

NIMRNIGERIA



NIGERIAN INSTITUTE OF MEDICAL RESEARCH
Research for National Health

2020 *Annual Report*

NIMR *The Foremost Research Institute in Nigeria*

Nigerian Institute of Medical Research

2020
Annual Report

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Prof. Babatunde Lawal Salako
Director-General/Chief Executive Officer
Nigerian Institute of Medical Research

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DIRECTOR GENERAL'S FORWARD



In the year 2020, the world was suddenly greeted with a new disease, the SARS COV-2 (COVID-19) outbreak, which soon became a pandemic snowballing into catastrophic consequences in many nations of the world. Unequivocally, the pandemic demonstrated the fragility of our world and laid bare, the weaknesses in many national public health systems. Indeed, the COVID-19 pandemic posed a public health challenge never been experienced in recent global health history. As an Institution, the Nigerian Institute of Medical Research was well on track in deploying health research expertise and making modest strides in genomic surveillance, COVID-19 testing, and reporting towards the response to curbing the pandemic. At the threshold of the pandemic in Nigeria, NIMR was

responsible for the genetic sequencing of the index COVID-19 case that earned the country international commendation. In March 2020, NIMR in collaboration with Life Bank and other partners/sponsors established the first Nigerian modified drive-and-walk-through COVID-19 testing Centre. In partnership with Mobihealth, NIMR launched a Do-It-Yourself swab sampling process to expand coverage and increase the number of COVID-19 tests per day via a telemedicine approach. All through the year 2020, NIMR provided laboratory back up for Lagos State and other hospitals in Lagos State for Coronavirus testing.

In the demonstration of excellence, some NIMR scientists conceptualized and developed groundbreaking innovations culminating in the NIMR Biotechnological products. In line with this, NIMR launched three products:

1. The NIMR Biotech Total RNA Purification Kit, developed by NIMR Scientist, Dr. Muinat Fowora. It is the country's first set of local Ribonucleic Acid extraction kits, which expands the Nation's capacity to test for COVID-19,
2. NIMR SARS-CoV-2 Isothermal Molecular Assay (SIMA), a fast and sensitive point-of-care test for SARS-CoV-2 infection using a molecular

technique, developed by NIMR Scientist, Dr. Chika Onwuamah, and

3. NIMR SARS-CoV-2 Detection Assay (SCODA), a qPCR assay developed by NIMR Scientist, Mr. Joseph Shaibu.

The institute worked and still working in collaboration with the Ventilator Project Group based in the US to introduce the use of CPAP/Helmet to deliver oxygen to patients with severe COVID-19 disease in Nigeria. The CPAPs were given to many hospitals in Nigeria including the University College Hospital, Ibadan, Lagos University Teaching Hospital, Lagos, Federal Medical Center Ebute-Meta and Idi-Aba Abeokuta, Aminu Kano Teaching Hospital, Kano, Delta State University Teaching Hospital, Asaba, and University of Nigeria Teaching Hospital, Enugu. Physicians from these centers were trained on the use of the CPAP/Helmet to the benefit of their teaming patients. The management of NIMR also donated 60 Units of Non-invasive Ventilators to the Federal Ministry of Health as part of the institute's contribution to the fight against the COVID-19 pandemic. The shipping, training sessions, and distribution of the CPAP were sponsored by the Aliko Dangote Foundation and the CDC Foundation.

Similarly, the Institute, in collaboration with Co-Creation Hub (CCHub), developed and deployed a web-based application to collect accurate and quality data of high integrity necessary for surveillance of real-time trends of COVID-19 incidence rate, care-

seeking behavior, testing, contact tracing and planning, and the making of informed prognostications on case management among Nigerians. NIMR took a leapfrog in deploying health informatics to strengthen the potentials for digital surveys on symptoms tracking, exposure notification, testing, case investigation, and management of the COVID-19 pandemic in Nigeria.

Furthermore, the Institute demonstrated a strong commitment to improving COVID-19 testing in-country by engaging in the production of Viral Transport Medium (VTM) for COVID-19 sample collection at a time when it was very scarcely available in the country. The Institute's scientists were actively involved in the conduct of clinical trials with Lagos University Teaching Hospital (LUTH). NIMR also initiated a laboratory experiment on COVID-19 vaccine production; and conducted a population-based seroepidemiological and household contact survey of COVID-19 virus infection in Nigeria in collaboration with NCDC, AFCDC, US CDC, and the University College London.

Despite the Institute's emergency response to COVID-19, NIMR did not neglect its core research mandate. Scientists in NIMR conducted over fifty-five COVID-19 related studies in 2020. Management also awarded intramural grants to staff to support Ph.D. candidates, Post-PhD and other researches including arbovirus for Yellow fever project in Delta state, Novel *Plasmodium falciparum* biomarker: Immunogenetic

investigation of diagnostic efficacy targeting the development of a population-specific malaria point-of-care device in Nigeria, and mapping and characterization of Ijede, Ikorodu. Staff also conducted over twenty-seven research studies in the areas of HIV/TB, Malaria, Neglected Tropical Diseases, Communicable and Non-Communicable Diseases published in several peer-review journals in 2020.

The Institute received the COVID-19 intervention fund earmarked for research and short-term response interventions to contain the pandemic. Subsequently, the NIMR Central Research Laboratory was equipped with BGI DNBSEQ-G50 Next Generation Sequencing Platform with Robotic MGISP-100 Library Preparation system for research and research service support to researchers within and outside the country. In addition, NIMR undertook the procurement of 12 operational vehicles and the foundation laying for the COVID-19 10-bedded observation ward for clinical trials. The Institute also received other COVID-19-related donations and relief materials. MTN donated 100M naira to support the purchase of an oligo synthesizer used for primer design. Acro Biosystems, USA donated reagents and consumables worth 350 USD for detection and genotyping of novel tumor and epigenetic breast and prostate cancer markers. The University of Maryland, Baltimore, USA donated C18 HPLC column worth 2,500 USD, Daystar Christian Centre donated 10 Million naira and the Stanbic IBTC Bank Plc donated test kits to NIMR as

part of its corporate social responsibility efforts and the desire to increase COVID-19 testing in Nigeria.

The Institute launched a Blood Genetic and Transfusion Research and SMART Centre. In addition, three centres were established namely Centre for Reproductive and Population Health Studies (CRePHS), Centre of Excellence in Child and Adolescent Health Research (CECAR), and Centre for Research in Non-Communicable and Metabolic Diseases (CReNMD) from the Clinical Sciences Department.

The Institut Merieux in collaboration with the Nigerian Institute of Medical Research awarded the first ever-Young Investigative Award in West Africa to Dr. Emelda Chukwu, of NIMR. The award comes with a support of 10,000 Euros for Young Investigators working on antimicrobial resistance and antibiotic stewardship with the theme: 'Fighting against Antimicrobial Resistance and Improving Antibiotic Stewardship. Also during the year, Lead City University and Eko University of Medical Sciences awarded more NIMR scientists adjunct positions.

In 2020, there were several ongoing partnerships and funded research studies in collaboration with national and international organizations. These included the Northwestern University, FATE Foundation, University College London, Nigerian Centre for Disease Control (NCDC), Novartis; the National Institutes of Health (NIH), IeDEA International, China CDC, Institute Pasteur,

WHO/TDR, Emory University Atlanta, AIDS Prevention Initiative in Nigeria (APIN) Plus; South Africa Medical Research Council, Ford Foundation, EDCTP, WANETAM, TETFUND, IHVN, and USAID. Other research collaborators in the year included London School of Tropical Medicine & Hygiene, MRC, the Gambia, University College London, University of Ghana, University of Tokyo, Nigerian Council of Physicians of Natural Medicine, Centre Pasteur du Cameroon, Yaoundé, Saro Lifecare Ltd., Godrej Nigeria Limited, Health, Environment and Development Foundation, Saint Louis University, Missouri, University of North Carolina Chapel Hill, and New York University, Federal Medical Centre (FMC) - Lagos, CoCreation Hub (CcHub), Emzor Pharmaceutical Industries, Selenium Education and Research Centre South Africa (SERCA), NCD-GHS Consortium, and Northwestern University, USA.

Infrastructural and environmental development projects in 2020 included resurfacing of internal roads/parking in office and residential areas, renovations of Staff Clinic, ARV Clinic, and TB DOT Clinic, Central Diagnostic Laboratory, Centre for Tuberculosis Research BSL3 Laboratory, MBBT Molecular Laboratory, and the Administrative Block reception. The auditorium was renovated/furnished and equipped with modern digital sound systems. Also renovated were the medical compound, /Transport Unit offices; and there was a creation of relaxation lawn for

staff children and installation of Turnstile gate at the Institute entrance.

It is worthy to note the oversight visit of the Members of the House Committee on Healthcare Services, and the house Committee on COVID-19 visits to the Institute to assess the institute's response and innovative contributions to containing the pandemic. The Institute also received the TETFund Research and Development Standing Committee who visited to find facts and identify the contribution of NIMR to research and development in the country. In addition, the representatives of the Federal Ministry of Health re-inaugurated the NIMR Service Compact (SERVICOM) Unit to emphasize the delivery of service promptly and efficiently to Nigerians by public servants.

Despite the Coronavirus crisis, NIMR, no doubt pushed the limits and intensified research efforts in addressing issues of public health challenges. However, the challenge remains inadequate research staff, low level of funding, and poor recognition of local research and innovations. The government needs to improve on providing the necessary incentives required to change the narrative of health research and development in the country.

The management will not relent in promoting and supporting scientific excellence through health research to improve the public wellbeing of Nigerians. NIMR will keep exploring the possibilities

of public/private partnerships and endowments to boost research and innovations. The award of intermural and extramural grants to support research and increase staff remains management a top priority and on the front burner. Equipping our research laboratories, strengthening physical infrastructure, and reengineering the satellite stations are commitments we must keep.

Lastly, I wholeheartedly salute the courage and commitment of staff, who despite the heavy toll of COVID-19 on their health, continued to provide COVID-19 testing, genomic surveillance, and response activities all through the lockdown and without observing weekends and public holidays. The researchers who have kept

the flag flying despite the odds and I thank immensely, the Chair of House committee on COVID-19, both Senate and House Committee Chairs on Health for their robust and unalloyed support to ensure that the government provided COVID-19 intervention fund to NIMR. More importantly, I thank the Federal Government profusely through the leadership of the Federal Ministry of Health for the COVID-19 intervention fund, which has rapidly changed the face of research and research capacity in NIMR. We earnestly look forward to your continuous unflinching support and encouragement as we move with renewed confidence and dogged determination to make a difference in 2021.



PROF. BABATUNDE LAWAL SALAKO, MBBS (Ib), FWACP, FRCP (Lond), FRCP (Edin), mnim, FNAMed, FAS.
DIRECTOR-GENERAL/CHIEF EXECUTIVE OFFICER
NIGERIAN INSTITUTE OF MEDICAL RESEARCH

WHO WE ARE

*The nation's foremost Institute of Medical Research

*We collaborate with several institutions nationally and internationally to facilitate enabling environment for medical research

*We attract some of the brightest and best brains nationally and internationally in research collaborations

VISION

To be an institution of excellence in basic, applied and operational research for the promotion of National Health and Development in Nigeria.

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

CORE VALUES

Honesty, Integrity

Leadership

Excellence

Respect, Fairness, Dignity

Teamwork, Innovation

Relevance

Hardwork

Fair Reward and Recognition

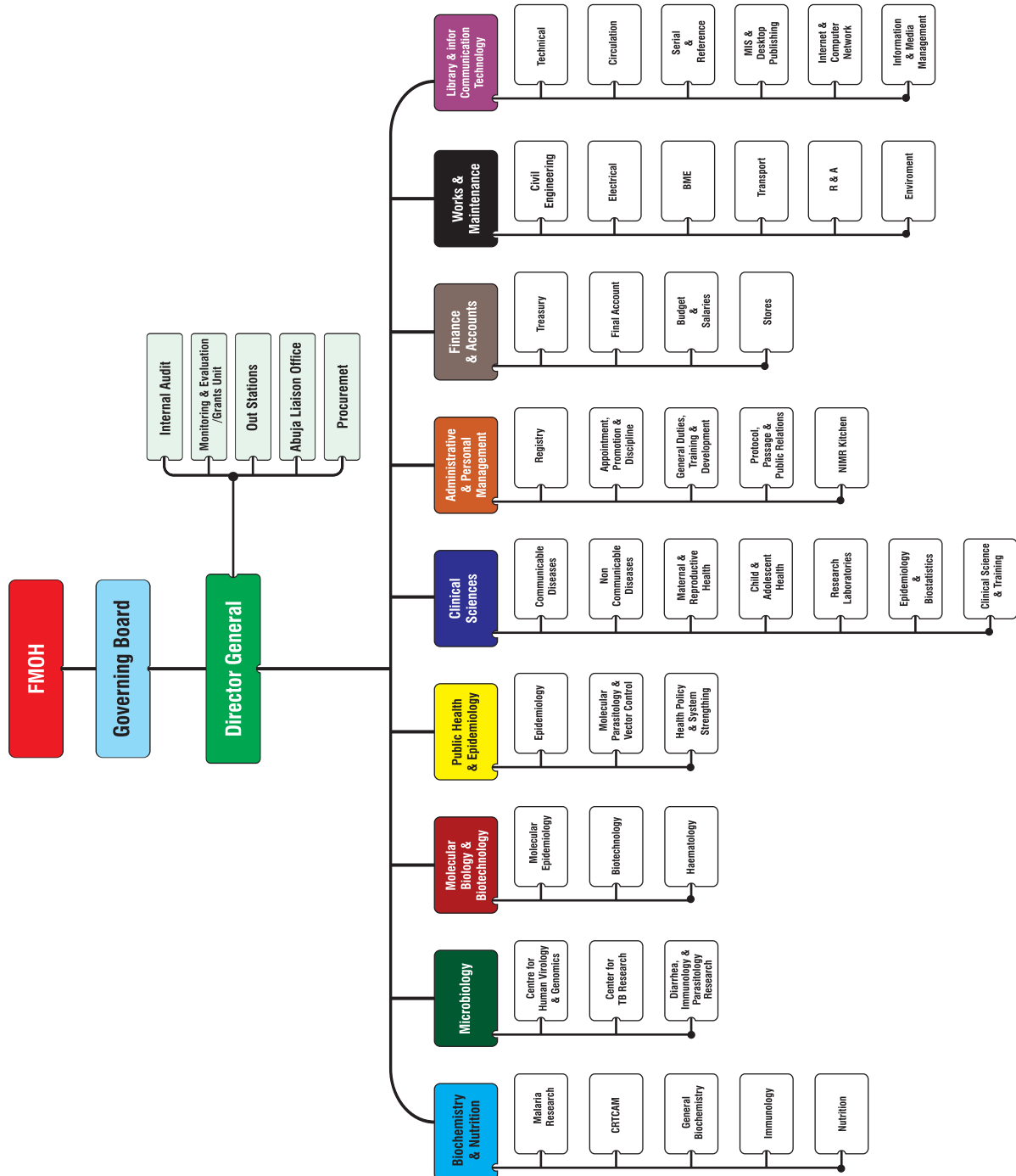
Accountability and Transparency

Communication: Internal and External

Equity



OUR ORGANOGRAM



RESEARCH ADVISORY BOARD MEMBERS

Prof. Oyewusi Gureje (University of Ibadan)	Chair
Prof. Babatunde L. Salako (DG-NIMR)	Member
Dr. Olajide Idris (Commissioner of Health, Lagos State)	Member
Prof. Ibrahim Abubakar (UCL Institute for Global Health)	Member
Prof. Folasade Ogunsola (University of Lagos)	Member
Prof. Sani Aliyu (Former DG-NACA)	Member
Prof. Alash'le Abimiku (IHV, University of Maryland, USA)	Member
Prof. Ayo M. J. Oduola (VIRF, University of Ibadan)	Member
Prof. Ighovwerha Ofotokun (Emory University, Atlanta, USA)	Member
Prof. M. B. Shittu (BUK)	Member
Prof. Oladosu A. Ojengbede (University of Ibadan)	Member
Prof. Oni Emmanuel Idigbe (Former DG-NIMR & CEO- HUDPHI)	Member
Prof. Martin Madu Meremikwu (University of Calabar)	Member
Prof. Stanley N C Anyanwu (Nnamdi Azikiwe Teaching Hosp.)	Member

PRINCIPAL OFFICERS



Prof. Babatunde Lawal Salako
Director - General / CEO



Alh. A.S. Yunusazazzau, mni
Director & HOD
(Administration Depart)



Prof. (Mrs.) N. N. Odunukwe
Director of Research
(Clinical Sciences Depart)



Mr. Y. Ogaji
Director & HOD
(Finance & Account Depart)



Engr. E. O. Adedeji
Director & HOD
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Dr. (Mrs.) O. A. Nwogbe
Deputy Director & HOD
(Library & Information
Communication Technology Depart)



Mrs. T. Malomo
Deputy Director & HOU
(Internal Audit)

SENIOR MANAGEMENT COMMITTEE

Prof. Babatunde Lawal Salako	Director - General / CEO
Alh. A.S. Yunusazazzau	Director & HOD (Administration)
Prof. (Mrs.) N.N. Odunukwe	Director of Research/ Deputy DG
Prof. (Mrs.) S.I Smith	Director of Research (MB&BT Department)
Prof. (Mrs.) Akinwale	Director of Research (Neglected Tropical Diseases)
Engr. E.O. Adedeji	Director & HOD (Works & Maintenance)
Mr. Y. Ogaji	Director & HOD (Finance & Account)
Prof. (Mrs.) R. Audu	Director & HOD (Microbiology)
Dr. B. Adewale	Deputy Director & HOD (PH & E)
Dr. (Mrs.) O. A. Nwogbe	Deputy Director & HOD (Library & ICT)
Mrs T. Malomo	Deputy Director & HOU (Internal Audit)
Dr. (Mrs) A. N. David	Deputy Director & HOD (Clinical Sciences)
Dr. O. O Aina	Chief Research Fellow & HOD (Biochemistry & Nutrition)
Dr. T. J. Bamidele	Senior Research Fellow & Coordinator (MB&BT)
Dr. T. Y. Raheem	Research Fellow 1 / HOU (CDL) Unit

NIMR 2017-2021 STRATEGIC OBJECTIVES

S/N	Thematic Areas	Strategic Objectives
1	Five year development plan	<ol style="list-style-type: none"> 1. Review previous strategic plan and identify gaps. 2. Develop, print and disseminate SP by first quarter of 2018. 3. Conduct a regular review of the strategic plan implementation.
2	Leadership and Governance	<ol style="list-style-type: none"> 1. Establish an institutional research advisory board. 2. Engage policy makers, lawmakers and stakeholders to review the Act that established the Institute. 3. Strengthen and maintain existing strategic partnerships, networks and collaborations.
3	Development of Human Resources required for health research	<ol style="list-style-type: none"> 1. Establish quarterly national grant writing workshops for researchers. 2. Improve number of grant applications submitted and being awarded including patents and innovations. 3. Increase research output 4. Facilitate adjunct positions for NIMR research staff in the Nigerian universities. 5. Pursue opportunities to collaborate with universities to award academic certificates and degrees. 6. Conduct periodic relevant training/workshops for research support staff. 7. Produce NIMR specific scheme of service, ensure approval by Head of Service and implementation in the institute. 8. Conduct yearly promotion.
4	Infrastructural development to support human resources	<ol style="list-style-type: none"> 1. Create a state-of-the-art central laboratory accessible to all Researchers. 2. Establish a functional biorepository accessible to researchers in and outside NIMR. 3. Develop and implement SOPs for all laboratories and calibrate and maintain existing laboratory equipment. 4. Renovate and build new structures in tandem with the physical needs of the institute.
5	Strategic resource mobilization (finance/capital)	<ol style="list-style-type: none"> 1. Improve available opportunities for intramural funding and establish extra mural funding to universities and other relevant Institutions yearly. 2. Strengthen Grants Management Unit to attract more funding. 3. Establish networks for private sector funding 4. Lobby policy makers for increased budgetary allocation to and appropriation for, research in subsequent years. 5. Explore possibilities of endowments

BIOCHEMISTRY AND NUTRITION DEPARTMENT

The Department of Biochemistry and Nutrition is a multidisciplinary entity that deploys cutting-edge technologies and sound scientific expertise undertaking basic and translational research with impactful outcomes through its various units:

- **Biochemistry & Immunogenomics-** focuses on the general biochemical analysis of biological molecules, polymorphisms in red blood cell-related diseases, molecular mechanisms of malaria parasite infectivity, and pathogenesis.
- **Centre for Research in Traditional, Complementary, and Alternative Medicine (CRTCAM)** - trains and researches safety and authentication of efficacy claims and compound testing of selected natural products and active ingredients.
- **Nutrition-** provides relevant scientific information and investigates nutritional quality, safety, and associated disorders such as deficiencies of vitamins, minerals, and in-born errors of metabolism.
- **Immunology-** focuses on the cellular immune responses in some tropical diseases in humans and animals such as performance of malaria antigen detection vs parasite enumeration by microscopy.
- **Malaria Research & Epidemiology-** monitors the prevalence of malaria in

communities via the use of molecular diagnosis, therapeutic efficacy, resistance detection of re-infected and recrudescence in Nigeria.

- **Molecular Oncology & Diagnostics-** engages in basic and translational molecular oncology research thereby providing solutions in oncology research using avant-garde biochemistry, pathology, computational, and molecular biology tools.
- **Non-Communicable Diseases & Cosmetology-** focuses on research and evaluation as well as partnership and collaborations designed to eliminate dangerous chemicals linked to chronic diseases (Non-communicable diseases) from cosmetics and personal care products and provide safe alternative solutions.
- **Quality and Improvement Unit** focuses on the implementation of a quality management system in the Centre for Research in Traditional, Complementary, and Alternative Medicine and other laboratories in the Department.

Research Activities

Center for Traditional, Complementary, and Alternative Medicine:

- Researched safety and authentication of efficacy claims and compound testing on selected natural products and active ingredients. Conducted phytochemical and proximate analysis for Herbal products.

- Researched on the safety profile and efficacy of herbal and medicinal products including acute and sub-acute toxicity studies
- Conduct research in the investigation of toxicology, proximate analysis, efficacy, and elucidation of the mechanism of action of phytochemicals from natural products, for communicable and non-communicable diseases. The Centre's laboratory is equipped with a Buchi rotary evaporator, Agilent Gas chromatography-mass spec chromatography, ionization atomic absorption spectrometer, and Agilent 2100 HPLC located in the central research laboratory.
- *In-silico* Docking of Compounds to Receptor Proteins for Rational Drug Design. This core uses rigid, semi-flexible, and flexible docking software and algorithms to build 3D stereospecific optimized structures against receptor proteins using docking and molecular dynamics software. Anticancer drug discovery and infectious disease docking studies are been investigated using this arm of the department.

SARS-CoV-2 Virus Studies:

- Conducted laboratory analysis on COVID-19 positive participants and serum micronutrients.
- Rapid assessment of the preparedness of health workers in the national response to COVID-19 or future outbreaks in Nigeria.

Malaria:

- Conducted an HPLC analysis of the quality of Artemisinin Combination Therapy (ACT) medicines and malaria

omic correlates of artemisinin-based therapy. resistance in Nigeria (EDCTP)

Malaria epidemiology, drug safety, microscopy, and clinical trials:

- The endemicity of malaria in our society has spurred the need for continuous malaria epidemiology, diagnosis training, prevention, treatment, drug, and safety efficacy studies. This multidisciplinary team conducts WHO standard microscopy training in the diagnosis of malaria. Also, conducted studies on the safety and efficacy of anti-malaria using the institute's HPLC and spectrometry core facilities; and molecular characterization of pathogens regularly.

Cosmetology:

- Investigated the chemical constituents of sanitizers used in Nigeria.
- Assessed public health implications of the toxicities associated with the enormous chemical burden of bleaching products on the skin and their ways into the systemic circulation. Adopted public health and social measures (PHSM) to sensitize the public on the dangers of these chemicals. Cosmetologists were trained on the appropriate use of chemicals/natural products, and the use of biochemical analytical methods (HPLC, AAS, GC-MS) to assay chemical compounds in cosmetics.

Molecular Oncology and Diagnostic Development:

- Evaluated anticancer, antiviral, and antidiabetics drug discovery from medicinal plants

Collaborators

International Collaborators

- MRC- Gambia.
- University of Ghana, Legon.
- University of Tokyo, Japan.
- Centre Pasteur du Cameroon, Yaoundé (*In vitro* anti-plasmodia activities of lime extract of a combination of *Picralima nitida*, *Alstonia boonei* and *Gongronema latifolium* with Chloroquine-sensitive and resistant *Plasmodium falciparum*).

National Collaborators

- Nigerian Council of Physicians of Natural Medicine (Acute and Sub-acute toxicity of Herbal products).
- Pax Herbal Clinic and Research Laboratory (PAXHERBALS shall submit both her finished products and raw materials for any phytochemical and toxicity analysis that will give valuable information for drug discovery).
- Saro Lifecare Ltd. (Comparative bio-efficacy of four rodenticides against wild rats) Godrej Nigeria Limited. (Bioefficacy and toxicity effect of Good Knight Power Shots Multi insect killer Spray Aerosol against field-collected *Anopheles* mosquitoes and laboratory rats and mice).
- Health, Environment and Development Foundation. (Toxicological and efficacy studies of *Picralima nitida* as anticancer and antidiabetic agent in animal model).
- Nigerian Universities and Research Institutes.
-

Grant/Fellowship Awards

- WHO/TDR small grants - Improving adoption and use of malaria RDTs & ACTs for effective case detection and treatment:

achieving high results-based treatment using community health workers towards pre-elimination –Dr. Olusola Ajibaye.

- WHO/TDR-Understanding the impact of insecticide resistance on the efficacy of IRS and LLIN in 3 ecological settings of Mali, Benin, and Nigeria – Prof. T. Awolola and Dr. Y. Olukosi.
- EDCTP- Investigating artemisinin resistance in Nigerian isolates of *Plasmodium falciparum* -Dr. Kolapo Oyebola.
- A Novel non-kelch-13 Artemisinin resistance marker: Investigating association with artemisinin resistance in comparison with Kelch-13 propeller gene among *Plasmodium falciparum* malaria subjects in Lagos, Nigeria. - WANETAM GRANT –Dr. Olusola Ajibaye.
- Malaria omic correlates of artemisinin-based therapy resistance in Nigeria. (EDCTP) –Dr. Olusola Ajibaye.
- Saro Lifecare Ltd- Comparative Bio-efficacy of four Rodenticides against wild Rats – Dr. O.O Aina.
- Godrej Nigeria Limited- Bioefficacy and Toxicity Effect of Good Knight Power Shots Multi insect killer Spray Aerosol against Field collected *Anopheles* Mosquitoes and Laboratory Rats and Mice – Dr. O.O. Aina and Dr. A. Adeogun.
- Health, Environment and Development Foundation-Toxicological and Efficacy Studies of *Picralima nitida* as Anticancer and Antidiabetics Agent in Animal Model - Dr. O.O Aina.

NIMR Grant Awards:

- Novel *Plasmodium falciparum* biomarker: Immunogenetic investigation of

- Conducted *In-silico* docking studies and ADMET analysis of compounds.
- Investigated miRNA expression and detection in prostate cancer.
- Examined pharmacogenomics of docetaxel in patients with solid tumors.
- Developed vaccine by competent cloning strategies and protein expression in *E. coli*.
- Provided technical support in areas of bioinformatics and molecular pathology for the NIH U54 epigenomic biomarkers of HIV-Associated Cancers in Nigeria (Lagos Site).

Molecular Parasitology:

- Examined serum levels of interleukin -10 and tumor necrosis factor-alpha among school-aged children in urban slums co-infected with *plasmodium falciparum* and intestinal helminth in Lagos state.

Mammalian Cell Culture:

- The department hosts the institute's second mammalian cell culture laboratory for anticancer drug discovery studies, antivirals, recombinant protein production, and other mechanistic studies. It supports various collaborating institutions in providing cell lines for virus growth, products, and vaccine development. This core houses our Attune Nxt Flow Cytometry and Zeiss fluorescent microscope.

Molecular Parasitology and Vaccine Design:

- We use bioinformatics and molecular biology tools to investigate candidate gene targets for vaccine development

using bacterial and mammalian gene cloning approaches in making recombinant proteins for the subunit vaccine approach. Our team is equipped with bacterial cloning tools, a mammalian tissue culture system, and shared equipment for Sanger sequencing and next-generation sequencing using patterned flow cell and rolling circle amplification (RCA).

Achievements

- WHO/TDR small grants - Improving adoption and use of Malaria RDTs & ACTs for effective case detection and treatment: achieving high results-based treatment using community health workers towards pre-elimination - Dr. Ajibaye Olusola.
- WHO/TDR- Understanding the impact of insecticide resistance on the efficacy of IRS and LLIN in 3 ecological settings of Mali, Benin, and Nigeria - Awolola TS(PI), Olukosi YA (Co-PI).
- Creation of Tissue Culture Lab and Production of Viral Transport Medium (VTM).
- Production of Viral Transport Media (VTM) in collaboration with Microbiology and Biotechnology Department for COVID-19 sample collection.

Capacity Development

- Number of Conferences/Workshops /Training attended: (7)
- Students Supervised: B.Sc.s: (10); M.Sc.: (13); Ph.D.: (4)
- NYSC: (5); I.T.: (20)

diagnostic efficacy targeting the development of a population-specific malaria point-of-care device in Nigeria in a COVID-19 pandemic. (NIMR grant) – Dr. Olusola Ajibaye.

Challenges

- Non-IGR generating source to boost revenue for Department.
- Revamping the flow cytometer.
- Need to Complete the CO2 set-up for incubators
- Need for the acquisition of an additional incubator for plasmodium culture.
- Fund to improve on genetic profiling and cryo-archiving to ensure that cell lines are mycoplasma-free so that NIMR can be a national reference centre for tissue culture studies.
- Inadequate office space for staff.

Way Forward

- Increase grant application submissions for possible funding of ongoing and new projects.
- Provide research support services in basic medical research involving mammalian cell line studies and flow cytometry.
- Validate and develop flow cytometry and qPCR testing protocols for leukemia in collaboration with Hematologists and Pediatric oncologists.
- Availability of funds and infrastructural development through grants.
- Support for initiatives.
- Improve mechanisms for interdepartmental collaboration.
- Provision of additional offices and office tools.

2021 Work Plan

Biochemistry and Immunogenetics Unit

- In vivo ACT (AL) DTES in Lagos, Evaluation of the effectiveness of techniques for parasite detection.
- Evaluation of the effectiveness of techniques for differentiating between similar parasites.
- Investigation of new qPCR and cyflow assays for parasite detection and discrimination.
- In vitro parasite susceptibility, ring survival, and invasion assay studies.
- A novel Plasmodium falciparum biomarker: Immunogenetic investigation of diagnostic efficacy targeting the development of a population-specific point-of-care device in Nigeria for Malaria and COVID-19.
- Malaria omic correlates of artemisinin-based therapy resistance in Nigeria. (EDCTP GRANT).
- HPLC analysis of antimalarial drugs circulating in Lagos state.

Centre for Research in Traditional, Complementary, and Alternative Medicine (CRTCAM)

- Conduct research on safety and authentication of efficacy claims and compound testing of selected natural products and active ingredients.
- Phytochemical and proximate analysis.
- Training of traditional medical practitioners on the role of safety and efficacy of alternative medicine.

Immunology Unit

- Cellular immune responses in some tropical diseases in humans and animals.

- Performance of malaria antigen detection vs parasite enumeration by microscopy.

Malaria Research & Epidemiology Unit

- Assessment of the quality of artemisinin-based antimalarial drugs in Nigeria.
- A pilot multisectoral intervention for controlling malaria vectors, mitigating insecticide resistance, and assessing WaSH facilities at health care units in selected coastal and Sahelian West African countries.
- A randomized controlled trial: Anti-malaria Prophylaxis for pregnancy (AMPROP) clinical trial.
- Molecular profiling of *Plasmodium falciparum* parasite across the six geopolitical zones in Nigeria.
- Census of enumeration areas and characterization of Ijede local government development area, Lagos State, Nigeria.

Molecular Oncology & Diagnostics Unit

- Vaccine design and development.
- Continuous production of VTM.
- Anti-COVID rationale drug design from medicinal plants.
- Cloning and purification of recombinant proteins.
- Karyotyping for chromosome services.
- Anticancer drug research.

Non-Communicable Diseases & Cosmetology Unit

- Initiation of cosmetic training classes.
- Research-based seminars and workshops on key strategic days.
- Primary care through medical outreach to identify existing chronic diseases in the communities.

Nutrition Unit

- Relationship between nutrition, health, and infection; Nutritional status determines the outcome of infection.
- Street foods and water analyses in Lagos state.
- Nutrition Education: Staff of NIMR.
- Training: Nutrient analysis protocol.
- Workshop: Nutrition advocacy to schools, teachers, and heads, Screening of adolescents for kidney disorders.

Malaria Microscopy Training/Workshop

- The training/workshop targets beginners as well as those who wish to expand their capabilities. Eligible for the training are different categories of medical laboratory personnel, interns, Medical Laboratory Scientists post-graduate students involved in malaria research, Microscopists, and others that may be interested in malaria research. The effective diagnosis of malaria in laboratories is important in reducing malaria burden, promotes accurate diagnosis of malaria, saves lives, and minimize antimalarial drug resistance.

CLINICAL SCIENCES DEPARTMENT

The Clinical Sciences Department has a tripartite mandate to conduct research, provide comprehensive clinical services to patients enrolled in HIV, Tuberculosis, Hepatitis, and other specialist care, and develop the capacity of researchers and health care workers. As such, the Department functions in three broad areas of research, program /projects support, and clinical and laboratory services. The Department also works very closely with the Centre for Human Virology, and Genomics (CHVG) and the Centre for Tuberculosis Research (CTBR) in the

Microbiology Department. In the year under review, there were 5 Project Staff, 19 Volunteers, and 13 NYSC members Department. In the year 2020, the Institute's Management created three Research Centres in the department, namely:

- Centre for Reproductive and Population Health Studies (CRePHS)
- Centre of Excellence in Child and Adolescent Health Research (CECAR)
- Centre for Research in Non-Communicable and Metabolic Diseases (CReNMD).

Composition of staff members of the new Centres

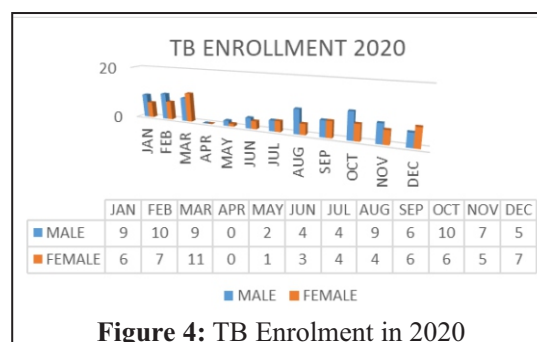
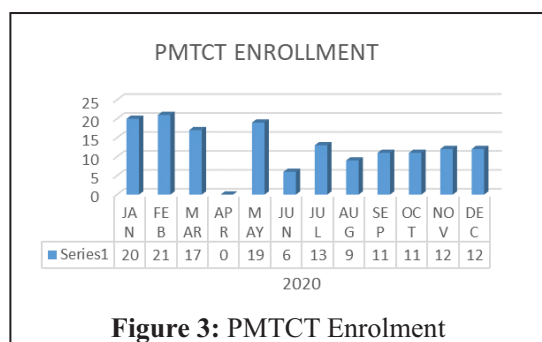
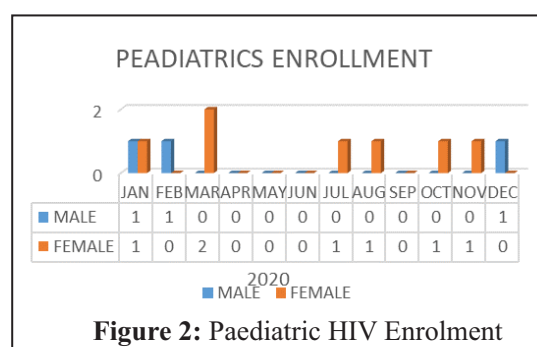
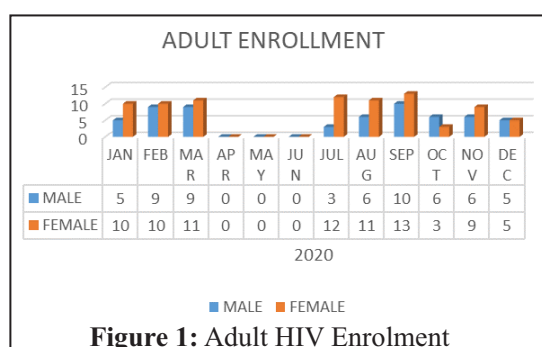
Centre for Research in Non-Communicable and Metabolic Diseases (CReNMD)	
Prof. Nkiruka N. Odunukwe	Director
Dr David A. Oladele	
Dr Esther N. Ohihoin	
Dr Jane O. Okwuzu	
Centre for Reproductive and Population Health Studies (CRePHS)	
Prof. Oliver C. Ezechi	Director
Dr. Aigbe G. Ohihoin	
Dr. Dan. I. Onwujekwe	
Dr. Paschal M. Ezeobi	
Mrs. Sabdat O. Ekama	
Ms. Ifeoma E. Idigbe	
Centre of Excellence in Child and Adolescent Health Research (CECAR)	
Dr Abideen O. Salako	Ag. Director
Dr. Titilola A. Gbajabiamila	
Dr. Agatha E. Wapmuk	
Research/Training/Service Support	
HIV Programme Site Coordinator:	Dr. Paschal Ezeobi
Research Coordinator:	Dr. David Oladele
Training Coordinator:	Dr. Aigbe Ohihoin

The Staff Clinic provides emergency health services to staff of NIMR and their dependents. The Department also offers specialist services as detailed in the table below.

Specialist Clinics in CSD

Specialist Clinic	Day of the week	Consultant
Haematology	Monday	Dr. N. N. Odunukwe
Paediatrics and Child Health	Tuesday	Dr. A. N. David Dr. A. O. Salako
Hepatitis & Gastroenterology Clinic	Monday, Wednesday, Friday	Dr. P. M. Ezeobi
Hypertension and Nephrology clinic	Tuesday	Prof. B. L. Salako
Gynaecology and Women's Health	Thursday	Dr. O. C. Ezechi Dr. A. G. Ohioin
Infectious Diseases	Monday- Friday	Dr. D. I. Onwujekwe
Adolescent Clinic	2 nd Saturday of the month	Dr. A. N. David

The charts below show the monthly enrolments into the HIV and TB treatment programmes in 2020 segregated by sex.



Research Activities

Research activities in the Department employ a multidisciplinary approach with staff from different research centres and other departments in the Institute collaborating for excellent research output.

The CSD disseminated some of its research activities at the 1st Virtual International Scientific Conference of the Institute which took place in November 2020.

Ongoing research activities are as listed in the table below:

S/N	Title	Status	Sponsor	PI
1	EN-RTP: Emory Nigeria Research Training Program	Ongoing	NIH	Prof. O. C. Ezechi
2	ITEST	Ongoing	NIH	Prof. O. C. Ezechi
3	Mapping and Characterization of Ijede, Ikorodu	Ongoing	NIMR	Dr. A. N. David
4	Efficacy and safety of selenium in the management of COVID-19 in adult Nigerians in Lagos: An RCT	Ongoing	SERCA	Dr. A. N. David
5	AMPROP: Antimalaria prophylaxis for pregnancy	Ongoing	NIMR	Dr. A. G. Ohihoin
6	A multicenter double-blind randomized group clinical trial involving graphene impregnated latex condoms	Ongoing		Dr. A. G. Ohihoin
7	One-Stop Clinic: Integrating specialist care for HTN and DM for the elderly infected with HIV in Lagos, Nigeria	Ongoing	NIMR	Ms. I. E. Idigbe
8	Acceptability of flavored zinc in the management of diarrhea in children: An interventional study	Ongoing	Emzor	Dr. A. N. David
9	Management of malaria in African countries: A prospective non-interventional cohort study	Ongoing	Novartis	Dr. A. N. David
10	Integration of Hypertension Management into HIV Care in Nigeria: A Task Strengthening Strategy (TASSH Project)	Ongoing	NIH	Prof. O. C. Ezechi
11	IeDEA International epidemiology databases to evaluate AIDS	Ongoing	NIH	Prof. O. C. Ezechi
12	Study of APOL1 Gene variants and the risk of kidney disease in COVID19 in Nigeria	Ongoing	Northwestern Univ, USA	Dr. D. A. Oladele
13	The Nigerian cardio-metabolic genomics study (NicGen): A Nation-wide cross-sectional study of the genetic epidemiology of cardiometabolic and related diseases in Nigerians	Ongoing	NCD -GHS Consortium	Dr. D. A. Oladele
14	Open-Label, randomized controlled trial of the safety and efficacy of hydroxychloroquine, chloroquine phosphate, and lopinavir-ritonavir for the treatment of persons infected with 2019 Coronavirus Disease (COVID - 19) in Nigeria	Ongoing	NIMR	Prof. B. L. Salako

Achievements

The achievements of the Clinical Sciences Department in 2020 are as follows:

- Increased number of proposals developed.
- Increased number of publications.
- Capacity building in grant writing accomplished.
- Development of HIV Self Testing Verification Mobile App in conjunction with CcHub.
- I-Test transit from UH3 to UG3.
- Construction of the clinical observation center for randomized clinical trials (Ongoing).

- Sponsored research projects (including 4 NIH-funded research).

Capacity Development

- To maintain highly trained and competent staff in various disciplines, the Department supports staff to acquire relevant additional training necessary for career progression. It also accommodates internship training, youth service program, clinical residency training as well as training of researchers in the Department's areas of competence.

Table 3: Staff on Postgraduate Training

S/N	Name of staff	Programme	Specialty	Status
1.	Mrs. Sabdat Ekama	PhD	Pharmaceutics	Ongoing
2.	Dr. Priscilla Ezemelue	PhD	Environmental Toxicology	Ongoing
3.	Ms. Idigbe Ifeoma	PhD	Medical Sociology	Ongoing
4.	Mrs. Herbertson Ebiere	PhD	Clinical Pharmacy	Ongoing
5.	Dr. Agatha Wapmuk	FMCPH	Public Health	Ongoing
6.	Dr. Titilola Gbajabiamila	PhD	Public Health	Ongoing
7.	Dr. Oluwatosin Odubela	PhD	Public Health	Ongoing
8.	Dr. David Oladele	PhD	Public Health	Ongoing
9.	Dr. Agatha David	PhD	Public Health	Ongoing
10.	Pharm. Martin Chidi	M.Sc	Pharmaceutical Chemistry	Ongoing

Conferences/Workshops/Training attended (8)

Fellowship Supervision

- Three (3) Part II Fellowships of the National Postgraduate Medical College/West African Postgraduate Medical College.

Collaborations

We acknowledge the tremendous support and contribution of the Implementing Partners, FHI 360, and their collaborating organization, Association for Reproductive and Family Health (ARFH) to the accomplishments for HIV/AIDS services of the Department in 2020. Our HIV/AIDS programme continues to be among the

largest and the best in the country with cumulative enrolment above 25, 000 including adults, pregnant women, and children, and a mother-to-child transmission (MTCT) rate of 0.0% in 2019.

International Collaborators

- Saint Louis University, Missouri; University of North Carolina Chapel Hill, and New York University, New York, USA:
- Innovative Tool to Expand HIV Self-Testing (ITEST) among Nigerian Youth.
- TASSH (New York University and St Louis University).
- Emory University, Atlanta, Georgia, USA:
- Emory-Nigeria HIV Research Training Programme.
- IeDEA (International epidemiology Databases to Evaluate AIDS).
- Northwestern University, Illinois, USA:
- Intensive Combination Approach to Roll-back the Epidemic in Nigerian Adolescents (iCARE). Study of APOL1 Gene Variants and the Risk of Kidney Disease in COVID19 in Nigeria.
- University of London, UK:
- The Nigerian Cardio-Metabolic Genomics Study (NicGen): A Nation-wide cross-sectional study of the genetic epidemiology of cardio-metabolic and related diseases in Nigerians.

National Collaborators

- Federal Medical Centre (FMC), Ebute Metta:
- As a site for research and clinical services (as part of the MoU signed between NIMR and FMC).
- CcHub:

- Development of HIV Self Testing Verification Mobile App.

Grants/Fellowships/Awards

- National Institute of Health (NIH):
- EN-RTP: Emory Nigeria Research Training Programme.
- Innovative Tools to Expand Youth-Friendly HIV Self Testing.
- Integration of Hypertension management into HIV care in Nigeria: A Task Strengthening Strategy (TASSH Project).
- IeDEA -International epidemiology Databases to Evaluate AIDS.
- iCARE – Intensive Combination Approach to Roll-back the Epidemic among Nigerian Adolescents and Young Persons.
- Novartis:
- Management of Malaria in African Countries: A prospective non-interventional cohort study.
- Emzor Pharmaceutical Industries:
- Acceptability of Flavoured Zinc in the Management of Diarrhea in children: An interventional study.
- Selenium Education and Research Centre South Africa (SERCA):
- Efficacy and Safety of Selenium in the Management of COVID-19 in Adult Nigerians in Lagos: An RCT.
- NCD-GHS Consortium:
- The Nigerian Cardio-Metabolic Genomics Study (NicGen): A Nation-wide cross-sectional study of the genetic epidemiology of cardio-metabolic and related diseases in Nigerians.
- North Western University, USA: Study of APOL1 Gene Variants and the Risk of Kidney Disease in COVID19 in Nigeria.

NIMR Grant Awards:

- Mapping and Characterization of Ijede, Ikorodu, Lagos.
- One-Stop Clinic: Integrating specialist care for HTN and DM for the elderly infected with HIV in Lagos, Nigeria.
- AMPROP: Antimalarial Prophylaxis for Pregnancy.

Challenges

- The COVID-19 Pandemic significantly affected services leading to modification of services delivery methods.
- Manpower shortages in vital areas.
- Non-replacement of staff that has left the Institute.
- Need for Nurse Researcher, Clinical Psychologist, and Nutritionist as staff.
- Reliance on volunteers.
- IGR remittance for department support.
- Infrastructural challenges:
- Some structures are dilapidated and need refurbishment (being addressed).
- Need for equipment: computers, photocopiers, air conditioners, laboratory supplies.

Way Forward

- Continued effort to achieve strategic objectives.
- Advocate for employment of needed staff.
- Ensure integration of adjunct researchers/professors into CSD activities to enhance staff capacity.
- Continued advocacy for infrastructural capacity development.
- Pursue aggressively more publications.
- Advocate for the release of 30% of departmental IGR for research and other departmental activities.

MICROBIOLOGY DEPARTMENT

The year 2020 was indeed an unusual year faced with a health crisis caused by the Coronavirus disease 2019 (COVID-19). In a quest for more relevance, Microbiology Department had prepared to respond to an outbreak of viral origin, particularly by training some staff in pathogen identification and characterization. The department commenced testing for the virus before the reported index case of COVID-19 in the country on February 27, 2020. The three Centers in the department (Center for Human Virology and Genomics [CHVG], Center for Tuberculosis Research [CTBR], and Center for Infectious Disease Research [CIDR]) are currently playing a major role in response to this pandemic and other infectious agents of national importance as presented in this report.

While we rejoice over the great feat achieved in our research output, we also feel the pain of the demise of two of our key staff, Mr. Abba Ujah (Store Officer) and Mrs. Florence Okhiku (Laboratory Scientist). May the souls of the departed rest in peace.

Research Activities

Ongoing Research Activities:

- Care-seeking behavior, real-time trends, and prediction of COVID-19 using an electronic data-based platform.
- Socialization approach to early and appropriate tuberculosis cases detection, notification, and treatment adherence support in Nigeria.
- Plasma and PBMC repository to elucidate the immune and cytokine profile of SARS-CoV-2 infected Nigerians-Lagos subset.
- Molecular and serological diagnosis of SARS-CoV-2 in Nigeria.
- Laboratory validation of COVID-19 serology assays.
- Evaluation of cross-reactivity of antibodies to SARS-CoV-2 and malaria using de-identified samples.
- In-house design and development of SARS-CoV-2 virus molecular assays.
- Population-based seroepidemiological and household contact study of COVID-19 virus infection in Nigeria.
- Association between mitochondrial DNA levels, HIV replication, and HAART genotoxicity; Implications for better HIV management.
- Field evaluation of the Febrile Illness Syndromic Assays (FISA) in Lagos State.
- Mitigating HIV drug resistance among HIV-positive pregnant women and their new-born in Lagos, Nigeria.
- Genotyping human papillomavirus strains among women in Nigeria.
- Bioprospecting for anti-tuberculosis potentials of marine actinomycetes in Lagos Lagoon.
- Evaluation of GeneXpert MTB/RIF for detection of mycobacterium tuberculosis and Resistance to rifampicin among presumptive tuberculosis cases in Lagos State.
- Whole-genome sequencing for investigation of MTBC diversity and MDR-TB resistance prediction in Nigeria.
- A survey of antimicrobial resistance burden in Lagos State.
- Implementation of antimicrobial

stewardship programmes in healthcare facilities in Lagos State: A needs assessment.

- Comparative metagenomic analysis of the vaginal microbiome of women living with HIV.
- Evaluation of efficacy of hand sanitizers in Lagos.
- Viral Haemorrhagic fevers and their hosts in Nigeria.
- Investigation on the biological and molecular characterization of the re-emergence of Yellow fever in Nigeria.

Completed Research Activities:

- A national survey of public awareness of antibiotic resistance and antibiotic prescribing behavior among medical practitioners in Nigeria.
- Knowledge and perception of risk of contracting Coronavirus Disease 2019 (Covid-19) among adult Nigerians.
- Microbial and chemical analysis of water supply in Lagos.

Achievements

Product Innovation

- Dr. Chika Onwuamah developed SARS-CoV-2 Isothermal Molecular Assay (SIMA) – a point of care assay.
- Joseph Shaibu developed SARS-CoV-2 Detection Assay (SCODA) - qPCR assay
- First to sequence SARS-CoV-2 of the COVID-19 index case in Nigeria.
- Established the first COVID-19 drive-through sampling center in the country.
- Introduced teleconsultation guided “Do-It-Yourself” (DIY) home COVID-19 self-swap test sample to meet the increasing demand for testing.

- Provided COVID-19 testing services to several facilities.
- Produced infection control materials, namely:
- Hand sanitizers and decontamination solutions and quality tests.
- Sterilized and packaged facemasks.
- Produced Viral Transport Medium (VTM) for sample collection in partnership with Biochemistry Department.
- Prepared panels for validation of COVID-19 PCR and serological assays.
- Validated commercially available RDTs for NAFDAC registration and ELISA kits for in-country algorithm for COVID-19 serosurveys.
- Launched blood genetics and transfusion research and opened a SMART Centre.
- Dr. Davies-Bolorunduro obtained a post-doctoral research position at Universitas Airlangga, Indonesia.

Capacity Development

- Conferences/Workshops/Trainings attended: (47)
- B.Sc., M.Sc., Ph.D. students supervised: (4)
- NYSC/Industrial Training Students: (19)

Collaborations

International Collaborators

- Institute de Pasteur, Dakar, Senegal.
- Centres for Disease Control and Prevention (CDC), Abuja.
- Centres for Disease Control and Prevention (CDC), China.
- University College London.
- West African Node of Excellence for TB, AIDS, and Malaria (WANETAM).

- Institute of Tropical Medicine Antwerp Belgium.
- Critical Path Institute, Tucson Arizona USA.
- Tuberculosis Supra Reference Laboratory, Milan, Italy.
- Tuberculosis Supra Reference Laboratory, Cotonou, Benin.
- Emory University, Atlanta Georgia.

National Collaborators

- Centre of Excellence in Genomics and Infectious Diseases – RUN, Ede.
- Federal Ministry of Health.
- National Tuberculosis and Leprosy Programme Control (NTBLPC).
- Institute of Human Virology Nigeria (IHVN).
- FHI 360.
- College of Medicine, University of Lagos.
- Lagos Mainland Hospital, Yaba, Lagos.
- KNCV; TB REACH Nigeria.
- The University of Nigeria.
- Lagos State Ministry of Health.
- Lagos State Tuberculosis Control Programme.
- Delta State Ministry of Health.

Grants/Fellowship Awards

- Emory-Nigeria Research Training Program – Dr. Uche Igbasi, Dr. Emelda Chukwu, Fehintola Ige.
- Institut Merieux young investigator on Antimicrobial Resistance- Dr. Emelda Chukwu.
- Africa Research Excellence Fund (AREF) – Dr. Emelda Chukwu.
- EDCTP career development fellowship grant - Dr. Nneka Onyejebu.
- Fate Philanthropist funded the

development of SIMA kit – Dr. Chika Onwuamah.

- Ford Foundation funded a project on Practice Management System in Ondo State - Samuel Amoo.
- Northwestern University funded project on Immune and Cytokine Profile of SARS-CoV-2 – Prof. Audu.
- UCL, NCDC & NIMR funded COVID-19 seroepidemiology survey in Lagos State - Prof. Audu.
- NIMR is funding Arbovirus grant support for the Yellow fever project in Delta state - Prof. Audu.

NIMR Grant Awards

- Junior category – Dr. Davies-Bolorunduro, Dr. Emelda Chukwu, Dr. Azuka Okwuraiwe, Chioma Kunle-Ope.
- Senior category - Dr. Chika Onwuamah, Prof. Rosemary Audu
- COVID-19 awards – 8 researchers.

Challenges

- Staff shortage due to:
- Serious illness and death of some staff members.
- Poaching and no replacement of staff.
- Resignation of highly skilled staff.
- Increased workload due to COVID-19 testing.
- Inadequate laboratory, store, and office spaces.
- Non-functional air conditioners in some laboratories and offices.
- Non-functional refrigerators in the laboratories and faulty institutional cold storage facilities.
- Biosafety Level 2 laboratory not attaining negative pressure.

- Incubator in Biosafety Level 3 laboratory not installed due to unavailability of some accessories.

Way Forward

- Recruit more staff especially research and project staff to cope with the increasing workload.
- Repair cold storage facilities and replace retired refrigerators.
- Renovate building designated for store and offices for CTBR.
- Repair BSL2 lab to ensure functional negative pressure.

- Provide accessories for the installation of the incubator in the BSL3 laboratory.
- Provide microscope and PCR machine for use in CIDR.

2021 Work Plan

- Re-organize to improve strategic research collaborations.
- Take research products to market.
- Train and re-train to maintain a culture quality of management system.
- Strengthen bio-banking by improving database systems for isolate storage.

Product Innovation: SIMA & SCODA





Service Innovation: Modified Drive-through COVID-19 Testing Center



Teleconsultation guided DIY home COVID-19 Self-swab test sample collection



Biosafety Level 3 Laboratory Suite



BACTEC MGIT 960 Machine for TB Culture and Drug Susceptibility Testing



Sample Processing Room in Biosafety Level 3 Laboratory Suite



Team building activity of staff at the Center for Infectious Disease Research



Antimicrobial Resistance Surveillance Workshop

MOLECULAR BIOLOGY AND BIOTECHNOLOGY DEPARTMENT

The Molecular Biology and Biotechnology Department consists of the Molecular epidemiology and Food safety Unit, Microbial Genetics and Nanotechnology Unit, Probiotics science and Gut microbiome Unit, Molecular Diagnostics Unit, and Respiratory Diseases Research Laboratory.

Research Activities

- Molecular characterization of efflux pump genes, antimicrobial resistance profile, and biofilm formation in *Klebsiella* spp., *Pseudomonas aeruginosa*, *Salmonella enterica* serovars, *Escherichia coli*, and *Staphylococcus aureus*. (On-going)
- Antibiotic resistance profile and replicon plasmid typing of Metallo- β -lactamase producing *Pseudomonas aeruginosa* and *Escherichia coli* strains (Ongoing).
- Real-time PCR for the detection of *Helicobacter pylori* from biopsy (Completed)
- Characterization of virulence factors and efflux pump systems of non-typhoidal *Salmonella* serovars. (Ongoing).
- An Assessment of the role of healthcare workers, food handlers and the environment as reservoirs of *Vibrio cholerae* in Abia and Kano States, Nigeria' a NIMR sponsored project.

Research Projects

- Executed project on Molecular epidemiology of bacterial pathogens (*Helicobacter pylori*, *Vibrio cholerae*,

Campyloacter jejuni, *Salmonella enterica*, non-typhoidal *Salmonella*), Food diseases/safety.

- Executed project on Technological properties of locally isolated lactic acid bacteria (LAB)/Probiotics science, Gut microbiome/slum diarrhea, Antimicrobial resistance, Metagenomics/16S rRNA sequencing.
- Executed project on Microbial Science, genomics of bacterial, fungal pathogens, nanotechnology.
- Executed project on Molecular diagnostics (production of DNA/RNA extraction kits, sample DNA release buffers), Proteomics.
- Activation of Respiratory Bacterial/Fungal Diseases (TB, *Streptococcus pneumoniae*, etc) Research Laboratory.

Achievements

- Production of NIMR-BIOTECH RNA/DNA extraction kits
- Hosting and facilitation of a World Bank-funded Molecular biology training with the theme 'From Basic PCR in Trypanosomes to Bioinformatics' in collaboration with the Africa Centre of Excellence, Ahmadu Bello University, Zaria, Nigeria 19th–24th October 2020.
- Convening of the first-ever NIMR-Institute Merieux Young Investigator Award (YIA) in West Africa on October 19, 2020.
- A Ph.D. student and staff of the Department traveled to IPD, Dakar Senegal to undertake part of his Ph.D.

2021 Work Plan

- Commencement of at least one international grant.
- Conduct training/workshop.
- Completion of at least two Ph.D. students' work.
- Acquisition of equipment from a grant obtained.
- Establishment of the Food Safety Lab for detection of food pathogens.
- To write and submit more proposals.
- Conduct of the second YIA for IM-NIMR.
- Conclusion of Emory Training grant by Dr. U. Igbasi.
- Attendance at international conferences.
- Attend and give a presentation at National Biotechnology Conference.
- Involvement in the H. pylori Maastricht –VI Florence Meeting.
- Establishment of the AMR Committee in NIMR.
- Supervision of Ph.D., MSc, and BSc students.
- Publication of at least twenty-five scientific papers.



Fig 1. Participants at the ACENTDFB-NIMR Molecular Biology Hands-on training workshop held in collaboration with the Africa Centre of Excellence on Forensic Biotechnology and Trypanosomiasis, Ahmadu Bello University, Zaria, Nigeria. 19th – 24th October 2020

project on ICGEB Smart Fellowship.

- External reviewer to Young Investigator Award proposals for LUTH.
- Participation of project staff and Ph.D. students in AMR-Genomics workshop that held from 4th – 6th November 2020.

Capacity Development

- Virtual /physical conferences/Training attended: (12)
- IT students Supervised: (5)
- BSc: (2); MSc: (3)

Collaborators

International Collaboration

- University of Buea, Cameroon, University of Yaounde Cameroon.
- University Medical Centre, Gottingen, Germany, Heriot-Watt University, UK.

National Collaboration

- The University of Lagos, University of Ibadan, ABU Zaria.
- African Centre for Excellence on Neglected Tropical Diseases (NTD) and Forensic Biotechnology (Ahmadu Bello University Zaria, Kaduna State).
- African Centre for Excellence on Mycotoxins and Food Pathogens (Fed. University of Technology, Minna, Niger State).
- Lead City University, Ibadan.
- Eko Unimed, Lagos.

Collaborative activities

- Molecular Biology hands-on training workshop in NTD.
- MSc, Ph.D. adjunct lectureship and these supervisions.
- Bioinformatics training.

Grants/Fellowship Awards

- African Centre for Excellence on Neglected Tropical Diseases (NTD) and Forensic Biotechnology (Ahmadu Bello University Zaria, Kaduna State). Prof. S. I. Smith, Role: Collaborating Partner and Institution.
- TETFUND for a project on 'Characterisation of *Haemonchus contortus* and studies of its somatic native and recombinant protein as candidate vaccine antigen in goats'. Prof. S. I. Smith. Role: Co-Investigator.
- Vaccinology in the age of pandemics: Strategies against COVID-19 and other global threats June 15-16 2020 (Registration Award to attend give to Dr. T.A Bamidele).

Challenges

- Funding of reagents for research
- Inadequate staff to conduct the molecular biology techniques required for projects.
- Lack of adequate secretarial assistance to attend to reports and documentation.
- COVID-19 disrupted many research and training activities scheduled to take place e.g., cancellation of an international workshop.
- Lack of office space for senior staff members.

Way forward

- Employment of new staff (Research Fellows, Scientists, Technologists) to work in the department.
- Improved funding of the Laboratory.
- Provision of office space.
- Increase in proposals/grants to increase funding for research.

PUBLIC HEALTH AND EPIDEMIOLOGY DEPARTMENT

The Public Health and Epidemiology Department continues to wax stronger in its research activities through the joining of consortiums and engaging in groundbreaking collaborative research studies. The latest such consortium is the African Health Observatory for Health Policies and Systems by the Health Policy and Systems Research Group. The Department's areas of focus are mainly tropical diseases, health systems, and bioethics. The Department approaches its primary assignment to conduct research and strengthen public health and national development through the research units in the department namely:

- Onchocerciasis and Soil-Transmitted Helminths Research laboratory
- Molecular Parasitology Research Laboratory
- Molecular Entomology and Vector Research Laboratory
- Epidemiology / Health Policy and Systems
- In the last year, the number of grants it attracted to the Institute has grown tremendously and this has enhanced its research activities as evident below.

Research Activities

Completed

- Evaluation of YEDI neglected tropical diseases awareness pilot project in selected secondary schools in Kosofe LGA, Lagos State, Nigeria.
- Mass drug administration in the management of Trachoma in Northern Nigeria: Implications on child survival.
- Awareness and preparedness of hospital

staff against Novel Coronavirus (COVID-19): A Global Survey.

- Utility of temperature measurement using non-contact Infrared thermometer in detecting elevated temperature as an infection control measure in the era of Covid-19.

Ongoing

- Assessment of insecticide resistance and vector surveillance sites in Nigeria.
- Effect of climate change on home management of malaria in Lagos State, Nigeria.
- Building laboratory diagnostic capacity and strengthening existing laboratory system for Buruli ulcer control and research in Nigeria 2015 – Date.
- The END Fund Pilot NTD's Prevention Project Monitoring and Evaluation.
- The role of human Leukocyte Antigen Class II Alleles in the occurrence of Type 2 Diabetes Mellitus among patients with HIV and Pulmonary Tuberculosis co-infection in Nigeria.
- Role of community support in community-based health insurance.
- Risk communication and community engagement during the COVID-19 pandemic.
- The epidemiology of schistosomiasis and soil-transmitted helminths in Ogun State and the implication of co-infection for disease control.
- Identification of genes associated with susceptibility or resistance in *Bulinus* snail species infected with *Schistosoma haematobium*.

- Co-morbidity of SARS-Cov-2 infection with Non-Communicable Diseases among Apparently Healthy Nigerians.

Laboratory Diagnosis of NTD” from 9-12 March 2020. Thirty-five participants attended the workshop from various tertiary institutions in Nigeria.

Capacity Development

- The Department organized a workshop on “Current Techniques in Effective

S/N	Name of staff	University	Ph.D. project title	Status
1.	Mrs. VNV Enya	University of Benin Department of Microbiology Faculty of Life Sciences	The Role of Human Leukocyte Antigen Class II Alleles in the Occurrence of Type 2 Diabetes Mellitus among Patients with HIV and Pulmonary Tuberculosis co-infection in Nigeria	Ongoing
2.	Mr. AK. Adeneye	University of Ibadan Department of Sociology, Faculty of Social Sciences	Effect of climate change on home management of malaria in Lagos State, Nigeria	Ongoing

- Conferences/ workshops/ trainings attended: (8)
- PhD students supervised: (2)
- I.T Students: (15)

- University of Pennsylvania, Philadelphia, USA.
- Institute of Tropical Medicine and School of Tropical Diseases and Global Health, Nagasaki University, Nagasaki Japan.
- Research Triangle Initiative, USA.

Collaborators

International Collaborators

- Department of Molecular Parasitology and Tropical Diseases, School of Medicine & Research Center of International Tropical Medicine, College of Medicine, Taipei Medical University, Taiwan.
- Center for Discovery and Innovation in Parasitic Diseases, Skaggs School of Pharmacy and Pharmaceutical Sciences, University of California, San Diego, USA.
- Advanced Medical and Dental Institute, Universiti Sains Malaysia Penang Malaysia.
- Department of Preventive Medicine, Faculty of Public Health, University of Debrecen, Hungary.

National Collaborators

- Saro Lifecare, Lagos.
- ABT/PMI/USAID/Vectorlink associates, Abuja.
- Nigerian Natural Medicine and Development Agency, Lagos.
- Lead City University, Ibadan.
- National Tuberculosis, Buruli ulcer, and Leprosy Control Programme (NTBLCP), Abuja, Nigeria.
- Department of Zoology, Faculty of Science, Obafemi Awolowo University, Ile-Ife, Nigeria.
- Department of Zoology, Faculty of Science, University of Lagos, Akoka, Lagos.

- Department of Geography, Faculty of Social Science, University of Lagos, Akoka, Lagos.
- Department of Psychology, Faculty of Social Science, University of Lagos, Akoka, Lagos.
- Biochemistry Department Faculty of Science Ahmadu Bello University, Zaria.
- German Leprosy and Tuberculosis Relief Association (GLRA), Enugu.
- Department of Sociology, Faculty of Social science, University of Lagos.

Grants and Fellowship Awards

- The END Fund Pilot NTD's Prevention Project Monitoring and Evaluation Grant, 2019-2020.
- Nigerian Natural Medicine and Development Agency - Repellent, Larvicidal and Adulticidal Bioefficacy of natural products against Mosquitoes. 2019–Date.
- Sumitomo Experimental hut trial Project Grant in Kanji, on the Bioefficacy and IRS Residual Life of Sumishield 50WG insecticide against *Anopheles species*, 2020.
- PMI/Vectorlink/USAID project grant on Routine and Resistance Monitoring of *Anopheles* mosquitoes in Nigeria,
- African Health Observatory Platform on Health Systems and Policies (AHOP),

NIMR grant awards

- Nigerian Institute of Medical Research (NIMR) Grant Award 2020-2021 (Grant No. 3NM-JRGT-20-0051).
- Nigerian Institute of Medical Research (NIMR) Grant Award 2020-2021 (Grant No. NMG-CIF-11-0029).

Challenges

- Need more office and laboratory spaces,
- Increase funding,

Way forward

- Focused attention in securing fund for research,
- Increased training opportunities and sponsorships for staff,

2021 Work Plan

- Conduct research into profiling malaria vectors for insecticide resistance in Nigeria.
- Conduct research into the characterization of *Aedes* mosquitoes and insecticide resistance of these species in Nigeria.
- Investigate the bioefficacy of new and improved innovative dual active Long Lasting Insecticide Nets (LLINS) currently introduced for the control of insecticide-resistant species of mosquitoes in Nigeria.
- Conduct research into the perception of individuals towards the potential release of Genetically Modified Mosquitoes in Nigeria.
- Effect of climate change on home management of malaria in Lagos State, Nigeria.
- Acceptability and willingness to take the COVID-19 vaccine in Nigeria.
- Epidemiology of schistosomiasis and soil-transmitted helminths in Ogun State and the implication of co-infection for disease control.
- Epidemiology of *Schistosoma mansoni* in Iwelepe and Ogbera communities in Ogun State and evaluation of sensitivity and

specificity of a point of care circulating cathodic antigen (POC-CCA) rapid test kit in urine.

- *Mycobacterium tuberculosis*: Whole-genome sequence library, the virulence, and drug resistance patterns.
- Enhancing the fundamentals for effective control of Buruli ulcer through sequencing and mutation analyses of drug resistance in the era of the global spread of antimicrobial resistance.
- Molecular epidemiology of urinary schistosomiasis and characterization of human and animal infective schistosome species in three endemic areas of Ogun State, southwestern Nigeria.

CLINICAL DIAGNOSTIC LABORATORY

The Clinical Diagnostic Laboratory (CDL) provides Clinical Laboratory Services to staff and the public. It is also involved in training and research activities. There are seven (7) sections in CDL namely Haematology, Medical Microbiology, Chemical Pathology, Immunology, Serology, Food handlers' fitness service, and Kits / Reagent evaluation. CDL provided and is still providing quality internship training for eligible graduates of Medical Laboratory Science and others through collaboration with Universities and training institutions.

Research Activities

- The Role of *Streptococcus pneumoniae* antibodies in predicting vulnerability and severity of SARS-COV-2 infection in Lagos, Nigeria (A collaborative research among the staff of CDL and MB&BT Department. PI: Dr. TY Raheem).
- Investigation of *M. tb* strain diversity in relapsed and recurrent TB cases in Lagos Nigeria (A collaborative research among the staff of CDL, MB&BT, CTR, and Clinical Sciences departments. PI: Dr. TY Raheem).
- Molecular Epidemiology of Carbapenem - Resistant Enterobacteriaceae (CRE) in Southern Nigeria. Information obtained may be useful to inform policy on the use of Antibiotics and general treatment of clients with bacterial infections (PI: Mrs. MAnidobe).
- COVID-19 Sero-epidemiology study in Nigeria (using Abott i1000 and some of the staff of CDL. PI: Prof R. Audu *et al*).
- ApoL1 research project using the TC matrix (PI: Prof BL Salako and some staff of CDL).

Achievements

- Sustained implementation of Quality Management System (QMS) and internal laboratory audit.
- Improving the turn-around time and quality of laboratory services and prompt dispatch of results through e-mails to clients.
- Provided uninterrupted essential routine laboratory/research services during the COVID-19 lock-down period. Undertook a total number of 4,114 laboratory diagnostic assays from January-December, 2020. Haematology 1193, Serology 1380, Microbiology 246, Chemistry 944, Immunoassay 319, and Fungal studies 32.
- Improvement on inter-unit and inter-departmental relationships and research collaborations.

Capacity Development

- No of Conferences & Workshop Attended: (5)
- Students on Internship: (4)
- Ph.D. students supervised: (2)

Collaborators

- Lead City University.
- ABU – Zaria.
- Malaria Elimination/Control Programme.
- MLSCN-Kit Evaluation programme.

NIMR Awarded Grants

- Innovative Grant for Development of Communication Strategy for the Management and Dissemination of Research Innovation and Findings for C O V I D - 1 9 P a n d e m i c . (3NIMRGA0033-20-01 Dr. T.Y. Raheem).

Challenges

- Inadequate personnel.
- Lack of backup for some key equipment e.g., ELISA Machine.
- Inadequate Medical Laboratory Scientists to handle the increasing workload.
- Inadequate work/office space.
- Lack of service contracts for specialized equipment in CDL.

Way forward

- Service maintenance for specialized equipment is needed.
- New ELISA Machine to replace the old one.
- Purchase of automated blood coagulation machine.
- Purchase of additional fridges, freezers, desktop computers, and printers.
- Replacement of old air-conditioning units.

2021 Work Plan

- To continue implementation of the quality management system and specialized laboratory services.
- To increase research collaborations with NIMR research departments and other tertiary institutions.
- A d v o c a c y a n d w e l l n e s s programme/training of food handlers/vendors/consumers.

CENTRAL RESEARCH LABORATORY

The Central Research Laboratory (CRL) has been the nexus of research and service support for NIMR staff and other researchers in the country. The Management, under the headship of Prof. Babatunde Lawal Salako, was reactivated CRL in May 2019. The Central Research Laboratory has not reneged on its mandate to acquire state-of-the-art equipment to support research and building human capacity within and outside Nigeria. In its present capacity status, CRL is set to support the conduct of high throughput research and positioned to compete for grants effectively with researchers from other parts of the world.

Core Values

- *Excellence, Commitment & Innovation*

CRL Structure

- Dr. BA. Iwalokun (Head, CRL)
- Dr. C. Onwuamah (Asst. Head CRL)
- Dr. N. Otuonye (Lab Manager)
- Miss. J. Ayoola (Scientific Officer)
- Mr. N. Yussuf – Laboratory Technician

Scientific Committee Members

- Dr. M. Fowora (MB & BT Dept)
- Dr. A. James (Biochemistry & Nutrition Dept)
- Dr. O. Ajibaye (Biochemistry & Nutrition Dept)
- Dr. A. Okwuraiwe (Microbiology Dept)

Research Services implemented by CRL in 2020

Research Service	Client Institution	Remark
Pharmacokinetic investigation of Clozapine in patients with psychiatric disorders	Neuropsychiatric Hosp. Yaba, Lagos. University of Maryland, Baltimore (USA).	Completed
Sequencing of spa gene in 22 clinical isolates of <i>S. aureus</i>	MB & BT Dept, NIMR	Completed
Qualitative locus sequencing from the genome of <i>Oreochromis niloticus</i> strains recovered from selected water bodies in Nigeria	Nigerian Institute of Oceanography	On-going
Detection and quantitation of quinones and heavy metals in some selected skin lightening cosmetics sold in Nigeria	NIMR	Completed
Sequencing of 18s ITS and <i>cox</i> genes of 22 <i>Anopheles gambiae</i> complex isolates from Southern and northern Nigeria	Public Health & Epidemiology Dept, NIMR	On-going

Achievements

- Acquisition of new 18C reverse column (Agilent grade) as a gift from University of Baltimore (cost: N1m).
- Completion of standard operating procedures for all equipment in CRL.
- Involvement in the sequencing and submission to GenBank of RNA-dependent RNA polymerase of the index case of 27 February 2020 in Nigeria.
- Involvement and rendering of research support for the completion of clinical research in the first wave of COVID-19 patients in Lagos.
- Obtained one COVID-19 Intervention grant for the implementation of COVID-19 based research in the country.
- In collaboration with the National Medical Council, participated in the national validation and recommendation of three real-time reverse transcriptase PCR for the diagnosis of COVID-19 in Nigeria.
- Obtained two grants on implementation of pharmacogenetic screening of adverse drug reaction in women living with HIV (Emory) and establishment of HLA typing laboratory in Nigeria (Africa-India Mobility Fund).
- A total of 21 publications were published by members of CRL in 2020.
- Received donations of reagents and consumables worth 350 USD for detection and genotyping of novel tumor and epigenetic breast and prostate cancer markers from Acro Biosystems, USA.
- Received donation of C18 HPLC column worth 2,500 USD from the University of Maryland, Baltimore, USA.
- Acquired BGI DNBSEQ-G50 Next

Generation Sequencing Platform with MGISP-100 Library Preparation system for research and research service support by NIMR to researchers within and outside the country.

- Despite COVID-19 restrictions, 15 IT students were trained or engaged as training assistants by CRL.
- CRL also conducted the first-ever partial genome sequencing of SARS-CoV-2 for COVID-19 response frontline health workers in the country.

Capacity Development

- Conferences attendance: (7)
- Students on Internship: (15)

Collaboration

International collaboration

- BGI, China

National collaboration

- Genomics Laboratory, CRL, University of Lagos.
- In-vitro Diagnostic Laboratory, Nigerian Medical Research Council.
- Pharmacokinetics Laboratory, Neuropsychiatric hosp. Yaba.
- Genomics Lab, Redemer University, Ede, Osun State.

Challenges

- COVID-19 lockdown measures affected the operation of CRL in 2020. As such, a few of the research services were uncompleted due to the non-availability of some of the clients at the stipulated service implementation dates.
- Limited funds available to CRL debarred the bulk procurement of some expensive

key consumables for SeqStudio use for research service (BigDye 3.1, Big Dye xterminator & exosap PCR cleanup).

- Complaints of shortage of funds by clientele to access CRL research services

Way Forward

- Development of a more robust strategic action plan to link NIMR to the Pharmaceutical Industry and TetFund affiliated Universities through CRL.
- Seed funding from NIMR Management.
- Competing for international training grants.
- Review of research service costs.

2021 Workplan

- Installation and trial implementation of the newly acquired BGI NGS and Library Preparation system.
- Development and implementation of the 2021 Training Calendar.
- Training of research scientists in HPLC, Sequencing, Flow cytometer, RT-PCR, and Bioinformatics as indicated in the Training Calendar.
- Resource mobilization & wealth creation.

CRL, NIMR TRAINING TIME-TABLE FOR 2021

Course Category	Course Description	Proposed Dates	Duration	Q1	Q2	Q3	Q4	Fee (₦)
Basic courses	SARS-CoV-2 Genome Sequence Analysis	February	3					40,000:00
	Primer Design: Principle, Chemistry, design tools (for gene amplification & Cloning) and Reconstitution	March	2					20,000:00
	Principles and approaches for the Identification of epigenetic markers for cancer pathogenesis, treatment, treatment monitoring and prognosis	April	3					40,000:00
	Principles and procedures of Immunophenotyping by flow Cytometry	May	3					50,000:00
	Hands-on-Training in the use of GeneXpert for Human Papilloma Virus & Hepatitis B diagnosis	May	5					50,000:00
Intermediate Courses	Hands-on training on the molecular detection of antibiotic Resistance Genes in MDR bacterial pathogens by PCR	June						50,000:00
	Molecular Docking & Epitope Mapping for Drug and Vaccine Design	July	3					50,000:00
	Molecular detection of mycotoxin genes in fungal contaminated staple food in Nigeria.	July	5					50,000:00
	Hands-on-Training on the use of Real-Time PCR for Gene Detection and Melting Curve Analysis	Sept	4					70,000:00
Advanced Courses	SARS-CoV-2 Whole Genome Sequencing & New Variants Identification	March	5					100,000:000
	Whole Genome Sequencing and Analysis of MDR bacterial pathogens: Applications in Surveillance & Epidemiological Studies	August	5					100,000:00
	HPLC: Principles, Programming & Procedures: Application for pharmacokinetic profiling of drug metabolites in blood samples	Sept	5					100,000:00
	Hands-on Training in Pharmacogenetics & Pharmacogenomics	Oct						100,000:00
	Use of RT-PCT for viral and bacterial pathogen quantitation and gene expression analysis	Dec	5					100,000:00
	In Silico ADMET and Toxicological Analyses	Dec	3					50,000:00

LIBRARY AND INFORMATION COMMUNICATION TECHNOLOGY DEPARTMENT

The Coronavirus pandemic inevitably changed the working style from the traditional office environment to online space. As such, mobilization of digital information, dissemination, and ICT support became essential and top priority more than ever before in 2020. The library and ICT department is well-positioned to provide technical support for virtual activities and respond to remote requests for information and knowledge sharing within and from outside of the Institute. The department played a vital role in providing diverse, reliable, and up-to-date information especially on COVID-19 related to the various Institutional social media platforms including the website. Also, the department provided information service through phone calls and emails by responding to requests and inquiries on research activities, clinical and laboratory services, and particularly COVID-19 testing. To maintain physical distance during the COVID-19 pandemic, staff facilitated virtual activities related to research, training and other forms of learning by deploying necessary ICT groundwork. Also, some staff of the Department successfully worked remotely from home during the year.

Activities

- Health Information gathering & dissemination.
- Health Information Systems design and Management.
- Health Information Communication and Social Marketing of NIMR activities.
- Computer software and hardware management.
- Network and Internet Infrastructure management.

- Report writing.
- Desktop publishing.
- Web content development.
- ICT Training.

Achievements

- Successfully facilitated 2020 online/remote staff promotion examination.
- Successfully facilitated Institute virtual events.
- Improved NIMR social medial contents, presence, and global visibility.
- Relentlessly provided information service to meet huge requests and inquiries on research activities, clinical and laboratory services, and particularly COVID-19 testing activities in the Institute.

Challenges

- Inadequate funding to subscribe to biomedical information e-resources.
- Lack of funds to implement Digital Library System.
- Needs for working tools (Laptops and Desktops).
- Inadequately skilled staff (Desktop publishing).

Way Forward

- Fund to implement digital library system.
- Acquisition of additional working tools (Laptops and Desktops).
- Employ graphic and web content management professionals.

2021 Work Plan

- Implementation of the digital library system.
- Subscription to HINARI and other research-assisted e-resources.
- Reengineering of the website and social media platforms.
- Strengthening the internet and network linkages with fiber optics.
- Establishment of institutional integrated data Centre.
- Develop institutional ICT policy.

GRANT, MONITORING AND EVALUATION (GM&E) UNIT

The Grant, Monitoring and Evaluation Unit (GM & E) is saddled with the responsibility of providing statistical support, data management, monitoring and evaluation of activities, management of grants and projects of the various Departments and Units of the Institute. The Unit is subdivided into four, namely Biostatistics, M&E, Data Management, and Grants Management sub-units.

Biostatistics: This sub-unit provides statistical support for the Institute. The activities carried out are as follows:

- Study designs, sample size calculation, design of data collection tools, data collection and application of statistical techniques on routine, experimental, and survey data within NIMR, and collaborating with other researchers within and outside the country.
- Interpretation and presentation of results for research findings.
- Reviewing statistical sections of grant proposals or scientific papers.
- Preparing NIMR Manpower Statistics on an annual basis.
- Ensure adherence to program/project plans, track activities and assess project performance.
- Evaluate project/program impact and generate strategic information that will enhance decision-making.
- Reports on NIMR activities as requested by FMoH.
- Review and Monitor the implementation of the annual work plan of various Departments and Units.
- Review and Monitor the implementation of the Strategic Plan.

Data Management: This sub-unit is in charge of coordinating and supporting the management of data in the Institute. Its roles include the following:

- Database design and maintenance.
- Cleaning, updating, and organizing data generated from different divisions/units.
- Automate routine queries.
- Support generation of necessary reports.

Grants Management: This sub-unit has the full responsibility of overall oversight and monitoring of project and project funding to:

- Plan, budget, identify, and record all funding related to projects and programmes.
- Ensure strict adherence to all terms and conditions of the Grants awarded.
- Ensure adherence to technical standards.
- Meet the needs of grant beneficiaries.
- Disseminate/Notify staff of upcoming calls.
- Advertise and collate reviewed NIMR Calls.

Monitoring and Evaluation: This sub-unit routinely tracks the activities of Departments and Units in the Institute as well conduct periodic evaluation of these activities. The following are the specific duties carried out by the M&E sub-unit:

- Develop a standardized M&E tool that captures relevant data adequately.

- Issue Awards.
- Facilitate effective communication among all stakeholders.
- Be responsible for monitoring and managing contracted services.
- Document and maintain the records of NIMR's grants (both internal and external).

Research Activities

- Entomology Surveillance.
- An Investigation into the epidemic of chronic kidney disease in Hadejia, Jigawa State, Nigeria.
- Mass drug administration in the management of trachoma in northern Nigeria: Implications on child survival.
- Circum Vent (Ventilator) Project.
- Innovative Tool to Expand HIV Self-Testing (ITEST) among Nigerian Youth.
- Database Management for departments and units that generate large data sets.
- Population-based seroepidemiological and household contact study protocol for COVID-19 virus infection.
- Study of APOL-1 Gene Variants and the Risk of Kidney Disease in COVID19 in Nigeria,
- Social distancing as a public health intervention against the Covid-19 pandemic. Effect of social determinant of health prevailing in Nigeria.
- Mathematical modeling of Covid-19 pandemic in Nigeria: Predictions and impact.
- New Nets Project Entomological Surveillance/Insecticides Resistance Monitoring

Achievements

- Supported at least 12 Ongoing Research activities in 2020.
- 4 new collaborations (UCL, SLU, Shell Nigeria, and MRC Gambia).
- Funding support by American Statistical Association to participate at the Symposium on Data Science and Statistics (Virtual).
- Successfully Conducted the 2020 rounds of call.
- Pre and Post Doc completed and awarded.
- Junior Category awaiting feedback from one (1) reviewer.
- Senior Category -awaiting feedbacks from three (3) external reviewers.
- Grant renewal for 2019 Pre doc and so far has awarded at least 40 new grants to NIMR Researchers in 2020.
- Update NIMR SAM, ERA Common, and Grants.gov platforms.
- Nigeria through NIMR was listed as a member of the Belmont Forum - International transdisciplinary research providing knowledge for understanding, mitigating, and adapting to global environmental change.

Challenges

- Late submission of progress reports for internal grants.
- Internet issues slow down data entry on web-based applications.
- Need for training on modern statistical software, visualization, big data, and grant management.
- Not being able to harmonize data generated for research especially the FGN funded grants.

- Delays on notification of inflow of external grants.
- Need for grant management software to manage grant management cycle- explain.
- No funding for extramural research – especially for NIMR Adjuncts.
- Employment of additional competent staff.
- FGN funded projects should be backed up on REDCap.
- Commission the development of an Institutional data sharing, use, and transfer policy

Way Forward

- Utilize effectively the new collaboration(s).
- Engage more with our adjunct researchers to improve productivity.
- Re-organize work schedule and time management to improve productivity.
- Increase training opportunities for staff.

Summary of Internal grants awarded 2017-2020

	2017	2018		2019		2020		Total
		#R	#A	#R	#A	#R	#A	#A
Pre-Doc	0	9	8	9	9	5	2	19
Post-Doc	0	3	2	1	1	2	1	4
Junior Category	0	14	3	21	4	13	5*	12
Senior Category	2	11	4	7	0	11	2*	8
Innovative Grants	0	0	3	0	4	0	0	7
COVID Intervention funds / grants	0	0	0	0	0	0	30	30
Total	2		19		21		37	80

RESEARCH, INNOVATION & PRODUCT DEVELOPMENT (RIND) UNIT

In recent times, there is a continued and sustained paradigm shift to translation of research that can birth highly innovative and tangible medical products and services from core research ideas. The development of new knowledge, techniques, and technologies plays a critical role in the development process of every nation. Thus, NIMR's Research Innovation and Product Development (RIND) Unit priority focused on translating research ideas into innovative, quality, and affordable medical products and services. The climax of our research focus is to identify gaps in the laboratory and diagnostic needs and fill them with innovative research products. The goal is to change the narrative of over-dependence on the importation of innovative products and to advance the course of medical research and diagnosis in Nigeria. RIND hopes to close part of the gaps in the diagnostic needs of Nigerians through the production of Proudly Nigerian **NIMR Biotechnological Products and Services**. We are striving to provide cost-effective basic medical equipment and reagent medical solutions, and thus, save the much-needed foreign exchange for the country.

Objectives of RIND

- To identify gaps in medical diagnostic needs and produce such locally.
- To validate and conduct quality controls on products produced.
- To render medical service in and outside NIMR.

Research Activities

Ongoing

- Re-designing and packaging of NIMR BIOTECH Products: An important feature of engineering products and design entails that each product must resemble one another in size configuration of width, depth, and height with a clear identity.
- Activities Envisaged:
- Getting the unique 3-dimensional geometry right ranging from reagent bottles, housing configuration for machines to packaging.
- Experiment, design and develop a Digital Oven and Incubator.
- Experiment, design and develop a Digital Colorimeter for blood chemistry analysis.
- Re-design packaging for cartons and reagent bottles.

Achievements:

- Conceptualization & Development of Medical Products such as:

Medical equipment:

- NIMR BIOTECH-Electrophoretic Machines Model I&II.
- NIMR BIOTECH-Hematocrit Centrifuge.
- NIMR BIOTECH-Biological Incubators.
- NIMR BIOTECH-Laboratory fitted Oven.
- NIMR BIOTECH-Bucket Centrifuge.

Reagents & laboratory Consumables

- NIMR BIOTECH- Haemoglobin Genotype buffer.

Diagnostic Kits:

- NIMR BIOTECH- DNA/RNA extraction kits:
- NIMR BIOTECH NimCure Application software.
- NIMR BIOTECH Covid-19 SIMA Testing Kits.
- NIMR BIOTECH POC-PCR Panel for febrile illness detection.
- NIMR BIOTECH PCR SARS COV2 Detection Assay.

Product Validity Testing

- RIND carried out nation-wide validation of diagnostic accuracy and performance of NIMR-made electrophoretic machine for determination of haemoglobin genotypes in Nigeria:
- This study was undertaken to validate the performance characteristics of NIMR-made electrophoretic machines for hemoglobin determination using standard machines currently in use in respective medical facilities in Lagos, Sokoto, Osun, Enugu, and Kaduna State. Of all the parameters evaluated (Time of band separation, Neatness of band separation, Accuracy of band separation, Consistency of band separation), the sensitivity and specificity between NIMR-made electrophoretic machine and those used by the centers (foreign-made brands) was 100%.
- Validation of efficacy of NIMR Biotech DNA Extraction kits for Diagnostic Accuracy and Performance: The study was conducted in Lagos and Osun state: Nigerian Institute of Oceanography & Marine Research, Victoria Island, Lagos,

Department of Cell Biology, University of Lagos, and the University of Ife. The choice of facilities was based on the high standard of services, the availability of a standard molecular laboratory, and access to different specimens. Again, reports from these centers showed a 100% performance agreement between NIMR-BIOTECH DNA extraction kits and most of the highly-rated DNA extraction kits imported into the country.

Innovation Awards: Research & Innovation awards were given to:

- Dr. Chika - POC PCR for detection of febrile illness in children.
- Mr. Femi Amoo - Development of NIMCure for TB treatment adherence.
- Dr. Muniat Fowora -Development of NIMR BIOTECH DNA/RNA extraction kits.
- Mr. Joseph Shaibu – Development of NIMR BIOTECH PCR SARS COV2 Detection Assay.
- Mr. Akwaowo Bassey Orok & Mr. John Omovohwo - Genotype Machine/ Buffer development.

Capacity Development

- Online training and capacity building in innovation techniques.
- No of conferences and workshops attended: 7 Online conferences.

Grants/Fellowship Awards

- NIMR Grant Awards for RIND

Challenges

- Cumbersome process of patenting and product registration with the relevant authority.
- Lack of institutional policy to protect a researcher innovation effort: appropriate financial benefit, co-ownership right, and duration, what happens at retirement?
- Delay in the supply of equipment requested for the Unit because of lack of funds.

Way Forward

- Establish pipeline for the moving of products from bench to bedside, creating a niche for RIND.
- Get regulatory requirements for RIND products and establish protocols for meeting them.
- Given NIMR is in the Tech hub of Nigeria, we can liaise with them to create Nigeria's Silicon Valley or innovation hub.

- Establish an organogram for RIND, including leadership to project staff and interns.
- From the benefit sharing of product commercialization, RIND to have full staff and eventually become a Centre

2021 Work plan

- Patenting, Licensing, and Product registration with relevant authorities
- Validation and product testing in more centres
- Re-designing and packaging of the product
- Update of SOP design & development
- Grant writing & Publications
- Production of more Reagents & laboratory Consumables

Technical/Production Team	
• Prof. Nkiruka N. Odunukwe	Head & Team Leader of RIND NIMR
• Dr. Greg Ohihion	Deputy Head
• Mr. Akwaowo Bassey Orok	RIND Focal Person NIMR
• Dr. Fowora Muniat	NIMR Biotech DNA/RNA extraction kits Innovator
• Dr. Chika Onwuamah	Isothermal POC PCR Innovator
• Mr. Femi Amoo	NimCure Project Innovator
• Mr. John Omovohwo	Equipment Production, Design, Fabrication & Servicing
• Dr. Ngozi M. Otuonye	Quality Control
• Dr. Esther Ohihion	Researcher
• Dr. Jane Okwuzo	Researcher
• Mr. Adeneye Adeniyi	Researcher
• Dr Ngozi Otuonye	Logistics/Quality Control
• Mr. Adeniyi Adeneye	Logistics

Our finished products are as shown below:



NIMR BIOTECH GENOTYPE MACHINES- MODEL 1



NIMR KITS AND REAGENTS



INSTITUTIONAL REVIEW BOARD (IRB)

The year 2020 witnessed national and international public health concerns due to the unusual global health crisis caused by the Coronavirus disease (COVID-19). In the grim situation of the pandemic, research ethics plays an important role in protecting the rights and safety of the research participants and ensuring the scientific correctness of research procedures. However, the conduct of COVID-19 related research requires a timely moral approach in granting approvals to study protocols. This is to aid the narrow time factor essential in gaining knowledge on incidence, contact tracing, diagnosis, and management of the diseases. As such, NIMR-Institutional Review Board adopted a conference review of COVID-19 studies to provide a flexible and timely expedited ethical review process without compromising safety and methodological validity and fair consent of study participants.

Ethical Review Meetings

- NIMR-Institutional Review Board held several review meetings and a Board meeting in November 2020.

Research Protocols Received and Approved in 2020

- NIMR-IRB received one hundred and seven (107) proposals in the year 2020. The research protocols reviewed and approved within the set turnaround time of six (6) weeks were of five categories:
- NIMR Staff Protocols: (78)
- Non-NIMR Staff (individuals) protocols: (29)

- NGO/CSO and multinational organizations protocols: (7)
- COVID-19 protocols (51)
- Students from various Universities and Polytechnics: (13)

Collaborations

International collaborations

- New HIV and Microbicides Advocacy Society (NHVMAS)
- Brown University
- West African Bioethics Training Programme (WABTP)
- National Health Research Ethics Committee (NHREC)
- Federal Medical Centre (FMC) Ebutte-Metta

Challenges

- Undue delay in the review of protocol and response for PIs
- Irregular submission of study progress reports by PIs
- Poor knowledge of researchers on good research and ethics practices

Way Forward

- Automation of the IRB process
- Organize more training on health research ethics

2021 Work Plan

- Capacity building of members and researchers
- Computerization of administrative/secretariat process
- Increase awareness on good research ethics and practice

Members of NIMR-Institutional Review Board

Names	M/ F	Profession	Organization	Position on Board
Prof. O. C. Ezechi	M	Gynecologist & Obstetrician	N.I.M.R	Chairman
Dr. A. N. David	F	Pediatrician	N.I.M.R	Vice Chairman
Dr. O. A. Nwogbe	F	Health Information Management Specialist	N.I.M.R	Admin Secretary
Dr. Tajudeen Bamidele	M	Microbiologist	N.I.M.R	Asst. Admin Secretary
Alh. A. S. Yunusazazzau	M	Administrator	N.I.M.R	Member
Prof. R. A. Audu	F	Virologist	N.I.M.R	Member
Dr. B. Adewale	M	Bioethicist	N.I.M.R	Member
Dr. G. Ohioin	M	Gynecologist & Obstetrician	N.I.M.R	Member
Rev Ariire Bankole	M	Cleric	Anglican Church, Lagos	Member
Dr. O. B. Awoyomi	M	Orthopedic Surgeon	F.M.C Ebutte-Metta	Member
Dr. T.Y. Raheem	M	Med. Laboratory Scientist	N.I.M.R	Member
Dr. O. O. Aina	M	Pharmacologist	N.I.M.R	Member
Ms. Olayide Akanni	F	Media/Journalist	(JAAIDS)	Member
Barr. Olatunde Daudu	M	Lawyer	Olatunde Daudu & Co Lagos	Member
Dr. A. Z. Musa	F	Biostatistician	N.I.M.R	Member
Ms. Ifeoma Idigbe	F	Sociologist	N.I.M.R	Member
Alh. B. A.T. Lawal	M	Imam	Muslim Society	Member

ADMINISTRATION DEPARTMENT

The Department provides administrative and support services to ensure the efficient day-to-day operations of various departments in the Institute. The Department facilitates the creation of an enabling environment for the conduct of research through the discharge of its personnel management and administrative functions. The Department consists of Divisions and Units, which include:

- Registry.
- Appointment, Promotion, and Discipline.
- Pension & Welfare.
- General Duties, Training and Development.
- Legal Matters.
- NIMR Kitchen.

Activities

- The activities of the Administrative Department include:
- Provision of Secretarial Services to the Standing Committees of the Institute, and the necessary working documents for standing committees' meetings as directed by the Director-General / CEO.
- Advises Management on administrative and personnel issues.
- Responsible for implementation of personnel management tasks such as recruitment, training & development of staff. As well as administration of salary related to allowances, leave matters, staff posting, discipline, and withdrawal of service through either retirement, resignation of appointment, termination,

or dismissal.

- Facilitates staff Annual Performance Evaluation Report (APER).
- Responsible for staff welfare matters, implementation of approved policy on Medicare, Pension, and Housing, etc.
- Handles Institute legal and Insurance matters.
- Keeps and updates staff records.
- Liaises with the Finance & Accounts, and Research Departments in the preparation of the Institute's development rolling plans and annual budgets.
- Supervises the Security Unit.
- Handles of institute's official administrative correspondence with the public.
- Undertakes other duties as may be assigned by DG/CEO, FMoH, and OHCSF.

Achievements

2020 Promotion

- The Department obtained approved establishment positions from the Office of Head of Service Civil of the Federation (OHCSF) for the conduct of the 2020 promotion exercise for qualified members of staff. The numbers of staff promoted, converted, and issued letters are as indicated below:
- | | | |
|----------------|---|----|
| • Senior Staff | - | 24 |
| • Junior Staff | - | 15 |
| • Conversion | - | 5 |

• **Exit From the Service of the Institute Retirement**

- The following staff exited from the Institute in 2020:
- Mr. M. Bamidele, Chief Medical Laboratory Technologist, CONHESS 13 with effect from 26/10/2020.
- Mr. J. C. Nwokeji, Chief Technical Officer, CONHESS 13 with effect from 21/11/2020.

Resignation of Appointments

- Dr. T. O. C. Faleye, Research Fellow I, CONHESS 11 with effect from 1/4/2020.
- Mrs. C. J. Agba, Nursing Officer, CONHESS 07 with effect from 2/10/2020.
- Mr. J. K. Wahazi, Chief Motor Driver/Mechanic, CONHESS 06, with effect from 30/9/2020.

Withdrawal from Service

- Mr. S. R. Adah, Assistant Chief Accountant, CONHESS12, with effect from 12/11/2020.
- Mr. D. Ochigbo, Principal Procurement Officer, CONHESS 11, with effect from 12/11/2020.
- Mr. M. A. Musa, Senior Assistant Social Welfare Officer, CONHESS 08 with effect from 28/12/2020.

Deaths

- Mrs. F. O. Okhiku, Assistant Chief Medical Laboratory Technologist, CONHESS 12, died on 6/11/2020
- .Mr. O. I. Ahmed, Medical Laboratory Scientist, CONHESS 09 died on 4/11/2020.
- Mr. C. N. Odimba, Foreman (Carp. &

Joinery), CONHESS 06, died on 11/10/2020.

Project Staff/Adjunct Researchers:

- The Department also facilitated the appointment of thirty-nine (39) project staff spread across the various departments of the Institute and an adjunct researcher for the Department of Public Health and Epidemiology.

External Relations:

- The Administration Department facilitated the consolidation of an existing network of collaborations with related Institutions all over the world, for an exchange programme including six (6) post-doctoral research opportunities. The Lead City University and Eko University of Medicine are still considering additional applications from some of the Institute's research staff with the bid to appointing them as adjunct lecturers in their Organizations.

Capacity Development

- Conferences /Workshop/ Training: The Covid-19 pandemic crippled the activities globally, but four staff of the Department attended a training workshop organized by the Office of the Head of the Civil Service of the Federation at Alex Ekwueme Federal University Teaching Hospital, Abakaliki, Ebonyi State.
- NYSC/Industrial Training Programs: The Department had absorbed some National Youth Service Corps (NYSC) members; and enrolled students for the Students Industrial Work Experience

Scheme (SIWES), Bench Space, and Internship as follows:

- | | |
|----------------|----|
| • Bench Space | 4 |
| • Internship | 32 |
| • NYSC | 16 |
| • SIWES Scheme | 52 |

Challenges

- Challenges encountered by the Department in the course of discharging its duties in 2020 include:
- Inadequate office space.
- Shortage of secretarial and clerical staff.
- Lack of office equipment such as computer system etc.
- Inadequate training of staff of the Department.

Way Forward

- Acquisition of additional working tools such as computer systems.
- To ensure that the Institute operates within the extant rules and regulations guiding the Public Service.

2021 Work Plan

- Conduct the 2021 Promotion Exercise.
- Facilitate training and development issues.
- Handle correspondences between existing strategic partnership networks and collaboration.
- Handle the institute's legal matters.
- Provision of accommodation and office equipment.
- Implement policies for staff in the Institute such as communicating with Insurance companies on behalf of the Institute and ensure the payment of insurance premium.
- Provide secretarial services to the Institute.

FINANCE AND ACCOUNTS DEPARTMENT

The Finance and Accounts department is responsible for handling all financial transactions and management of the financial resources of the Institute. It has four (4) main units and three (3) Sub-Units including Other Charges, Treasury, Budget and Salaries, and Stores. The department performs a wide range of accounting functions including management of internal revenue generation by Centre for Human Virology & Genomics (CHVG), Clinical Sciences Department (CSD), and Clinical Diagnostic Laboratory (CDL). Despite the break out of the COVID-19 pandemic and its financial and economic implications, the department dutifully carried out its activities successfully in the year.

Activities

- The activities carried out during the year under review include but not limited to the following:
- Maintenance of relevant books of accounts of the Institute.
- Budget compilations for capital, overheads, and personnel expenditures.
- Management of internal and external Grants.
- Supervision and control of stores.
- Oversight and monitoring of internal revenue generation.
- Performance of banking-related functions.
- Other functions delegated by Management.

Achievements

- • Completion of audit of 2018 Accounts of the Institute and submission to the office of the Auditor-General of the Federation.
- • Successful defense of the 2019 budget at the National Assembly, leading to the release of funds for operational and capital projects execution in the Institute.
- Replacement of some old office equipment in the department to improve operational effectiveness.
- Improved capital budgetary allocation to the Institute.

Capacity Development

- Conferences /Workshops/ Training attended: (1)
-

Challenges

- Inability to secure improved overheads from the Federal Government in the annual budgetary allocation to fund operational costs.
- Inadequate office space for the staff of the department.
- Lack of motivational incentives, especially on-the-job staff training.
- A high rate of staff exit from service without replacement affects the department's capacity to carry out all its functions.

Way Forward

- • Continuous interface with the National Assembly to attract more government funds to the Institute should be sustained in the coming years.

- The Management should consider recruitment of more experienced accounting staff.

2021 Work Plan

- Preparation for audit of 2019 accounts
- Defense of Annual Budget at National Assembly
- Improvement in staff training to motivate staff.
- Replacement of old office equipment to improve operational performance

WORKS AND MAINTENANCE DEPARTMENT

The Works and Maintenance Department provides support services on maintenance of infrastructures such as building, electric power supply, plumbing, air conditioning, transport logistics; as well as biomedical and environmental maintenance in the Institute.

Activities

A. (Capital Projects)

- Resurfacing of internal roads/parking lots of lab complex (front and back), Essential Blocks 1 & 2.
- Construction of rooftop (Admin) for mini-events, e.g., cocktails, meetings, etc.
- Renovation of Staff Clinic, ARV Clinic, DOT Clinic, CDL, CTBR Lab, (Molecular Lab, BSL3, MBBT) including furnishing.
- Enlargement of Administrative block reception.
- Complete renovation/furnishing of the Auditorium.
- Relaxation Centre on block (A) lawn for staff children.
- Renovation of the medical compound.
- Renovation of transport Unit offices.
- Installation of turnstile gate at the Institute entrance.
- Procurement of 12 operational vehicles. (Intervention Funds)
- Foundation for COVID-19 10 Bedded observation room for clinical trials. (Intervention Funds).
- Internal works in the E-Library building. (Intervention Funds).

B. Annual Maintenance Service Contracts

- The service contracts agreements signed between the Institute and private sector participators PSP (Vendors) are as follow:
- Cleaning Services – RANSTOJAN Nig. Limited.
- Biomedical Wastes Incinerating – EMIS Engineering Limited.
- Priority Feeder Line/Equipment – DAT Investment Coy Ltd.
- Fumigation of NIMR premises - Hamtec-Abraham Ventures.
- Evacuation of the central waste bin – Lawman/PSP-Cleaners Royal Ventures.
- All the above-mentioned services were satisfactorily executed in the year under review.

C. Routine Maintenance Services

- The routine maintenance services undertaken cut across civil, electrical/electronics, biomedical, transport, environmental, and refrigeration/air-conditioning works. The activities of each Division and Unit for the year 2020 are as given below.

Civil Engineering Unit

- Supervision of renovation works in the transport division.
- Repair of all cracks walls in the Institute's infrastructures.
- Supervision of renovated work in Medical Compound.
- Evacuation of all filled septic/inspection chambers.

Electrical Engineering Unit

- Load balancing on transformers for power sustainability.
- Proactive, preventive, corrective, and general services of the institute's plants in line with the manufacturer's recommendations.
- Rectification of all electrical faults in the institute laboratories, including the equipment.
- Monitoring and supervision of the institute priority feeder contractor in the maintenance of the High Tension (H.T.) line, High Tension circuit breakers, Transformers, and the ring main unit.
- Maintenance and servicing of all the generators for continuous and optimal performance.
- Ensuring steady power supply to all offices, laboratories, and residences.
- Reducing response time to fault rectification.
- Ensuring electrical load balancing in each phase, etc.
- Constant monitoring of the Low-Tension lines to effect repairs.
- Replacement of all non-functional electric bulbs in the lab complex.
- Constant maintenance of the security lightings.

Transport Unit

- All Institute's vehicles were serviced as at when due throughout 2020.
- Replacement of expired vehicle tires.
- Processing of papers for newly acquired vehicles.
- Serviced transportation needs of various Departments and Units.

Environmental Unit

- Evacuated all waste (solid, domestic, gardening & medical) generated by the Institutes.
- Mowing of lawns and plants in NIMR.
- Cleaning of drainage networks, in-house existing facilities, public toilets, and the environments in the Institute.

Refrigeration & Air Conditioning Unit

- Installations of any new, repairs and routine servicing of all the Air Conditioners in the institute.
- Repair of all faulty fridges and freezers.
- Attended all work orders issued to the unit.

Biomedical Engineering Unit

- Undertake preventive and corrective maintenance on research and diagnostic laboratory equipment.
- Inspection and Installation of newly procured Laboratory Equipment.
- Calibration of laboratory equipment.
- Participation in Ad hoc activities assigned by Management.
- Certification and verification of laboratory equipment.
- Training of IT students.
- Incineration of laboratory wastes and contaminated devices.
- Servicing research and diagnostic laboratory equipment.

Challenges

- Delay in payment to LAWMA/PSP resulting in delayed service delivery.
- Insufficient budget allocation to maintenance due to many priorities.
- Lack of modern tools for maintenance.

- Lack of stock of spares in the store leading to delay in maintenance.
- Lack of training and re-training of technical staff.
- Inadequate office imprest.

Way Forward

- Centralization of maintenance votes.
- Meandering of administrative Bottleneck.
- Soliciting for adequate office /imprest.
- Bulk purchase of maintenance material should be encouraged as previously done.
- Need for working tools and safety wears for staff of Works & Maintenance as a proactive/preventive measure against any form of work accident and casualty.

2021 Work plan

- Hands-on training for all the craft men and leadership training for senior staff of the department.
- Restore, improve or replace every infrastructural facility that will enhance enabling environment for basic, applied, and operational research studies going on in the Institute.
- Cart away all the wastes generated by the Institute solid, domestic, and medical wastes twice a week.

INTERNAL AUDIT UNIT

The Internal Audit unit is responsible for handling internal checks and balances of the institute's accounting procedures, including those of the outstations. The main purpose of Auditing is to maintain an efficient and effective internal financial control system (security and control of cash, stores, etc.). Auditing also guides and ensures that institutional financial processes strictly comply with laid down government financial regulations and circulars, while ensuring the proper documentation of bookkeeping and reconciliations. The ultimate aim is to ensure that all accounts and vouchers prepared or received are reconciled. This is also in addition to the normal auditing process of examining internal control, security measures, and spot checks to ensure that adequate measures exist in observing the governing regulations on the receipts, custody, e-payment, and stores.

Activities

- Undertake pre-payment audit of all institute's expenditures.
- Verify and inspected all supplies to all stores.
- Audit various revenue generation centres.
- Verify and ascertain error-proof e-payment system.
- Ensure all payment vouchers followed due process and errors reduced to the barest minimum.
- Assess to ensure all procurement items adhere and met standards and user specifications.
- Apply internal control checks and balances standards.

- Prevent errors and loopholes through post-payment audits.
- Identify and secure Institute's Assets through labeling

Achievements

- Increase in productivity as official time no longer wasted in the banks to collect cash.
- Routine Audit/spot checks of CHVG/CDL/NIMR CMC
- A routine audit of CSD spot checks.
- Field inspections of premises/equipment and staff quarters/vehicles.
- Inspections/verification of supplies to the main store, CHVG stores, Clinic stores, and pre-stocktaking.
- A routine audit of CHVG, CDL, NIMR CMC.
- A routine audit of the clinic accounts.

Challenges

- Non-training of Auditors, which greatly hampered the speed, volume, and quality of the audit process.
- Inadequate office equipment.
- Shortage of skilled staff.
- Due to COVID-19, the auditing process became slow due to limited staff available to work in the office environment.
- There was no post-payment Audit of the various income generating Centres as a result of the COVID-19 Pandemic

Way Forward

- Staff Training.
- Employment of skilled Auditors.
- Provision of additional office space.

2021 Work Plan

- To examine on regular basis, the financial records of the Institute and report to management on the state of accounts situation of the Institute.
- To safeguard the assets of the institute by ensuring that staff and stakeholders strictly adhere to management's policies and regulations (internal control system).

PROCUREMENT UNIT

The Procurement Unit operates according to the Public Procurement Act, 2007 (PPA) which guides, regulates, and harmonizes the practices relating to the procurement of supplies, services and works to ensure probity, accountability, and transparency in the procurement process in government institutions in Nigeria. The aim of the Unit, as in every government establishment, is to obtain the best value for money on behalf of the Institute and the Federal Government of Nigeria. Also, ensure that goods, works, and services are procured at the most favorable terms compatible with the desired quality and delivery requirements, taking into cognizance the total life cycle costs in a manner that safeguards and preserves the reputation of the procuring entity.

The aforementioned summarily encompasses the Nine (9) essential procurement steps of efficient procurement plan driven by needs assessment; appropriation; advertisement; transparent pre-qualification; bid opening; bid evaluation - Technical and Financial; tenders board's approval; contract award and execution; as well as project implementation, monitoring, and evaluation.

Activities

The Procurement Unit process procurement-related requests initiated by the end-users and contract agreements entered into by the Institute on capital projects through the following roles:

- Submission of the Institute's yearly procurement plan based on needs

assessment supported by prior budgetary appropriations for approval in line with the BPP's requirement.

- Preparation and submission of tender notices/notifications and requests for expressions of interest for publications to solicit for bids, proposals or to pre-qualify potential contractors, suppliers, and consultants or service providers for contract jobs in the Institute.
- Preparation and issuance of tendering/pre-qualification documents and standard requests for proposals to prospective bidders.
- Receipt of bids/pre-qualification documents and proposals in response to solicitations; examination of bidding documents; maintenance of appropriate documentation of same and arranging official opening of bids.
- Collection and confirmation of the validity of any performance guarantee submitted by contractors.
- Submission of Evaluation Sub-committees' reports (both technical and financial) to the Institute's Tenders Board for consideration and approval.
- Forwarding of the summary of Tenders Board's decisions on the award of contracts for approval.
- Preparation, announcement, and conveyance of notifications of awards to successful bidders.
- Debriefing, responding to complaints, and resolution of conflicts or disputes arbitrarily among bid losers.

- Preparation and arrangement for and participation in contract negotiations and signing.
- Preparation of minutes and maintenance of appropriate data and records of proceedings of the meetings of the Tenders Board.
- Production of reports on a range of procurement-related activities, documenting processes, procedures, and decisions/recommendations as appropriate.
- Carrying out of the appropriate market and statistical surveys and preparation of an analysis of cost implications of proposed procurements.
- Liaising with stock verifier/user departments to ensure that works, goods, or services delivered conform with specifications or set standards and terms of the contract and in line with procurement time-frame, assisting in managing and monitoring the time-scales in every stage of the procurement process, execution of all contract agreements.
- Observance of highest ethical standards and strict adherence to all extant laws, regulations, and guidelines on procurement in every stage of the procurement process.
- Monitoring supply markets and trends (example, material price increases, shortages, changes in suppliers, etc.) and interpreting the impact of these trends on the Institute's procurement strategies, developing supply options and contingency plans that support the Institute's procurement plan.
- Maintenance of updated database as may be provided by the Bureau of Public

Procurement (BPP) for Public Sector Procurement and contract awards and collate statistical information on tenders and award of contracts for use in planning and research and.

- Perform any other duties or responsibilities as may be assigned by Management.

Achievements

- Despite the emergence of the novel Corona Virus (COVID-19) pandemic in 2020, the Procurement Unit;
- Ensured prudent use of public funds in conformity with business principles, mandate, and contract agreements. This is evident by the number, quality, and volume of projects executed in the Institute in 2020.
- Identified and procured critical materials and services required to advance research;
- Ensured transparency in the procurement and supplies process.
- Strengthened relationships with other departments/units and relevant external bodies for better understanding; and harmonious achievement of the set objectives of the Public Procurement Act 2007, extant laws, guidelines, and regulations.

Challenges

- Delays in the release of budgetary allocations from appropriation by the government, which in most cases, leads to consequential delays in the completion of projects in the Institute.
- Inadequate number of skilled staff.
- Inadequate knowledge of extant laws, regulations, and guidelines governing the

process of public procurement by end-users, which in most cases, slow down the procurement process.

Way Forward

- Early release of allocations from the appropriation for speedy implementation of the Institute's capital projects.
- An increase in the number of competent staff.
- Enlightenment of non-procurement staff on Public Procurement Act, 2007 guidelines and regulations.
- Improvement in payments processing and expedite payments to contractors after approval within the shortest possible period to ease the problems faced by contractors.

2021 Work Plan

- Preparation and submission of 2021 procurement plan by the Procurement Planning Committee
- Consideration, ratification, and approval of the 2021 procurement plan by the Tenders Board
- BPP's certification, advertisement, bid opening & pre-qualification bid evaluation (Technical & Financial), and submission of Technical & Financial Evaluation sub-committee report
- Consideration of bid evaluation sub-committee report, tenders board approval, award of contract, signing of contract documents/execution, project implementation & monitoring, certification, handing over & commissioning

CORPORATE MARKETING & COMMUNICATION UNIT

The Corporate Marketing & Communication unit is responsible for marketing and management of the Institute's business facilities such as auditorium, researchers' suites, and conference rooms. CMC consists of marketing and operational arms. The COVID-19 pandemic affected most of the services rendered by the unit; thus, very little was achieved in the year under review.

Activities

Rental of Conference Facilities

The conference facilities available for rent are:

- 300 Capacity Auditorium.
- 120 Capacity conference room.
- 40 Capacity conference room.
- 10 Capacity syndicate room.

These facilities functioned maximally in the first two months of the year 2020, but with the emergence of the COVID-19 pandemic in March, all the conference halls were abandoned by users due to either government stay-at-home policy or fear of contracting the virus. The most affected facilities were the conference rooms at the Cancer Research Training Centre. The facilities were not accessible to users because the NIMR COVID-19 drive-through testing centre was located at the car park.

Laboratory Services

- The year started with the review of the activities of the HMOs that registered for laboratory and clinical services and the dispatch of invitation letters to new HMOs

for patronage. Unfortunately, only one HMO, Glorious Health Care could sign MOU with the Institute before the COVID-19 lockdown of 2020. The lockdown also affected the services of the laboratories and the clinics because they could not operate fully. Some of the registered HMOs have not fulfilled their obligations to the institute and owe for the services rendered to them.

Parking lots:

- The parking lots operated just for two months in the year 2020. This was because the testing site for COVID-19 was located at the car park.
- **Research Innovation and Product Development (RIND):**
- The CMCU works closely with RIND in the patent and marketing of the products developed by the institute.

Researchers' Suites

- This 22 room well-furnished apartment for the use of researchers was handed over to CMCU to manage at the beginning of the year 2020. CMCU attracted and served researchers in NIMR, research partners and collaborators, NIMR guests, conferences, and workshop participants. Like the other facilities, this facility could not operate maximally because of the COVID-19 pandemic.

Challenges

- COVID-19 lockdown and restrictions.
- Outstanding bills with HMOs
- Virtual conferences and workshops reduced patronage

Way Forward

- Introduction of modern ICT facilities into the existing conference facilities that will enhance virtual meetings conferences and workshops
- Reaching out to more HMOs to patronize the institute laboratories and having a more robust MOU with them to guide against default.

- Improvement on the staffing and maintenance of the researchers' suites to maintain the standard.
- Automating the operations and systems of the researchers' suites
- Maintain a productive working relationship with RIND.
- Rehabilitate facilities in the Cancer Research Centre for improved service delivery
- Develop and maintain a partnership with relevant external training outfits.

GRANTS

NIMR 2020 Internal Grants

S/N	PROJECT INVESTIGATOR	PROJECT TITLE	FUNDED BY	DATE ISSUED	STATUS
1	DR OLUKOSI ADEOLA	CENSUS OF ENUMERATION AREAS AND CHARACTERIZATION OF IJEDE LOCAL GOVERNMENT AREA OF LAGOS STATE NIGERIA.	FGN/NIMR	16 TH NOVEMBER 2020	ONGOING
2	DR MUSA/ DR OSUOLALE	DEVELOPING A NOVEL CONTACT TRACING MOBILE APPLICATION FOR CORONAVIRUS DISEASE 2019 (COVID-19) FOR IMPROVING TESTING CAPACITY AND CONTROLLING THE SPREAD OF COVID-19 IN NIGERIA.	FGN/NIMR	16 TH NOVEMBER 2020	ONGOING
3	DR AZUKA P. OKWURAIWE	ASSOCIATION BETWEEN MITOCHONDRIAL DNA LEVELS, HIV REPLICATION, AND HAART GENOTOXICITY; IMPLICATIONS FOR BETTER HIV MANAGEMENT.	FGN/NIMR	16 TH NOVEMBER 2020	ONGOING
4	DR OHIHION ESTHER	INTERVENTIONS TO IDENTIFY CARDIOVASCULAR COMPLICATIONS IN HIV POSITIVE PATIENTS.	FGN/NIMR	16 TH NOVEMBER 2020	ONGOING
5	DR AGATHA DAVID	HEALTH OUTCOMES AND IMMUNOLOGIC RESPONSES OF HIV- EXPOSED UNINFECTED AND HIV UNEXPOSED CHILDREN IN CHILDREN IN, LAGOS, NIGERIA (HEIR STUDY)	FGN/NIMR	3 RD MARCH 2021	ONGOING
6	DR GYANG V. PAM	EPIDEMIOLOGY OF SCHISTOMA IN IWELEPE AND OGBERE COMMUNITIES IN OGUN STATE AND EVALUATION OF SENSITIVITY AND SPECIFICITY OF A POINT OF CARE CIRCULATING CATHODIC ANTIGEN (POC-(CCA)) RAPID TEST KIT IN URINE.	FGN/NIMR	16 TH NOVEMBER 2020	ONGOING
7	MRS KUNLE-OPE CHIOMA	PREVALENCE AND DRUG SUSCEPTIBILITY PROFILE OF NON- TUBERCULOUS MYCOBACTERIA INFECTIONS AMONG CASES OF BRONCHOPULMONARY DISORDER IN LAGOS STATE.	FGN/NIMR	13 TH NOVEMBER 2020	ONGOING
8	DR AJIBAYE OLUSOLA	A NOVEL PLASMODIUM FALCIPARUM BIOMARKER: IMMUNOGENETIC INVESTIGATION	FGN/NIMR	16 TH NOVEMBER 2020	ONGOING

NIMR 2020 EXTERNAL GRANTS

S/N	PROJECT INVESTIGATOR	PROJECT TITLE	FUNDED BY	DATE ISSUED	STATUS
1	DR. KOLAPO OYEBODE	SECOND EUROPEAN AND DEVELOPING COUNTRIES CLINICAL TRIAL PARTNERSHIP PROGRAMME.	EDCTP	OCTOBER 2020	ONGOING
2	PROF. B.L SALAKO	HADEIJA KIDNEY PROJECT.	H3 AFRICA	16 TH NOVEMBER 2017	ONGOING
3	PROF. EZECHI OLIVER	BOCA BIOLISTIC LLC.	BOCA BIOLISTIC LLC	14 TH MAY 2018	ONGOING
4	PROF. EZECHI OLIVER	INNOVATIVE TOOLS TO EXPAND YOUTH-FRIENDLY HIV SELF -TESTING I-TEST.	SAINT LOUIS UNIVERSITY	15 TH AUGUST 2019	ONGOING
5	PROF. EZECHI OLIVER	EMORY-NIGERIA HIV RESEARCH TRAINING PROGRAM (EN-RTP).	FOGARTY INTERNATIONAL CENTER	3 RD OCTOBER 2020	ONGOING
6	PROF. B.L SALAKO	STUDY OF APOL-1 GENE VARIANTS AND THE RISK OF KIDNEY DISEASE IN COVID19 IN NIGERIA.	NORTH-WESTERN UNIVERSITY, USA	3 RD SEPTEMBER 2020	ONGOING
7	PROF. B.L SALAKO	EVALUATION OF CPAP/HELMETS TO SUPPORT PATIENTS WITH SEVERE COVID-19 ILLNESS IN NIGERIA.	CDC FOUNDATION	13 TH NOVEMBER 2020	ONGOING
8	PROF. EZECHI OLIVER	INTEGRATION OF HYPERTENSION MANAGEMENT INTO HIV CARE IN NIGERIA.	NIH	2 ND DECEMBER 2020	ONGOING
9	PROF. EZECHI OLIVER	INTERNATIONAL EPIDEMIOLOGIC DATABASE TO EVALUATE AIDS PROJECT.	IEDEA		ONGOING
10	DR. DAVID AGATHA NKIRUKA	MANAGEMENT OF MALARIA IN AFRICAN COUNTRIES: A PROSPECTIVE NON-INTERVENTIONAL COHORT STUDY.	NOVARTIS	13 TH OCTOBER 2020	ONGOING
11	DR. N.N ONYEJEPU	WANETEM - WEST AFRICA MODE OF EXCELLENCE FOR TB, AIDS AND MALARIA: IMPROVING TUBERCULOSIS DIAGNOSIS AND MANAGEMENT OF CHILDHOOD TB	WANETEM	OCTOBER 2017	ONGOING
12	DR. EMELDA CHUKWU	YOUNG INVESTIGATOR AWARD	INSTITU - MERIEUX	OCTOBER 2020	ONGOING

PUBLICATIONS

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Adeneye, A.K., Olukosi, Y.A., Brai, B.I., Oparaugo, C.T., Agomo, C.O., Okoh, H. I., Aina, O.O., Ajibaye, O., Iwalokun, B. A, Orok A, Akindele, S.K, Akinyele, M.O, Enya, V.N., Aniedobe, M.N., Adeogun, A.O., Olakiigbe, A. K., & Awolola, T.S. (2020). Knowledge, perception, and practices of malaria prevention and treatment in communities of Lagos and Niger States, Nigeria. *Epidemiology Public Health*, 3(1): 1034.

Adeoye, A.M., Adebayo, O., Abiola, B., Iwalokun, B., Tayo, B., Charchar, F., Ojo, A., & Cooper, R. (2020). The Association between selected molecular biomarkers and ambulatory blood pressure patterns in African chronic kidney diseases and hypertensive patients compared with normotensive controls: protocol for a longitudinal study. *JMIR Res Protoc*, 9(1):e14820

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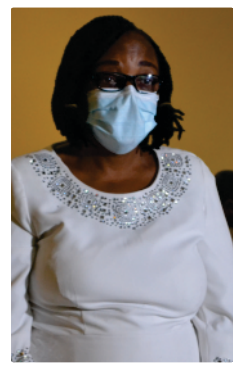
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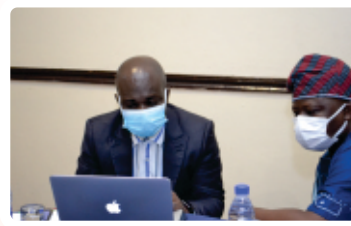
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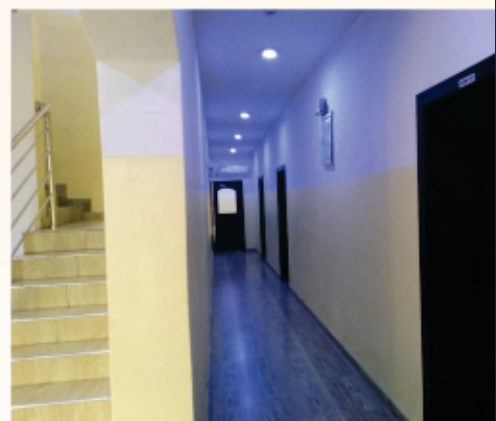




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