# Nigerian Institute of Medical Research

Research for National Health

## 2010 Annual Report

# Nigerian Institute of Medical Research



## 2010
# Annual Report

NIMR
NIGERIAN INSTITUTE OF MEDICAL RESEARCH

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ISSN 0331 - 4537

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## Director General's Foreword

I feel delighted to present the 2010 Annual report. The Annual report documents all the activities and events in the Institute in the past year.

Ours is a large Institution with several Divisions and Units engaged in various forms of research, administrative and other activities that enhance the smooth running of the Institute. Therefore, the reports presented highlights of NIMR programmes and activities.

The year under review, witnessed my assumption of duty as the new Director - General/CEO of the Institute. The Year was full of activities. Some of the very many research studies conducted during the year are presented in the report.

For me personally, major part of the year was used to study the mandate and activities of the Institute with a view to planning how to effectively take the Institute to the next level so that it assumes its strategic position as the foremost Health research Institute in Nigeria.

One thing that stood out in the year was the conceptualization of the first ever Strategic Plan for the Institute by the Governing Board, under the Chairmanship of Professor E 'B Attah, FAS, OON. The Strategic Plan was to give a strategic direction and impetus to the Institute. I am happy to report that the process of developing the plan has been finalized, and it is now ready for printing.

It is my expectations that the friendly and peaceful atmosphere that characterized the year will not only be sustained but will further be improved upon in the coming year to enable us discharge our responsibilities without hindrance.

Finally, I wish to encourage the entire staff to continue to discharge their duties with due diligence using excellence, honesty, commitment, due process, accountability and rule of law as the watch word.

I want to assure the NIMR family that reward for excellence will be encouraged.

Professor Innocent AO Ujah, MBBS, FMCOG, FICS, mni
Director -General

# Mission Statement

## Vision

To be an institution of excellence in basic, applied and operational research for the promotion of national health and development

## Mission

To conduct research into diseases of public health importance in Nigeria and develop structures for the dissemination of research findings while providing the enabling environment and facilities for health research and training in cooperation with the federal and state ministries of health and in collaboration with universities, allied institutions and organized private sector nationally and internationally.

## Mandate

The mandate of the Institute under the enabling Act of 1977, stipulates that it shall conduct research into health problems in the country essentially in the following areas:

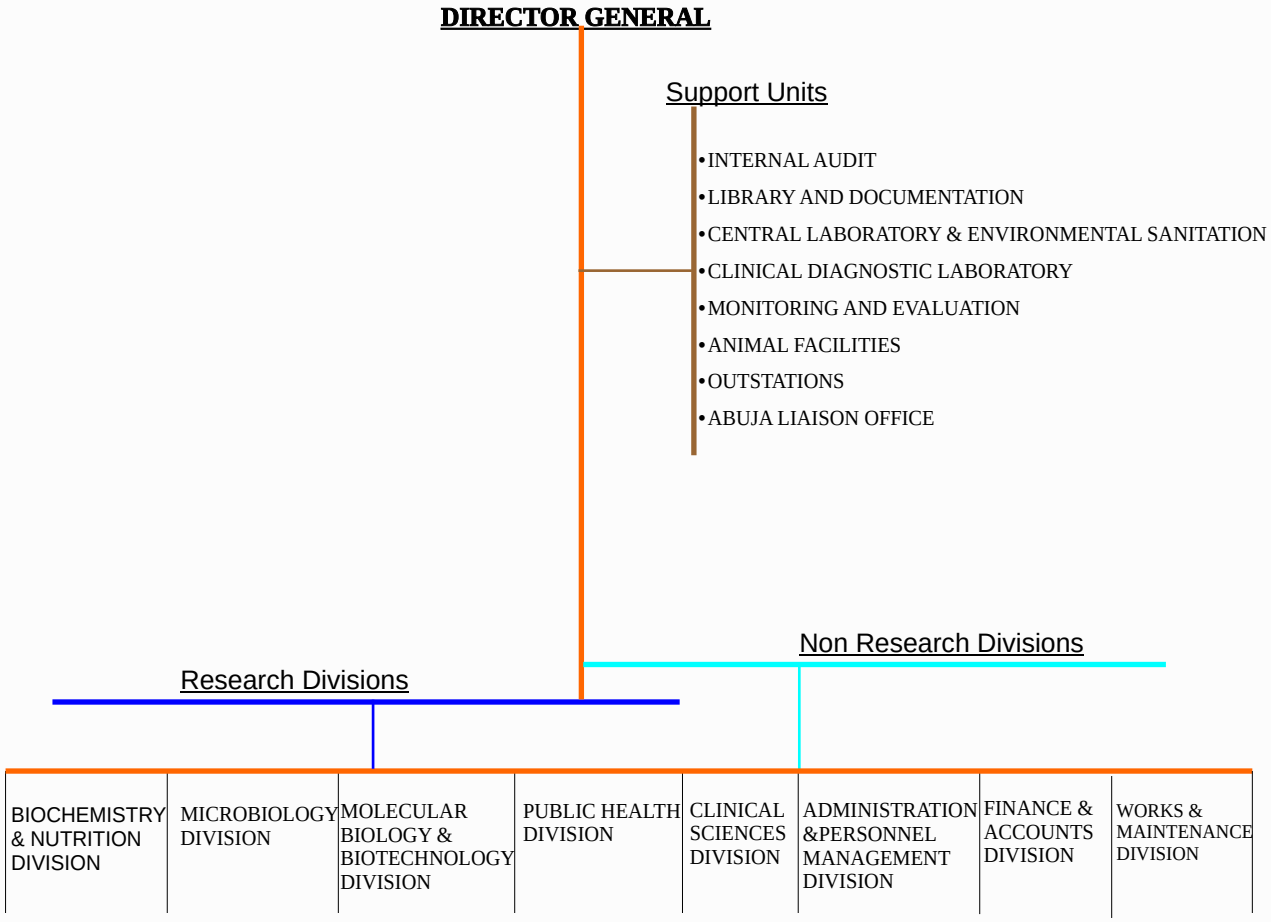
- Communicable Diseases of Public Health importance in the country.
- Non-Communicable Diseases prevalent in the country.
- Basic, applied and operational research for the prevention and control of diseases endemic in the country in co-operation with the Federal and State Ministries of Health.
- Develop human and infrastructural capacities for clinical and biomedical research in collaboration with Medical Schools, Universities and other Health-related Institutions, in and outside Nigeria.
- Disseminate the results of health research in the country through training courses, scientific publications, conferences, workshops and other communication channels to the Federal and States Ministries of Health, relevant stakeholders in the Public and Private Sectors as well as the general public.

## Governing Board of the Institute

### MEMBERS OF THE GOVERNING BOARD - 2010

| | |
|---|---|
| Professor Ed. 'B. Attah<br>FRCP(C),FAS, OON | Chairman |
| Professor F.M. Akinkugbe | Member |
| Dr. (Chief) R. Ejifoma | Member |
| Hon M. Abdullahi (MON) | Member |
| DR. E.B.A. Coker | Member Rep. (FMOH) |
| Professor . I. A. O. Ujah, *mni*<br>Director-General | Member |
| Alh. A. S. Yunusazazzau<br>Ag. Director (Admin) | Secretary |

## Organogram - 2010



## National and International collaborators - 2010

NIMR collaborates with Ministry of Health in the Federation in pursuit of its mandate, as well many Universities and the private sector especially the Pharmaceutical industries. The Institute has also been able to establish excellent working relationship with some international organizations/institutions such as:

African Malaria Network Trust
Alexander von Humboldt, Germany
Centre for Disease Control, Atlanta
Chevron - Nigeria
Coris BioConcept, Research and Development Department, Gembloux, Belgium.
Cruz, FIOCRUZ. Belo Horizonte, MG, Brazil.
Deutsche Forschungs Gemeinscaft (DFG) Germany
Family Health International, North Carolina, USA
Ford Foundation
European Network for Advanced Research on Malaria Transmitting Insect Control
European Union and Developing Countries Clinical Trial Partnership, The Hague, Netherlands.
GTZ, Germany
Harvard School of Public Health, Boston USA
International Association of National Public Health Institutes, Atlanta, USA.
International Centre for Genetic Engineering & Biotechnology (ICGEB), Italy.
International Foundation for Science (IFS) Sweden,
Instituto Venezuolano de investigaciones (IVIC), Caracas
KIT Biomedical Research , (Netherlands)
Laboratòrio de Imunologia Celular e Molecular, Centro de Pesquisas René Rachou, Fundaçao Oswaldo
Liverpool School of Tropical Medicine, UK
Lund University, Sweden
MacArthur Foundation
Medical Research Council, The Gambia
Medical Research Council, UK
National Reference Centre for Helicobacter Freiburg, Germany
North Western University Chicago, USA
Royal Tropical Institute (Netherlands)
Roche Foundation Lausanne, Switzerland
SARETI, South Africa.
Swiss Tropical Research Institute
TWAS, Italy
University of Cocoody, Abidjan, Ivory Coast
University of Maryland, Baltimore, USA
Vector Control Reference Unit, South Africa National Institute of Communicable Diseases, Johannesburg, South Africa.
West African Health Organization
Welcome Trust, UK
Wolfson Wellcome Biomedical Laboratories, Zoology Department, Natural History Museum, London, UK.
World Health Organization

## Institutional Grants received in 2010

| NAME OF PROJECT | DONOR AGENCY | PRINCIPAL INVESTIGATOR |
|---|---|---|
| Intervention study on non communicable diseases and preveritable life style risk factor in 3 urban Slums in Lagos. | International Association of National Public Health Institute (IANPHI) | Dr. O.P Akinwale |
| Assessment of the efficacy of long lasting insecticide nets in Kainji and Ikorodu | VESTERGAARD FRANDSEN | Dr. S.T Awolola |
| Prospective trial of VIUSID in Clinical management of HIV/AIDS in Adult Nigerians who are not eligible for HAART | SWISS PHARMA Nigeria Limited (SWIPHA | DR. N.N Odunukwe |
| Prevention and treatment of HIV/AIDS in Nigeria | Harvard school of Public Health / PEPFAR | Dr. D.I. Onwujekwe |
| Diagnostic methods for detection of *Helicobacter pylori* and epidemiology of enteric helicobacter infections from patients in Nigeria | International Centre for Genetic Engineering and Biotechnology (ICGEB) | Dr. S.I. Smith |
| Small scale Entrepreneurship | Chevron - Nigeria | Dr. E.O Idigbe |
| Community participation: a strategy to improve perinatal care in Nigerian communities. | International Association of National Public Health Institute (IANPHI) | Dr. O.C Ezechi |
| External Quality Project | International Association of National Public Health Institute (IANPHI) | Dr. R. Audu |
| Correlation of *Helicobacter Pylori* infection with gastro-duodenal diseases in Nigeria – improvement of diagnosis and treatment | Deutsche Forschungs Gemeinscaft (DFG) Germany | Dr. S. I. Smith |

**Scientific Seminars Presentations in 2010**

| PRESENTER | TITLE | DATE |
|---|---|---|
| Dr. A.O. Oduola | High Level of DDT resistance and associated mechanisms in the Malaria Mosquito: A.GambiaeS.I. from communities in Nigeria. | 14th April 2010 |
| Dr. F.O.Nwaokorie | Genetic profile of fusobacterium nucleatum associated with oro-facet infections using arbitarchy Primed polymerase chain reaction (Ap-Pcr) | 12th May 2010 |
| Dr. N.N. Odunukwe<br>Dr. O.O. Kalejaiye<br>Dr. T. Gbaja-biamila | Health Awareness | 9th June 2010 |
| Mr. S.T. Abolarinwa<br>Dr. B. Adewale<br>Dr. K.S.O Oyedeji | IBR – functions and operation Of NIMR | 14th July 2010 |
| Mr. S.T. Abolarinwa | Research, Library & Internet | 11th August 2010 |

## Staff PhD Programmes - 2010

| NAME | PhD PROGRAMMME | UNIVERSITY |
|---|---|---|
| | COMPLETED | |
| Dr. B.I.C Brai | Nutritional biochemistry | University of Ibadan |
| Dr. A.O. Oduola | applied / medical entomology | University of Lagos |
| | ON-GOING | |
| Mr. H.I Okoh | Bioactivity of some local plant species against developmental stages of Anopheles gambiae and Aedes aegypti | University of Lagos |
| Mrs M.A Fowora | Incidence of *H.Pylori* with gastro-intestinal diseases | University of Benin |
| Mrs A.Z .Musa | Long-term effect of ARV drugs on HIV positive patients in Nigerian: Insights from mathematical models – 5 years review | University of Ibadan |
| Mr. C.K Onwuamah | Evaluation of the genetoxicity of antiretroviral drugs in alliums cepa and on male fertility in mice | University of Lagos |
| Dr. O.C. Ezechi | The burden of premalignant lesions of the cervix in HIV positive women in south Western Nigeria | Lund University, Sweden |
| Mrs. J. Okwuzu | Prevalence of parasitic opportunistic infections in referred HIV/AIDS patients | University of Lagos |
| Mr. O.B Saliu | Moleular Studies of HIV-1 Drug Resistance in treatment naïve andexposed individuals in Lagos, Nigeria. | University of Lagos |
| Mrs Faneye | Molecular characterization of viral aetiology of rash in children aged 0-5 years in Nigeria | University of Ibadan |
| Mr. A.B. Orok | Immunobiology of concomitant infections of BasiaMicroti with plasmodiumyoelliNigeriensis | University of Lagos |
| Mr. O. Ajibaye | Polymorphisms in plasmodium falciparum apical membrane antigen y (AMA) in relation to malaria outcomes in Lagos, Nigeria. | University of Lagos |
| Miss N. Onyejepu | Diversity and primary drug resistance genotype of mycobacterial strains from HIV seropositive and seronegative patients in southwestern Nigeria | University of Lagos |

## Biochemistry & Nutrition Division

| | |
|---|---|
| Dr. P U. Agomo | Director of Research |
| Dr. Kathleen. N. Egbuna | Senior Research Fellow |
| Dr. Adeola Y. Olukosi | Senior Research Fellow |
| Dr. Bamidele A. Iwalokun | Senior Research Fellow |
| Dr. Oluwagbemiga. O. Aina | Research Fellow I |
| Mr. Hilary I. Okoh | Research Fellow II |
| Mr. Chimere O. Agomo | Research Fellow II |
| Mr. Olusola Ajibaye | Junior Research Fellow |
| Mr Orok A.Bassey | Junior Research Fellow |
| Mrs.Veronica N.V. Enya | Asst. Chief Medical Lab. Scientist |
| Mr. Samuel K. Akindele | Asst. Chief Medical Lab. Scientist |
| Mrs. Jumoke M. Akinyele | Science Laboratory Technologist I |

### HIGHLIGHTS OF 2010 PROJECTS

Scientists in the Department of Biochemistry and Nutrition were in year 2010 involved in a total of 6 projects, apart from various collaborative studies with other researchers. Three of these projects have been completed, while 3 are currently on-going. The projects were implemented in collaboration with and funded by the Federal Ministry of Health (FMOH), World Health Organization (WHO), West African Health Organization (WAHO), Medical Research council (MRC) Gambia and Society for Family Health (SFH). The projects focused on malaria with emphasis on site characterization, pathogenesis and antimalarial drugs in circulation as well as sickle cell anaemia with emphasis on the brain-hypothalamus-adrenal and adipocyte responses to crisis and in steady state among Sickle cell anaemia patients.

### Therapeutic efficacy and safety of Artemether-Lumefantrine (AL) and Artesunate-Amodiaquine (AA) for the treatment of uncomplicated *Plasmodium falciparum* Malaria in Nigerians.

Agomo PU, Aina OO, Aromire RO, Okonkwo F, Agomo CO, Olukosi YA, Okoh HI, Mafe AG, Akindele SK, Akinyele MO, Egbuna KN, Enya VNV, Iwalokun BA, Orok AB, Ajibaye O.

The ultimate goal of the research project was to improve the control of malaria in Nigerian children with the most efficacious and safe artemisinin-based combination therapy (ACT). Until the adoption of ACT in 2005, chemotherapeutic control of malaria had been hampered by the emergence and spread of multi-drug resistant *Plasmodium falciparum* parasites arising from drug adulteration, abuse, and pharmacogenomic challenges. With the introduction of ACTs, disparate levels of efficacy and safety of ACTs in clinical trials have been reported in some sentinel sites. This project was carried out to compare the therapeutic efficacy and safety profiles between Artemether-Lumefantrine (AL) and Artesunate-Amodiaquine (AA) in *Plasmodium falciparum* infected children aged 6 59 months seen at Ijede General Hospital in Ikorodu, Lagos; Nigeria.

**Objectives:**

?To determine and compare adequate clinical and parasitological rates (ACPRs) of AL and AA in children with in Lagos, Nigeria.

?To evaluate fever and parasite clearance profiles due to AL and AA in treated children with malaria.

?To monitor changes in the blood levels of haematological (PCV, HB, WBC, differential counts) and liver function (SGPT, SGOT, total bilirubin, alanine phosphatase) parameters before and after the treatment of malarial in children with AL and AA in Lagos, Nigeria.

**Methods:** Patients 1-54 years attending the General Medical Out-patient Department (GMOPD) of Ijede

Hospital, Ikorodu-Lagos State were screened for *Plasmodium falciparum* infection using thick and thin blood film microscopic method from finger pricked blood samples after obtaining informed consent and ethical approval. Patients with febrile indication not due to malaria or those with severe malaria were excluded from the study but given referral for further treatment. The patients (children and adults) enrolled into the study were randomized into two treatment arms: Artemether-Lumefantrine(AL) and Artesunate-Amodiaquine (AA). Parasitaemia density was determined in thick blood films against 200 leukocytes and expressed as parasites per microlitre of whole blood based on 8000 leukocytes/UL of blood assumption. The number of gametocytes was counted to compute the gametocyte rate using standard WHO method. Standard haematological techniques were employed for the determination of packed cell volume (PCV), total leukocyte and differential (neutrophils,

lymphocytes, eosinophil, basophils, monocytes) counts, while serum levels of glutamate-pyruvate and glutamate-oxaloacetate transaminases, alkaline phosphatase and total bilirubin were assayed using spectrophotometric methods. Data were computed as mean ± SD and percentages and analyzed using appropriate statistics at 95% confidence limit.

**Findings:** A total of 125 children and 85 adults completed the study with AL eliciting ACPRs of 90.3% and 97.7% in children and adults respectively. The ACPRs for AA were found to be 92.4% and 100% respectively. Both ACTs cleared parasitaemia and resolved fever adequately with fever clearance times of 13.59h and 16h and parasite clearance times of 29h and 34.3h respectively. Both combination therapies were well tolerated as they did cause significant changes in haematological and liver function parameters. In conclusion Both AL and AA have therapeutic efficacy above 90% and are thus highly effective and safe in the treatment of uncomplicated *Plasmodium falciparum* malaria in Nigerian children.

## Environmental survey and health seeking behavior of caregivers of children suspected to have malaria in Takwa-Bay, Lagos State.

Iwalokun BA, Agomo PU, Egbuna KN, Iwalokun SO, Adebodun V, Olukosi YA, Aina OO, Okoh HI, Agomo CO, Ajibaye O, Orok AB, Enya VNV, Akindele S, Akinyele A.

This project was undertaken to characterize Takwa-Bay for malaria risk factors and document existing knowledge, attitudes and practices related to malaria recognition, control and treatment in the locality.

**Objectives**:
(1)To evaluate risk factors of malaria transmission in Takwa-Bay and its environs.
(2)To determine the perception about malaria and health seeking behavior of caregivers of children suspected to have malaria in Takwa-Bay and its environs.

**Methods:** A field-base cross sectional cluster sample household survey of randomly selected and consented care-givers living in Takwa-Bay, Lagos-Nigeria. Qualitative and quantitative data were obtained using structured interviews and open/close ended pre-tested questionnaire to document perception about malaria and health seeking behaviors among the respondents.

**Findings:** A total of 112 respondents aged 21 - 53 years (mean ± SD age = 32.9±8.7 years).were studied. Of the 112 respondents, 59 (52.7%) were females (P >0.05), 76.8% had formal education predominated by primary school attendance (50.9%; P <0.05), 27.7% were traders, 13.4% were artisans, 18.8% were housewives and 8% were unemployed. The respondents (89.3%) were ranked within the 1st and 2nd quartiles of wealth index suggesting poor to moderately poor socio-economic status. The respondents had good knowledge of malaria aetiology (77.7 100%) and classical symptoms of uncomplicated malaria such as fever, malaise, headache and loss of appetite (87.5 - 96.4 %). But knowledge of danger signs seen in severe malaria such as convulsion, coma, jaundice and respiratory distress (28.6 57.6%) were significantly low (P < 0.05) Community members and the health post were mentioned as the major sources of information by the respondents compared to radio, television and traditional medicine practitioners (4.5 11.6 vs. 19.6 58%; P <0.05). Data on health seeking behavior indicated that the respondents employed allopathic medicines (71.4%), traditional medicines (20.5%) or both (8%) to treat their sick children. Self medication was practiced by 57.1% of the respondents. Reasons given for self medication included timeliness, knowledge about treatment of malaria, non-availability of doctors in the health post, poor attitude of health workers and lack of drugs at the health post, while the use of traditional medicines was based on cultural belief of efficacy of natural products, and the free to low cost associated with their procurement. Allopathic medicines used were CQ (32.5%), SP (42.5%), artemisinin monotherapy (13.8%) and ACT (3.8%), analgesics (75%), antibiotics (46.3%) and haematinnics (51.3%). The use of allopathic medicine was associated with having a formal education (OR (95%CI) = 11.6 (3.8-36.4) and younger age [OR (95%CI) = 5.0 (1.5-16.3)], while self medication was favorably practiced by the male gender [(OR (95%CI) = 5.4 (2.2-13.4)]. Leaves of *Vernonia amygdalina*, *Morinda lucida* and *Azadirachta indica* were among the plants used for malaria treatments.

More than 60% of the households' survey were located < 400 m to water bodies and surrounded by mosquito breeding promoting factors. We concluded that Takwa-Bay is a malaria prone area that is currently characterized by poor home management of the disease. Improved health education, community advocacy, environmental sanitation, home management of malaria, primary health service delivery and accessibility to ACT are strongly recommended for the area.

## Prevalence of malaria parasites amongst patients attending antenatal clinic at Ikorodu Local Government area Lagos

Olukosi YA, Agomo PU, Egbuna KN, Iwalokun BA, Aina OO, Okoh HI, Agomo CO, Ajibaye , Orok AB, Enya VNV, Akindele SK, Akinyele JM, Onajole AT

Early diagnosis and prompt effective treatment are the backbone of malaria control strategy. RDTs are being brought to the fore in resource poor countries despite their

cost, based on reason that costlier ACTs in National Antimalarial Treatment Policy makes their use more cost effective. The proposition by world health bodies for presumptive treatment to be restricted to children under five implies that all adults including pregnant women should be confirmed to have malaria infection before treatment. This single factor has far reaching implications for the pregnant woman for whom consequences of missed diagnosis are grave. This study compares the diagnostic performance of two RDTs, parasite lactate dehydrogenase based Optimal IT and parasite aldolase based Dr Grey's with the known gold standard, microscopy, in pregnant women. Parasite quantitizations by microscopy and by polymerase chain reaction are also compared.

**Method:** One hundred and thirteen consecutive and consented pregnant women aged 14-45years presenting with symptoms of malaria were screened using Optimal IT parasite lactate dehydrogenase and Dr Grey aldolase malaria rapid diagnostic kits at two antenatal clinics, Ijede primary Health Care Center and Ikorodu General Hospital between January and May 2009. Social demographic parameters including occupation, education, possession and use of Insecticide treated nets were captured using a structured questionnaire and analysed. Diagnostic performances were measured as sensitivity, specificity, positive predictive value and negative predictive value while agreement between them was based on Chohen's kappa coefficient and Bland Altmans concordance.

**Findings:** Prevalence of malaria amongst the pregnant women was 19.47% with parasitemia ranging from 13parasite/µl and 141,000parasite/µl. The order of detection of frequency of positives in pregnant women was p-aldolase>qPCR>microscopy>p-LDH. Detection threshold for Optimal IT was 50parasite/µl but for qPCR it was 18parasite/µl. Compared with microscopy as gold standard, Optimal IT pLDH and Dr Grey aldolase MRDTs gave respectively, sensitivities were 64% and 73%, specificities 100% and 59%, false positive rate 0 and 0.41, false negative rate 0.36 and 0.27, positive predictive values 1 and 0.3, negative predictive value 0.92 and 0.9. Above parasitemia >100parasites/µl, sensitivity for Optimal IT increased to 83%. Composite sensitivity for PCR and microscopy were 96% and 88% respectively. The Cohen's Kappa coefficient rating of 74% for optimal IT indicated that there was a substantial agreement of malaria parasite detection with microscopy while with the Dr Grey aldolase kits the rating, 21%, indicated only a fair agreement. At low parasitemia (<100), qPCR performed better than other diagnostic methods and overall it showed better agreement with microscopy. Correlation of the malaria parasite quantization by microscopy and qPCR methods 0.52, was significant with a CI 0.058 0.80(P=0.026) at 95% and the Bland Altmans plot gave a bias of 0.525.

In conclusion, Dr Grey's aldolase lacked specificity and so its sensitivity does not count for much. Optimal IT specificity was absolute in this study. Above parasitemia >100parasites/µl, its sensitivity was less than 95% Therefore it does not meet the WHO performance requirement for RDTs. Optimal IT has potentials to be used for screening pregnant women pregnant women in Lagos State. Unless the sensitivity is improved however, it still has to be combined with microscopy. Q-PCR offers a reliable detection and quantitation method of parasites in pregnant women in Lagos state. There is a need for standardization of parasite quantitation by microscopy across laboratories.

## Baseline study on Antimalarial drugs prescribed by Health Personnel and Self-Administered by Patients in Lagos and Ogun States South Western Nigeria

Enya VNV, Chimah UC, Agomo CO, Ajibaye O, Okoh HI, Akindele SK, Afolabi AS , Raji I, Egbuna KN, Oparaugo CT, Iwalokun BA, Olukosi Y.A, Orok AB, Puddicomb J, Akinyele MO, and Agomo PU.



**Objectives:** To evaluate the antimalarial prescription pattern of health personnel / patient's choice of drug, use of pharmacovigilance forms for monitoring/reporting of adverse events.

**Methods:** A cross sectional study of consenting individuals who recently suffered from malaria and health personnel who usually treat malaria patients were recruited for the study from communities and health facilities in LGAs of Lagos and Ogun states between August 2008 and August 2009. Semi-structured questionnaire was administered by an interviewer, was used to collect demographic data, information on malaria diagnosis, prevention, treatment and pharmacovigilance. Data collected from health personnel and individuals were analyzed using EPI-INFO version 6 statistical software.

**Results:** Three hundred and ninety-nine individuals who recently suffered from malaria and 164 health personnel who usually treat malaria patients were analyzed. The mean age of the individuals studied was 26.9 years, 192 (48.1%) were females and 207 (51.9%) males. One hundred and eighty-six (46.7%) were students, and 51(12.8%) suffered from malaria within 1 week to the study. The most reported symptom was headache 244(61.2%). One hundred and fifty-seven (40.4%) reported self-treatment of malaria, only 5 (3.2%) used ACTs. A total of 66 (43.9%) of the health personnel studied were females and 96 (58.5%) males, 95 (57.9%) were into private practice, 69 (42.0%) work in government health facilities and 92.5% regularly treated

malaria cases. Sixty-four (39.0%) prescribed ACTs and forty-three (26.2%) reported use of NAFDAC pharmacovigilance forms.

**Conclusion/Recommendations:** This study has revealed high level self-medication, consultation of patent medicine vendors and inappropriate use of ACTs by a large proportion of patients in Lagos and Ogun semi-urban communities. We recommend that patient above 5 years should show laboratory evidence based positive malaria parasite test result before he/she can be treated with ACT and there has to be proper monitoring/reporting of adverse events by health personnel using NAFADAC pharmacovigilance form.

## Modulatory effect of dietary zinc on erythrocyte osmotic fragility in mouse malaria model with *plasmodium berghei*.

Iwalokun BA, Akindele SA, Agomo PU

The ultimate goal of this project is to validate the concept that zinc is important in the recovery of erythrocyte membrane from malaria-induced perturbation. It has been established in previous studies that the pathogenic effects of *Plasmodium falciparum* on the erythrocyte following invasion involve membrane destabilization and loss of intracellular homeostasis indicated by sodium pump dysfunction. Although Arthemisinin Based Combination therapies (ACTs) are efficacious in the clearance of parasitaemia and resolution of fever/host chemistry, they are limited in their ability to foster timely re-stabilization of erythrocyte membrane. This study determined the impact of zinc supplementation as a membrane de-stabilizing inhibitory factor in *Plasmodium berghei* infected mice. Erythrocyte ghost membrane Na+K+-ATPase activity was also determined.

**Method:** A total of 35 albino mice weighing 20.8 - 22.1 g (mean weight = 21. 7g) and divided into 4 experimental (Group 1 = Infected not treated; Group 2 = Infected and treated with Arthemeter-Lumefantrine (25 mg/kgbw); Group 3 = Infected and treated with zinc (50 mg/kg feed; Infected and treated with AL + zinc (50 mg/kg feed) and 1 uninfected control (Group 5) groups of 7 mice per group were intraperitoneally infected with $10^7$ *P. berghei (NK65 strain)* parasitized erythrocytes suspended in 0.2 mL of phosphate buffered saline (pH 7.2) and monitored for parasitaemia on days 3, 7, 10 and 14. Daily mortality was also scored and osmotic fragility determined through osmofragiligraph on days 0, 3, 6, 8 and 10. Erythrocyte ghost membrane was prepared by hypotonic lysis and digoxin-sensitive Na+K+-ATPase was determined on day 7 among surviving mice based on inorganic phosphate liberated from ATP hydrolysis. Data were analyzed statistically.

**Results:** We found day 3 parasitaemia range to be 13.8 15.7% in the infected mice and this was characterized by significant ($P<0.05$) Median Corpuscular Fragility (MCF) elevation by 22.3 22.7% (44.2 + 0.7 vs. 53.2 54.1 + 2.8 x $10^{-2}$ g%) and reduction in digoxin-sensitive $Na^+K^+$ATPase by 29.2 30.5 %. Absolute mortality (100%) was observed in groups bearing untreated infected and infected mice treated with zinc supplementation alone by day 7 post inoculation. Treatment with AL + zinc was associated with greater improvement in MCF on days 6 (48.1 $\pm$ 1.7 vs. 53.1 $\pm$ 1.4 x $10^{-2}$ g%), 8 (44.3 $\pm$ 0.5 vs. 52.9 $\pm$ 1.3 x 10-2 g%) and 10 (44.1 $\pm$ 0.4 vs. 49.4 $\pm$ 2.7 x $10^{-2}$ g%) compared with treatment with AL alone. Day 7 digoxin sensitive-$Na^+K^+$-ATPase activity was significantly higher in AL + Zinc treated mice compared with AL treated mice (0.55 $\pm$ 0.8 vs. 0.42 $\pm$ 0.5 U/mg protein) but non-significantly ($P>0.05$) different from 0.57 $\pm$ 0.3 U/mg protein activity found in the control.

**Conclusion:** Our findings reveal that supplementing Arthemeter-Lumefantrine treatment of malaria with 50 mg zinc per kg diet may result in timely and better erythrocyte membrane recovery in structure and homeostatic function compared with Arthemether-Lumefantrine treatment alone in mice with *Plasmodium berghei* malaria. Further studies are being proposed in humans.

## Serum Levels of Leptin in Nigerian Patients with Sickle Cell Anaemia.

Iwalokun BA, Hodonu SO, Iwalokun SO, Agomo PU

This study was done in an attempt to acquire new knowledge regarding the roles of leptin in the pathophysiology of sickle cell anaemia. Several studies have shown that the pathophysiology of homozygous sickle cell anaemia (HbSS) results in a myriad of metabolic, nutritional, haematological and clinical effects that interacts with other co-morbid factors to determine the quality of life and life expectancy of afflicted patients. Because of the critical roles of leptin in nutrition and metabolism, inflammation, haematopoiesis and cellular immunity, its plasma levels in steady and

unsteady states of HbSS in Nigerian patients was investigated.

**Method**: A total of 51 SCD-HbSS patients aged 5 35 years with 34 (61.8 %) being females who were either on admission or visiting four medical centres in Lagos, Nigeria together with 22 non-SCD controls aged 5 -30 years comprising 12 (54.5%) females were enrolled after obtaining their informed consent and ethical approval. Patients were further stratified into steady and unsteady cases of SCD-HbSS based on clinical presentations, while blood samples collected by venipuncture from each of the study participants were analyzed haematologically for full blood count and Huff level and microscopically for malaria, while plasma leptin was assayed using ELISA method. Body composition defined by weight, fat mass and body mass index (BMI) was determined using standard methods. Data obtained for cases and controls were analyzed statistically.

**Results:** Twenty one patients had unsteady HbSS and elicited greater and significant ($P<0.05$) reduction in fat mass, BMI, Huff and eosinophil count but elevated mean total leukocyte, count, level of irreversibly sickled cells and *P. falciparum* parasitaemia (4613.7 vs. 749.6 - 1078.4 parasites/lug), pyrexia rate (58.3 vs. 25.8%) when compared with steady state patients or non-SCD controls. Compared to the control, significant decreases in plasma leptin before and after controlling for body fat that was worsened by crisis were observed among the SCD patients. Unlike the non-SCD controls, leptin correlated non-significantly ($P>0.05$) with all body composition indices measured in the patients except for fat mass in unsteady cases. Multivariate regression analysis identified ESR and RC as independent predictor of low plasma leptin concentration in the SCD patients.

**Conclusion:** Based on these findings, we conclude that plasma level of leptin is further decreased in the unsteady state of HbSS, shows poor correlation with adiposity and malarial infection but has inflammation and poor reticulocyte response as independent predictors among Nigerian patients.

## Antioxidants Evaluation of Artemisinin based combination Therapy in mouse infected with *Plasmodium berghei* malaria.

Akindele SK, Agomo PU, Adedeji SO, Aina OO, Iwalokun BA, Akinyele MO

Previous studies have shown that antimalarial drugs elicit varying effects on oxidative stress due to malaria in humans and animals. There is paucity of information on the antioxidant performance of Artemisinin-combination therapies currently in use in Nigeria. This research was designed to determine the effect of artesunate-mefloquine (AM) and artesunate-amodiaquine (AA) on oxidative stress in mice infected with *Plasmodium berghei* NK 65 strain.

**Objective:** To determine whether or not AA or AM improves oxidative stress in *P. berghei* infected mice following treatment.

**Method:** A total of forty mice, both sexes were divided into four groups with ten mice per group. A standard dose of malaria parasite was administered intraperitoneally (ip) into the test groups. After establishing a standard parasite density for pre-treatment as recommended by World Health Organization of $\geq$ 1000 parasite per microlitre of blood, the test groups were treated with AM and AL at a dose of 4mg per kg of body weight for the artesunate component and a dose of 25 mg per kg. bw for amodiaquine or mefloquine for 3 days, mimicking human treatment regimens. Plasma levels of reduced gluthathione (GSH), glutathione-s-transferase (GST) and catalase (CAT) were measured spectrophotometrically as indices of oxidative stress. Data were statistically analyzed.

**Findings:** The Artesunate +Mefloquine and Artesunate + Amodiaquine were well tolerated by the treated mice and significant ($P<0.05$) improvement in oxidative stress was observed only in catalase activity.

**Conclusion:** Based on our findings, we conclude ACTs in use in Nigeria have potentials to impact positively on catalase level as a component of antioxidant system in humans.

## Serum cortisol level in Nigerian patients with sickle cell disease

Iwalokun BA, Hodonu SO, Iwalokun, SO; Egbuna, KN; Agomo, PU

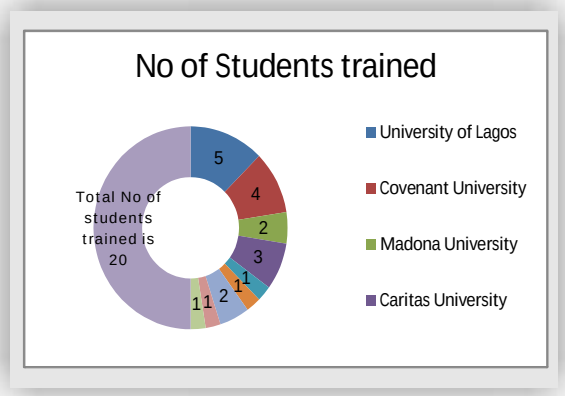
The goal of this project was generate data that would improve understanding of brain-hypothalamus-adrenal axis response to crisis in sickle cell anaemia. SCD due to single nucleotide polymorphism on codon 6 (GAG----GTG) of the -globin gene remains a major non-infectious cause of morbidity and mortality in Nigeria. Crisis initiated by sickling of red blood cells with SS haemoglobin and micro vascular occlusion presents with multiple pathogenic pathways to evoke life-threatening complications such as aplastic anaemia, acute chest syndrome and severe haemolytic anaemia. Several studies have reported the involvement of endocrinological aberrations in the pathogenesis of crisis in SCD. However, there is currently paucity of data on

blood cortisol level among SCD patients in Nigeria and relationship between cortisol and sickling parameters remains unclear. This study was undertaken to determine the levels of serum cortisol in SCD Nigerian patients in steady state and on crisis. Relationship between serum cortisol level and sickling parameters were also investigated.

**Methods:** Blood samples were collected into plain tubes from sickle cell disease patients confirmed by cellulose acetate electrophoresis and attending sickle cell clinics at Maternal and Child Health Centre, Ikorodu, Lagos after obtaining informed consent. The patients were clinically examined to ascertain their steady state. Serum samples prepared by centrifugation at 2500 rpm for 10 min were analyzed for cortisol level using sandwich ELISA method.

**Findings:** Mean levels of cortisol in SCD patients in crisis (23.7 $\pm$ 2.8 ng/dL) and steady state (19.4 $\pm$ 2.8 ng/dL) were significantly ($P < 0.05$) and lower than the control (30.7 $\pm$ 2.8 ng/dL; $P < 0.05$). Significant negative correlation was found between percentage of irreversible sickled cells (ISC) and cortisol level ($r = -0.75$; $P < 0.05$), while relationship of cortisol level with age was not significant ($P > 0.05$)

**Conclusion:** SCD patients are chronically under a state of adrenocortical insufficiency with elevated blood cortisol level as a potential marker of sickle cell crisis.




TRAINING:

A total of 20 students from 9 different universities in Nigeria were trained in the year 2010. Training conducted for the students include buffer preparations, laboratory animals handling, phytochemical screening of plant extracts, DNA extraction from biological tissues, gel electrophoresis, paper chromatography, DNA quality assessment, proximate analysis of food samples, malaria microscopy and *Plasmodium berghei* parasitaemia induction in mice, *Allium cepa* test in and research paper presentation.

University students on industrial training in the Division

## Central Laboratory and Environmental Sanitation Unit

| | |
|---|---|
| Mrs. N.M Otuonye | Chief Medical Laboratory Scientist / (HOU) |
| Mr. Yahaya Abdulmumini | Principal Biomedical Engineer |
| Mr. Saheed T. Agoola | Laboratory Assistant |

The Central Laboratory and Environmental Sanitation Unit consist to sub-units namely Equipment Maintenance and Environmental Sanitation.

**Equipment Maintenance Unit** is responsible for maintenance of central equipment that serve all research divisions and students from other Institutions in Nigeria. The unit is also responsible for the management of medical, office and household refuse and waste disposal in NIMR as well as carrying out preventive, corrective, calibration and maintenance of Laboratory equipment in NIMR. We also install of equipment that requires expertise to fix.

**Environmental Sanitation Unit** is responsible for maintaining environmental hygiene around the institute by handling all household refuse and other categories of medical waste in the institute. We work jointly with Lagos Waste Management Authority (LAWMA) the organ responsible for the management of waste in Lagos State. All medical wastes generated from the various divisional laboratories including the ARV clinic were incinerated to ensure proper disposal of infectious or hazardous waste. We also ensure the distribution of colored coded bags for segregation and sorting of medical waste.

**Challenges**

Some of the challenges faced by the unit include non-availability of modern equipment such as Atomic Absorption Spectrophotometer (AAS) and HPLC, if we had this machine, we would have been able to help the nation in medical emergencies such the lead poisoning in Zamfara State of the country. There is also the need to employ more hands for the unit; especially a Biomedical Engineer and Lab. Assistant.

Another serious challenge is the arbitrary purchase of equipment for research Laboratories without input or advice from the unit. When such equipment fails, we are helpless (in fixing it) because in some cases the equipment may have been made with substandard components. Not being involved in procurement of biomedical equipment allows for supply of sub-standard equipments, repair or maintenance of such equipment

### Risk Factors Associated with the Acquisition of HIV and STIs in Female Sex Workers (FSWs) in Nigeria.

Otuonye Ngozi[1], Enabulele Onmoiwu[2], Aluyi Henry[2], Onwuamah Chika[3]

Globally, female sex workers (FSWs) are considered to be at high risk of STIs/HIV infections due to the large numbers of short term sexual partners and high risk behaviours they are involved in such as drug and alcohol abuse.

The study assessed the risk factors that influence the acquisition of STIs/HIV infections in Nigerian FSWs.

Four hundred and fifty **(**450) FSWs aged (15 35 years) were randomly selected in 3 local government areas in Lagos, Nigeria. A pre- and post-test counseling was conducted after a written informed consent was obtained from them. Participants provided demographic data, information on sexual behaviour, contraceptive use, and number of new sexual partners within 3 months and vaginal douching. Cervical and high vaginal swabs were screened for the presence of sexually transmitted pathogens using standard microbiological methods. Quick view Chlamydia test kit was used for detection of Chlamydia antigen on the cervical swabs. Their blood samples were screened for HIV antibodies using ELIZA kits and Western blot tests, syphilis antibodies using RPR and TPHA kits.

HIV infection in those involved in anal (36.0%) and oral sexual practices (31.7%) were high. *Candida* infection (19.6%) was most prevalent in the group that used condom, followed by HIV (16.4%). HIV infection in those who douched was high (32.3%) and was low (10.0%) in those who do not douche. HIV (21.8%) was prevalent in FSWs who had 20-30 new sex partners

within 3 month

Anal, oral, sex, douching, increased number of new sex partners and improper use of condom have been identified as risk factors to HIV and STIs acquisition in FSWs**.** Information on the need to access health programmes for early treatment of STIs/HIV, counseling on sexual practices, vaginal douching and proper use of condoms in order to maximize benefits should be made available to them. Regular surveys on these risk factors would help in developing new strategies for control and prevention. These would reduce the burden of STIs and HIV diseases in FSWs.

1)Central Laboratory Unit, Nigerian Institute of Medical Research PMB, 2013, Yaba, Lagos, Nigeria

2)Microbiology Department, Faculty of Life Sciences University of Benin, PMB 1151, Benin City, Edo State, Nigeria.

3) Microbiology Division, Nigerian Institute of Medical Research PMB, 2013, Yaba, Lagos, Nigeria

### The Role of Male Circumcision in the spread of HIV infection Southwest Nigeria

Otuonye MN, Oladele D, Onwuamah CK, Oparaugo CT, Okoye RN, Okwuzu JO, Adeneye AK, Akintunde GB, Uwandu MO Okhiku FO, Adesesan A, Nwaokorie FO, Enya VNV, Fowora MA, Goodluck HA

Male circumcision is recognized as an important intervention that can possibly reduce the risk of heterosexually acquired HIV infection in men by approximately 60%.This study accessed the role of male circumcision in the spread of HIV infection in Southwest, Nigeria.

In this study, 992 respondents aged 12-60years who consented were randomly selected from HIV counseling and testing (HCT) centers, Universities, secondary schools, participants at trainings and conferences and patients tested at Human virology Laboratory NIMR. Each respondent completed a questionnaire to provide information on demography, knowledge of HIV and HIV status. Information on whether they were circumcised, at what ages were they circumcised and the purpose of circumcision was assessed. Sexual behaviors and practice were ascertained which included number and types of sexual partners, knowledge and use of condom. These were collated and analyzed using EPI INFO 2002 software.

Of the 992 respondents 98.5% were single while 82% were Christians. Their age ranged between 10-60 years. About education, 37% and 44% had both secondary and tertiary education respectively. A total of 893 (90.02%) respondents were circumcised, (76.3% < 8 days old, 13.9% < 1year and 8.4%, 1-12 years). Out of 90.02% respondents who were circumcised at < 8 days, 52.6% were HIV positive; those circumcised at < 1 year, 7.5% of them were HIV positive and for those 1-12 years, 9.61%, were HIV positive. In addition, 68.8% of the respondents use condom while 31.2% do not use condom during sexual activities. Furthermore, 45.68% use condom always, 54.4% do not. On the number of sexual partners, 73% had one 11.6% had 2, 4.2% had 3, 0.5% had 5 while 1.1% agreed to having 10 or more sex partners.

From this study, male neonatal circumcision is common and may not be related with the spread of HIV in South/West Nigeria.

**2010 Grant Award by EDTCP:**

The Unit recently won a grant award for the "Establishment of RECS and Capacity Building of Human Resources and Infrastructure in Nigeria" With Mrs. Ngozi Otuonye as the Principal Investigator

**Conference Attended in 2010:**

- Keystone Symposia X5 HIV Vaccines. Fairmont Banff Springs, Banff, Alberta, Canada. Mar. 21-Mar. 26, 2010
- Microbicides, 2010 Conference, Pittsburg, Pennsylvania USA, May 22-25, 2010.
- AIDS Vaccine, Geogia, USA, Sept. 28th-Oct. 22nd, 2010
- AMLSN 46th Annual Scientific Conference and International Symposium Lagos, Nigeria. October, 2010.

**Training:**

National Health Institute USA on Reduction of Global Health Diseases. Johannesburg & Burban August 2-6th 2010

## Clinical Diagnostic Laboratory Unit

| | |
|---|---|
| Mrs R.N Okoye | Deputy Director( Laboratory Service |
| Ms Oluranti Ojerinola | Chief Medical Lab. Scientist |
| Mrs C.T Oparaugo | Asst. Chief Medical Lab. Scientist |
| Mrs. Bukola Adetunji | Senior Medical Lab. Scientist |
| Mr A.A Adesesan | Medical Laboratory Scientist I |
| Mr Samuel Nduaga | Medical Laboratory Scientist II |
| Mr Essien Ini-Obong | Medical Laboratory Scientist II |
| Mrs.Idowu Edu-Muyideen | Science Laboratory Technologist I |
| Miss Oriaku Chinasa | Science Laboratory Technologist II |
| Mr Niya Ezra | Medical Laboratory Technician |
| Mrs Aisha Issa | Science Laboratory Technician |

CDL team

Clinical Diagnostic Laboratory (CDL) provides efficient and quality clinical diagnostic services for both staff and members of the public at affordable cost. The unit supported research activities of the institute as well as training of students from Universities and allied Institutions from within the country. CDL is also involved in some collaborative research work with researchers within the institute. The research work includes;

? Evaluation of Chlamydia test kits and vaginitis in adult females.
?Molecular epidemiology of Thalassemia as a predictive/disposing factor to HIV and Malaria in Nigeria.
? Impact of HIV on Malaria intensity on pregnant women.
?Molecular epidemiology on bacterial isolates from women of reproductive age.
?External Quality Assurance on Malaria, HIV and TB.

The laboratory is equipped with ultra-modern equipment in all its seven units. A total of N2, 753,889.00 was spent on Reagents and Equipment in 2010. Income generated in the year 2010 is tabularized in the table below.

| BENCHES | Income Generated 2010 |
|---|---|
| **Microbiology** | N1,122,700 |
| **Chemistry** | N1,713,950 |
| **Serology** | N1,966,300 |
| **Haematology** | N1,599,850 |
| TOTAL | N6,402,850 |

Haematology bench

Serology bench

Clinical chemistry bench

Microbiology bench

**ACHIEVEMENTS**

? Upgrading of Clinical Diagnostic Laboratory from primary to tertiary level.

?Provision of laboratory reagents for different sections of the unit at appropriate time which made the work much easier and prompt.

?Procurement of state of the art of equipment for clinical diagnostic laboratory unit.

?High customer / patients patronage

?A high increase in the revenue generated daily.

?CDL is the first Public laboratory to be accredited by the Medical Laboratory Council of Nigeria.

**HIV COUNSELING AND TESTING BENCH**

CDL offers free HIV counseling and testing to the general public between the hours of 8.00 am and 4.00 pm Monday through Friday excluding public holidays. A total of 6823 clients were counseled and tested in the year 2010.

Hiv counseling and testing bench

**CONSTRAINTS**

?Inadequate staff strength to meet the teeming number of tests being requested for by the clients/patients.

?Inadequate laboratory and office space.

?Insufficient training vote for the research staff in CDL

?Lack of internet facilities in CDL to enable staff keep abreast with modern technology

Inadequate funding

Non-availability of well qualified Biomedical engineers to handle breakdown equipment

## Clinincal Science Division

| | |
|---|---|
| Prof. I.A.O. Ujah, *mni* | Director General (Obs. & Gynae) |
| Dr. N.N. Odunukwe | Deputy Director(Research) HOD & Head of Division (Haematologist) |
| Dr. O.C. Ezechi | Chief Research Fellow (Obs. & Gynae) |
| Dr. N. David | Chief Research Fellow (Pediatrician) |
| Dr. DI Onwujekwe | Snr. Research Fellow (Clinician) |
| Dr. O.O. Kalejaiye | Snr. Research Fellow (Clinician) |
| Dr. R. Dan-Peters | Research Fellow I (on Secondment) |
| Dr. P. M Ezeobi | Research Fellow II (Clinician) |
| Dr. T. Gbajabiamila | Research Fellow II (Clinician) |
| Dr. David Oladele | Research Fellow II (Clinician) |
| Dr. E.A. Somefun | Jnr. Research Fellow (Clinician) |
| Dr. C.V. Gab-Okafor | Jnr. Research Fellow (Clinician) |
| Dr. B. Oke | Jnr. Research Fellow (Clinician) |
| Miss S. Ozuchi | Jnr. Research Fellow (Pharmacist) |
| Mrs. E. N. Amadi | Chief Nursing Officer |
| Mrs M. Bankole | Asst. Chief Medical Lab. Scientist |
| Mrs. E. C. Herbertson | Senior Pharmacist |
| Mrs. D. D. Oladipo | Staff Nurse 1 |
| Mrs. E. E Anyasi | Staff Nurse 1 |
| Mrs. C. Okerekeocha | Snr. Lab. Techn. |
| Mrs. F. Ajayi | CHO |



The various Units of the Division carried out several research programs in the areas of communicable diseases (HIV, TB, Malaria, Hepatitis B. etc,) and non communicable diseases(cervical, breast, prostate and blood cancers) in 2010. The activities of the Division in 2010 are detailed below;

**Adult ART UNIT**

By the end of November 2010, the number of patients assessing treatment at NIMR site was fifteen thousand seven hundred, despite the clamp down on patient recruitment rate. Several HIV related research studies are carried out in collaboration with this unit.

**SEXUAL AND REPRODUCTIVE HEALTH RESEARCH UNIT**

The unit apart from conducting research into sexual and reproductive health diseases of public health importance in the Country, also engage in capacity strengthening of community health workers in area of maternal health and provision of reproductive health and prevention of mother to child transmission of HIV services to PLHWHAS. The unit is currently conducting research in the areas of PMTCT, gender base violence, HIV/TB co-infection in pregnancy, malaria in pregnancy, premalignant lesion of cervix, contraceptive needs/choice of PLHWHAS, effect of gender on ART treatment outcome and quality of life.

An operational research by the unit on PMTCT implementation has shown that it is possible to reduce MTCT rate to less than 1% in our setting using a novel outreach PMTCT strategy in collaboration with relevant stakeholders.

**PHARMACY UNIT**

The pharmacy unit is responsible for supply chain management of Antiretroviral drugs, drugs for opportunistic infections, anti TB drugs and emergency drugs for the emergency clinic. The unit currently manages the institute's drug store in which supplies from Oshodi and APIN are stored. Other functions of the unit include pre-ART and adherence counseling: provision of drug information to the clinical team and pharmaceutical care to patients. Research Fellows who are Pharmacist are carrying out research in collaboration with Research Fellows in various units/ Divisions and with NAFDAC / FMOH on Pharmacovigilance.

**NURSING UNIT**

The nursing unit, has been responsible for the nursing/ counseling needs of members of staff, their families and dependant relatives at the staff emergency clinic.

**DATA MANAGEMENT UNIT**

The unit is responsible for managing and monitoring proper documentation of health /clinical information as well and converting all paper-based information into electronic format. The unit also supports clinical

research activities and compile monthly reports for internal use, FGN and other sponsors,

**COUNSELING UNIT**

The counseling unit included the voluntary counseling and testing, drug adherence, support of PLWHAS and nutrition counseling intervention. Counseling has been a very important component of the care and support of patients that come to clinical science clinics. It is the entry point for care of patients and a point of hope for patients' survival and continuation of their treatment.

**PAEDIATRICS ART UNIT**

The activities of the unit include providing care, support and treatment for children who are exposed to as well as those who are infected with HIV. The unit also continues to attend to the medical needs of the children and wards of staff.

**DOTS TB CLINIC**

The TB DOTS Clinic in NIMR became operational in 2005 with the recommendation of WHO Afro, the support of the National TB and Leprosy Control Programme, NIMR Management and Harvard PEPFAR, and the collaboration of the National TB Reference Laboratory. With the establishment of the Clinic, NIMR became one of the first centres for TB/HIV collaborative activities in Nigeria. It was aimed at providing innovative access to curative TB services for PLWHA in a setting where HIV stigma and discrimination are minimized, and an opportunity for operations research in HIV/TB co-infection, as well as for possible clinical trials.

NIMR DOTS Clinic has in five years of operation become one of the key clinics for TB treatment in Lagos State. Over 3,179 TB patients have been treated. It has provided reliable evidence for TB/HIV co-infection rates among adult PLWHA. The clinic has also achieved a high treatment success rate and a cure rate for smear positive TB of above 90%. This provides evidence that in settings where daily DOTS is not feasible, innovative approaches like the modified weekly observation of treatment can be used to provide effective TB control services during the intensive phase of treatment.

**TRAINING ACTIVITIES**

The Division serves as a pool for Resource Persons who have undergone series of TOT trainings in various fields ranging from Adult ART, Paediatrics ART, PMTCT, Nutrition, Data Management, Counselling and HIV Nursing Care. The Division forms the backbone of the Institute's Training Committee. The staff of the division embarked on various trainings according to their Specialties.

## Abstract Presentation at Conferences

### The changing pattern of HIV related death in Southwestern Nigeria: Organ failure and Sudden deaths on the rise.

Adu RA. Ezechi OC, Onwujekwe DI, Odunukwe NN, David AN, Kalejaiye OO, Oladele DA, Gab-Okafor CV, Somefun EO, Oke B, Ohwodo H, Ezeobi PM, Gbajabiamila T, Musa SO, Musa AZ, Audu RA Onubogu C, Idigbe OE.

Despite the increasing availability of HAART for treatment of HIV/AIDS among persons with AIDS, the deaths rates are still high. Periodic reviews of these deaths are necessary in planning strategy to reduce the deaths

**Objectives:** To review the trend and identify factors associated with deaths among PLWHAs accessing treatment, care and support at a large HIV treatment center in Lagos South western Nigeria.

We reviewed the deaths in a large HIV treatment centre in south western Nigeria from January 2005 to December 2009. All death during this period were identified from the clinic data base. Information on their sociodemographic characteristics, clinical, laboratory events and causes of death were extracted and analyzed

**Results:** There were 115 deaths among 13,500 PLWHAS seen during the period (0.85%). The number of deaths decreased progressively, from 39 in 2005 to 10 in 2009. The leading causes of deaths were Tb (26.95), HIV associated nephropathy (19.1%), unexplained (18.3%) and terminal AIDS (13.0%). While TB was the leading cause of death in 2005 accounting for 30.6%, HIVAN (40.0%) was the leading cause in 2009. Further analysis showed that from 2005 through 2009, deaths due to TB and AIDS decreased from 30.6% to 10% and 19.4% 10% respectively , whereas the proportion of deaths due to HIVAN and non HIV related deaths increased from (16. 7% to 40.6% and 11.1% to 23.4% respectively. The CD4 count of the deceased patients at death ranged from 6 to 620 with a median of 68 cells/uL. The median CD4 at death increased significantly over the years from 65 cells/uL in 2005 to 157 cells/uL in 2009 ($P<0.05$). The median time to death also increased from 30 days (6-390) in 2005 to 180days (50-420) in 2009 ($P<0.05$). While late presentation was a major factor associated with deaths, age, sex and education did not have any association with death.

**Conclusion:** The causes of mortality in HIV patients have changed over the years. While deaths due to opportunistic infection and terminal AIDS continue to decrease as a result of increased access to ARV and TB drugs, late deaths are now occurring in PLWHAS with controlled HIV infection as a result of HIVAN and non HIV related sudden death. It is therefore important to monitor the causes of HIV-associated mortality and to better our

understanding of the relationships among immune defenses, treatment-related toxicities, and end-organ failure in patients with HIV disease.

### Prevalence and predictors of low birth weight in HIV positive pregnant women

Oladele, D, Ezechi, OC, David AN, Gab-Okafor CV, Oke B, Kalejaiye OO Ohwodo H, Adu, RA, Onwujekwe DI, Odunukwe NN, Ezeobi PM, Gbaja-Biamila T, Musa AZ, Musa OS, Herbertson E, Idigbe, OE

Low birth weight (LBW) is a leading cause of perinatal mortality especially in low and medium income countries. Many factors are responsible for incidence of LBW which include maternal HIV infection. However, not all babies of HIV positive mothers are born with LBW. To reduce perinatal mortality due to LBW in HIV exposed babies it is important to identify the factors associated with LBW among this cohort.

**Objective:** To assess the factors associated with LBW amongst HIV positive mothers accessing PMTCT services in a large HIV treatment centre in Lagos Nigeria.

A descriptive retrospective cross - sectional study using existing data of patients who accessed PMTCT service at our antiretroviral clinic from 2005 to 2009.

**Results:** During the period of review, Ninety nine of the 987 babies born weighed less than 2500grams (10.0%) and the mean birth weight among the LBW babies was 2.02±0.43. The mean gestational age of babies with LBW was 36.0±3.81 when compared to those with birth weight =2.5g whose mean gestational age is 38.17±1.85 ($P<0.05$). LBW were found to be associated with GA less than 36weeks ($X^2$ =286; p = 0.00), vaginal delivery ($X^2$ = 108; p = 0.00), premature rupture of membrane ($P<0.05$) and twin gestation ($P<0.05$) but not with use of ART($X^2$ = 17.3; p =0.29), viral load (($X^2$ = 364; p = 1.00), CD4 count and educational status of mother($X^2$ = 31.8; p = 0.37).

**Conclusion:** Low Birth Weight of 10% is lower than previously reported, probably because of great percentage of ART use before pregnancy. LBW was found to be associated with preterm delivery, and twin gestation. Effort should be focused on reducing preterm delivery and improving management of twin delivery to reduce incidence of LBW.

### High risk sexual behavior and practices among PLWHAS in south western Nigeria

Somefun E, Onajole AT, Akanmu SO, Oladele DA, Kalejaiye OO, Gab-Okafor CV, Oke B, Ohwodo H, Adu RA, Ezeobi PM, Gbajabiamila T, Musa AZ, Musa SO, Herbertson E, David AN, Onwujekwe DI, Ezechi OC, Odunukwe NN, Idigbe OE

With increased access to ARV drugs, PLWHAS are living longer and thus require protection against STI and pregnancy. Secondary prevention education among this group requires in-depth knowledge of their behavior and practices as it relates to sex and contraception.

**Objective:** To determine the sexual and contraceptive behavior, practices and influencing factors among PLWHAS in a HIV treatment centre in Lagos Nigeria.
A descriptive study using a self administered structured questionnaire among PLWHAS in a HIV treatment centre in Lagos. Data was obtained on socio demographic characteristics, sexual and contraceptive behavior and practices and on influencing factors.

**Result:** Three hundred and eighty two consenting PLWHAS were seen during the study period. Risky sexual behaviors and practices noted among the respondents were multiple sexual partnership (13.5%), bisexuality (1.0%), lesbianism (0.2%), oral genital sex (2.4%), Oral anal sex (2.1%) and anal genial (1.0%). Male gender (p=0.002) and non disclosure of HIV status (p-0.000) were influencing factors found to be associated with the risky behavior. Contraceptive use was low (27.7%), with condom being commonly used (66.7%). Condom use was associated with married (p=0.001) and in a sero-discordant relationship (p=0.00).
**Conclusion:** Risky sexual behavior and practices were noted among the study group. Therefore there is need to intensify campaign on the dangers and consequences of this high risk behavior.

### Rate, pattern and barrier to HIV status disclosure in Lagos Nigeria

Amadi E, Ezechi OC, Onwujekwe DI, Odunukwe NN, Oladele DA, Adeneye AK, Idigbe OE.

HIV status disclosure is a difficult emotional task creating opportunity for both support and rejection and impacts on HIV prevention and control. This study assessed the rate and barriers to disclosure and non disclosure among PLWHAs Lagos Nigeria.
A cross sectional study design using 26 item semi structured questionnaire. 384 clinic attendees were selected from the daily clinic, attendance register using systematic random sampling method over a period of 6 weeks.

**Result:** HIV status disclosure and non disclosure rates were 62.5% and 37.5% respectively. Further analysis showed that the respondents had disclosed their HIV serostatus to; Spouse/partner (51.3%) mother (16.3%), siblings (10.0%), children (7.1%) pastors/Imam (6.7%) and close friends 96.3%). Young age ($p<0.001$), having at least secondary education (p=0.006) and HIV positive partner (p=0.0001) were associated with disclosure. Barriers to disclosure included fear of stigma and

discrimination (60.1%), Job loss (25.7%), rejection by family and friends (18.7%), fear of accusation of infidelity (14.6%), confidants spreading the news (4.9%) and violence (4.6%).

**Conclusion:** Though the HIV status disclosure of 62.5% in this study seems high, the non disclosure rate of 37.5% constitutes a major challenge to HIV prevention and control. There is need for the re-intensification of interventional measure that targets the provider, clients and community on the dangers of stigma and discrimination and non disclosure.

### Favourable socio economic factors reduce HIV related stigma and improve quality of life

Herbertson E, Aderemi Williams RI, Ezechi OC, Odunukwe NN, Onwujekwe DI, Musa SO, Addeh JE, Okwuonu DU, Idigbe OE

Stigma is described as an attribute that is deeply discrediting and results in the reduction of a person or group from a whole and usual person to a tainted, discounted one. Discrimination is the societal response to the negative value attached to the stigma an individual may carry. Stigma has consequences on the prevention of HIV infection and care of PLWHA and inferentially, on quality of life. Quality of life (QOL) is a term that is popularly used to convey an overall sense of well being and includes aspects such as happiness and satisfaction with life as a whole.

**Objective:** To assess the level of stigmatization in PLWHA and its effect on quality of life.
Method**:** This was a cross sectional study. Data collection was done by randomly administering the questionnaire. The study instrument is a questionnaire adapted from a combination of the Tanzania. Stigma questionnaire and the WHO QOL-HIV questionnaire. The sample size is 70.

**Result:** The study showed that there was stigma among PLWHA to the magnitude of 51%. This discovery could be attributed to the favourable socio-economic characteristics of the respondents such as their level of education and attitude to life. For instance, 51% of the respondents had at least secondary education 70% of them had jobs; 68% of them had known their HIV status for between one and two years while the others have known and lived well with this knowledge or between 3 and 12 years; 94% of them had pre and post test counseling when they did the HIV test. 83% of the respondents had disclosed their HIV status and were receiving support from family and friends.

**Conclusion:** Favourable socio-economic circumstance could reduce stigma among PLWHA.

### Family planning knowledge and contraceptive use in HIV positive patients

Anyasi EE, Gab-Okafor CV, Ezechi OC, Odunukwe NN, Oladipo DD, Amadi EN, Onwujekwe DI, Oladele DA, Oba A, Owa F, Udo C.

Family Planning has a critical role to play in curbing of HIV/AIDS Epidemic. Among HIV infected women the prevention of unintended pregnancy is essential for prevention of mother-to-child transmission (PMTCT) of HIV and reducing of number of children orphaned when parents die of AIDS related illnesses. Family planning reduce maternal mortality rate and reduce incidence of STI, but family planning services are not always accessible at many of public health clinics providing HIV care and treatment.
Contraceptive use was accessed in patients, receiving treatment in APIN ARV treatment site, Nigerian Institute of medical research (NIMR) Yaba, Lagos using questionnaire to collect demographic characteristics, sexual activity, contraceptive practices and factors influencing contraceptive use.

**Result:** Data showed that many of the respondents are women of childbearing age, sexually active and had knowledge of family planning. Use of condom is not consistent. Many don't use hormonal contraceptives due to fear of side effect, religious belief, misconception, desire for children. A lot of them preferred condom use.

**Lesson Learned:** There is need for more awareness about the benefit of family planning and safer sex amongst HIV positive patients. Proper counseling about the different family planning methods and the expected side effect is very important. Women with HIV infection have gynecologic problems that are associated with HIV infection. There is need to understand individual needs regarding contraception.

**Recommendation:** All HIV infected women of child bearing age should be asked about plans and desire regarding pregnancy upon initiation of care and routinely thereafter. Family planning providers must be trained. Efforts are needed to promote tolerance for family planning choices made by couples.

### Adolescent club in an HIV treatment centre in Lagos Nigeria: abstract

Somefun E, David AN, Osakwe C, Owolabi IO, Onourah LN, Otuka R, Onwujekwe D, Odunukwe NN, Oba A, Idigbe OE,

With improved access to care and ARVs including second line drugs, more children are becominga adolescents and teenagers and have had to battle with issue of HIV related stigmatization as they grew. There are other issues hitherto which are not of major concern to caregivers such as when to disclose their status to them,

vulnerability of this group with regards to risk taking behavior , sexuality, motivation and poor drug adherence To address these, the adolescents were informed and their consent was sought for membership. The concept was enthusiastically embraced and the club came into being in July 2009.
The TEENAGE ZONE CLUB presently has 30 regular members of whom 60% are teenagers and meet once a month. The activities of the club are coordinated by the Paediatric team of the program. At meetings, issues of interest are identified and prioritized for discussion and action. Guest Speakers come in occasionally to speak on specific issues. The other activities of the club include dance, drama and skill acquisition seminars.

**Lesson Learnt:** This club has not only helped to address HIV/AIDS issues, it has also brought about behavioral change and promotion of healthy relationship amongst this group. The club has helped the adolescents to explore their own needs and concerns about their Higher education, career and sexually. Adherence to ARVS has also improved amongst club members.

**Recommendation:** Adolescent clubs should be structured into Antiretroviral Clinics. There is also the need to train youth counselors and equip them with appropriate tools and skills in order to improve service delivery to them. There should be development and provision of appropriate HIV/AIDS prevention program targeted at adolecents

## HBV/HIV co-infection: prevalence and evaluation of selenium as adjunct to HAART in Lagos Nigeria

Odunukwe NN, Okwuzu JO, Somefun EO, Musa AZ, Ezeobi PM, Gbajabiamila T, Ezechi O, Kalejaiye OO, Gab Okafor CV, Oladele D, Oke BO, Onwujekwe DI, Amaize EI

Hepatitis B infection and HIV are endemic in the same world regions and share routes of transmission. Co-infection with both viruses is common, with most co-infected individuals living in sub-Saharan Africa and in the Far East. Liver disease due to chronic hepatitis B infection is a leading cause of mortality and morbidity in HIV positive persons globally, therefore treatment of chronic HBV is generally recommended for all HBV/HIV co-infected patients. Hepatitis B is 100-times more transmissible than HIV because of the high "viral load" in HBV infected blood and body fluids. Unlike HIV, HBV virus can survive for days in dried blood. Management of viral hepatitis in patients with HIV disease is quite challenging, though effective treatment for HBV and HCV are available, pharmacologic therapy for co-infected patients is complex. Best strategy for management of HBV/HIV is yet to be defined.

This study assessed the prevalence of hepatitis B virus and possible risk factors for this disease among PLWHA accessing care in Lagos. It also evaluated the effect of selenium as adjunct to HAART and the need for HBV DNA viral load as a marker of efficacy during treatment in resource limited setting.

**Method:** A cross sectional study of HIV infected consented individuals aged 18 years and above was carried out between 2006 and 2008. A questionnaire to collect demography and possible risk factors was administered to each participant. They were all screened for HBsAg and positive ones were followed up for 18 months. The participants were also screened for Tuberculosis (TB) by chest X-ray and sputum AFB smear. They were placed either on HAART (Truvada and Nevirapine) only or HAART and selenium for those who were eligible for ART, and Selenium alone for those who were not eligible for ART. Eligibility was based on the 2005 National ART guidelines. Hepatitis B markers studied were HBsAg, and HBV DNA. The diagnosis of chronic hepatitis B was based on HBV DNA positive results, and /or elevated ALT level. HIV viral load, CD4 cell count, Haematological and Biochemical indices were also analyzed at base line and at the end of the study.

**Result:** Eight thousand three hundred and nine HIV infected persons were screened. HIV/HBV seroprevalence among the studied population was 10%. The commonest risk factor volunteered by the participants was heterosexual transmission ( table 1). One hundred and forty-nine (149) HBV/HIV patients were enrolled for the second phase of study and were followed up for 18 months. Age and sex distribution, of HBV/HIV population showed female (59.9%) preponderance. The preponderant age groups were 26-35 (41.5%) and 36-45 (36.1%). Twenty one (21) participants were lost to follow up. Seven were confirmed dead within the study period, (all the seven were HBV/HIV/TB co-infection). Only 121 who completed the study had repeated HBV DNA analysis at 18$^{th}$ month. At baseline 32.9% of all the participants had undetectable HBV viral load and at the end of the study 72.2% had undetectable HBV viral load. All participants (100%) who had undetectable HBV viral load at baseline that were eligible and started on HAART remained undetected at the end of the study. While only 18 % of those on selenium alone and those on no medications who had undetectable HBV viral load at baseline remained undetectable at eighteenth month.

**Conclusion:** The relative high frequency of HIV/HBV co-infection emphasizes the need for immunization of all PLHWAs who are not vaccinated against HBV. Tuberculosis infection in HBV/HIV co-infected patients

## Success of early diagnosis of tuberculosis among PLWHA on first contact with HIV/AIDS care and treatment of NIMR

Onwujekwe DI, Odunukwe NN, David AN, Kalejaiye OO, Gab-Okafor CV, Somefun EO, Oke BO, Oladele DA, Gbajabiamila T, Ezeobi PM, Musa AZ, Ozichi SA,Ezechi OC

This project has been concluded and has provided evidence and justification for multiple screening approaches for presumptive diagnosis of TB among PLWHA, to improve yield. The successful use of standard questionnaire based on key symptoms and signs of TB by both health professionals and clerical staff in clinical and community settings for TB screening, was a major achievement of this study. In addition, the study provided the first insight into the burden of tuberculosis among PLWHA in Nigeria. The methods have become part of the widely accepted procedure for TB case-finding among most-at-risk populations. However, the problems associated with sputum smear microscopy (long turn-around time, low sensitivity), persist. There is a need to complement case finding with more sensitive diagnostic techniques in PLWHA. A pilot study using fluorescent microscopy is indicated, and will be proposed. Quality-assured bacteriology will come in a long way.

## A modified dots for managing TB in a predominantly HIV infected cohort

Onwujekwe DI, Odunukwe NN,David AN, Kalejaiye OO, Gab-Okafor CV, Somefun EO, Oke BO, Oladele DA, Gbajabiamila T, Ezeobi PM, Musa AZ, Ozichi SA,Ezechi OC

An analysis of the outcome measures of this modified approach to delivering anti-TB treatment to patients who could not access treatment closer to their residences has been done. The modification of treatment was from daily, observation treatment to once a week observation of treatment during the intensive phase of Category1 TB patients treatment. Monitoring during the continuation phase remained unchanged. On-going adherence counseling and treatment support by a relative are used to encourage treatment completion.

**Result:** Sputum conversion rate at end of intensive phase of treatment was 82.2%. Cure Rate for smear positive cases of 97% was achieved, which is higher than the generally recommended target of 85% for daily DOTS. However, a default rate of 21.7% compared to 17% in the National program was observed. Defaulter tracing using telephone calls for a subset of defaulted patients revealed that many early defaulters (who defaulted within two weeks of ambulatory treatment) were mostly those referred for hospitalization for complications of the disease like severe anaemia or anaemic cardiac failure. Wrong addresses and phone numbers were some of the obstacles to defaulter tracing. The summary of outcome measures has been written up and a full article for dissemination is in preparation.

**Way forward:** The adherence strengthening through patient selection, and a home-based adherence monitoring tool which has been developed and is being pilot-tested.

## Prospective trial Bio-Strath in clinical management of HIV in adult Nigerians who are not eligible for HAART.

Odunukwe NN, Musa AZ, Oladele D, Amaize E, Herbertson EC, Okwuzu JO, Amadi EN

Poor nutrition and HIV-related adverse health outcomes contribute to a vicious cycle that should be slowed down by nutritional supplements. Low serum micronutrient levels in HIV-positive individuals have been associated with immune impairment, disease progression, and increased mortality. Past studies document decreased levels of antioxidants and selenium in people living with HIV/AIDS.

Data from our pilot observational studies at NIMR HIV clinic suggests that interventions with selenium and several vitamins may slow down disease progression and OI's. The study was to determine the efficacy of BIO-STRATH in the management of HIV in adult Nigerians who are not eligible for ART, (CD4 $\geq$350 cell/ul).

This is a randomized and placebo-controlled clinical trial of BIO-STRATH among HIV infected individuals aged >18 years, with recent CD4+ lymphocyte count >350 cells/ul of fresh whole blood (Measured by Cyflow), with no AIDS defining symptoms or signs. All participants gave signed informed consent, and they were adult males and females Nigerians who's HIV status was confirmed by Western Blot. They were antiretroviral drug naïve and ineligible for HAART according to national ART guideline. A questionnaire for collecting their demography was administered to each person and their baseline HB, WBC, ALT, serum creatinine, CD4 + lymphocyte counts and viral loads were quantified.

**Result:** Twenty five participants were on BIO-STRATH and 16 were on placebo (control group). They were followed up for 6 months with a repeated analysis of all the baseline data at 12$^{th}$ week. The data generated from the trial was analyzed using SPSS package. The level of significance was taken as $p \leq 0.05$. The demographic patterns of the participants showed age range of 19-45 years and mean age of 30.5 $\pm$6.3 years. Four participants were lost to follow up after collecting drugs for one month. I got pregnant after four months of starting the study and 12 from the placebo arm opted out at various stages of the trial resulting in only 4 from this arm completing the study. Comparison of the data before and after treatment with BIO-STRATH revealed significant increase BMI, RBC, HB, HCT, MCHC, MCH, and % Lymphocytes, while platelets, and % Neutrophils were significantly reduced and MCV showed no significant

change. There was no significant change in the biochemical parameters. Comparison of the immunological and virological parameters revealed that the mean CD4 count increased significantly after treatment, with the highest rate of increment just after the first 3 months of treatment. There was slight decline of the mean viral load after the first three months of treatment. Comparison of baseline and sixth month data revealed significant rise of the mean viral load (p=0.0.28). The rise in the viral load correlate with high rate of missed doses recorded in the last 3 months of the study.

**Conclusion:** BIO-STRATH appears to increase BMI, CD4 count and the haematological parameter of HIV patients. It appears to have little or no antiretroviral effect on HIV-1, Poor adherence affects BIO-STRATH efficacy.

**Recommendation:** BIO-STRATH may be useful as adjuvant to HAART for anaemic patients who are eligible or prone to develop anaemia from ART. Strong adherence to BIOSTRATH probably will improve the quality of life of HIV positive individuals who are not eligible for HAART.

## ON-GOING PROJECTS

### National multiple myeloma survey: prevalence and treatment outcomes of multiple myeloma in Nigeria

Odunukwe NN, Kalejaiye OO, Ezechi OC, Onwujekwe DI, David AN, Gab-Okafor CV, Somefun EO, Oke BO, Oladele DA, Gbajabiamila T, Ezeobi PM, Ohwodo H, Adu RA, Musa AZ, Bankole MN, Okwuzu J

The protocol for the project has been completed, sent to the IRB and approval obtained. The SOPs for the project have been completely developed. For commencement of the project once funding is released.

### Study of the epidemiology of precancerous cervical lesions in Nigerian women

Ezechi OC, Odunukwe NN, Onwujekwe DI, David AN, Kalejaiye OO, Gab-Okafor CV, Somefun EO, Oke BO, Oladele DA, Gbajabiamila T, Ezeobi PM, Ohwodo H, Adu RA, Musa AZ, Herbertson E , Neimogha MT, Nwokorie P, Fanneye O.

The project is at implementation stage and subjects for the study are already awaiting recruitment. Preliminary training for the Research Team was completed this quarter.

### Capacity improvement for community based private and public health workers on the common cause of maternal and childhood morbidities and mortality.

Odunukwe NN, Ezechi OC, Onwujekwe DI, David AN, Kalejaiye OO, Gab-Okafor CV, Somefun EO, Oke BO, Oladele DA, Gbajabiamila T, Ezeobi PM, Ohwodo H, Adu RA, Musa AZ, Herbertson E , Neimogha MT, Nwokorie P, Fanneye O.

Protocol and SOP for the implementation and the evaluation of the project were completed and forwarded to the IRB for approval. The first inaugural meeting of the project management team was convened and work plan for the implementation of the project developed. Job schedules and committee for the execution of the project was done. The sites for the implementation of the project were also selected. The project is set to start but awaiting funding.

### Study of the epidemiology of precancerous cervical and other genital lesions in Nigeria woman.

Ezechi OC, Gab-Okafor CV, Nwaokorie O, Oladele DA, Somefun EO, Ezeobi PM, Gbajabiamila TA, Adu RA, Musa AZ, Ekama ZO, Idigbe I, Amadi EN, Neimogha MT, Faneye O, Kalejaiye O, Onwujekwe DI, Nkiru AN, Odunukwe NN, Ujah IAO.

The objective of the research is to determine the burden of precancerous cervical and other genital lesion, the effect of HIV infection on the diagnostics accuracy of direct visual inspection with acetic acid and Lugol's iodine as a cervical cancer screening tool and the HPV type distribution in Nigerian women of known HIV status. The experience of the women during test and after the availability of the results will also be explored using qualitative methods. A multidisciplinary team of Clinician, Biologists, Epidemiologist, Social Scientists and Biostatistician been assembled to conduct the research study. All necessary approvals have been obtained from the Institutions authority and IRB. The study Protocols, SOPs and training have been concluded and enrollment will commence in the first quarter of 2011.

### Training of community based health professional to support community based research into pregnancy, childbirth and childhood related disorders in collaboration with state and LGAs.

Ezechi OC, Gab-Okafor CV, Nwaokorie O, Oladele DA, Somefun EO, Ezeobi PM, Gbajabiamila TA, Adu RA, Musa AZ, Ekama ZO, Idigbe I, Amadi EN, Neimogha MT, Faneye O, Kalejaiye O, Onwujekwe DI, Nkiru AN, Odunukwe NN, Ujah IAO.

In Nigeria, maternal and childhood morbidity and mortality are major public health challenge. Majority of these deaths occur in community as a result of low capacity of health workers. In addition information used for policy formulation are generated from the big cities and their health facilities. It is therefore no surprise that we are unable to prevent the unfortunate death of thousands of our women and children. This project aim at strengthening the capacity of the community based health workers on community based research, the management of common maternal and childhood diseases, the recognition of the early danger signs, and prompt referral of cases.

The protocol and SOP for the operational research component of the study has been completed and sent to the IRB for approval. The inaugural meeting of the project team was convened; the work plan and the project sites were approved. Advocacy visits and baseline survey of project sites is scheduled for first quarter of 2011.

### SOCIO-CULTURAL AND ECONOMIC BARRIERS AND CHALLENGES OF IMPLEMENTATION OF SAFE INFANT FEEDING IN CONTEXT OF HIV INFECTION IN NIGERIA

David AN, Odunukwe NN, Ezechi OC, Onwujekwe DI, Kalejaiye OO, Gab-Okafor CV, Somefun EO, Oke BO, Oladele DA, Gbajabiamila T, Ezeobi PM, Ohwodo H, Adu RA, Musa AZ

Inaugural meeting with investigators comprising of clinicians and biostatisticians was held during this quarter. The protocol and standard operating procedures for the project completed and are awaiting IRB approval for commencement of the project. A pilot study is on-going.

### Prevalence of helminthiasis among HIV infected children in Lagos Nigeria

David AN ,Odunukwe NN, Ezechi OC, Onwujekwe DI, , Kalejaiye OO, Gab-Okafor CV, Somefun EO, Oke BO, Oladele DA, Gbajabiamila T, Ezeobi PM, Ohwodo H, Adu RA, Musa AZ, Okwuzu J

Protocol developed and meetings of the investigators held. Materials and reagents purchased and recruitment of study subjects already commenced.

### Toxoplasma gondii in HIV/AIDS: prevalence and risk factors

Odunukwe NN, Okwuzu JO, Ezechi OC, Onwujekwe DI, Ezeobi PM, Gbaja-Biamila T, Musa AZ, Somefun EO, Oke BO, Okoye RN, Oriaku CI.

The prevalence rates of latent Toxoplasma infections in HIV- infected patients has been found to vary greatly from 3% to 97%. Infection with Toxoplasma gondii can cause illness in the brain and other organs like lungs and eyes when contracted congenitally or reactivated in immune- suppressed individuals. *Toxoplasma gondii* is of particular concern in humans because of the potential for transmitting the disease to the unborn fetus if the mother is infected for the first time during pregnancy and Toxoplasma encephalitis was commonly detected in AIDS patients with Toxoplasma infection.

Objective: To determine the prevalence of Toxoplasmosis in HIV/AIDS including pregnant women as well as identify risk factors to toxoplasmosis in HIV patients.

Methods: Cross- sectional study of 240 male and female HIV infected individuals aged 18 and above, who gave signed informed consent was conducted.

Result so far: Out of 240 samples collected, 173 have been processed, 74 samples tested positive to Toxo Ig while 99 samples were negative.

## NEW PROJECTS

### Establishing the differential diagnosis of lymphadenopathy for community detection of early extrapulmonary TB and cancers in the six geopolitical zones of Nigerians.

Odunukwe NN, Oke BO, Kalejaiye OO, Ezechi OC, Gbajabiamila T, Ezeobi PM, Ohwodo H, Adu RA, Musa AZ. Bankole MN

Protocol has been developed and sent for IRB approval.

### Establishment of cancers research networks for cervix, breast, prostate and blood cancer.

Procurement plan and work plan submitted to the management for due process and procurement. All necessary contact and links for the success of the project

TRAINING ACTIVITIES

The Division serves as a pool for Resource Persons who have undergone series of TOT trainings in various fields ranging from Adult ART, Paediatrics ART, PMTCT, Nutrition, Data Management, Counseling and HIV Nursing Care. The Division forms the backbone of the Institute's Training Committee. The staff of the Division embarked on various trainings according to their specialties

| NAME | TRAINING | STATUS |
|---|---|---|
| Dr. (Mrs.) Nkiru Odunukwe | MD Programme | On-going |
| Dr. Oliver C. Ezechi | Ph.D (LUND University, Sweden) | On-going |
| Dr. Funto Kalejaiye | FWACP | On-going |
| Dr. (Mrs.) Esther Somefun | MPH | Completed |
| Dr. (Mrs.) C.V. Gab-Okafor | MPH | Completed |
| Dr. (Mrs.) Rose Adu | M.Sc (Microbiology) | On-going |
| Dr. Bamidele Oke | M.Sc (Microbiology) | On-going |
| Mrs. Jane Okwuzu | Ph.D (University of Lagos) | On-going |
| Mrs. Sabdat O. Ekama | FWACPharm | Completed |
| Mrs. Ebere Herbertson | FWACPharm | Completed |
| Mrs. Ejomen Addeh | FWACPharm | On-going |
| Miss Chioma Okpalla | FWACPharm | On-going |



**Workshops / Conferences/ Meetings Attended**

1. Keystone Symposia X5 – 2010: HIV vaccines Alberta Canada( March 2010)
2. Initiative to Strengthen Health Research Capacity in Africa (ISHReCA) Conference Ouagadougou, Burkina Faso (11-13 July 2010)
3. 38th NSHBT Annual scientific conference in Abuja (18 th to 20th August 2010)
4. Workshop on Proposal writing for German Leprosy and TB Relief association staff (August 30-September 2, 2010) ENUGU.
5. 5th National Conference on HIV/AIDS in Abuja (2nd to 5th May, 2010)
6. 26th APIN Annual Scientific Conference in Lagos (24th to 26th March, 2010)
7. APIN Pharmacovigilance training Abuja (July 13 -16, 2010)
8. A Logistics Management of HIV/AIDS Commodities Course: Kaduna (24 – 28 May 2010)
9. National Conference on HIV: Abuja (3 – 5 May 2010)
10. APIN Data base training for Pharmacist( April 2010)
11. 34th AGSM of West African College of Physicians (Sierra Leone Nov. 7- 12, 2010)
12. International Network for Cancer treatment and Research (INCTR) (26/1/2010 Ife)
13. 2010 International Cancer Week Conference (Abuja 26 – 28, October, 2010)

**FINANCIAL ACTIVITIES**

The comprehensive financial records of the division are with the Finance and Accounts Division of the Institute. These comprises of grants and proceeds from Emergency clinic.

## Microbiology Division

| | |
|---|---|
| Prof. E.O. Idigbe | Director Of Research |
| Dr. A.A. Adeiga | Deputy Director (Research) |
| Dr. (Mrs) N. Idika | Chief Research Fellow |
| Dr. SMC Ezeugwu | Chief Research Fellow |
| Dr. (Mrs.) C.C. Onubogu | Chief Research Fellow |
| Dr. (Mrs) R.A. Audu | Chief Research Fellow |
| Miss N. Onyejepu | Research Fellow II |
| Mr. O.B. Salu | Research Fellow II |
| Mr. C.K. Onwuamah | Research Fellow II |
| Mr P. I. Anochie | Junior Research Fellow |
| Mrs C.N. Kunle-Ope | Junior Research Fellow |
| Mrs. E. Meshack | Junior Research Fellow |
| Mrs. E. Afocha | Junior Research Fellow |
| Dr.(Mrs.) N.N. Nwokoye | Junior Research Fellow |
| Mr. A. Okuraiwe | Junior Research Fellow |
| Mr. O.S. Amoo | Junior Research Fellow |
| Mrs. F.A. Ige | Junior Research Fellow |
| Mr. A. A. Adesanmi | Junior Research Fellow |
| Miss O. Awoderu | Junior Research Fellow |
| Mrs. A.O. Faneye | Junior Research Fellow |

Microbiology division is made of four units; immunology, diarrhoea, tuberculosis and human virology.

### RESEARCH FINDINGS

### IMMUNOLOGY UNIT

#### Aspergillosis co-infection with tuberculosis in TB treatment failure

Adeiga AA, Onyewuche JI, Akintunde GB, Awoderu OB, Faneye AO

Aspergillosis is a fungal infection having Aspergillus species as aetiological agents such as *A. fumigatus* and *A. flavus*. It is commonly reported among the immunocompromised patients with chronic diseases such as tuberculosis, HIV and when under immunosuppressive drug treatment. In TB case management, failure is reported in some of the TB cases when the patients develop resistance to first line TB drugs such as isonizid and Rifampicin. In this circumstance, implication of Aspergillosis is either suspected alone or as co-infection especially if the TB management is exacerbated. This may cause suspicion of Aspergillosis. It is for this cause that the disease is investigated among TB treatment failures and HIV patients.

The aim is to determine the presence of Aspergillus antigen in the patients with TB treatment failure or HIV positive. Other objectives include establishing pattern of distribution of the condition and social factors contributing to this.

Result shows that among the chronic TB patients, 18 of 55 (32%) patients screened were positive for Aspergillus antigens in their blood. In the age distribution of the disease among patients affected, 18.2% were in age range of 21-30years, 18.2% in the range of 31-40years, 10.9% in range of 51-60years and 1.8% in the range of 61-70 years of age. In categorizing the conditions of those affected, 17(71%) of the 21 treatment failure were positive for Aspergillosis. 3(21%) of the treatment default were positive and 8(40%) of those not cured. 6(42%) of relapsed cases were positive for Aspergillosis. Among the HIV TB subjects, 18(69.23%) were positive for Aspergillosis.

area, 45% of those with co-infection were non drug regimen compliant.

**Conclusion:** Detection of Aspergillus antigen in the blood of the patients is evidence that the patients found positive were infected with the disease. The age distribution of the disease mostly affected the teenage to middle age group of the patients among the active TB patients. The social factor affecting the disease indicated that most of the patients were in the low income group and also living in high density area. These could predispose the patients to Aspergillosis and precipitating co-infection.

**Summary:** Aspergillus antigen was detected in both patients with active TB and HIV patients. Age distribution indicated that teenage to middle age patients were mostly affected. Poverty was found to drive the disease. In the case management category, those not cured were mostly positive for Aspergillosis.

## Pattern of secondary effect of measles infection leading to disability and mortality in children

Adeiga A, Faneye AO, Awoderu OB, Akintunde GB, Salu OB

Measles remains a serious problem of infancy and childhood in the developing world, despite the availability of measles vaccine (Bypass et al 1995). It is the cause of more than 2 million deaths of infants every year worldwide and death is common among infants of 9 to 36 months of age especially in the malnourished (UNICEF, 1990). Factors of ignorance, malnutrition non-immunization and delay in seeking medical attention have been attributed to the high mortality rate of measles infection (Aaby et al 1999).

Apart from causing high mortality in children, measles infection have been associated with secondary defects such as tosclerosis that leads to deafness which is sensor neural hearing loss. (Nieder Meyer H.P 2001, Sziklai et al 2009). The secondary defects such as otosclerosis have been associated with immune response to measles infection as a result of hypersensitivity reaction to measles through over production of pro-inflammatory cytokines to cause the disability or death. These pro-inflammatory cytokines include interleukin -1, 12; tumor necrosis factor alpha and granulocyte macrophage colony stimulating factor (GM-CSF).

Some children under five years, when infected with severe measles sometimes recover from infection with disabilities such as deafness due to otitis media and blindness due to etinopathy. One of the causes of otitis media tosclerosis is hyper inflammatory reaction of which measles have been associated. Pro-inflammatory cytokines were reported to be involved in the inflammatory process which can be exaggerated and lead to death. There is therefore need to investigate the generation of the pro-inflammatory cytokines in measles infection and at what stage and level of their generation. Children with disability find it difficult to cope with challenges of life. Therefore it is important to prevent situation that will cause disability. When pro-inflammatory cytokines are detected, they can be managed.

Our objectives are to determine measles infection in the patients tested, determine pro-inflammatory cytokines in the children infected with measles and examine the children with severe measles for otitis media.

Children coming down with high fever, rash, conjunctivitis are to be tested for measles. Those found positive will be tested for the pro-inflammatory cytokines which are interleukin 1, alpha, tumor necrosis factor alpha, interleukin 12 and granulocyte macrophage colony stimulating factor (GM-CSF). Three state in the southwest (Lagos, Oyo and Ogun) were randomly selected and the local government with hot spots of measles was identified for study.

Achievement so far:

?IRB approval was obtained

?Letters to sites of study were written and responses obtained.

?Advocacy visits were paid to Lagos and Ogun states after responding to allow the study in their states.

?Data collection instrument (Structured questionnaire) was developed.

?One of the equipment needed was delivered.

Challenges in immunology unit:

? Delay in supply of research materials.
? Delay in supply of reagents.
? Delay in release of fund for field work.
? Frequent power outage that spoils the reagents and samples collected.

Need to perfect transportation logistics

## DIARRHOEA UNIT

### Study of the bacterial, fungal and parasite pathogens from stool, throat swabs and blood of febrile children under the age of five in some communities of Lagos State, Nigeria

Idika N, Ezeugwu SMC, Enwuru CA, Ogbonna FN, Bankole M.

Infections, especially malaria and acute respiratory infections (ARI) are the leading causes of children mortality and morbidity in developing countries. In Nigeria, over 90% morbidity and 80% of mortality in children under 5 yrs arise from malaria, vaccine preventable diseases, diarrhoea diseases and ARI, all of which can be prevented or treated at little cost. Since fever is a symptom of many acute childhood illnesses, this study was designed to identify other pathogens, apart from malaria parasite in febrile children <5 yrs in some communities in Lagos State.

**Objective:** is to identify other pathogens apart from malaria parasite that could be responsible for febrile condition in children under five years.

The consent of the care-giver / parents of the children was obtained. Throat, anal swabs and blood samples were collected from 200 febrile children <5 yrs presenting at the General Hospital Ijede and PHC Ebute Meta. Same samples were collected from 100 apparently normal children <5 yrs in 2 nursery schools in Yaba as control. The samples were processed using standard microbiological techniques to identify parasitic, fungal and bacterial pathogens. Using questionnaire, anthropometric parameters of the children and socio-economic characteristics of the parents were recorded.

**Results:** shows that 49.2% of the study subjects were females 45.5% of the blood samples were positive for malaria parasites. 37.7% of throat swabs grew bacteria mostly *Staphylococcus aureus*, followed by *Streptococcus pneumoniae* and *Streptococcus pyogenes.* 45.5% grew yeasts. 77.7% of the stool samples grew pathogens mainly *Escherichia coli* while a few grew *Salmonella paratyphi S. typhi and S. arizona.* Cysts of *Entamoeba coli, E. histolytica* and the trophozoites of *E. coli* were seen. Less than 10% had moderate and severe chronic under-nutrition (stunting) while less than 20% had moderate and severe under-nutrition (thinness).

In conclusion, study shows that only about half of the febrile conditions were due to malaria parasites.

Project had been completed and result sent to Nigerian Journal of Health and Biomedical Sciences and International Journal of Malaria and Tropical Diseases for publication. Result was presented at 18th Union Conference African Region from 3rd to 5th March, 2011.

### Study of prevalence of rotavirus in diarrhea infections among children under five years of age in Lagos, Nigeria.

Idika N, Anochie P, Afocha E, Adesanmi A, Ezeugwu SMC, Audu R, David N, Enwuru C. A, Ogbonna F, Bankole M, Austin-Akaigwe P, Attat P,

Rotavirus is the leading single cause of severe diarrhoea among infants and young children each year; rotavirus causes millions of cases of diarrhoea in developing countries, almost 2 million resulting in hospitalizations. With so much global attention in vaccine development and the introduction of Rotarix vaccine for diarrhoea in Nigeria in 2006, this study was designed to highlight the importance of Rotavirus as an aetiological agent of acute gastroenteritis among children less than five years and identify the circulating strains in Lagos, Nigeria.

Our objective is to determine the prevalence of rotavirus and identify the circulating serotypes in children less than five years with diarrhoea to reduce its incidence in rural communities.

With informed consent, diarrheal stool samples were collected from children under five years and information on the socio-economic characteristics of their care-givers was collected using semi-structured questionnaire. 135 samples have been collected and were processed for parasites, bacteria and rotavirus using standard microbiological methods. Another set of questionnaire was used to collect information on the frequency of diarrhea in children 2 years- 5 years immunized and non-immunized with the Rotarix vaccine in Lagos. *On-going study*

**Challenges in Diarrhoea:**

? Inadequate funding.

? Late release of fund and supply of reagents and

equipment.

- ? Transportation for sample collection not regular.
- ? Non functional Air Condition in Diarrhoea Laboratory therefore making conditions for research unfavorable in the lab

## TUBERCULOSIS (TB) UNIT

Activities in the in for 20101 activities are grouped into three components namely research, service delivery training and monitoring.

### Assessment of microscopy and cultural techniques in the diagnosis of TB amongst HIV patients.

Kunle-Ope CN, Onubogu CC, Nwokoye NN, Onyejepu N, Raheem TY, Igbasi UT, Tochukwu NE, Omoloye RM, Ejezie CO, Onwujekwe DI, Idigbe EO.

The diagnosis of active tuberculosis (TB) in HIV infected patients continues to be a great challenge especially when their HIV infection is advanced. The sensitivity of sputum smear microscopy in HIV infected cases can be as low as 20%, as a result, smear negative TB occurs more frequently in this population. Culture for acid-fast bacilli (AFB) is the gold standard and much more sensitive than microscopy which has been the mainstay of TB Control Programme. However, it is not readily available in most of the laboratories due to sophisticated laboratory infrastructure, expensive equipment and human resources.

In this study, we assessed the yield of AFB by microscopy and culture for active TB diagnosis in HIV patients.
1477 HIV patients were screened for AFB by microscopy and culture using NALC-NaOH method at the National TB Reference Laboratory, Lagos, Nigeria from 2008 to 2010. Information on HIV status of each patient was obtained from their medical records. Ziehl-Nelseen (ZN) stained smears were made from the final deposits and examined under light microscopy for AFB. Loopfuls of each of the final deposits were evenly spread on the entire surface of Lowestein-Jenseen slopes and incubated at $37^0$C. The slopes were examined for growth on day 3, 7 and weekly thereafter for 8 weeks. Slopes with growths, smears of colonies were made, stained by ZN and examined for the presence of AFB.
Results shows that, out of the 1477 patients, 480 (32.6%) were AFB positive. 230 (15.6%) were detected by culture, 125 (8.5%) were detected by microscopy while 125 (8.5%) were detected by both methods. The difference between the detection for culture and microscopy was statistically significant, $p<0.05$.
In conclusion, the higher yield of AFB by culture compared to microscopy confirms the higher sensitivity of culture for active case finding of TB in HIV patients. There is therefore an urgent need for the Nigeria and other resource countries to increase capacity for culture facilities in TB laboratories.

### Effect of sputum quality on the microscopic diagnosis of TB

Nwokoye NN, Onubogu CC, Igbasi TU, Tochukwu NE, Raheem TY, Ejezie CO, Omoloye RE, Kunle-Ope CN, Idigbe EO.

The recommended diagnostic method for the identification of active pulmonary tuberculosis (TB) is the smear microscopy. This method is very useful in identifying highly contagious patients but its usefulness depends largely on the quality of the sputum specimen.

This study assessed the effect of sputum quality on the microscopic detection of Acid Fast Bacilli (AFB).
The study was carried out between January and February 2009. A total of 970 sputum samples were examined for AFB after staining by Ziehl Neelsen method. Good quality sample was defined as sputum sample with mucoid or mucopurulent material and a volume of 3-5 ml, although smaller volume of adequate consistency was considered satisfactory. Ethical clearance was granted by the Institution review board NIMR. Patients that gave written informed consent were enrolled in the study.

**Result:** Of the 367 patients that were included in the study, 99 provided at least one good sample, with AFB detection rate of 8(8.1%). About 128 provided at least 2 good samples, with AFB detection rate of 18 (14.1%). Eighty-nine patients with 3 quality samples recorded the highest AFB rate of 17 (19.1%). While 51 that provided 3 unsatisfactory samples had the lowest AFB detection rate of 3 (5.9%). In general, 96 out of 644 (14.9%) satisfactory samples yielded AFB while 10 out of 326 (3.1%) unsatisfactory samples were AFB positive.
In conclusion**,** the data above demonstrated a positive correlation between AFB detection rate and good quality sample. It also established that a considerable number of TB suspects failed to provide satisfactory sputum samples. For this reason, training of health workers in

providing health education to TB suspect on how to produce good quality sputa should be a priority of the TB program.

### Evaluation of direct and concentrated smear microscopy for the diagnosis of TB in high HIV prevalent setting

Nwokoye NN, Onubogu CC, Kunle-Ope CN, Tochukwu NE, Onyejepu N, Raheem TY, Ejezie CO, Omoloye RM, Onwujekwe D, Idigbe EO.

Direct and concentrated smear of sputum samples for AFB microscopy have been the most commonly used tools for diagnosis of TB. However, the sensitivity of the direct smear method, which is mainly used in the resource-poor countries is presently reported low especially in HIV-infected individuals

This study was carried out to compare the sensitivity of the direct and concentrated smear methods for diagnosis of TB in both HIV-positive and negative individuals.

The study was carried out at the National TB Reference Laboratory in Lagos, Nigeria. The study population comprised of 480 patients drawn from the ARV and DOTS clinics of NIMR from 2009 to 2010. Two hundred and twenty-four (46.7%) of these patients were positive for HIV, 73(15.2%) were negative while 183(38.1%) had unknown status. Direct and concentrated smears of sputum samples obtained from the patients were stained by ZN and examined microscopically for AFB. Data was analyzed statistically using Prism version 5.03 computer software programme.

**Results:** AFB detection rates were 75 (33.5%) and 25 (34.2%) for HIV-positive and negative patients. In the HIV-positive patients, the AFB detection rates were 32 (14.3%) by direct smear and 75 (33.5%) by concentrated smear. In HIV-negative patients, 24(32.9) were diagnosed by direct smear and 25 (34.2%) were diagnosed by concentrated smear. The rate of diagnosis by concentrated method was significantly higher than the direct method in the HIV-positive group ($p = 0.29$).

In conclusion, data showed a higher sensitivity in TB case detection by the concentrated smear method in the HIV-positive patients. About 43 patients amongst the group would have been missed if direct smear alone was carried out. Since direct smear only is the entry point to DOTs in resource poor countries, the observation in this study highlighted the urgent need to develop capacity for concentrated smear in developing countries to be able to detect more TB amongst HIV patients.

### Potential of the nitrate reductase assay as a tool for drug susceptibility testing (DST) and detection of multi-drug resistance tuberculosis (MDR-TB) in Lagos, Nigeria

Onubogu CC, Onyejepu N, Nwokoye NN, Kunle-Ope CN, Igbasi UT, Raheem TY, Idigbe EO.

Globally Nigeria ranks 5th among the 22 Tuberculosis (TB) high burden Countries. Early detection and treatment of infectious cases of TB reduces the spread of TB while rapid and low cost drug susceptibility testing of *Mycobacterium tuberculosis* (M.TB) is imperative for treatment monitoring and early diagnosis of MDR-TB.

Aim is to evaluate and compare the nitrate reductase assay (NRA) as potential conventional alternative *in-vitro* drug susceptibility tests which is inexpensive and presents quick results with the proportion method (PM) in our resource poor setting.

A total of 118 strains of *M. tuberculosis* which were isolated on LJ medium from patients with pulmonary TB at the National Tuberculosis Reference laboratory in Lagos, Nigeria in 2009 were tested against four first-line drugs by proportion method. In parallel, these strains were analyzed by NRA in which the four first line drugs were also incorporated. At the end of incubation, reduction of Nitrate was recorded. The results obtained were compared to those obtained by the proportion method in LJ medium containing primary ant-TB drugs as the gold standard method.

**Results:** A total of 115 samples was evaluated and compared. Two (2) samples recorded contamination while there was no growth on LJ medium for one sample. In comparing NRA to the proportion which is the gold standard there was 100% agreement for rifampicin while 98% was recorded for isoniazid, ethambutol and streptomycin. Results were obtained in 10 -14 days by NRA as compared to PM which were available in 4 -7 weeks. The NRA has shown to be simple, rapid and inexpensive method for TB drug susceptibility testing especially in resource poor setting. It is also a good potential method for MDR- TB detection.

### External quality assessment of AFB microscopy for private Laboratories in Nigeria

Nwokoye NN, Onubogu CC, Raheem TY, Audu R, Aniedobe M, Onwuamah C, Okoye R, Nduaga S

The National TB Reference Laboratory (NTBRL) NIMR

with support from Association of National Public Health Institute (IANPHI) established an external quality assessment (EQA) program using panel testing slides set. This was the first evaluation of smear microscopy performance among private laboratories in Nigeria.

Objective: To monitor and improve the reliability of acid fast bacilli (AFB) smear microscopy whilst establishing inter-laboratory comparability agreement with a reference standard.

AFB Panel slides were prepared as per protocol and sent to forty-two private laboratories that participated in the EQA programme. A total of 5 unstained panels were sent to each laboratory with instruction to stain panels using routine SOP and quantify the AFB using the WHO/IUATLD grading system. The NTBRL NIMR assessed the results and sent feedback to the participated laboratories. The pass mark was 80%, correct answers earned 20% each, quantification error and low false positive and negative answers earned 10% while no mark was allotted to incorrect answers as well as high false positive and negative answers.

**Result:** the highest score recorded was 100% and lowest 0% with the mean score of 59.8%. About 17(41.5%) laboratories scored = 80%, 12(29.3%) scored = 50% and between 70% and 50% respectively. The total number of errors recorded among the laboratories was 116. The commonest error type observed was quantification error 74(63.8%). About 10(8.6%) slide results from two laboratories were wrongly quantified with grading system different from the WHO/IUATLD format. Nevertheless, no laboratory had false positive error type.

In conclusion: the performance of most laboratories was found to be unsatisfactory. The fact that two laboratories used smear grading system other than the internationally accepted one was an indication of gross deficiency in the laboratories. On-site visits, regular feedback on individual results and re-training will allow for gradual improvement in the quality of the microscopy network in the country.

## Use of paralens led (QBC™ diagnostics) system to detect acid-fast bacilli in sputum.

Onubogu CC, Nwokoye NN, Raheem TY, Igbasi TU, Ejezie CO, Omoloye RE, Kunle-Ope CN, Idigbe EO.

Implementation of light-emitting diode (LED) and introduction of systems that transforms existing light microscope into a fluorescent-enabled microscope are innovations in fluorescent microscopy (FM) that may bring about revolution in TB diagnosis.

The study was carried out to evaluate the performance of the ParaLens LED (QBC™ Diagnostics) system for the prompt diagnosis of cases of tuberculosis.

Tubercle Bacilli in Sputum specimens using fluorescent microscopy technique

**Method:** Routine patients who presented with clinical symptoms and signs of TB at NIMR DOTs centre were instructed to produce 2 sputum samples after giving an informed consent. Two direct smear-slides were prepared from each sample and stained using QBC TB stain and Ziehl Neelsen (ZN) stain respectively. The slide readings were blinded until after the study when results were compared.

**Result:** A total of 270 samples were obtained from 135 patients. Out of these, 234(86.7%) of samples for both staining techniques showed concordant result while 36(13.3%) samples showed discordant results. Among the discordant samples, 29 (80.6%) were QBC positive, ZN negative, while 7(19.4%) were QBC negative, ZN positive. Overall sensitivity was 57.9% and 42.1% for QBC and ZN respectively.

Tubercle Bacilli in Sputum specimens Using fluorescent microscopy technique

**Conclusion:** ZN microscopy has been the gold standard for the diagnosis of TB. However, the sensitivity of ZN microscopy has been documented to be very low compared to the culture technique. Data from this study confirmed this low sensitivity of the ZN technique.

However on comparison, the new QBC technique had a relatively higher sensitivity than the ZN. The QBC technique is simple, does not emit UV, does not need dark room and can be used with an existing light microscope. Nevertheless, practical issues regarding quality control program still need to be addressed before its implementation as TB diagnostic tool.

**The positivity rate of the early morning sample (second sample) used for diagnosis of pulmonary tuberculosis.**

Igbasi UT, Onubogu CC, Nwokoye NN, Onyejepu N, Raheem TY, Kunle-Ope CN Tochukwu NE, Omoloye RM, Ejezie CO, Onwujekwe DI, Idigbe EO.

In public health context, the emphasis on AFB microscopy for diagnosis of TB is justified in resource-poor country for smear positive patients who are the main transmitters of the infection. AFB microscopy detects 95% of the infectious cases. The Millennium development goals 6 is to halt transmission of TB and begin to reverse the incidence of TB by the year 2015 and one of the DOTS strategies is to detect 70% of the infectious cases. These can be achieved through quality assured AFB microscopy with the greatest emphasis on sample quality as well as number of samples required for diagnosis.

Guidelines for diagnosis pulmonary TB in resource constrained setting advocates for 3 sputum samples. We aim to assess the usefulness (relevance) of early morning sputum sample (sample 2) in AFB direct smear microscopy in order to reduce the number of visits the TB suspects makes to the lab for diagnosis and also increase the case detection rate.

**Method:** We retrospectively reviewed the result of 2,821 TB suspects that submitted 3 sputum samples (spot, early morning and spot) for AFB direct smear microscopy in the National TB Reference Laboratory, Yaba- Lagos. The data source is our laboratory register.

**Result:** Out of 450 cases studied, 328 of the spot sample ($1^{st}$ sample) were positive for AFB while 378 of the early morning samples ($2^{nd}$ sample) were positive for AFB and 325 of third sample (spot 2) were positive. The positivity rates are as follows;$1^{st}$ spot (sample 1): 72.9%, early morning sample ($2^{nd}$ sample): 83.1% and spot 2 ($3^{rd}$ sample) : 72.2%. P Value: $X^2$ 18.42; df = 2; P = 0.0001

In conclusion, this study revalidates the use of early morning sample for AFB direct smear microscopy. A good sputum sample is required for accurate result. The best sputum sample is obtained early morning because secretions have accumulated overnight

## SERVICE DELIVERY

The following services are offered by TB Lab to support the DOTS clinic;

? Direct sputum microscopy (to support the DOTS clinic).A total of 10,621 sputum samples were processed in 2010

? Culture by both solid and liquid media using Bactec MGIT 960

? Drug susceptibility of TB Bacilli using both solid and molecular methods (HAINS Assay).

## MDR-TB SURVEY

Currently NIMR TB Laboratory is involved in the National MDR-TB Survey. The Laboratory was chosen to carry out Hain's assay on the survey samples for MDR-TB and to culture the identified MDR-TB isolates and other mono-resistant isolates. The survey started in October 2009 and is still on-going. In 2010 a total of 1,420 MDR-TB survey samples were received and analyzed.

## CAPACITY BUILDING

The TB Laboratory has been involved in training of Laboratory workers in the areas of;

? Monitoring and evaluation of some facilities involved in the MDR-TB National Survey.

? Training of IT students from tertiary institutions on Tuberculosis bacteriology.

? Supervision of HND, BSc, MSc and PhD students projects from various Institutions in the Country.

## CHALLENGES:

? Poor funding of TB unit. The unit struggled to survive in 2009/2010 through funding of Hain's assay.

? The costs of reagents are high for liquid culture reagents and the funding is inadequate.

? Lack of equipment back up.

? Lack of an assigned maintenance officer to operate the General dedicated to the MGIT machine in the night.

? Delay in carrying out urgent repairs of physical structures.

? Inadequate space for storage of laboratory items.

? Inadequate office space.
? No internet services.
? Lack of impress Account.
? No common room for the National TB reference lab which is part of WHO Accredited requirement.

## HUMAN VIROLOGY LABORATORY UNIT

### Comparative study between cyflow counter and the dynal T4 quant methods of CD4 enumeration.

Meshack EH., Audu RA., Onyewuche J, Oparaugo CT, Aniedobe MN, Sylvester-Ikondu UF, Salu OB, Musa AZ, Onwuamah C, Uwandu M, Idigbe EO

**Objective:** To compare the CD4 counts obtained by the automated Cyflow counter and the manual Dynal T-4 Quant methods of CD4 enumeration.

**Setting**: Urban area in Nigeria.

**Subjects:** Two hundred and six (206) HIV positive patients on Highly Active Anti-retroviral Therapy (HAART) at the ARV clinic of the Nigerian Institute of Medical Research Yaba, Lagos, had their CD4 cells count simultaneously assayed same day using the Dynal and Cyflow counter methods.

**Results:** For the Cyflow, the (range=3-1140 cells/µl), while the Dynal (range = 20-1000 cells/µl).The overall correlation coefficient (r) between Dynal and Cyflow values was 0.76(P< 0.001). The regression equation to predict Cyflow (x) value from Dynal (y) value is x = 31 + 0.95 Dynal (x).

**Conclusion:** The correlation between Cyflow and Dynal was not good enough since Cyflow can read as low as 3 cells/µls, the Cyflow counter is recommended as it will give a clear picture of the immunosuppression of the patients before the initiation of the ART. For those transiting from Dynal to Cyflow, or those utilizing the results obtained from both methods, a predictive regression equation has been established.

### Experience with hepatitis B viral load testing in Nigeria

Okwuraiwe AP, Salu OB, Onwuamah CK, Amoo OS Odunukwe NN, Audu RA.

Quantification of the viral burden is an important laboratory tool in the management of hepatitis B virus (HBV)-infected patients. However, widespread use of assays is still hampered by the high cost. Treatment reduces viral load to undetectable levels. HBV infected patients tend to have high HBV DNA levels, and severe liver disease.

**Objectives**: This study was carried out to determine the pattern of HBV viral load levels of patients assessing management in Nigeria.

**Method:** Variables included socio-demographics like age, sex, religion, income, educational background and residence. The COBAS Amplicor automated Analyzer (PCR based) was used to assay the virus quantitatively.

**Results:** 594 patients were tested from 2008 to 2009. Statistical analysis was done using Epi info version 2002 and test of significance by Kruskal-Wallis. Mean age of the patients was 36.8 (ranging from 9 to 69) years. HBV viral titre ranged between 4,145 and 68,011,800 DNA copies/ml.

**Conclusion:** There was a high occurrence of viral titre in the population studied. High viral load is a risk factor for hepatocellular carcinoma. A policy earmarked to combat this virus in Nigeria is hereby solicited

Scientist in the Cd4 Laboratory using the cyflow cytometry for the enumeration of Cd4 T cells.

## Determining the HIV status of infants: Rapid Test vs. DNA PCR

Audu RA, Onwuamah CK, Salu OB, Okwuraiwe AP, in collaboration with FMOH and CDC

The World Health Organization recommends the use of rapid HIV testing from 9 -18 months in HIV-exposed children to screen for antibody negative that is, HIV-uninfected infants. Since most published data on time to seroreversion are relatively old, this study was therefore carried out to determine the current time to seroreversion using new generation rapid tests.

**Method:** Four hundred and twelve infants had their toe; finger or heel pricked from where blood was collected for rapid test assays and dried blood spots were collected for DNA PCR.

**Result:** Three hundred and eighty out of the 412 (92%) infants tested for HIV using rapid test turned out to be positive meanwhile using the DNA PCR, only 180 (44%) were positive. Among infants aged 9 months of age or below, the sensitivity of the rapid test kit was 97.6 with a specificity of 2.2%. The age range of 9.1 to 12 months had 93.9% and 20% sensitivity and specificity respectively. Those above 12 months of age all had a sensitivity of 100% with those 15.1 to 18 months having the highest specificity of 25%.

**Conclusion:** Though the sensitivity of rapid test is100% at ages >12months, definitive diagnosis of HIV infection in all infants still remains the PCR. There is an urgent need to scale up the identification of infected infants so they can be adequately managed to reduce the unacceptably high mortality observed among the Nigerian children.

PCR Laboratory for the Amplification, detection, entry and calculation of HIV-1 RNA viral load and HIV-1 DNA PCR

## Validation and quality assurance of the infant diagnostic PCR test using a second spot from the same dried blood spot

Audu RA, Salu OB, Onwuamah CK, Okwuraiwe AP, in collaboration with FMOH and CDC

Early diagnosis of HIV infection in exposed infants is critical to prompt access to care and treatment. Dried blood spot (DBS)-based DNA PCR is the method of choice in resource limited settings. Nigeria embarked on a demonstration project from February to August 2007 to evaluate testing algorithms and quality assurance procedures. This project was therefore aimed at enhancing laboratory management system to produce quality results; identify laboratory errors and provide solutions to minimize them as well as revise PCR testing algorithm and laboratory supervision mechanism to be used in the national Early Infant Diagnosis (EID) scale-up.

**Methods:** DBS samples were collected from infants from 6 clinical facilities in Lagos and shipped by either courier service or a hospital vehicle to a primary testing laboratory in Lagos. The samples were tested using Roche Amplicor DNA PCR. Infants with positive results were to be rebled and the test repeated. Quality assurance (QA) measures included retesting of all positive samples and 10% of all negative samples in a secondary testing laboratory. Other measures were supervisory role of EID laboratory coordinator, use of CDC excel spreadsheet for data management, primary testing laboratory being ISO certified as well as using the CDC control in addition to Roche controls provided and finally the secondary testing laboratory participates in the external proficiency testing provided by the International Laboratory Branch (ILB), CDC.

**Results:** Only 8.5% of those infants who tested positive came back for repeat testing. Eighteen laboratory errors were identified in the primary testing laboratory. They were retested in duplicates and the errors were resolved before releasing the results to the health facilities. There was a 97.7% (250/256) concordant result between both laboratories. The 6 discordant samples were sent to CDC for verification and the results obtained was same as that obtained in the primary testing laboratory.

**Conclusion:** The national algorithm should be revised so that a second blood draw for another PCR among those testing positive be eliminated but emphasis should be placed on quality assurance of the test performed.

### Performance characteristics of the method validation of the cyflow counter for enumeration of CD4 T-cells

Meshack EH, Uwandu M, Onwuamah CK, Audu RA, Idigbe EO.

The Cyflow Counter 1 (Partec, Germany) used for enumerating CD4 T-cells has been in use in Nigeria for about 6 years. It became expedient to evaluate its accuracy, precision and linearity.

**Methods:** Whole blood collected in EDTA bottle is the preferred specimen. The manufacturer recommends that sample should be assayed within 6 hours or within 48hrs if stored at 2-8℃. Four control materials with known value were assayed in triplicate within the same run to evaluate accuracy. Intra-assay precision was evaluated by assaying a low and a high specimen 4 times while inter-assay precision was evaluated by running a low and a high in duplicate at 6hrs, 9hrs, 24hrs, 48hrs and 72hrs. Specimens were stored at 2-8℃. Three concentration levels (25285, 2529, 253) of control material were assayed in triplicate to evaluate the linearity of the machine.

**Result:** The 4 specimens used to evaluate accuracy all had their values within the ±10% acceptable range with correlation of 0.999 with the true value. The low and high specimens used to evaluate intra-assay precision gave 5.1% and 3.4% coefficient of variation (CV) respectively. The evaluation for inter-assay precision performance had CV of 0 to 8.3% for the low specimen and CV range of 0.27 to 5.1% for the high specimen. All values obtained for the high specimen were within ±1SD of the mean value at 6hrs while for the low specimen, the SDIs ranged from -0.7 to -4.9 of the mean values at 6hrs. For linearity, the upper concentrations were within the acceptable ±10% range. However, the lowest concentration (253) was above the +10% value.

**Conclusion:** The Cyflow counter is accurate and precise in its measurement. For best results, it is recommended to assay specimens within 24hours of collection.

Partec CYFLOW Machine for CD4 T-Lymphocyte enumeration

Specimen preparation laboratory for the extraction of HIV-1 RNA, HBV DNA and HCV RNA for viral loads estimation

### Validation of performance characteristics of amplicor HIV-1 monitor test V1.5 for HIV-1 RNA

Salu OB, Okwuraiwe AP, Onwuamah CK, Amoo OS, Audu RA, Idigbe EO.

The Amplicor HIV-1 Monitor Test v1.5 (Roche) is for the quantification of HIV-1 RNA in human plasma. This assay is used to assess patient's prognosis and to monitor the effects of HAART in Nigeria. It became necessary to validate the performance characteristics. Thus this study measured the accuracy, precision and linearity of the assay using the standard specimen preparation for the enumeration of plasma HIV-1 RNA.

**Methods:** Six panels of known values from a proficiency testing programme and 3 controls (low, high, and negative) were assayed using Amplicor HIV-1 Monitor test v1.5 with limit of detection (LOD) of 400-750,000 RNA copies/ml of plasma. These samples were assayed in triplicates within the same run to estimate accuracy. Intra-assay precision was determined by assaying 4 panels and 6 specimens three times while inter-assay

precision was determined by running 4 samples (2 panels and 2 specimens) for three consecutive days. Not detected results were not included in the calculation of precision. Three concentration levels (5.46, 4.46 and 3.46 RNA log Copies/ml) of control materials with known ranges were assayed in triplicates to determine the linearity.

**Results:** For accuracy, 8 samples were within the ±2SD of the true value. For the Intra-assay precision 6 of the 11 samples assayed were within the manufacturers Co-efficient of variation (CV) range (24-36%). While the inter assay precision, 2/4 samples were within manufacturers CV range of 29-41%. From the linearity, the coefficient of correlation (R) was 0.997 compared to the manufacturers (R) of 0.985. The linear equation of this study was y=0.000 + 0.925x compared to the manufacturers y=0.009 + 1.008x.

**Conclusion:** In this environment, for samples with >400 RNA copies/ml there is a 45% variability of results within the same run and a 75% variability between different runs.

### Establishing an external quality assurance programme in Nigeria

Audu RA, Onubogu CC, Okoye R, Nwokoye N, Musa AA, Onwuamah CK, Aniedobe MN., Idigbe EO.

Quality assessment programmes (QAPS), are a means to verify that laboratories are proficient in their testing process. As good as the QAPS may be, they are not readily available to laboratories in developing countries. Some of the limitations in enrolling in foreign programmes are the high cost, challenges of suitable means of transportation of specimens to sites. Other limitations include difficulty in the interpretation of PT results and the absence of technical support in identifying causes of poor performance with the objective of correcting it. In view of these many challenges, the WHO has recommended that the developing countries should strive to develop their national external QAPS which will enable many laboratories in their respective countries to participate. Such QAPS should be coordinated by a national reference laboratory in country which has accreditation by WHO. There are several laboratories in Nigeria that are not enrolled in any external QAPS neither is there any in-country programme presently. It is in line with the recent WHO recommendations and the urgent need to develop an external QAPS in Nigeria that informed this proposed project

**Objective:** To establish a national quality assurance programme for HIV, malaria and mycobacterium tuberculosis in Nigeria in order to improve and strengthen the capacity of the laboratories in providing effective and qualitative services.

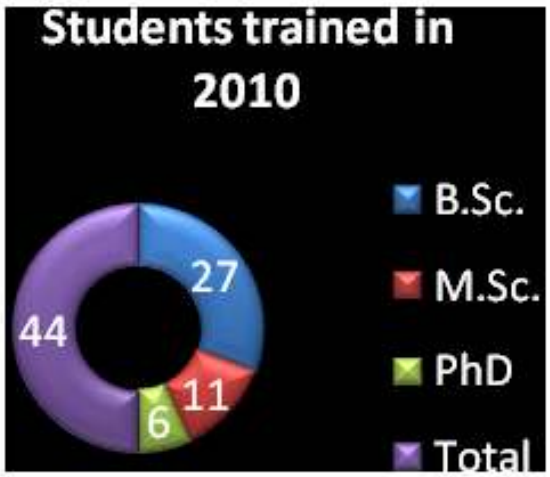
**Result:** Baseline assessment of public and private Laboratories completed and questionnaires are being analyzed. Majority of the Laboratories assessed are not enrolled for any external quality assessment and they have indicated interest in participating. Protocols for HIV and TB panel preparation have been reviewed and approved. Preparation of panels is to commence.
Staff will attend a training to acquire skill for malaria panel preparation. *On-going study*

### Challenges in HVL:

Space constraint: We do not have laboratory space for our equipment and office space for staff.

## Molecular Biology and Biotechnology Division

| | |
|---|---|
| Dr. (Mrs.) S. I. Smith | Deputy Director/HOD |
| Mr. E. A. Omonigbehin | Chief Sci. Lab Tech. |
| Dr. (Mrs.) M. T. Niemogha | Chief Research Fellow |
| Mr. S. N. Akaka | Chief Conf. Secretary |
| Dr. K.S. O. Oyedeji | Senior Research Fellow |
| Mr. K. A. Akinsinde | Asst Chief Med. Lab. Scient |
| Mr. Moses Bamidele | Princ. Sci. Lab. Tech. |
| Mrs. T. W. Fesobi | Senior Sci. Lab. Tech |
| Dr. S. A. Adesida | Research Fellow I |
| Dr. B. I. C. Brai | Research Fellow II |
| Dr. (Mrs.) F.O. Nwaokorie | Research Fellow II |
| Mr. T. A. Bamidele | Research Fellow II |
| Mrs. M. A. Fowora | Snr. Med. Lab Tech |
| Mrs. H. A. Goodluck | Junior Research Fellow |
| Mr. Jacob I. Yisau | Junior Research Fellow |
| Mrs. A. O. Adagbada | Junior Research Fellow |
| Miss R.S.I Okocha | Head Lab. Attendant |




### Emergency response survey with response survey with response to cholera and meningitis outbreak

Ujah IAO, Smith SI, Oyedeji KS, Niemogha MT, Nwaokorie FO, Oladele D, Brai BIC, Bamidele TA, Omonigbehin EA, Akinsinde KA, Bamidele M, Ochoga M

PI- Dr. S.I. Smith
Coordinator- Dr. K.S. Oyedeji

The team responded to three cholera outbreaks in the country namely; outbreak in Bauchi, Borno and Gombe. The following are the reports at the various states.

### Rapid response to cholera out break (Bauchi team)

**Research Team:**

Dr. MT Niemogha
Dr. D. Olade
Dr. F. O. Nwaokorie
Mr. M. Bamidele

**Our Mission**

- To provide Research Component on the control of Cholera in Bauchi State
- Provide some relief materials
- Assist the health workers where necessary

**Aim**

- To collect stool, rectal swabs, vomit, and water samples (source of drinking) from the affected areas
- To carry out laboratory investigation to identify the circulating strains
- To utilize the found strain as link to the development of vaccine and guide to patients' management,

### Epidemiology of cholera outbreak in Bauchi State: Situation Report

Bauchi State is located in the North-East geopolitical zone of Nigeria. It has a surface area of 49,259 sq. km The State shares border with seven other states: Yobe State (North - East), Jigawa State (North West), Kano and Kaduna (West), Gombe (East) Tarawa and Plateau (South). Bauchi State is made up of twenty (20) Local Government Areas (LGAs) with 323 Political Wards. The current cholera epidemic in 2010 started in the neighbouring states of Gombe and Borno state before cases were seen in Bauchi State. However from the time of diagnosis of first case, the epidemic had spread through most of the Local Government Areas (LGA) in the state.

The first case of cholera outbreak was reported from the Abubarkar Tafabalewa University Teaching Hospital on the 18th of August (epidemiologic week 24). The index case was a 29year old lady (Hamamatu Ahmed) from Yelwan Makaranta in Birshi Ward of Bauchi LGA. She presented to the Accident and Emergency Unit of the Abubakar Tafawa Balewa University teaching Hospital on account of sudden onset of watery stool and vomiting. She was admitted for observation and stool specimen was taken for M/C/S and isolation of Vibrio *Cholerae*. This case was confirmed at the microbiology department of the institution through culture and isolation of *Vibrio Cholerae*. By week 25, cases were reported from Shira Local Government area and total number of cases has risen to 34 mainly in Bauchi and Shira Local government areas with one death reported. However, there has been progressive spread of the epidemic across the state. Currently, 15 of the 20 LGAs in the state have reported

cases of Cholera of which 8 were most affected i.e. Bauchi, Alkaleri, Ganjuwa, Giade, Katagum, Ninji, Shira, Tafabalewa and Toro LGAs.
At the end of week 34 (29th August) there were 3358 confirmed cases of cholera in Bauchi State with 104 deaths giving Case Fatality rate of 3.1%. The high case fatality rate in the state was due to late presentation of patients at the health facility, inconsistent case management and poor hygiene practices of the people.

**Risk Factors:**
The following risk factors were identified

- Poor sanitary condition
- Poor personal hygiene
- Lack of potable water supply. (About half of the population uses shallow well water for domestic use. Usually the well is left uncovered and may be located close to pit latrines)
- Consumption of raw vegetables and unpasteurized milk.

**Cholera trends in the past:**
There was a confirmed cholera outbreak in 1996 in Bauchi state but there was no record in the state epidemiology department of the distribution of the disease in time place and person. Also there was no record of the isolation of causative organism or strains responsible for the epidemic. However, Suspected Cholera outbreaks occur annually in Northern Nigeria particularly during raining seasons. In 2009 a suspected outbreak was reported Kabul, Nabardo, Nahuta, Lame and Toro towns all in Toro LGA of Bauchi State.

Present efforts at combating the Epidemic by Bauchi State Government is handled by the agency responsible for the control of the epidemic in the state. A Primary Health Care Development Agency (BSPHCDA) under the office of the state epidemiologist.

a) The following epidemic control activities have taken place.

- Constitution of Outbreak Investigation team
- Training of 20 District Senior Nursing officers and 20 Health Educators
- Provision of supplies particularly Intravenous Fluids (Ringers Lactate), Oral rehydration salts, Antibiotics (Doxycycline) etc
- Contact tracing of exposed population
- Chlorination of wells and living environment of confirmed cases
- Mass public enlightment through the mass media, local town criers, and religious leaders' e.t.c.
- Mass clearing of drainage led by the state governor
- Weekly surveillance and reporting of cases and deaths.

B) **Implementing partners:**

The state received the support of the UNICEF, WHO and Médecins Sans Frontières (MSF) i.e. Doctors without borders in the control of the epidemic.The MSF team set up a treatment camp in ABTUTH compound for case management of all cases from Bauchi and receives referrers from other local government areas. They are also involved in field works to some of the affected local government areas.

UNICEF helps in provision of supplies and WHO in training of health workers on case management and health education.

**Emergency Team Field work Activities:**
The cholera outbreak emergency response team visited 8 most affected local governments' areas. We collected 100 samples from the patients (stool samples, rectal swabs, vomitus sample and environmental sample as well as food sample). Questionnaire survey was done for the patients/guardian and health workers.

**Laboratory Investigations**
Sites visited: Local government areas visited includes: Bauchi (Treatment centre Abubakar Tafawa Beluwa Teaching Hospital ATBUTH), Dass, Ganjuwa (Karfi Mardaki, Mia, and Soro), Giade, Ningi, Shira, Tafawa Belewa (Bununu). Patients were seen at various Medical centres distributed in the Local Government Area. Some LGAs isolation camps were built and the patient' cases categorized as Mild, Moderate and Severe based on their level of dehydration. This category was used in treatment plan as Plan A, B, C

**Patients:** All patients seen on site with symptoms of Cholera (frequent stooling, vomiting and dehydration) irrespective of age or sex were studied. Information was elicited from the patients using a structured questionnaire. A second questionnaire was issued to the health workers.

**Samples collected:** A total of 100 samples (Stool, rectal swabs and vomit) were collected from patients on admission in Medical Centres who have not received any antibiotic treatment and fresh patients before admission (In some cases newly admitted patients who received antibiotics less than 3hrs prior to sample collection). Some Local environmental samples collected included water and food. The 100 samples were collected from the patient were transported to the laboratory in Cary Blair transport medium and processed according to the WHO guideline on Cholera.

**Laboratory Investigations:**
Culture Samples were placed in 5ml of alkaline peptone water and incubated for 4 hours at 37°C. Thereafter they were cultures in Thioglycollate Citrate bile salt Agar

(TCBS). After 16-18hr, observed colonies were identified using standard laboratory method for oxidase tests and Gram's reaction. Antisera (Denka Seikan Japan, was used to serotype the organisms

**Antibiotic Susceptibility Testing:** Susceptibility was carried out on the isolates using Kirby Bauer Method. Isolates were placed in broth and standardized using McFarland's standard 0.5. Using cotton wool sterile swabs were emulsified on plates and spread on Mueller Hinton Agar plates. Gram negative disc (Abtek) were carefully placed, onto the plates and incubated at 37°C. The plates were read after 16-18hrs

**Results:** Preliminary investigation shows that *Vibrio cholerae* was isolated from the patients. According to the Antibiogram so far 60% of the isolated strains were Susceptible to Ofloxacin, Gentamycin, tetracycline but resistance to Augmenting, Cotrimozasole, and amoxicillin. Typed isolates were polyvalent Positive. Results for now are inconclusive

**Observations from the field:**

? Confirmed and suspected cases of cholera were not isolated in some treatment centres.
? Lack of adequate training for care givers on case management protocol for cholera epidemic.
? Non compliance with treatment guidelines
? Treating cases of severe gastroenteritis with broad spectrum antibiotics
? Lack of supplies especially chlorine and Ringers lactate
? Non specification of accurate dose of chlorine for chlorination and abuse of use of chlorine with some patients presenting with possible side effects of chlorine Toxicity.
? Re-infection of members of the same household after attending to family member at treatment centre
? Very poor hygiene level especially at the rural areas and urban slums which were the reservoir of the infection.
? Poor practice of universal safety precaution among health workers at the treatment centres.

Team recommended to Bauchi State for immediate relief , the following:

(1) The state should provide water tanks with clean potable water to affected areas that have wells, ponds, and river as their only source of drinking water.

(2)There is the possibility that the concentration of chlorine in the chlorinated well will be diluted after Heavy rains, therefore the wells should be re Chlorinated after the rain.

(3) Concentration of chlorine in a well should be defined and maintained accordingly to avoid chlorine toxicity.

(4)The communities should be educated on the proper ways of preparing ORS using clean boiled water

**For long the intervention term:**

(1) The teaching of Hygiene Education should be made compulsory in the primary and secondary school curriculum and in Koreanic schools.

(2) Children in schools should be educated on the various diseases that lead to epidemics, how to control them and how they can help teach both their educated and non educated parents, neighbours, friends and teachers the ideal hygiene practices. So that they can grow with it and make Nigeria a Healthy Nation

(3) All health workers should be trained on emergency response to epidemic in order to achieve better case management

(4) There is a need for proper documentation and archiving of report of this epidemic to provide the required assistance in managing future epidemic.

Samples were transported to NIMR Lagos for further analysis that will involve more serotyping and PCR analysis.



## Preliminary Report of the Laboratory Technical Intervention by the Nigerian Institute of Medical Research Emergency Response Team (NIMRERT) to Borno State on the Ongoing 2010 Cholera Outbreak

The Nigerian Institute of Medical Research Emergency Response Team (NIMRERT) led by Dr Kolawole Oyedeji and strengthened by Dr Mike Ochoga ( Coordinator Rapid Response Team Avian Influenza Control Project, FMOH Abuja) arrived Borno state (Maiduguri) on Sunday 29th August 2010. Other members of the NIMRERT are Bamidele Tajudeen and Kehinde Akinsinde.

With planned itinerary, the NIMRERT proceeded to the State Ministry of Health to meet with the Permanent Secretary, the director of Disease Control and the State epidemiologist with the letter of introduction from the Director General of NIMR. The meeting with the above mentioned officers took approximately 45 minutes where the Permanent secretary lauded the action of NIMRERT and the initiative of the Director General of NIMR to assist the state in providing the laboratory technical support in this time of need. He however stressed and attributed the cause of the cholera outbreak to the attitude of the people to personal hygiene and most importantly public health. He cited an example where people connect their sewage disposal system directly to the drainage on the road. The health ministry took the offenders to court and they were fined only =N=500.00 for such a grave offence. He went further to state that cholera is endemic in the state since the cases occur all the year round but

with different magnitudes. Last year it was in southern Borno and now in the Northern part of the state. It is more prominent in the border areas of the state and the reason is attributed to migration of the population.

The state ministry of Health through the Permanent secretary plans to collaborate with the Nigerian institute of Medical Research in health research and other health intervention more so that the institute has an outstation in Maiduguri. This meeting was also attended by the Head of the NIMR outstation in Maiduguri (Dr Lazarus Samdi) who is going to be focal person for the collaboration in Maiduguri, Borno state.

At this juncture the Permanent Secretary handed the team over to the Director (Disease control) for further briefing and mapping of the affected area to be able to plan the intervention

The NIMRERT also brought some Ringer lactate infusions, ORS, scalp vein needles etc, to assist in the management of the cases, if need be in some of the sites to be visited.

**Mapping:** About 19 LGAs were affected by this epidemic. Some others that were affected did not give any report, so the number of LGAs may be more than this. Among the LGAs selected to be visited were BIU LGA, Maiduguri Metropolitan (MMC), JERE LGA, HAWUL LGA, GWAZA LGA, and MUNGONO LGA. The team started their work from the cholera camp situated at the Infectious Diseases hospital (IDH) in Jere LGA. With planned itinerary the team's plan is to visit all the mapped LGAs

**Laboratory Technical intervention:**
Three samples were collected from a patient at this camp with the aid of the sterile swab sticks. One of the swabs were used to inoculate the Carry Blair transport medium, streak directly on the TCBS (Thioglycollate Citrate Bile salt Sucrose medium) and prepare the slide for direct Gram stain reaction in the laboratory. Further, the team was armed with alkaline peptone water which is enrichment medium and this was used for the vomit, water and the sewage samples.

Questionnaires were administered on the patients and or their parents and the health workers. Some information was also collected from the state Ministry of health through structured questions. It is pertinent to mention that the samples were collected from new cases (not yet placed on antibiotics) and some prolonged admission cases that have been on antibiotics.

**Results:** The preliminary result showed that the isolated organisms were resistant to some of the antibiotics but were sensitive to tetracycline (81%), ofloxacin (76%), and gentamicin (62%) of the 21 samples that the antibiogram was determined. About 5% of the isolates from the 21samples were resistant to ofloxacin and gentamicin while 10% was resistant to tetracycline. The isolates were then inoculated into the storage medium for further tests at NIMR cholera laboratory in Lagos to determine the reasons responsible for the patterns of antibiogram observed and further molecular characterization of the isolates. Aside this, the sachet water and the disinfectant used in the camp (JERE LGA camp) were also sampled.

Growth was observed from the sachet water in the enrichment medium as this was turbid while the disinfectant showed no growth. The former has been plated to characterize the organism which showed sucrose fermentation on TCBS. Finally most of the stools cultured on TCBS showed growth of sucrose fermenters typical of Vibrio cholerae, but there is need for further tests to confirm the organism. Further tests such as oxidase, serology and molecular typing will be done after preparation of purity plates for the isolates for further confirmation.

**Discussions:** From the above results, it was observed that the most of the organisms responsible for this outbreak were sensitive to the following antibiotics; tetracycline, ofloxacin and gentamicin. However, it is imperative to mention that antibiotics sensitivity testing is an integral part of management of any bacterial infection such as cholera. This was observed in this epidemic as some (10%) of the isolates showed resistance to tetracycline.

Therefore there may be need for review of the management of such cases using this antibiotic. If not for the affordability issue antibiotics such as the ofloxacin could be adopted as the drug of choice in the management of the cases, since the level of resistance is lower (5%) compared to that of tetracycline.

There is need to test all the sachet water used at the site of treatment, the fomites and the disinfectants at intervals, as they could be sources of re infection of the disease. There should be public campaign and awareness on the importance of personal hygiene, public health in the state in order to prevent future occurrence of the cholera disease as most people are unaware of the practices to prevent the disease. It was also observed that the state might need capacity building in technical laboratory back up services to detect the incriminating organism during cholera epidemics. This was deduced from our interaction with some of the laboratorians in the various sites of the outbreak.
In view of this the NIMRERT planned a training to scale up the technical knowledge of the laboratory scientists as regards laboratory response during epidemics. This was done in Biu local government area of the state and Maiduguri metropolitan LGAs. This will be summarized

using the **SWOT** analysis as follows;

| Strengths | Weaknesses | Opportunity | Threats |
|---|---|---|---|
| 1.The availability of the nursing professionals in providing care during the epidemics<br>2. Infection control measures at the cholera camps | 1.Weak political will from the government in providing potable water and enforcing sanitation among the populace in the state<br>2. Poor logistics and supervision of the LGAs in the state to deliver quality health care to the people<br>3. Poor technical know and availability of basic laboratory equipments/ consumables/reagents in most laboratories in the state to respond to epidemics | Collaborations with indigenous health agencies and parastatals such as NIMR to strength the weak health system in the state | 1. Lack of commitment and workforce apathy to salvage the health of the people in the state.<br>2. Lack of good education of the people on the importance of personal hygiene and public health |

Cholera Outbreak in Gombe State during the Cholera Epidemic in 2010

**Laboratory investigation:** Twenty two rectal swabs were collected from patients at the cholera treatment camp situtated at the Mother and Child Care Centre, London Mai Dorowa, Shamaki Ward, Gombe LGA with the aid of sterile swab sticks. One of the swab sticks was inserted in the carry blair transport medium and the second streaked directly on TCBS Agar. All samples collected were from fresh cases without antibiotics and some prolonged admission cases that have been on antibiotics. Well and stream water analysed also revealed evidence on faecal contamination of both sucrose and non-sucrose fermenters on TCBS Agar.



It should, however, be noted that other bacterial pathogens were also isolated during the epidemic such as *Vibrio parahaemolyticus, Klebsiella pneumonia and Pseudomonas aeruginosa*. Result of antibiogram carried out shows the Following:

| Antibiotics | % Sensitive | % Resistance |
|---|---|---|
| Augumentin | 32 | 68 |
| ofloxacin | 79 | 21 |
| Gentamicin | 63 | 37 |
| Nalidixic Acid | 21 | 79 |
| Nitrofuran toin | 68 | 32 |
| Cotrimoxazole | 0 | 100 |
| Amoxicillin | 26 | 74 |
| Tetracycline | 58 | 42 |
| Doxycline | 68 | 32 |

Bauchi Team Members with Epidemiology officer in Bauchi State

Ofloxacin, Gentamicin, Doxycline, and Nitrofurantoin antibiotics are recommended for all the cases observed in Gombe State. .Molecular analysis on the suspected V. cholera isolates is on-going. So far, out of 64 isolates from Bauchi analyzed for the cholera toxin (ctx) gene using PCR, 27(42%) of the isolates gave positive results. *On-going study*

Plate showing result of antimicrobial susceptibility tests performed during the field work on *V. cholerae* isolates

## Survey and mapping of leading causes of childhood mortality in Nigeria

Ujah IAO,Smith SI, Adesida SA, Nwaokorie FO, Omonigbehin EA,Bamidele M, Fowora MA, Yisau JI, Adagbada AO, Adeneye N, David A, Iroha E, Olowu , Adedoyin OO, Adeboye M, Eneh A, Ibeziako N, Jiya N , Oguche S, Bello M

PI- Dr. S. I . Smith

Project Coordinators- Dr. S.A Adesida, Dr. F Nwaokorie

Nigeria is one of the Sub-Saharan African countries most affected with child mortality. In 2003, the World Bank documented an under-five child mortality rate of 183 per 1000 for Nigeria, one of the highest in the world (World Bank, 2003). One contributory cause can be expected to be the country's poverty level or poor environment, which is concentrated in rural areas or slum area in big cities and which has led to substantial health damage. Poverty or poor environment might exacerbate the problems of poor health and prevalence of childhood diseases, hence high mortality risks. However, few studies have investigated the association between diseases and socioeconomic, environmental, and individual risk factors in Nigeria and other developing countries (Onyiriuka, 2005; Ngianga-Bakwin et al., 2007; Awqati et al., 2009). The United Nations (UN) has set the Millennium Development Goals (MDG4) for all countries worldwide to reduce the rate of infant mortality in under-5s by two-thirds between 1990 and 2015. A better understanding of the causes of death among children is therefore essential to improve approaches for child survival interventions. By identifying groups or settings in which mortality risk is high, preventive actions can be more effective.

Several meetings have been held with our various collaborators and the collaborator from Ilorin attended one of the meetings to discuss advocay visit as well as field work. Questionnaires to be used for the study was discussed extensively and a final questionnaire was agreed on for the field work. Letters were dispatched to the various CMD's.

Five University Teaching hospitals were visited in five sites namely: Lagos, Sagamu, Enugu, Port-Harcourt and Ilorin. By the beginning of next year, the remaining sites such as Maidugari Teaching Hospital and Usman Dan Fodio University Teaching Hospital, Sokoto and University of Jos Teaching Hospital will be visited. The causes of child deaths would be determined by looking at a retrospective analysis within the past 5 years. Questionnaires were used to analyse causes of childhood deaths from 2005 2009.

So far, we have been able to achieve 80% of what was planned in 2010. Four study sites out of five have been visited. These are:

? University of Port Harcourt Teaching Hospital, Port Harcourt, Rivers State.

? University of Nigeria Teaching Hospital, Enugu, Enugu State.

? Olabisi Onabanjo Teaching Hospital, Sagamu, Ogun State.

? University of Ilorin Teaching Hospital Ilorin, Kwara State.

The 5th site Lagos University Teaching Hospital, Idi-Araba required an approval for LUTH-IRB and this has been granted. Currently, we are working on accessing childhood deaths within the past 5 years (2005-2009). Already, 1,400 deaths have been identified and work is ongoing and we plan to pull out at least 75% of these case notes.

Over 1000 questionnaires have been obtained from the four sites as follows:

QUESTIONNAIRES

| STUDY SITE | NUMBER OF QUESTIONNAIRE |
|---|---|
| Port Harcourt | 304 |
| Enugu | 374 |
| Kwara | 244 |
| Ogun | 122 |
| Total | 1044 |

Data entry and analysis are ongoing to enable us determine the leading causes of childhood mortality in Nigeria. *On-going study*

Dr. Nwaokorie FO, Mrs Adagbada J, with Resident Doctors collecting data from case notes at UNTH Ituku Ozalla, Enugu.

## Diagnostic methods for the diagnosis of *helicobacter pylori* and epidemiology of enteric helicobacter infections from patients in Nigeria

Smith SI, Fowora MA, Omonigbehin EA, Goodluck HT, Akinsinde KA, Lesi F, Abdulkareem F, Onyekwere C, Otegbayo JA, Ndububa DA

Sponsor: ICGEB

*Helicobacter pylori* is the causative agent of gastritis, peptic ulcer disease and is a risk factor in the development of gastric cancer. The International Agency for Research on Cancer (IARC), an arm of WHO has grouped *H. pylori* as a class I carcinogen. *H. pylori* grows at 37 $^{0}$C within 72h to 12 days and due to the fastidious nature of *H. pylori* various diagnostic tests have been developed for the detection of the microorganism. Culture of the microorganism is the gold standard but due to power outages, culture of *H. pylori* in Nigeria is difficult or impossible and so methods that would provide rapid and efficient diagnosis for detection of up to 80% of *H. pylori* inspite of the power outages are sought for. However, it should be noted that for monitoring treatment failure, culture is still relevant. Concomitantly, intestinal *Helicobacter* spp will be screened for from asymptomatic subjects and those presenting with diarrhoea.

General Objectives: To isolate and characterize *H. pylori* using molecular techniques and or phenotypic techniques that would provide cheaper diagnosis of the disease as well as proffering early diagnosis. To establish if any a relationship between intestinal Helicobacter spp and diarrhoea**.**

The study period covered samples collected from UCH, Ibadan.

Sample size: Sample size was obtained using the following formula: n= Z2(P(1-P)/D2 (UNDP/World Bank/WHO 2001) where n = sample size, Z=1.96, P= expected prevalence, D=0.05 The prevalence rate from our previous study was 34%, therefore the sample size is 197, but we would use 200 samples, although we have more than 200 samples so far since the commencement of the study. Three biopsies each were obtained from patients (42), (after obtaining informed consent), total (168) presenting with various gastroduodenal pathology disorders and biopsies were used for various experiments such as, CLO test, histology, PCR (using the boiling method) and the fluorescent in situ hybridization (FISH). While rectal samples were obtained from the patients (since it was difficult to obtain stool samples) and were screened for *H. pylori* stool antigen test (HpSA). The stool samples that had discrepant results between the UBT and the 16S rRNA *Helicobacter* genus specific primer have been sequenced and results sent from South Africa.

Characterization of the isolates**:** This would be done using the method of Cowan (1993).

Out of 204 biopsies from 68 patients, 41% were positive for *H. pylori* by CLO test, 35% were positive for *H. pylori* by histology test, while using PCR, 16 S rRNA gene for Helicobacter spp. 54% were positive, from which 43% were positive for glmM gene and 41% for cagA gene. Using the FISH technique, 43% were positive for H. pylori using the fluorescently labeled H. pylori 16S rRNA probe, while 47% were resistant to tetracycline and 16% were resistant to chanthromycin.

Discrepant results (25) between UBT and stool samples of patients sent to South Africa for sequencing showed that only eight showed 100% homology with *H. pylori* while 17 showed 50% homology.

The diagnosis of *H. pylori* using the FISH technique shows that the FISH technique could be suitable for use in our environment although it requires skill to be able to correctly diagnose infections caused by *H. pylori*. In Nigeria, using the glmM gene PCR, would be a better option for faster and accurate diagnosis of *H. pylori* when culture seems impossible due to power outages. During the month of October (26$^{th}$ Oct. 2$^{nd}$ Nov) my collaborator from Caracas, Dr. M. Contreras visited the lab and learnt the FISH techniques and some likely primers used for the technique. In addition, she also gave advice on best method for obtaining Hp culture. *Study Completed*.

## Prevalence and molecular typing of *Salmonellae* spp isolated from foods

PI: Smith Stella Ifeanyi

Collaborators: Fowora MA, Omonigbehin EA, Nwaokorie FO, Bamidele M, 2 B.Sc students,. Aboaba, Adeneye N

Sponsor: IFS

Worldwide, *Salmonella* has been recognized as an important food-borne pathogen. It can be isolated from raw meats, poultry and poultry products, and milk and milk products. Salmonella outbreaks have also been associated with poor cooking, reheating of foods, and improper handling of food by food preparers (Goman et al., 2002). Representing 30.4% of all *Salmonella* strains isolated from humans, *Salmonella enterica* serotype Typhimurium was the second most commonly isolated *Salmonella* serotype in the Republic of Ireland in 2001, exceeded only by *S. enterica* serotype Enteritidis (NDSC 2001)). The worldwide incidence of nontyphoidal salmonellosis is estimated at 1.3 billion cases and 3 million deaths annually (Tassios et al., 1997). Although Salmonella gastroenteritis is generally a self-limiting illness, severe cases may require antimicrobial therapy. Food contamination with antibiotic-resistant bacteria can be a major threat to public health, as the antibiotic resistance determinants can be transferred to other pathogenic bacteria, potentially compromising the treatment of severe bacterial infections. The prevalence of antimicrobial resistance among food-borne pathogens has increased during recent decades (Chiu et al., 2002; Threlfall et al., 2000). This increase is attributed to the selection pressure created by using antimicrobials in food-producing animals, In addition to the unregulated use of antibiotics by humans in developing countries (Angulo et al., 2000; Van den Bogaard et al., 2000). Several methods have been developed for faster diagnosis of NTS from humans, foods and animal sources with the aim of payin more attention to food hygiene practices from food handlers to reduce or eliminate risk associated with antibiotic-resistant and pathogenic bacteria originating from food (Alvarez et al., 2004). Other studies expressed the need for the use of antibiotics in animal feed to be strongly regulated with the main aim of minimizing the opportunity for organisms to develop resistance (Thi et al., 2007).

In Nigeria, not much studies have been done for proper isolation and identification of *Salmonella* spp from food handlers and foods sold by them.

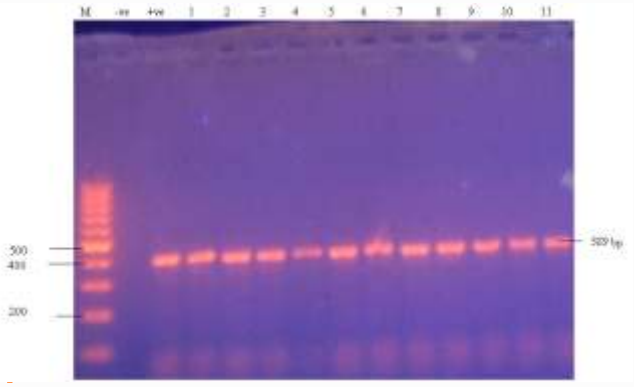
Objectives:

1. To isolate and characterize *Salmonella* species from foods sold by food handlers (both raw and cooked).
2. To detect *Salmonella* spp in foods sold by the food handlers using known diagnostic methods and compare with conventional methods.
3. To type and compare the *Salmonella* spp isolated from foods with that identified by direct detection using PCR methods.
4. To screen the isolates for antibiotic susceptibility patterns.
5. To correlate the isolates from foods with those of the food handlers previously used in first study.

A total of 200 samples have been collected from food handlers (50 cooked and 40 raw meat products). Serology was used as one of the diagnositic methods for the detection of *Salmonella* spp using the Reveal kit and according to manufacturer's instructions. In addition, the samples were also grown on Rappaport-Vassiliadis (RPV) and Bismuth Sulphite Agar (BSA) media and finally on Salmonella-Shigella Agar (SSA) to culture for *Salmonella* spp.

Lastly the samples were subjected to PCR using the primers salm 3 (5'-GCTGCGCGCGAACGGCGAAG-3') and salm 4 (5'-TCCCGCCAGAGTTCCCATT-3') directly from the samples. The primers amplified the 389 bp fragment within the conserved *invA* gene sequence of *Salmonella* spp. The boiling method and alkaline methods were employed for the DNA extraction.

Out of a total of 200 samples 62.5% were positive for *Salmonella* spp using the salm3/salm4 primer set, while using the ST 11/ ST 15 primer set, 54.5% were positive. Only 19% of the isolates were identified as *Salmonella* spp using biochemical characterization. Out of 189 suspected Salmonella spp, 28% were confirmed using salm3/salm4 primer set while 38.6% of the isolates were confirmed using the *inv*A gene primer.



PCR analysis of Salmonella spp using the Salm3/Salm4, size is 389 bp

The work is completed but this goes to show that the snacks commonly consumed by Nigerians are not that safe for consumption as *Salmonella* spp was identified in at least 19% of the samples and confirmed in at least 54.5% by PCR. The major challenge to this work was inadequate funding. *Study completed.*

## Chlamydia and associated pathogens as cofactor in cervical neoplasm

Niemogha MT, Adeiga AA, Ezechi O, Smith SI, Adesida SA, Brai BIC, Fesobi T, Akinsinde KA, Okoye RN, Adagbada AO, Oladele D, Gbajabiamila T, Enya V, Otuonye MN, Odunukwe NN.

*Chlamydia trachomatis* is the most common cause of sexually transmitted venereal infection in the world, with an incidence estimated at 3 to 4 million cases per year in the United States. *Chlamydia* is composed of elementary bodies (the infectious form) and reticulates or inclusion bodies (the replicating forms) and comprise of 15 known sero variants. Although *Chlamydia* has high prevalence there is paucity in data concerning this organism in Nigeria. Its intracellular existence makes study on *Chlamydia even* more difficult. Apart from that, asymptomatic carriage rate has made its presence often ignored.
There is also paucity of data in Nigeria as to the role of *Chlamydia* and other pathogens in cervical Neoplasm. This is largely due to difficulty in diagnosis of the infection as well as lack of man power and facilities to study both phenotypic and genetic risk factors associated with pathogenesis of cervical cancer in our community. This aspect of the study sought to investigate the role of Chlamydia and other pathogens as co-factor in the pathogenesis of Cervical Neoplasm, with the hope that circulating associated strain will be identified, a basis for specific vaccine development.

**Objective:** This aspect examined the role of *Chlamydia*, Human papilloma Virus and other pathogens in Cervical Neoplasm.

**Method:** Awareness campaign was done. Randomized samples collection was carried out. Endocervical and high vaginal swabs were collected from adult females in the Ejigbo/Idimu local Government Area of Lagos, Metropolis. Samples were collected after consent from adults females ages 18 to 58 years who are sexually active. Endocervical swabs (2), High vaginal swabs (2) and 5mls of blood samples were collected from each female. Laboratory analysis of samples were carried out, using three kits (Quick Vue, Grand medical and Diaspot) for *Chlamydia*, Microscopy was done for Bacterial Vaginosis, *Candida* and *Trichomonas*. Serology and culture of samples were done for HPV, *Chlamydia* and *Candida* pre-cancer cells were performed using the Acetic Acid test 'AAT' to Observe abnormal changes (collaboration with the National cervical cancer prevention programme NCCPP Mass medical mission, Olaitan Street, Kilo, Surulere, Lagos).

**Result:** Out of the 200 women sampled only 2 (1%) was positive by serology, 20(10%) was positive by direct microscopy (presence of inclusion body). Cervical cancer (AAT) 4(2%) was positive. The results of culture using Embryoneted egg for *Chlamydia*, Culture of *Candida* and serology results of HPV are not yet out. Therefore a relationship between *Chlamydia*, HPV, other pathogens and cervical cancer is yet to be resolved. The project is under-funded and is on hold at the moment.

## Evaluation of Chlamydia test kits relative to assured culture standard

Niemogha MT, Smith SI, Adesida SA, Oduyebo O, Okoye RN, Umurhuru A, Fesobi TW, Adagbada AO, Adeiga AA, Akinsinde KA, Brai BIC

*Chlamydia trachomatis* is the most common cause of sexually transmitted venereal infection in the world, with an incidence estimate at 3 to 4 million cases per year in the United States. *Chlamydiae are composed of elementary bodies (the infectious form) and reticulate* or inclusion bodies (the replicating forms) and comprise of 15 known sero variants. Although *Chlamydia* has high prevalence there is paucity in data concerning this organism in Nigeria. Its intracellular existence makes study on *Chlamydia* even more difficult. Apart from that, asymptomatic carriage rate has made its presence often ignored. There are however various methods for the diagnosis of *Chlamydial* infection. Conventional isolation of *Chlamydia* involves culturing in cell lines or embryonated hen's egg and stained for visual examination with *Giemsa*, iodine or fluorecein conjugated antibodies. More recently, rapid immunoassays using antibodies to Chlamydia antigen have also been developed. These methods include direct fluorescence assays and enzyme immuno assays. Analysis of various surgical kits may give insight into better and easier methods of detecting *Chlamydial* infections.
*Chlamydia*, a known common cause of sexually transmitted infection will be evaluated by making use of Test Kits. This will involve screening methods and isolation to estimate quantity of elementary bodies and inclusion bodies in order to know the degree of infective particles that can be picked by the kit when there is an infection.

**Specific Objectives:**
1) To screen for Chlamydia making use of various kits
2) To culture Chlamydia, making use of cell lines and embryonated Hen's eggs.
3) To identify and characterize Chlamydia
4) To type Chlamydia making use of monoclonal antibodies
5) To assess the various kits using comparative methods.

Participants included those from Obstetrics/Gynaecology clinic, STI Clinic, Family Planning Clinic, those for Pap smear, and Asymptomatic females. They were first consented and endocervical

samples collected from them. Four endocervical swabs were collected from each participant. Each swab was tested against Chlamydia test kits. Centres where samples were collected included Lagos University Teaching Hospital (LUTH), Sexually Transmitted Disease Clinic - Harvey Road, Clinical Diagnostic Laboratory NIMR, St. Kizito Lekki and surulere, Infirmang Laboratory, Egbada Diagnostic Centre, RAMPS Diagnostic Centre Ejigbo, Manna Hospital Egbeda.
Informed consent was read to participants prior to collection of samples. Endocervical swabs and High Vaginal swabs were then collected. Samples collected at the medical centres were transported to the laboratory in NIMR in Hank's transport medium. They processed immediately.

**Laboratory Investigation:** Evaluation of test kits for Chlamydia was done following manufacturer's instruction. Reactions were recorded. For the Embryonated Hen's eggs, the Vaginal Samples were expressed in 2 sucrose phosphate buffer (medium for Chlamydia) after drilling the egg the fluid was introduced using needle and syringe. For investigation of HVS, Amstel criteria were applied. PH of the vagina was also taken after collection of sample. Thereafter the steps below were followed.

***Immuno-assay:*** The Assay kits used were Diaspot Rapid Diagnostic test for Chlamydia, Grandmedical Diagnostic and Quick Vue (Quikel Deuschel GMBA). A qualitative assay was carried out following the manufacturer's instructions.

***Microscopy:*** Staining of smears made on slides. Smears from Endocervical swabs, High Vaginal Swab (HVS) and smears from Embryonated Hen's Egg (EHE) Culture were stained with Giemsa stains. They were the observed for inclusion bodies.

**Culture:** One swab was kept aside for culture in Embryonated Hen's egg. Each batch of eggs was candled daily for two weeks. Samples from Embryos were taken on the 3$^{rd}$ and 5$^{th}$ and 9$^{th}$ for staining and examined. Samples showing inclusion bodies were stored in 2Sp-buffer at -25$^{o}$C.

**Results:** So far from 400 samples tested, Quickvue gave 25% positivity, Diaspot 23% positivity while Grand Medical gave 15% positivity. The Embryonated Hen's egg culture gave 10% relatedness with Quickvue, 7% with Diaspot and 3% with Grand Medical. The study is on-going; further investigations will probably reveal better results; for now it is inconclusive.

**Challenges/Constraints:** The challenges faced were multifaceted. Sample collection: The areas where we were supposed to reach were unreached because of poor funding for field work. If enough money is allocated, a nurse or medical support staff should be paid to ensure proper and adequate number of samples per week. This will in turn depend on the field worker who should be adequately trained and financially supported especially in the area of transportation.
**Availability of power supply:** This is a natural problem. The kits for evaluation should be kept under adequate temperature (4 10 $^{o}$C) constantly to avoid breaking cold chain, so that potency will remain for a long time. Sometimes Chlamydia may be present in minute amount necessitating more sensitive technique e.g. PCR.
This is a natural problem. The kits for evaluation should be kept under adequate temperature (4 10 $^{o}$C) constantly to avoid breaking cold chain, so that potency will remain for a long time. Sometimes Chlamydia may be present in minute amount necessitating more sensitive technique e.g. PCR.

The area of Embryonated Hen's egg culture should be enhanced and collaboration with a farm where eggs are hatched to ensure continuous supply of egg. When one batch is finishing or any mistake observed, the set of eggs should be changed just like it is done in Vom Veterinary where poultry farming is in high use. If this is done many lapses will be corrected. The summary of the challenges is funding. *On-going study*

## Chlamydia and vaginitis in sexually active female: incidence, diagnostic methods and possible controls

Niemogha MT, Smith SI, Oduyebo O, Adesida SA, Afolabi A, Anorlu R, Odunukwe NN, Okoye R. N. Oparaugo CT, Umurhuru , Brai BIC, Bamidele TA, Fesobi TW, Akinsinde K, Agomo CU, Yesufu VO, Agbebaku E.

*Chlamydia trachomatis* is the most common cause of sexually transmitted venereal infection in the world. Chlamydia infection and vaginitis constitute problem in the female genital tract. They cause ulcerative lesions of the genital organs (adenopathies, strictures). *Candida albicans, Trichomonas vaginalis,* organisms that constitute bacterial vaginosis and other sexually transmitted pathogens are associated with risk for HIV infection. Identification methods are a major problem, harnessing identification methods will help proper and prompt diagnosis which will reduce HIV transmission in our predominantly heterosexual communities.

**Objectives:***Chlamydia* and Vaginitis constitute problem in the female genital tract, sometimes *Chlamydia* may present in asymptomatic form. It is therefore necessary to adapt a common method for identification of such problems.

**Method:** A total of 1000 participants will be sampled. So far, 600 participants from various female groups have been sampled from family planning clinic, STI clinics, Brothels and hotels, Obstetrics and Gynaecology clinics

and higher institutions. Endocervical and high vaginal swabs were collected from each participant and investigated by microscopy, immunoassay and culture.

**Result:** Of the 1800 vaginal swabs analysed; 769 (43%) infections were identified. Of these Chlamydia 90 (30%), Candida albicans 260 (43%), Bacterial Vaginosis (BV) 285 (48%) and *Trichomonas* was 44 (7%). Chlamydia 50 (55%) co-existed with yeast and Bacterial Vaginosis. The P-value (P>0.05) showed that female sexual group is not a factor in the isolation of Chlamydia and *Candida albicans*. The F-value (7.805) increases as P<0.05 decreases indicating always a significant detection of Chlamydia, Candida, *Trichomonas* and BV in syndromic females. The following observations were recorded; High prevalence of *Chlamydia* and *Candida* identified as focus group for therapy. Microscopy combined with immunoassay for prompt and accurate diagnosis. Surveys on female Sexual Health and laboratory findings identified for policy on STI's and HIV/AIDS control.

**Challenges:** This project should be adequately funded. Chlamydia in the area of STI or association with cervical cancer is a public health issue that needs to be addressed. *On-going study*

## Epidemiological survey of the impact of *helicobacter* infection among children in Western Nigeria

Oyedeji KS[1], Smith SI[1], Bamidele T[1], Yisau JI[1], David A[1], Adeneye AK[1], Fowora M[1], Omonigbehin EA[1], Adedokun A[2].

*1. Nigerian Institute of Medical Research, Lagos*
*2. Lagos State University Teaching Hospital, Ikeja*

**Study Population:**
Asymptomatic children with age range of 1-16 years.
Expected Number of samples: 235
Samples collected so far: 33 blood samples and 8 stool samples
**Expected results:**
1. PCV of participants
2. BMI
3. Hp stool culture
4. HpSA antigen detection
5. Ova and parasite detection
6. Serology

Thirty-two percent (32%) of the 135 children screened were positive to detection of *H.pylori.* Male: female is 1.5:1. The most affected age group is 11-16 years. Most of the infected children have a PCV below 25% and were mostly free of occult blood (3%) and parasites (6%). About 73% of the children were underweight and only about 27% were normal. Out of the 73% underweight, 22% tested positive to *H. pylori* serology and 3% tested positive for occult blood. PCV was low in almost all the participants (15 25% in 96.9%) and 40 41% (3.1%).Participants with normal PCV neither tested positive for *H. pylori* serology nor occult blood but had low BMI values. Out of the stool samples collected, 37.5% were positive by stool antigen test (HpSA) while 25% of the cultured samples (on Dent's medium) showed growth characteristic of *Helicobacter pylori*. Generally, there has been a very poor response from the participants, with respect to stool sample collection.

**Conclusion:** In as much as it is difficult to conclude at this juncture, it is obvious that the prevalence of *H.pylori* infection is high among the children already screened. The low PCV level needs to be seriously addressed as this could lead to impaired immunity in this children and consequent exposure to other opportunistic infections**.**
**Challenges:** The major challenge is getting the participants to bring their stool samples. However, plans are underway to alleviate this problem. Funding is another challenge; the HpSA kit is very costly and is not available locally. *On-going study*

**STAFF ACTIVITIES:**

? Dr. M. T. Niemogha is away on one year sabbatical leave at the University of Benin
? Mrs. M. A. Fawora is awayfor six months as part of her PhD work in Munich, Germany on a
? DFG sponsored project.
? Dr. BIC Brai obtained his PhD in 2010.

**GRANTS RECEIVED IN 2010**

? "Correlation of *Helicobacter pylori* infection with gastroduodenal diseases in Nigeria: improvement of diagnosis and treatment. DFG (German African Research Foundation).

## Equipment available in the lab through grants and Due Process

PCR room showing from the left, Techno Thermal cycler, Eppendorf thermo mixer comfort Nanodrop spectrophotometer, Eppendorf Masterl cycler gradient, Automatic voltage regulator Eppendorf master cycler personal. Bio-Rad electrophoresis Power pack, CBS scientific power pack

Type I biosafety cabinet containing PCR tubes and tips, micropipettes, micropipette stand and racks. Beside the biosafety cabinet to the left is a Stuart vortex mixer and a mini microcentrifuge.

## Public Health Division

| | |
|---|---|
| Dr (Mrs.) M. A. Mafe | Director (Research) |
| Dr (Mrs.) O. P. Akinwale | Deputy Director (Research) /Head of Division |
| Dr T. S. Awolola | Chief Research Fellow |
| Dr B. Adewale | Chief Research Fellow |
| Dr (Mrs.) M. A. Sulyman | Research Fellow 1 |
| Mr. A. K. Adeneye | Research Fellow 11 |
| Mr. A. O. Oduola | Research Fellow 11 |
| Miss J. B. Obansa | Research Fellow 11 |
| Mr. M. A. Adeleke | Junior Research Fellow |
| Mr. P. V. Gyang | Junior Research Fellow |
| Mr. M. B. Ajayi | Chief Medical Laboratory Scientist |
| Mr. O. Ogungbemi | Chief Nursing Officer |
| Mr. D. O. Akande | Principal Medical Laboratory Scientist |
| Mr. C. Duker | Principal Medical Laboratory Scientist |
| Mrs. A. A. Dike | Laboratory Technician |

The research activities of the Public Health Division focus on communicable and non communicable diseases of public health importance in the country. In 2010 the division conducted field and laboratory based research in the following areas:

### SCHISTOSOMIASIS

### Identification of genetic markers for diagnosis of bladder cancer associated with Urinary Schistosomiasis

Akinwale OP, Adeleke MA, Gyang PV, Ajayi MB, Akande DO, Dike AA

Schistosomiasis ranks second to malaria among parasitic diseases of socio-economic and public health importance while bladder cancer has been associated with long-term urinary schistosomiasis, with chromosomal alterations occurring in exfoliated cells in the urine of patients. Literature has shown that squamous cell carcinoma (SCC) is the most common malignancy in many tropical and subtropical countries due to endemic infections by *Schistosoma haematobium*. It has also been reported that schistosoma-related bladder carcinoma defines a characteristic pathology that differs from non-schsitosoma-related bladder carcinoma and suggested exploring the potentials of molecular markers such as microsatellites for detecting schistosoma-related SCC in Africans. In this study therefore, we will characterize genomic DNA (gDNA) from exfoliated urine cells of infected participants and assess it for allelic loss using some known microsatellite markers, which are based around regions of frequent chromosomal loss in bladder carcinoma.

We hope to contribute to the development of a simple, non-invasive screening method for schistosomiasis related bladder cancer.

**Goal:** To contribute to the development of a non-invasive diagnostic method for schistosomiasis related bladder cancer.

**Objective:** To characterize exfoliated cells in the urine of *S. haematobium* infected patients and determine loss of heterozygocity and genomic instability using microsatellite analysis.

Urine and blood samples were collected from Ipogun, Ondo State an agrarian community, endemic for urinary schistosomiasis. The gDNA extracted from blood and urine samples was subjected to Polymerase Chain Reaction (PCR) amplification using six human genomic markers with some blood gDNA serving as reference DNA. The six molecular markers have been optimized with someurine and blood samples. The study is ongoing and more genomic markers and communities will be covered to generate coherent data. *On-going study*

Dr (Mrs.) O. P. Akinwale. Deputy Director (Research) and Head of Public Health Division.

A research staff searching for fresh water snail intermediate hosts of schistosomes at one of our study sites in Ogun

Urine samples collected from study participants heavily infected with *Schistosoma haematobium*, showing visible haematuria.

**Investigations of human cytomegalovirus co-infection in HIV patients**

Akinwale OP, Afilaka B, Gyang PV, Adeleke MA, Adeneye AK, Onwujekwe DI, Alimi F and Akande DO

Human cytomegalovirus (HCMV), a human herpes virus is an important pathogen in immunocompromised hosts including patients with AIDS, neonates and transplant recipients. Like other herpes viruses, HCMV usually remains latent in the infected people throughout their life except in immunocompromised patients in which loss of cell-mediated immunity permits the activation and replication of the virus to benign. The pathogenesis of the disease includes chorioretinitis, gastrointestinal disorders, pneumonitis, and radiculopathy. Previous epidemiological reports showed that barely 50% of the HIV patients in United States 1992 developed different clinical signs of HCMV including chorioretinitis, esophagitis, colitis, pneumonia. Recent studies however indicated drastic decline in the prevalence of HCMV among HIV patients with the introduction of antiretroviral treatment of the HIV patients. Therefore, earlier detection of the pathogen in HIV patients becomes imperative for prompt commencement of ART treatment and thus, improving the quality of life of these immune-compromised patients. Diagnosis of HCMV is clinically difficult and the thrust of diagnosis has relied mostly on serology. However, the use of molecular technique most importantly, polymerase chain reaction (PCR) for the diagnosis offers a novel approach and gives impetus for reliable estimation of prevalence of the virus in human populations through amplification of sequence of the virus in human specimens. In Nigeria, the prevalence of HCMV among HIV patients and the utilization of molecular techniques for its diagnosis are still scarce in literature. It is against this background that the this study utilizes PCR to determine the prevalence of HCMV among HIV patients attending antiretroviral (ARV) clinic in Nigerian Institute of Medical Research so as to determine the relationship between the prevalence of HCMV HIV-1 viral load as well as Cd4 counts of the patient.

A total of 218 patients have been screened out of which 30 (13.76%) were positive. However, the computation of the patients' demographic and clinical data is still on-going at the database section of NIMR ARV clinic. HCMV infected patients had been referred to Ophthalmologist examination and treatment. *On-going study*

**Molecular Entomology and Vector Control Unit**

**Laboratory Evaluation of the wash Resistance of Olyset® And Permanet®2.0 Long-Lasting insecticidal Nets in comparison to a conventionally treated Net, for use in Nigeria**

Awolola TS, Oduola AO, Olojede JB and Dike AA

Long-lasting insecticidal nets (LLINs) technology has circumvented the need for re-treatment of insecticide-treated nets, which lose their efficacy after washing and are often not retreated. Nigeria is scaling up the use of LLINs for malaria control without quality assurance of the bio-efficacy of the nets at country level. With the current trend of insecticide resistance in the major malaria mosquito in Nigeria, there is a dire need for this baseline information prior to bed nets control intervention.

Due to the growing demand and usage of LLINs, this study evaluated insecticide regeneration and wash resistance of the two WHO fully recommended LLNs: Olyset® and PermaNet®2.0 commonly use in Nigeria.
Net samples supplied by the manufacturers were washed using standard WHO washing and drying protocols. Bio-efficacy of nets was evaluated at baseline using standard WHO cone bioassays with a reference susceptible mosquito strain of *Anopheles gambiae s.s.* To estimate insecticide regeneration time from the nets after washing, bioassays were carried out every 24 hours on net samples washed once or thrice until the initial baseline bio-efficacy was restored. Wash resistance was assessed using bioassays on day 0 and after the 1st, 5th, 10th, 15th and 20th successive washes.

PermaNet®2.0 outperformed the Olyset® in term of mosquito mortality on net samples. Full insecticide regeneration of PermaNet®2.0 was achieved one day after washing, while mortality remained >98% after 20 standard washes even with <50% of the baseline insecticide content of the nets. In contrast, a significant amount of time (21 days) is required for full insecticide migration to the Olyset® net surface after washing when kept at ambient temperature. Heating at 50°C for 2 hours however, increased the rate of insecticide regeneration. After 20 successive washes, Olyset® net retained >88% of their original insecticide concentration, but bio-efficacy declined to < 90% after 20 washes. Although the Olyset® net has been recommended for use, the operational implication of the time-lag for full insecticide regeneration to the net surface is not clear.

**Next step**

The challenge here is to investigate under field condition if Olyset® nets will provide full protection against free flying mosquitoes within the first two weeks after washing

## ETHICS

**Assessing participants' understanding and voluntariness of informed consent in a clinical trial in Nigeria**

Adewale B, Rossouw T and Schoeman L.

The citizens of developing countries are often in vulnerable situations because of their lack of political power, illiteracy, unfamiliarity with medical interventions, effects of war, natural disasters resulting in famine, extreme poverty or serious need for medical care. The health-related conditions that arise out of these situations however make research in these populations vital and increasing funding for research on diseases that affect the world's poor is making such research possible. As a result of the tension between the need for research and the possibility of exploitation of participants' vulnerability, the need exists for the development of reliable ways of ensuring that participants' consents are voluntary, informed and that they actually understand the information provided during the consent process.

This study seeks to assess the research participants' understanding and voluntariness of informed consent in a clinical trial by means of a cross sectional survey of research participants in an anti-malaria clinical trial in Nigeria.

The study design is a cross-sectional analysis of the informed consent process. It will consist of qualitative and quantitative components. The assessment of understanding will be done using the method of Lindegger et al., (2006) which involves a combination of the questionnaire in the form of a forced-choice checklist and self report methods. Voluntariness will be assessed using a questionnaire adapted from Barsdorf and Wassenaar (2005), which was demonstrated to have excellent internal reliability. As recommended by Barsdorf and Wassenaar (2005), minor alterations have been made to the questionnaire to improve the understanding of the questions by the respondents as well as the validity of the questionnaire, taking into cognizance the various threats to voluntariness as stated by Faden et al., (1986) as well as by Pace and Emanuel (2005). It is believed that the questionnaire which obtained an acceptable reliability score (Barsdorf and Wassenaar, 2005) will adequately measure the level of voluntariness of the participants.

It is expected that this study will provide information on factors that influence research participants to take part in clinical trials and ways of improving the process of obtaining the consent of participants in clinical trials. So far data collection has been completed and the data analysis is currently in progress.

## CONFERENCES/TRAINING/WORKSHOPS ATTENDED

1. IANPHI-THL Summer School "Role and Function of a Comprehensive National Public Health Institute", **National Institute for Health and Welfare (THL), Helsinki, Finland.** June 7 11, 2010.
2. International Congress of Parasitology (ICOPA XII), Melbourne, Australia. August 15 20, 2010.
3. Ninth International Conference on Urban Health (ICUH 9), New York, USA. October 24 26, 2010.
4. African Health Research Ethics Symposium II. Durban South Africa. September 29 October 1, 2010.
5. ENAROMaTIC Consortium workshop. Pisa, Italy. January 13 17, 2010.
6. Vestergaard Supported Ministerial Committee Meeting on Innovative Vector Control, Hanoi, Vietnam. January 21 27, 2010.
7. WHO-MIM Taskforce Workshop, Linlongwe, Malawi. March 13 17, 2010.
8. 41st Annual Conference of the Entomology Society of Nigeria, Wesley College, Ondo. October 4 - 7, 2010.
9. Agriculture, Environment and Health: Developing an exchange platform for sustainable agriculture productivity in West Africa, IITA Cotonou, Benin Republic. May 3 7, 2010.
10. WHO/APOC workshop on data analysis. Bohicon, Republic of Benin. February 24 27, 2010.

## RESEARCH GRANT

Dr O. P. Akinwale - International Association of National Public Health Institutes (IANPHI) Seed Grant for Research, 2010 2012.

## CHALLENGES

Main challenge faced by the Division in the year 2010 was irregular/inadequate funding from the Federal Government for research, maintenance/repairs of equipment and other activities such as attendance at conferences and workshops.

## Monitoring & Evaluation Unit

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| Mrs. A.Z. Musa | Research Fellow |
| Mrs. A.M. Adedeji | Principal Statistical Officer |

The Monitoring and Evaluation unit is new under the Director General's office. It was set up as one of the steps taken in to achieve the new trend of results based M and E system and also the reporting requirement of the Institute. The Unit was established for the Institute to have a functional M and E system in place for systematic monitoring of input/output and processes, periodic evaluation of outcome and impact of projects, programs and the organizational activities at various levels.

The activities of the unit involve collecting key data elements related to the institute's objectives and operations and analyzing these data to guide management decisions, activities, projects, programs, practices, policies and funds allocation. In addition the unit makes an effort to document the experience, conduct operational research and develop conceptual basis for interventions to create knowledge base on these issues. Also, it provides data management and statistical support to all the Research Divisions and Units.

### Research Projects Carried Out and Supported

A study of workplace knowledge, attitude and practices on HIV/AIDS, Tuberculosis and Malaria in selected small and medium scale enterprises (SMEs) in Lagos. *Completed*

**Characteristics at Baseline of Adult HIV/AIDS patients over the years: 5 years case review *Completed***

Intervention study on Non-Communicable Diseases and preventable lifestyle risk factors in three Urban Slums of Lagos State Nigeria. *On-going*

National External Quality Assessment programme on HIV/ TB and Malaria for laboratories in the Nigeria.*On-going*

Cholera Outbreak in some states in Nigeria. *On-going*

A survey on emergency obstetric and neonatal care for medical officers . *On-going*

Reproductive practice amongst adolescents and young adults. *On-going*

### Studies completed

A study of workplace knowledge, attitude and practices on HIV/AIDS, Tuberculosis and Malaria in selected Small and Medium Scale Enterprises (SMEs) in Lagos.

Idigbe E.O., Musa A.Z., Adeneye A.K. and Adesanmi A.

Malaria is the most significant public health problem in Nigeria with 97% of the population being at risk. It accounts for 25% of under-5 mortality and 30% childhood mortality and 11% maternal mortality. There is an estimated prevalence rate of 3.1% among Adults aged 15 to 49 and about 2.4 million people above the age of 15 living with HIV/AIDs in Nigeria. Nigeria also has the second highest TB disease burden in Africa and ranks 4th among the 22 high TB burden countries in the world (2008 WHO Global TB Report).

Considering the public health concern and economic impact of this 3 diseases Malaria, Tb and HIV/AIDS (ATM), which also is directly or indirectly impacting negatively on the workforce in Nigeria; there is need for scaling up on the treatment and prevention. 70% of the workforce of Nigeria falls under Small and Medium Scale enterprises, if this population can be trained on issues around ATM, then it will go a long way in reducing the prevalence and prevention of these diseases in the country.

Chevron in collaboration with NIMR, NACA and a NGO are trying to reduce, prevent and control HIV/AIDS, Tuberculosis and Malaria in Nigeria by working with Small and Medium Scale Enterprises (SMEs).

A baseline knowledge, attitude and practice (KAP) study was conduct between December 2009 and February 2010 which provided both quantitative and qualitative information about behaviour, beliefs, attitude and practices of persons working in small and medium scale enterprises. The SMEs included are LEAP Africa, BCG Associates, Light Level Limited, Precision Logistics, Waste Matters, Lady Mechanic Initiative and Babitol,

A total of 259 individuals who were either members of staffs of those SMEs or identified step down groups of those SMEs were surveyed. Survey questions explored respondent's knowledge, perceived routes of transmission and prevention of HIV/AIDS, TB and malaria as well as their attitudes and practices in relation to risk behaviours that predispose them to these diseases.

In general, baseline knowledge about transmission and prevention of HIV/AIDS was high (64.0%), 79.2% didn't know TB can be cured and also only 27.4 knew the correct mode of malaria transmission. Condom use discussion with partner was 50% which pointed towards the need for behavior change in the target groups.

Chevron in collaboration with the Women's Rights and Health (an NGO) project trained peer educators on knowledge, attitude and behaviour around these three

## Characteristics at Baseline of Adult HIV/AIDS patients over the years: 5 years case review

Musa AZ, Odunukwe NN, Ezechi OC, Onwujekwe DI, Kaleyaiye OO , Audu RA, Gbajabiamilla TA, Ezeobi PM, Oladele D, Adu R, Shomefun EO, Gab-Okafor C, Oke BO, Herbertson E, Nwogbe OA, Salu OB, Nathan E, Idigbe EO

Sub-Saharan Africa remains the most heavily affected, accounting for 67% of all PLWHA and for 75% of AIDS deaths in 2007 with Nigeria having an estimated 2.9 million PLWHA.

The Federal Government of Nigeria (FGN), in January 2002, launched a National ART program as part of an expanded response to care and support for People living with HIV and AIDS (PLWHA) and NIMR became a treatment centre in February 2002 alongside 24 other centres distributed across the six geopolitical zones of the country.

During the early period of the access program, as a result of low awareness, stigma and discrimination and few treatment centres, most patients presented very late which was associated with high cost of treatment, morbidity and mortality. It's now 9 years since the FGN introduced the Antiretroviral Treatment (ART) access program. There is need to evaluate the program to assess if the increased access and awareness programs have had impacted on the status of patients at presentation.

The objective of the study was to determine the baseline characteristics of adult HIV and AIDS patients presenting for care, treatment and support over a 5 year period as a proxy to accessing the effect of increased access to ART services and awareness campaign.

A Database review of baseline characteristics of consecutive and consenting adult Nigerian patients receiving treatment, care and support at a large HIV treatment centre NIMR, Lagos Nigeria over a 5 year period (2005-2009) was carried out.

A total of 12,552 patients were analysed, there was female predominance (64%). This female preponderance was maintained over the five year period (ratio of 3:5, males to female). Age range was 15-84 years over the years with the most affected age-group being 30-49 (70%) and mean age 38.3yrs, but between 2008-2009 there was significant 20% increase in the age group 15-29years. More than half were married (58%) closely followed by the single group (27%) while the rest were separated, single and widowed (15%). 43% of the patients had secondary education, (28%) had tertiary while others either had none or just primary education (29%). Condom use was low; 84% reported they don't use condom, with only 16% reporting usage. The mean CD4 cell count of patients enrolled in 2005 was 235 and 288 cells/µL in 2009, giving a significant 23% increase, also comparing the yearly mean CD4 Cell Counts over the 5 years there was statistical significant of ($p< 0.001$) by Kruskal-Wallis's test. Similarly mean RNAViral load declined by 22% from 268,480 (2005) to 209,776 (2009) copies and also statistically significant by Kruskal-Wallis's test ($p<0.001$) when the yearly figures were compared. There was consistent increase in pregnant women presenting at baseline with a percentage increase of 16%, comparing 2005 with 2009. This may be attributable to increase in awareness and incorporation of HIV Counselling and Testing (HCT) in routine Antenatal Care screening.

The study showed that the awareness strategies over the years have been helpful in varying the characteristics at baseline. It also showed an early detection and presentation of HIV positive patients even amongst the younger population (<20 years). It was therefore recommended that the awareness campaign should be continued and also HIV services delivery point should be increased as early presentation reduces the overall cost of service.

## Library & Documentation Unit

The Library traditional functions of selection, acquisition, cataloging and classification were performed in the last one year, while the ongoing library automation continued during the period using Micro CDS-ISIS software. However efforts are being made to transfer the data in the MICRO CDS-ISIS to a customized library software (X-Lib) acquired by the library to enhance the library automation.

### COLLECTION DEVELOPMENT

The Library struggled to acquire materials to meet the information needs of clients. The Journals subscribed to are mainly local journals while the international journals acquired are mostly donations from friends of the library.

Books acquired were very few and they are all donation to the library. The library books and journal collections to date are:

(i) Books and Monographs 7,500
(ii) Periodical titles 492
(iii) CD-ROM 83

There was improvement in the IT services available in the unit particularly in the computer section of the unit where state of the art IT equipment were acquired some few years ago. These new equipment has improved the performance of the section significantly. The desktop publishing of the institute publication was done here i.e. Institute Annual Report, NIMR News and Brochure etc.

### INTERNET/WEBSITE

The Institute still relies on the Internet connection provided by a Federal Government appointed agent (Galaxy backbone) approved to provide Internet service to Federal Institutions and Parastatals. However, this connection is not adequate for the institute because it could only be used on three computers at a time hence the usage is restricted to the Computer Section of the Library located in the laboratory complex. To complement this connection Internet Modem were provided for some principal officers in the institute including the library to serve its clients.

The Institute website became more robust in disseminating information during this period. The current address www.nimr.gov.ng appropriately classify the institute on the internet as a government institution.

### LIBRARY BUILDING

In a bid to ensure that the library occupied its proper position in the Institute, the Governing Board has decided to build an ultra-modern library building on the vacant plot of land adjacent the administration building.

### CHALLENGES

Funding is a major challenge to the unit. For instance there was no allocation for library books and journals in 2009 hence it became difficult to renew our subscription for 2010 Journals.

The absence of a robust Internet Connection made prompt and regular uploading to the Institute Website difficult, apart from this it is not easy to meet the library user's information needs using internet modem on a stand-alone computer, while majority of NIMR staff are deprived access to the internet.

Currently the library does not have a functional photocopying machine.

Another challenge is the non-availability of a library school around Lagos that the junior staff can take advantage of to improve their knowledge and have career progression. Some of these staff have reached their bar without hope of progressing. Unfortunately the Institute policy does not allow staff to go for more than one year study leave with pay.

Library as we all know is basically service oriented and does not often have revenue generation motives or objective. In view of this, there is need to have adequate budget for library materials particularly books and internet service

However, inspite of these challenges, the unit took respite in the Director General's commitment to the building of an ultra-modern and functional library.

## Administration Division

### Senior Staff

| | |
|---|---|
| Alh. A. S. Yunusazazzau | Ag. Director (Admin) |
| Mrs. G. O. Ihenewengwa | Chief Executive Officer |
| Mrs. A. E. N. Okoye | Asst.Chief Personnel Officer |
| Mr. B.I. Ohanusi | Asst. Chief Exe. Officer I |
| Mr. N.N. Bitrus | Prin. Personnel Officer |
| Mr. B. N. Osuji | Principal Execu.Officer I |
| Miss A. N. Nnenji | Prin. Exe. Officer I |
| Mr. M. I. Ezerendu | Snr. Personnel Officer I |
| Mrs. Q M. Aderounmu | Prin. Exec. Officer II |
| Mrs. E. I. Edosonwan | Senior Executive Officer |
| Mrs. C. Nma Nwofor | Senior Exec. Officer |
| Mrs. N.I. Akintan | Personnel Officer I |
| Mr. M. K. Idris | Snr. Exec. Officer |

The Administration Division continued during the period under review to provide the enabling environment required for the prosecution of Institute's research mandate. This involved the interpretation and enforcement of Public Service Rules, provision of secretarial services to the Institute's Management Committees, provision of Legal services, security and Insurance cover for all of its assets; keeping of policy files and updating of staff records. The Administration Division also provided Secretarial services to the Institute's Governing Board and Board of Trustees.

The Governing Board held 5 meetings in 2010, while the Board of trustees held its meeting quarterly during the year. A retreat was held on the 16th of December, 2010 for members of the Board of Trustees (BOT).

**NEW APPOINTMENTS**

The Institute has a new Director General in the person of Prof. Innocent A.O. Ujah, *mni*. The Director General assumed duty in the Institute on the 24th of May, 2010.

Additionally, 3 new appointments into the services of the Institute were made. They are as stated below:-

| NAME | DESIGNATION/GRADE LEVEL | DATE ASSUMED DUTY |
|---|---|---|
| Mr. E.O. Ijoga | Information & Comm. Techn. Officer II - 7/2 | 5/7/10 |
| Mr. M.M. Awwal | Assistant Social Welfare Officer - 6/2 | 11/10/10 |
| Mr. J.K. Wahzi | Motor Driver - 3/1 | 06/12/10 |

**STAFF PROMOTION/UPGRADING**

14 senior staff promotions/upgrading were approved by the Governing Board during the 2009 promotion exercise.Those promoted/upgraded with effect from 1st January, 2010 were:-

| NAME | NEW DESIGNATION | CONHESS/COMHESS / STEP | EFFECTIVE DATE |
|---|---|---|---|
| Dr. B. Adewale | Chief Research Fellow | 13/1 | 01/01/10 |
| Dr.(Mrs.)M.T. Niemogha | Chief Research Fellow | 13/1 | 01/01/10 |
| Mr. S.N. Akaka | Chief Confidential Secretary | 13/3 | 01/01/10 |
| Mrs.F.O. Baiyewunmi | Chief Confidential Secretary | 13/1 | 01/01/10 |
| Mrs. E.N. Amadi | Chief Nursing Officer | 13/1 | 01/01/10 |
| Mr. E.A. Udofia | Asst. Chief Technical Officer | 12/1 | 01/01/10 |
| Dr. O.O. Aina | Research Fellow I | 11/1 | 01/01/10 |
| Dr. P.M. Ezeobi | Research Fellow I | 2/1 | 01/01/10 |
| Dr. (Mrs.) T.A. GbajabBamila | Research Fellow I | 2/1 | 01/01/10 |
| Mrs. E. Meshack | Research Fellow II | 09/1 | 01/01/10 |
| Mrs. N.B.A. Kadiri | Senior Internal Auditor | 09/1 | 01/01/10 |
| Mr. S.A. Adekoya | Senior Exec. Officer A/c | 08/3 | 01/01/10 |
| Mrs. M.A. Akhigbe | Internal Auditor I | 08/3 | 01/01/10 |
| Miss. P.O. Emelue | Personnel Officer II | 07/2 | 01/01/10 |

2010 Financial Report

# NIGERIAN INSTITUTE OF MEDICAL RESEARCH

## BALANCE SHEET AS AT 31ST DECEMBER 2010

| | 2010 |
|---|---|
| | =N= |
| ASSETS EMPOLYED: | |
| Fixed assets | **253,860,306** |
| CURRENT ASSETS; | |
| Investments (in NTB) | 31,000,000 |
| Cash and bank balances | 197,236,329 |
| Debtors and other debit balances | 34,448,380 |
| Total current assets | 262,684,709 |
| CURRENT LIABILITIES | (3,819,302) |
| Net current assets | 258,865,407 |
| Total net assets | 512,725,713 |
| FINANCED BY: | |
| Accumulated fund | 434,955,464 |
| External research grant | 61,020,249 |
| Revolving fund | 16,750,000 |
| | 512,725,713 |

## Maintenance Division

**CIVIL/BUILDING PROJECTS**

? Renovation and refurnishing works in House 6, and its Boys Quarters.

? Procurement of 3 vehicles: Hyundai Tucson Jeep, Toyota Camry for Abuja Liaison office and Toyota Jeep Van as a Project Vehicle.

? Renovation and refurnishing works in Board Room.

? Decoration and Re-furnishing of the Director General's office.

? Renovation and conversion of former Time Keeper's offices to a Reception Hall in the Administration Building.

? Renovation and conversion of former dressing room to a Reception Hall in the main Laboratory Complex.

? Relocation and Furnishing of liaison office at Abuja.

? Renovation of house 4 and construction of its Boy Quarters cum store.

? Fabrication and Erection/ positioning of an outdoor steel stacking rack for the store.

**PLUMBING AND FUEL SUPPLY RELATED WORKS**

? Re-construction for strengthening of the failed retaining wall at the new Library site extension now to be called Cancer Screening Centre reinforced concrete.

? De-silting of the existing Institute's network of Drains and sumps (cell pools)

? Sign writing work on all doors of various offices and Laboratories in NIMR Headquarters, Lagos.

? Fabrication and Installation of 2,500 00 litres and 5,000 litres capacity steel overhead Diesel Tank for the Auditorium 120KVA and HVL 250KVA Generators respectively.

? Reconstruction of the existing HVL underground water tank.

? Reconstruction and relocation of existing Septic Tank using r.c. retaining walls at the Medical Compound.

**ELECTRICAL**

? Procurement and Installation of 120KVA Soundproof Perkins Engine Generator dedicated to the NIMR Auditorium Building.

? Procurement and Installation of 250KVA sound proof Perkins Engine generator dedicated to the Human Virology Laboratory.

? Procurement and Installation of additional 500KVA Basic Perkins Engine generator at the NIMR central Power House.

? Procurement and Installation of a new 500KVA Distribution Transformer/The Feeder Pillar for the effective distribution of the loads.

? Effective maintenance service of the NIMR Priority Feeder Line to ensure constant and uninterrupted power supply.

? Separation of Air conditioners line from the other systems in all the blocks of flats as a device of checkmating discriminate power usage.

? Upgrading and Installation of 70mm$^2$ armored cable at the Human Virology Laboratory.

? Upgrading and Installation of 95mm$^2$ Cable for the Administration Building.

? Upgrading and Installation of 400mm$^2$ Cable for the Residential Quarters.

**MAINTENANCE SERVICE CONTRACTS**

The following maintenance Service Contracts were renewed and undertaken in 2010 for the following:-

? Old 500KVA Generator by Jubaili Bros (Engineering) Limited

? FS 50 Biomedical Incinerator by Sankey Nig. Limited.

? 100KVA and 250KVA Generators at the Human Virology Laboratory by Aicom Nig. Limited.

? Institute's Intercommunication System by Luvly Limited.
? Cleaning Services by Ranstojan Nig. Limited.
? Sewage Dislodgement and Disposal Van Operation By Hamtec-Abrahams Ventures
? Disposal of packaged domestic wastes from the Institute's Dino by Lagos State Wastes Management Authority (LAWMA).
? Other plants and Automobiles were periodically serviced in-house as at when due respectively.

**ROUTINE SERVICE/MAINTENANCE**

All faults reported by work order requests were handled through the regular and normal duty schedules of the Civil (Carpentry, Masonry, and Plumbing) Electrical/Electronics, Refrigeration and Air Conditioning Units of the Works and Maintenance Division. These services cut across all the building facilities of all Divisions, Offices, Laboratories and the residential quarters alike

**CHALLENGES:**

? Non - approval of Planned Maintenance Proposals and Strategies
? All proposals of planned maintenance materials are not approved most of the time due to lack of vision for need of them. Hence, plans for the yearly routine maintenance schedule are over - ruled.
? Insufficient budget allocation for maintenance. Most of the time, maintenance votes get exhausted by the 3rd quarter of the year resulting in rationing and prioritization
? Lack of modern tools in the Carpentry, Electrical, Masonry, Plumbing and R & A workshops.
? All the plants and hand tools in the workshop are old and obsolete and hence require immediate replacements with modern equivalents

## Research Publications


1. Aina OO, Akintonwa A, Akinyede A, Olayemi SO, Agbaje AO, Olukosi YA, Okoh HI, Agomo CO, Azu OO, Mojekwu TO, Egbuna KN and Agomo PU (2010). **Comparative Effect of Dihydroartemisinin plus Mefloquine combination and Dihydroartemisinin Alone on Electrocardiogram in Healthy Nigerian Volunteers.** *International Journal of Malaria and Tropical Diseases*. 6: 204 209

2. Akinwale OP, Rollinson D, Kane R, Stothard R, Ajayi MB, Akande DO, Ogungbemi MO, Duker C, Gyang PV and Adeleke MA. (2010). **Molecular approaches to the identification of Bulinus species in South-West Nigeria and observations on natural snail infections with schistosomes**. *Journal of Helminthology.* Doi: 10.1017/S0022149X10000568.

3. Akinwale OP, Ajayi MB, Akande DO, Gyang PV, Adeleke MA, Adeneye AK, Adebayo MO and Dike AA. (2010). **Urinary schistosomiasis around Oyan reservoir: twenty years after the outbreak was first reported.** *Iranian Journal of Public Health*. 39(1): 92- 95.

4. Adeleke MA, Mafiana CF, Sam-Wobo SO, Akinwale AP, Olatunde GO, Sanfo SM, Adjami A and Toe L (2010**). Molecular characterization of the Simulium damnosum complex (Diptera: Simuliidae) found along the Osun River system, in southwestern Nigeria**. *Annals of Tropical Medicine and Parasitology.* 104 (8): 679 - 683.

5. Chigor NV, Umoh JV, and Smith SI (2010). **Occurrence of Escherichia coli O157 in a river used for fresh produce irrigation in Nigeria.** *African Journal of Biotechnology*. Vol. 9 (2):178 182.

6. Elerson Gaetti-Jardim Junior, Ellen Cristina Gaetti-Jardim, Nwaokorie FO, Ana Cáudia Okamoto, Francisco Isaak Nicolas Ciesielski, Luis Fernando Landucci (2010). **Inhibitory activity of Plant extracts of the Brazillian Savanna on superinfecting and opportunistic microorganisms.** *Journal of Health*. 3:26-37.

7. Ene, AC; Atawodi, SE; Ameh, DA; Kwanashie, HO; Agomo, PU (2010). **Locally used plants for malaria therapy amongst the Hausa, Yoruba and Ibo community in Maiduguri, Northeastern Nigeria**. *Indian Journal of Traditional Knowledge*. 9 : 486 490

8. Enya VNV, Idika N, Egbuna KN, Mafe AG, Agomo CO, Iwalokun BA, Agomo PU, Ibeh IN, Wemambu SNC (2010). **Streptococcus pneumoniae and Plasmodium falciparum Malaria Infections among children under 5 years in Lagos South-Western Nigeria.** *International Journal of Malaria and Tropical Diseases* 6 : 209-214

9. Ezechi OC, Kalu BKE, Njokanma FO, Nwoko CA, Okeke GCE (2010). **Uncomplicated Caesarean Section: Is Delayed Return to Oral Feeding Necessary?** S.J. Med. Sci. 4(3):263-267.

10. Ezechi OC, Gab-Okafor CV, Oladele DA, Gbajabiamila TA, Somefun EO (2010). **Prevention of mother to child transmission of HIV: a review.** W. Nig. J Med. Sci. 2: 3-14

11. Ezechi OC, Ezechi OC Ezechi OC, Loto OM, Ndububa VI, Okogbo FO, Ezeobi PM, Nwokoro CA (2010) **Caeserean Section and Perinata Mortality**. SNJOG 4: 46-48

12. Ezechi OC, Edet A, Akinlade H (2010). **Incidence and risk factors for caesarean wound infection in Lagos Nigeria.** BMC Research 2: 186-190

13. Ezechi OC, Jogo A, Gab-Okafor CV, Nonwujekwe DI, Ezeobi PM, Gbajabiamila T, Adu RA, Audu RA, Musa AZ, Salu OB, Meshack E, Herbertson E, Odunukwe NN, Idigbe OE (2010). **Effect of HIV - 1 infection and increasing immunosuppression on the menstrual function.** J. Obstet. Gynecol. Res. 2010: 5 11-14

14. Igwo-Ezikpe MN, Okpuzor J, Awodele O, Nwaokorie FO, Fowora MA, Akinbo MO, (2010). **Prevalence of polycyclic aromatic hydrocarbons (PAHs) degrading bacteria in contaminated tropical soil in Lagos, Nigeria: Involvement of Plasmid in degradation.** International Journal. Biol. Chem. Sci. 4(6) 2133-2145

15. Monsuru A, Adeleke C, Mafiana F, Sammy O, Sam-Wobo G, Olatunji O, and Olaoluwa, Akinwale OP (2010). **Morphotaxonomic studies on Simulium damnosum Theobald complex (Dipteral: Simuliidae) along Oshun River, southwestern Nigeria**. Acta Entomologica Sinica. 53(11): 1319 - 1324.

16. Monsuru A. Adeleke C, Mafiana F, Sammy O. Sam-Wobo G, Olatunde O, Uwem FE, Akinwale OP and Toe L (2010). **Biting behavior of Simulium damnosum complex and Onchocerca volvulus infection along the Osun River,** Southwest Nigeria. Parasites and Vectors 2010, 3:93 doi: 10.1186/1756-3305-3-93.

17. Niemogha MT, Adewole, TA Ikea JA, Olukoya DK, Atoyebi OA, Iwalokun BA, Egbuna KN, Olukosi YA (2010) **Trends in Co-trimoxazole Resistance among Clinical Isolates of Escherichia coli from Nigeria: 1989 -2009**. International Journal of Malaria and Tropical Diseases 6: 181-188

18. Niemogha MT, Smith SI, Goodluck HA, Gbaja-biamila T, Fesobi T, Umurhuru A, Oduyebo OO, Adeiga AA, Adesida SA, Adagbada AO, Bamidele T and Musa AZ (2010) **Chlamydia and vaginitis in sexually active females: Classical Identification Methods for effective Control**. Sierra Leone J. Biomed. Res. 2(2): 142-150.

19. Oduola AO, Obansa JB, Ashiegbu CO, Adeogun AO, Otubanjo OA and Awolola TS (2010) **High level of DDT resistance in the malaria mosquito: Anopheles gambiae s.l. from rural, semi urban and urban communities in Nigeria.** Journal of Rural and Tropical Public Health 9: 114-120.

20. Olufunsho A, Alade A, Sunday OO, Chimezie A, Gbenga OA, Anthony TO, Smith SI, Omonigbehin EA and Herbert ABCr (2010). **Mutagenic Screening of Crude Oil Fractions Using Modified Ames Test and Allium cepa (Linn) Assay.** American Journal of Pharmacology and Toxicology 5 (1): 1-8

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21. Oyewole IO, Ibidapo CA, Okwa OO, Oduola AO, Adeoye GO, Okoh HI and Awolola TS (2010) Species **composition and role of Anopheles mosquitoes in malaria transmission along the Badagry axis of Lagos lagoon, Nigeria**. International Journal of Insect Science, 2, 51-57.

22. Oyewole IO, Moronkola, DO, Ogunwande IA, Okoh HI, Ibidapo CA, Denloye A, Ogunnowo AA, Adeoye M (2010). **Larvicidal activity of essential oil from Phyllanthus amarus Sch. et Thonn (Euphorbiaceae) against three species of Mosquitoes**. Der. Pharmaca Lettre, 2(6): 136-141.

23. Onwuamah CK, Agomo PU, Odeigha, PGC (2010). **Mouse cellular immune response to *Plasmodium berghei* NK65 infection: Effect of varying inoculum parasite density, type and time of chemotherapy**. Lambert Academic Publishing. Pp. 1 84

24. Smith SI, Omonigbehin EA, Goodluck HA, Abdulkareem FB, Onyekwere CA, Agomo C, Ndububa DA, Fowora MA, Otegbayo JA, Contreras M, Haas R, Rieder G (2010). **Diagnostic methods for the detection of *Helicobacter pylori* in Nigeria.** Trop Gastroenterology 31 (2): 113 -115.

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28. Nwaokorie FO, Ogunsola FT and Coker AO, (2010) **Beta-Lactamase Production in Anaerobic Bacteria Reviews in Infection**. 1(3): 172-179.