AMBROSE ALLI UNIVERSITY
EKPOMA, NIGERIA

98th

INAUGURAL LECTURE

TITLE OF LECTURE

INFECTIOUS DISEASES OF MAN: UNRAVELLING THE UNSEEN ENEMY AND MITIGATING AVOIDABLE CATASTROPHE

DELIVERED BY

PROF. SUNDAY OLOWO SAMUEL

MBBS, MPH, FMCPath, FAMeds

PROFESSOR OF MEDICAL MICROBIOLOGY

THURSDAY, JANUARY 26, 2023

a.inno prints:08035417798



PROF. SUNDAY OLOWO SAMUEL

MBBS, MPH, FMCPath, FAMeds
PROFESSOR OF MEDICAL MICROBIOLOGY

AMBROSE ALLI UNIVERSITY
EKPOMA, NIGERIA

98TH

INAUGURAL LECTURE

TITLE OF LECTURE
INFECTIOUS DISEASES OF MAN:
UNRAVELLING THE UNSEEN ENEMY
AND MITIGATING AVOIDABLE CATASTROPHE

PROF. SUNDAY OLOWO SAMUEL
MBBS, MPH, FMCPath, FAMeds
PROFESSOR OF MEDICAL MICROBIOLOGY

Thursday, 26th January 2023

© Sunday Olowo Samuel

Published by
Ambrose Alli University Publishing House
Ekpoma-Nigeria.

ISBN: 978-978-7-78963-6

All Right Reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the copyright owner.

Published 2023

Printed in Nigeria by
a.inno Printing Press
8, Uwen-Odia Street
Ekpoma, Edo State
Nigeria.
Tel: 08035417798
08131304444

PROTOCOL

The Vice-Chancellor
Deputy Vice-Chancellors
Former Vice-Chancellors present
Registrar
University Bursar
University Librarian
Provost, College of Medicine
Deans & Directors
Professors and other Members of Senate
Chief Medical Director, ISTH
Heads of Department and other Academic Colleagues
Members of Administrative and Technical Staff
Members of the University Community
My lovely Wife, Children and Members of Family
My Lords Spiritual and Temporal
Distinguished Invited Guests and Friends
Gentlemen of the Press
Security Operatives
Great Nigerian Students
Ladies and Gentlemen

PREAMBLES

It is a great honour for me to address this gathering today. I give Glory to the Almighty God who had seen today and set it apart for this purpose. I welcome you all who have come from far and near, and I want to immensely thank the Vice-Chancellor for giving me the opportunity to deliver the 98th Inaugural Lecture of this great University. This is the first Inaugural Lecture from the Department of Medical Microbiology and Parasitology, also the first in the Faculty of Basic Clinical Sciences. To the glory of God, today I arrive my academic destination!!!!

My Vice-Chancellor sir, permit me to share a little of my background with the audience which I believe will give an insight into my personality and my choice of profession. The journey of my life which started from eternity according to the Holy Bible in the book of Jeremiah Chapter 1 verse 5.'Before I formed thee in the belly I knew

thee, and before thou cometh forth out of the womb I sanctified thee and I ordained thee Professor of Clinical Microbiology and Infectious Diseases, unto the nation'.I was born.in a little town of Kabba in Kogi State of Nigeria more than five decades ago.My story is from the scripture in 1 Samuel Chapter 2 verse 8, God raised me from the dust and bring me out of the dunghill to sit among princes and kings.My interest to study Medicine started in my childhood as I admired Doctors and desired that one day, I will be one by God's grace.But the desire looked bleak when I lost my father at a tender age in Primary five in a polygamous family and the responsibility of care fell on my mother whom God used to care for me and my siblings.Despite her lack of formal education, she instilled in me the culture of discipline, respect, diligence, contentment and the fear of God, as ways of daily living. I'm grateful to God with whom nothing shall be impossible who saw me through all the hurdles of the primary school, secondary school, higher school certificate(Advance level), then by direct entry to the Medical school of the Premier University of Ibadan, My choice of Medicine as a profession was not in doubt to any of my colleagues in the secondary school for the grace of God upon me. But at a point in my preclinical years I almost left Medicine, because of financial constraint for Pharmacy but for the mercy of God, I finally graduated as a Medical Doctor, to God be the glory.

I got inspired to the field of Clinical Microbiology through one of my teachers and mentors, Prof Rasheed Ajani Bakare whom I admired as a Consultant Clinical Microbiologist,during my Pathology postingin the Clinical years at the University College Hospital Ibadan seeing the cause of infections in patients we saw in the clinic being unraveled in the Laboratory.

My interest in Clinical Microbiology almost got suppressed when as a house officer during my posting in Paediatrics under the tutelage of my wonderful Consultants at the University of Ilorin Teaching Hospital, the likes of Prof Ojuawo and Prof Mokuolu who endeared my interest in Paediatrics. I remember Prof Mokuolu during one of the Consultant ward rounds told me I would be a good Paediatrician, that I should give it a thought. The desire to be a Clinical Microbiologist was further suppressed during my National Youth

Service (NYSC) when as a Medical officer in-Charge of Nigerian Telecommunication (NITEL) clinic Ilorin, under my direct boss then in North West Zone, Dr T.A.B Sanusi, the current Registrar of the Medical and Dental Council, I got exposed to seeing Doctors succeeding in their career as Administrators.

But my interest in Clinical Microbiology was finally rekindled and brought back to the limelight when I met my humble, soft spoken mentor, Prof Boaz Adegboro(formerly Onile), an erudite scholar and renowned Professor and Consultant Clinical Microbiologist per excellence, in his office at the University of Ilorin Teaching Hospital in 1998. He said, 'Olowo come, I will train you' Prof Adegboro took me as his resident doctor and nurtured me through the rudiments of Clinical Microbiology and Infectious Diseases.I remain eternally grateful to Prof Adegboro.

Another phase in my career began, immediately after my success in Part II Fellowship examination of the National Postgraduate Medical College of Nigeria in November 2004. My teacher and mentor, Prof R.A Bakare called me that he had assignment for me in Ambrose Alli University Ekpoma, where his friend and classmate in Medical School in University of Ibadan, Prof George Akpede was the Provost of College of Medicine. I told him to please allow me discuss with my wife before giving it consideration. I could not discuss with my wife because I knew what the response would be, until I started receiving calls from my friends, Prof T.A.T Salami and Prof Dayo Asalu to come and join them in Ekpoma. Not long after that, Prof M.A.C Odike started calling me to come to Ekpoma, he sustained the pressure until I succumbed to the pressure and summoned the courage to discuss with my wife. In December 2004, during Christmas period in my home town, I drove to Ekpoma with my younger brother. I was amazed when I arrived the office of Prof Odike around 5pm, after we exchanged pleasantries and he turned to introduce Prof George Akpede to me as the then Provost. I was shocked to see my elder and father in the medical profession waiting for me and had to quickly apologize to him. He said I should please heed to their call to come over to the College of Medicine, Ambrose Alli University as the need for a Clinical Microbiologist was pressing to scale the hurdle of accreditation of the Medical school by the

Medical and Dental Council of Nigeria(MDCN). Because of that, I gave my word to convince my wife when I got back to Ilorin, haven seen that my service was needed in contributing to mankind for the Medical students who were stagnated be able to progress in their career. It was really a difficult decision to take for me and my wife considering the home front, but my wife though not easy but finally agreed for me to come.

When I came, as the pioneer Head of Department in both the College and Hospital, the challenges of raising the standard of the Department to be more functional in order to meet the need of the time was daunting.But I got encouragement from Prof J.E Onuminya, who would always tell me to explore the virgin land, do research and publish. And also encouragement from one of my fathers, a gentleman personified, Prof Ewan F. Alufohai who told me that we must develop the Medical School together. God took control and there was tremendous progress, the accreditation was successful to the glory of God, our students started graduating as Medical Doctors. By the grace of God, I was able to also attract other colleagues in the field of Pathology to join us in developing the Medical school, the likes of Prof K.J Adebayo now in the United States of America, Dr Eyitayo Fakunle now in the United Kingdom, Dr Maxwell Nwegbu and Dr D.O Olanrewaju. In the Irrua Specialist Teaching Hospital, with the cooperation and approval of Prof George Akpede as the Chief Medical Director then, two additional Consultant Clinical Microbiologists, Dr Gbolagade Adewuyi and Dr Ephraim Ogbaini-Emovon were employed to the Department and upon employment of more Consultants and Resident Doctors across the four Departments in Pathology, we commenced Residency training in Pathology and with the support of the immediate past Chief Medical Director, Prof S.A Okogbenin, who provided the needed infrastructures, the standard of our services scaled up from phenotypic to molecular diagnosis in our clinical diagnostic laboratories. Today, to the glory of God, the Department of Medical Microbiology, Irrua Specialist Teaching Hospital has full accreditation to train Specialists Clinical Microbiologist up to Consultant cadre. In the recently concluded Part II Fellowship

examinations, we recorded 100% success in Pathology (two candidates in Medical Microbiology and one candidate in Haematology) and to the glory of God all of them have been employed as Consultant Pathologists. This will also be a plus for the Medical school if the University can also employ them. I'm glad that two new Consultants are added to the Medical Microbiology Department and from one Consultant when I came, my Department has grown and is blessed with five Consultant Clinical Microbiologists. I thank Prof S.A Okogbenin,the immediate past CMD and his management team for the massive support. The Department has keyed into the research well of the Hospital and is supporting the training of Medical students, Medical Laboratory Science students and industrial training(IT) students of Ambrose Alli University. The Department is also training Resident Doctors from other Clinical Departments in the Hospital during their rotation and also supernumerary Resident Doctors from other centers.

INTRODUCTION

The title of Inaugural Lecture today is **'Infectious diseases of man: unravelling the unseen enemy and mitigating avoidable catastrophe'**

My Vice-Chancellor sir, permit me to define some terminologies to give insight into the title of my lecture today.

DEFINITION OF TERMS

- **Infectious diseases** also known as **transmissible disease** or **communicable disease**, is illness resulting from an infection. Infections are caused by infectious agents including viruses, viroids, prions, bacteria, fungi, helminths, arthropods and other macroparasites.
- **Man** refers to all humans collectively irrespective of gender
- **Unravelling** is unfolding what seems to be unclear
- **Unseen enemy** refers to microbial agents causing harm that cannot be seen with the naked eyes
- **Mitigating avoidable catastrophe** is alleviating the disaster that can be prevented

CAUSES OF DISEASES

The thought-pattern and judgment of any man is influenced greatly by the cultural norms, values and beliefs. The influence of religion on pattern of reasoning is exemplified by the magico-religious pattern of thought as documented in literatures. (Adegoke, A. A. 2008; Ebigbo, P. O., 1989). It was believed that invisible spirits - demons within and without mankind are causes of diseases and death. Primitive demonology has been repeatedly associated with modern microbiology by ethnologist as a parallel etiological concept. It tends thus to bring close apposition to the first and latest medical concepts of the causes of diseases. (Jonathan Wright, 1917) It may not be uninteresting to review, in a very cursory manner, what we have learned of the universally accepted and long held theory of demonology as the cause of the ills of the flesh and of the spirit, from which man has suffered. Such theories were dominant until comparatively recent times – in fact during all but a few recent centuries of many hundreds of years which have elapsed since we first caught a glimpse of the mentality of our ancestors. The traces of the idea are still so numerous and so apparent it is a work of supererogation to point them out in the current medical literature to discerning readers.

The concepts and the reasoning of early men as well as the modern ones are essentially the same. “That a man is well and like other people yesterday, but today he's lethargic and feverish and weak. Something ails him, something has got into him,” to use a modern parlance which expresses it all, both in the old and the modern concept. "I have contacted a number of active two-legged things much like myself and I know other four-legged things less, like myself some crawling things not at all like me. That's about all I know that harms a man.""Yes," says a skeptic, "but these we can see or feel or smell.""Whatever it is that has got into our fellow man doubtless is like some of the other things we know, only it can't be seen, nor felt nor smelt," says the ancient constructive scientist; "Must be something too small to see with the naked eye," says the modern theorist, who knows there are such things and how difficult it is to see them even through a double convex glass or even through a

combination of them (Microscope – the modern diviner magic glass). Thus far then the prehistoric and the modern scientist follow the same trend of thought. They reason from knowledge of things they know to things they do not know. Early man did not succeed in seeing his demon and he made mistakes about his attributes. Modern man finally saw the demons (Microbes), but it is very evident that the early microbiologists, who first saw them in connection with disease, also made mistakes as to his attributes, though they seem to have classified them a little differently. Reasoning from analogy is often man's only resource, but it is a fallible one and it is curious to see how it has helped him and how it has deceived him, both in his primitive and in his more sophisticated state. It is, however, all very logical. Given the same phenomena of nature and the same receptacle of the impressions they make-the same brain-we find the latter now making the same response to direct stimuli as it did at the dawn of the reasoning processes, differing only in the influence of an accumulated experience and in the inheritance of past achievements. (Adegoke A. A., 2008; Jonathan Wright, 1917)

The **germ theory of disease** is the currently accepted scientific theory for many diseases. It states that microorganisms known as pathogens or "germs" can lead to disease. (Louis Pasteur 1861) These small organisms, too small to be seen without magnification, invade humans, other animals, and other living hosts. Their growth and reproduction within their hosts can cause disease. Diseases caused by pathogens are called infectious diseases.

Infection is the invasion of an organism's body tissues by diseases-causing agents, their multiplication, and the reaction of host tissues to these organisms and the toxins they produce. **Infectious diseases** are responsible for an immense global burden of disease that impacts public health systems and economies worldwide, disproportionately affecting vulnerable populations.

In 2013, infectious diseases resulted in over 45 million years lost due to disability and over 9 million deaths (Naghavi et al., 2015)

Lower respiratory tract infections, diarrheal diseases, HIV/AIDS, malaria, and tuberculosis (TB) are among the top causes of overall global mortality (Vos et al., 2015). Infectious diseases also include *emerging infectious diseases*; diseases that have newly appeared

(e.g., Middle East Respiratory Syndrome) or have existed but are rapidly increasing in incidence or geographic range (e.g., extensively drug-resistant tuberculosis (XDR TB) and Zika virus (Morse, 1995)
As a leading cause of death worldwide, infectious diseases have hardly been conquered or controlled. In fact, one might consider the 1990s as an era of reawakening, when new and reemerging infectious diseases were recognized as a major worldwide health problem. The continued explosion of cases of infections caused by the human immunodeficiency virus has now produced negative population growth and major disruption in the societies of many African countries, where more than 35% of young adults are infected and more than 25% of children are orphans. By the end of the millennium, the virus had infected more than 50 million people; it now ranks with childhood diarrheal diseases, pneumonia, malaria, and tuberculosis as a leading cause of death. While highly active antiretroviral therapy (HAART) has been astonishingly effective in treating the disease, the necessary drugs are available to only a small percentage of infected populations, and transmission of the virus continues unabated in many regions of the world. The ability of modern technology to control infectious diseases has been found lacking. Antibiotics, which were developed within the last 75 years, resulted in the cure of many previously lethal infections, rightfully earning the name "wonder drugs." However, only several years into the "antibiotic age," pathogenic staphylococci were found to have the ability to produce enzymes (penicillinases) that destroyed penicillin, thus rendering the drug useless against these strains.(Lobanovska M, Pilla G.2017)

The future quickly became clear to Microbiologists and Infectious Disease Clinicians studying bacterial genetics; the methods used to impede the organism's ambition to multiply and grow will eventually be defeated by the power of natural selection through the rapid emergence of resistant mutations. The more antibiotic pressure that has been applied, the more rapidly these subpopulations of drug-resistant pathogenic organisms have emerged. Public health-minded clinicians and scientists have issued warnings that overuse and misuse of these "wonder drugs" will eventually render them useless. These warnings have gone largely unheeded.

As we enter the next century, the possibility is quite real that these organisms have won and that we will return, in a sense, to the preantibiotic era. It will remain our children or grandchildren to try to answer the question: Why did this generation of health providers not take better care of the future? It will be incomprehensible to them that we allowed antibiotics to be used in animal feed, to be used to treat colds and bronchitis due to viruses, and to be given to inpatients and outpatients without careful diagnostic evaluation. Will future generations eventually blame societal need to be "cost-effective" and the emergence of so-called managed care? Will they blame the pharmaceutical industry, whose need to make a profit led to misleading advertising, often directed at patients themselves? Will they blame physicians who did not learn microbiology and never bothered to consider the public health implications of their prescribing practices? Or will they blame our governmental agencies (the NAFDAC, MDCN etc), whose job was to protect the public health and make available scientific information that would dictate public policy but who did not do this? Will they blame patients themselves, who, because of misperceptions of the value and effectiveness of antibiotics, insisted on having their physicians prescribe them? Whatever future generations conclude about us, the facts are obvious: we continue to misuse and abuse antibiotics, one of the most important advances in human history, with little attempt to change.

The impact of antibiotic resistance is especially felt in hospitals, where infections caused by resistant organisms are increasing dramatically and have the potential to destroy gains enjoyed in other medical disciplines, such as organ transplantation, prosthetic devices, artificial organs, indwelling pacemakers, and neonatal and adult intensive care. Future medical advances will be determined to a large extent by the ability to prevent and successfully treat the Hospital-acquired infections (HAI) caused by antibiotic-resistant pathogens. The great irony is that the same areas of medicine where these latest dramatic advances are happening are also those where the most dramatic changes in microbes have taken place. Physicians involved in caring for transplant recipients, cancer patients, and patients requiring intensive care are entirely free to prescribe any and all

antibiotics they want without consulting Infectious Disease Specialists. There seems to be a puritanical obsession at work in medicine whereby narcotics, which relieve a patient's pain, are considered controlled substances that require a prescribing physician to fill out duplicate and triplicate forms, whereas any physician is free to prescribe any antibiotic, whether indicated or not.

Another great human accomplishment during the last century was the worldwide elimination of smallpox through vaccination. It was an example of warring nations actually cooperating for the common good. In the early 1970s, the majority of the world stopped vaccinating against smallpox. It therefore came as a horrible shock, in 1998, to find out from Russian scientists that they had "weaponized" the smallpox virus and readied it for use against the West, along with anthrax spores, Yersinia pestis, and other organisms. The human potential for destructive acts seems limitless.

Other infectious diseases have also slipped back into our society. Our attempts to control mosquitoes were initially successful, and federally funded programs reduced the Aedes aegypti and Anopheles species to the point where the arthropod-borne encephalitis viruses almost disappeared.

Malaria, once the scourge of the southern United States and Central America, was nearly eliminated. However, while these mosquitoes became resistant to DDT, apathy dominated the governments' response, and funding was cut. The mosquitoes have returned en masse, as have dengue, yellow fever, diseases induced by the various encephalitis viruses, and malaria. Finally, cholera, which had disappeared from the Western Hemisphere for decades, reappeared in Peru in the early 1990s and spread throughout Central and South America, wherever poor sanitation and poverty dominate the domestic scene. Within several years, over a million cases and thousands of deaths were reported, another reminder of the fragile control we have on infectious diseases.

When the public health infrastructure of our cities is allowed to deteriorate, microbial pathogens are ready and willing to take advantage of our citizens. In New York City in the late 1980s, funding for the tuberculosis program, among many others, was reduced and case follow-up was discontinued; the follow-up rate for

patients discharged from hospitals with a diagnosis of active tuberculosis was approximately 10%. Partly because of poor patient compliance with therapy, multiple-drug-resistant tuberculosis emerged and began to spread to other parts of the country. Many people, especially AIDS patients, died before the epidemic was finally controlled, when directly observed therapy was widely embraced and implemented. Similarly, when immunization slackened in Eastern Europe after the fall of communism, diphtheria reappeared, and more than 50,000 cases per year were reported in the early 1990s.

Our record of dealing with infectious diseases has been a checkered one, with some fantastic successes followed by dramatic mistakes and failures. It now seems clear that the virtual sea of microorganisms with which we must share this planet must be treated with care and understanding. We must learn to live in harmony with our normal flora and protect it from factors that breed resistance. We need to understand better the public health implications of unwise interventions such as mass use of antibiotics for the purpose of stimulating animal growth, or prophylaxis to prevent otitis media, or routine antibiotic treatment of respiratory tract infections caused by viruses. One might be justified in greeting these challenges with an air of optimism. The requisite tools and insight necessary to predict, blunt, or suppress microbial virulence are at hand. The molecular language spoken between microbe and host cell is increasingly well described. So far, we know that the host-pathogen relationship is a two-way, intricate affair with features of codependence.

CAUSES OF INFECTIOUS DISEASES IN MAN

Before I proceed further, Mr. Vice-Chancellor sir, it will be desirable to elucidate on the cause of these infectious diseases in man, also called pathogens. These micorganisms are living organisms so small that a microscope is required to see them. This term includes bacteria, fungi, parasites, and viruses.

Bacteria: Single-celled organisms that live in and around us. Bacteria can be helpful, but in certain conditions can cause illnesses such as sore throat, ear infections, and bacterial pneumonia

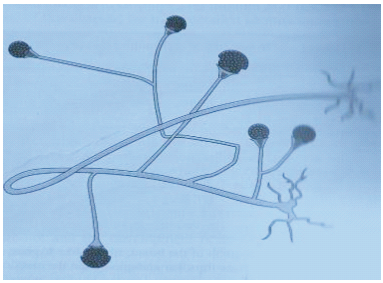


Fig. i *Clostridium perfringens* X 1000

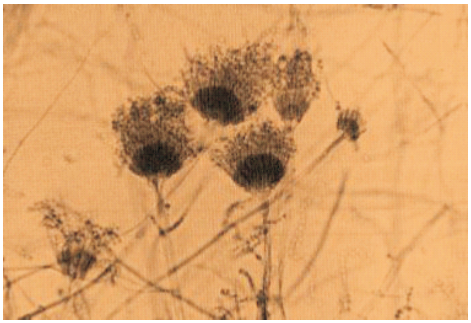
Fungus: A single-celled or multicellular filamentous organism. Fungi may or may not cause infections. Fungal infections are often opportunistic as they occur in people with compromised immune systems, such as cancer patients, transplant recipients, and people with HIV/AIDS or in healthy people. Fungi can be sources of antibiotics, antitoxins, and other drugs used to treat various diseases.(fig ii-iv)



fig. ii *Candida albicans* X 10,000

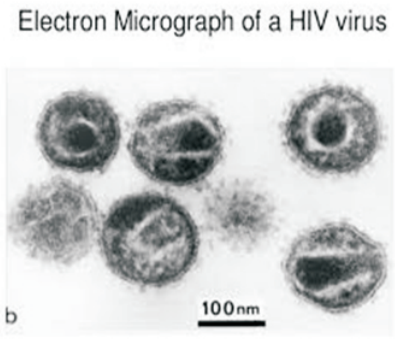


Absidia species X 400 (fig. iii)



Aspergillus terreus X 400 (fig. iv)

Virus: A strand of DNA or RNA in a protein coat that must get inside a living cell to grow and reproduce. Examples are varicella virus: the cause of chickenpox, the human immunodeficiency virus (HIV), that causes acquired immune deficiency syndrome (AIDS), and Ebola virus that causes Ebola Virus Disease (EVD). (figs. v-vi).



HIV virus (fig. v)

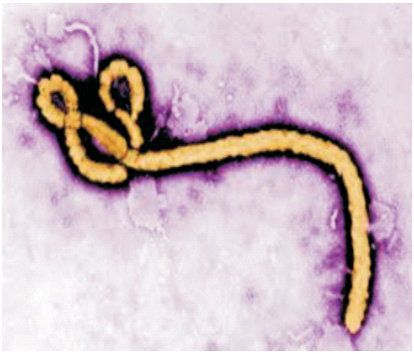
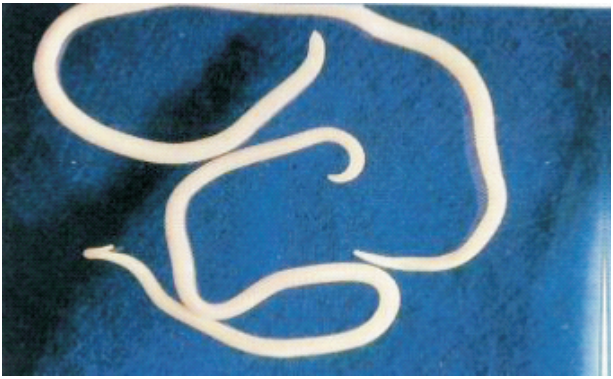


fig. vi Ebola virus

Parasite: An organism, usually a lower invertebrate animal, that lives in or on another living organism, usually a higher invertebrate or vertebrate animal (its host) from where it derives all the necessities of life to the detriment of the host that gives everything but gains nothing(figs vii)



Male & Female *Ascaris lumbricoides* (fig. vii)

There is a long and unending war between man in addition with his animals and these unseen enemy now identified as microbes. The seen and unseen exist in a dynamic interrelationship. (Jocelyne Piret and Guy Boivin, 2021; Wikipedia - List of Epidemics, 2023;Maya Prabhu and Jessica Gergen, 2021). Human beings, a migratory species across continents, carried disease with them; leading to globalization of the unseen organisms. These organisms have been rendering havocs since prehistoric era till date through various plagues and epidemics. Similarly, with the discovery of antimicrobials, man have been dealing ruthlessly on these 'microscopic demons' with the hope of eradicating them. However, this war seems not to have an end in near future as a result of emergence and reemergence of these pathogens, most especially the 'superbugs'- i.e. pathogens highly resistance to virtually all human arsenals, the Antimicrobials.

UNRAVELLING THE INVISIBLE ENEMY: MY CONTRIBUTION

Mr Vice Chancellor sir, in the course of my studies, I have made various efforts to unravel the mystery surrounding these invisible human's foes and mitigating their associated avoidable catastrophe. Knowing that these microbes are of different kinds and are associated with different diseases, requiring peculiar antimicrobial agents to treat them, I have worked on bacterial, viral, fungal and parasitic Infections, describing the clinical epidemiology and

laboratory diagnosis.

My bacteriologic studies range from bloodstream infections, Enteritis, Urinary tract Infections, eye infection, campylobacter and Mycobacteria diseases and more, as elucidated in the following publications: In a bacteriologic surveillance of blood cultures among patients with suspected septicaemia in Ilorin. Nigeria, an incidence of 41.7 per 1000 admissions was recorded(**Samuel SO** et al,2006) which was a statistically significant ($p< 0.05$) marginal increase when compared with the previous incidence of 37.9 per 1000 admissions reported from this centre. Majority of the isolates were Gram negative bacteria (51.61%) though the single predominant isolate was *Staphylococcus aureus* (35.85%). Other isolates included *Escherichia coli* (32.48%), *Klebsiella pneumoniae* (11.74%), *Proteus spp* (0.32%), coagulase negative staphylococcus (1.61%), *Salmonella typhi* (0.48%). beta-hemolytic streptococcus (0.48%) and *Acinetobacter* spp (0.32%). Most isolates were sensitive to fluoroquinolones (ofloxacin, pefloxacin and ciprofloxacin) and third generation cephalosporins (ceftriaxone and ceftazidime) except *Acinetobacter* spp that was 100% resistant to both groups of antibiotics. Gram positive isolates were resistant to the second- generation cephalosporin, cefuroxime. We recommended the use of combination of a third- generation cephalosporin and fluoroquinolones where not contraindicated, in the empiric treatment of septicaemia before sensitivity results are available.

Mr Vice Chancellor sir, in another study in University of Ilorin Teaching Hospital in 2006, we isolated 8.2% *Campylobacter* species in stool samples of children with diarhoea,out of which *Campylobacter jejuni* and *Campylobacter coli* were 56% and 44% respectively, all sensitive to erythomycin. This was the first report of *Campylobacter* isolation in Middle belt region of Nigeria(**Samuel SO** et al 2006).

Also in 2006, we reported in a study at University of Ilorin Teaching Hospital*Escherichia.coli* as the predominant cause of community acquired urinary tract infection(UTI),while *Klebsiella pneumoniae* was the most common agent of UTI among in-patients. A combination of third generation cephalosporin and

fluoroquinolone(where not contraindicated) was recommended for empiric treatment of UTI before sensitivity results were available. Majority of the isolates were resistant to nitrofurantoin and gentamicin(Akanbi II AA, Fadeyi A, Atata RF, Babatunde AS and **Samuel SO** 2006)

TB endometritis as a cause of primary infertility was reported among nulliparous women in our study and they subsequently responded well to antituberculous drugs (Ojo BA, Akanbi II AA, **Samuel S.O,** Odimayo M.S., Adesiyun A.O. 2007)

Microbiological investigation of sputum for AFB in addition to other diagnostic tools revealed distribution pattern of TB as 87% of pulmonary tuberculosis, 3.5% of abdominal Tb and 2.5% of disseminatedTB in our study in ISTH Irrua. 34% completed treatment whie 24% defaulted and were lost to follow up . The effect of this is development of multidrug resistant tuberculosis. (Salami T.A.T, **Samuel S.O,** Eze, K.C.2007)

In our study on diabetic wound infections in ISTH Irrua we reported polymicrobial withmost cases due to *Staphylococcusaureus*, *Escherichia coli* a, *Proteus* spp and Pseudomonas. All isolates in thisstudy displayed resistance to at least three different antibiotics; thus establishing a case of multi-drugresistance among isolates. Also, *Pseudomonas aeruginosa* which is commonly isolated from woundsshowed resistance to six out of the ten antibiotics tested.(Isibor JO, **Samuel SO**, Eyaufe A, EdomwonyiEO,Odiase V, Ehiaghe JI, and Eidangbe A 2013)

In a prospective study among cohort of HIV patients attending the clinic in Irrua Specialist Teaching Hospital Irrua,we found out that UTI is common with majority of the bacterial isolates being *E. coli* and *S. aureus*. All isolates were sensitive to fluoroquinolones. Prompt diagnosis and treatment will improve overall care. (**Samuel S.O**, Salami T.A.T, Adewuyi G.M, Babatope E, Ekozien M.I 2012)

Our study on pattern of bacterial conjunctivitis in Irrua Specialist Teaching Hospital, Irrua, Nigeria confirmed the fact that *S. aureus* remains the commonest cause of bacterial conjunctivitis in the general populace, with flouroquinolones and cefuroxime as the

drugs of choice in our environment. Majority of the patients were in the 31-40-year range. This is worrisome in view of possible long blind years that may follow complicated bacterial conjunctivitis, with the involvement of cornea and perforation. This poses a challenge to eye care service providers.We recommended health education of the populace through the local government community health extension workers on the danger of self-medication and early presentation to the eye care service provider to prevent sight threatening complications. (**Samuel S.O**, Enock M.E, Ekozien M.I, Ehimen M, Nmorsi O.P.G, Omoti A.E. 2012)
Methicillin-resistant Staphylococcus aureus (MRSA) still remain a problematic cause of both hospital and community infections globally as was reported in our study. We therefore recommended personal hygiene, decontamination of hands through proper washing and rational use of antibiotics to considerably reduce levels of infections. Screening of asymptomatic persons and those who have recently visited the hospital may be a significant proactive measure to curtail spread of the pathogen. (Isibor J.O, **Samuel S.O,** Nwaham C.I, Amanre I.N, Igbinovia O, Akhile A.O. 2011)

We investigated *Chlamydia trachomatis* infections in pregnancy, being a major cause of complications of pregnancy and the infections being mostly asymptomatic, our study revealed a prevalence rate of 8.18% among the pregnant women screened and we recommended that urine of pregnant women, especially those with symptoms of UTI, previous STI and history of multiple sexual partners should be tested for *Chlamydial trachomatis* infection.(**Samuel SO, Adewuyi GM, Ekoziem MI 2017).**

In our study on the Bacteriological Profile and Antibiotic Sensitivity Patterns in Clinical Isolates from the Out-Patient Departments of ISTH, high rates of resistance to common antibiotics were observed for gram-positive and gram-negative isolates, we recommended hospital pharmacies and treatment

guidelines should be made to reflect the current patterns of resistance to available antibiotics.(TobinEA,**SamuelSO**, InyangN J, AdewuyiGM, NmemaEE .2021)
Furthermore on bacteriology, we recognized the capacity of an infectious disease epidemic in a geographical location to send a metastatic seed to a remote place to start similar epidemic in the new site. This was reported in our study'Metastatic seed' of cholera in Edo State, Nigeria: a case report.' There were reported cholera epidemics in some States in Nigeria. Cholera is an acute diarrhea disease with marked epidemic propensity, caused by colonization of the small intestine by *Vibrio cholerae* serogroup 01 or 0139. Cholera, like other infectious diseases epidemics, has propensity for sending metastatic seed to any susceptible remote community. If the metastatic seed can be promptly diagnosed and managed appropriately, the spread and development of new epicenter can be aborted. This report is a case of metastatic cholera who presented in a tertiary hospital in Edo State, Nigeria. The case was promptly detected and effectively managed using good surveillance system, inter-departmental collaboration, swift responses, good laboratory practices, patient isolation and infection prevention and control measures, coupled with appropriate fluid and antimicrobial treatments. Thus, we prevented cholera epidemic in the hospital and Edo State in general. (GM Adewuyi, **OS Samuel**, AE Unuane, KO Iraoyah, GO Onuha, OT Otumu, Ogbue JI. 2022).

Mr Vice Chancellor sir, in unraveling these enemies'; I studied Lassa fever, HIV/AIDS, Hepatitis viruses, bird and swine flu viruses, human papillomaviruses as well as influenza viruses. Attesting to this claim are the following studies:
Hepatitis B virus shares similar transmission patterns and risk factors with the human immune deficiency (HIV) virus, in our study all patients that are HIV positive attending the adult
ART clinic in ISTH investigated for hepatitis B infection by screening for hepatitis B surface
antigen (HBsAG) as well as other baseline investigation such as CD4 count revealed
infection prevalence rate of 3.2%,we recommended to managing

physicians to look out for them because of their peculiarity and manage effectively.(Salami T.A.T, Babatope I.O, Adewuyi G.M, **Samuel S.O**, Echekwube P.O. 2012)

Our study on health workers attitude and behaviour to Hepatitis B infection, revealed poor compliance of health workers to hepatitis B vaccination, an issue that deserves serious attention.Health education campaigns for health workers so that they can understand therisks that they are exposed to based on the nature of their work**(Samuel S.O**, Aderibigbe S.A,Salami T.A.T. 2009**)**.

Our study conducted in North-Central Nigeria on Community awareness of bird flu people practicing backyard poultry, which revealed little knowledge and awareness of mechanism and risk of infection associated with it. This was also reflected in their attitude towards reporting of outbreaks in birds. Public awareness campaign and home visit by environmental and veterinary officers are importantstrategies that can prevent AI infection transmission among domestic birds and man(Musa O.I, Aderibigbe S.A, Salaudeen G.A, Oluwole F.A, **Samuel S.O.** 2010)

In our investigation on improving clinical diagnostic accuracy of lassafever using o wbct-20, showed thatWBCT-20, though not a specific test in the series of literature reviewed, was found to be sensitive in increasing diagnostic suspicion. The increased sensitivity in this study was due to the fact that patients with febrile illness often present late to a tertiary health center and prolongation of WBCT-20 is a later sign of Lassa fever. All the patients whose WBCT-20 were elevated were promptly commenced on I.V Ribavirin and there was both clinical improvement and later reduction of the initial WBCT-20 value to less than 20 minutes after one week of therapy. No fatalities were recorded in this group.(Salami, **T.A.T ; Ojei-Oziegbe, O.E.F., Samuel, S.O. 2006)**We recommended that the sensitivity in this series permits the use of WBCT-20 to investigate febrile patients including those diagnosed with resistant malaria and those with persistent fever inspite of prior treatment especially during the dry season when incidence of Lassa fever is at its peak.

In our review, Lassa fever is a significant cause of morbidity and mortality in West Africa, which requires a high index of suspicion

based on salient clinical features, epidemiologic considerations and specific laboratory investigations for effective management and control. (**Ogbaini EE, Samuel SO.2017**)

Our study on prevalence and distribution of cervical high-risk human papillomavirus infection in a rural community of Edo State, Nigeria using Geno array test kit which uses polymerase chain reaction (PCR) amplification and flow through hybridization assay, HPV prevalence of 16.6%. Six HPV serotypes were detected; types 16, 18, 35, 45, 52 and 58. HPV types 16 and 18 were most frequent, contributing 54.2%, and co-infection occurred in 29.2%. HPV-positive women had significantly higher mean number of life time sexual partners($p=0.046$) and mean parity ($p=0.0001$) compared to HPV-negative women. The mean age of the women ($p=0.710$),mean age at menarche ($p=0.570$) and mean age at coitarche ($p=0.940$) were not significantly associated with prevalence of HPV showed predominance of oncogenic cervical HPV types 16 and 18 within this sub region of rural Nigeria. We recommended strengthening reproductive and sexual education in both males and females with focus on HPV vaccination, delaying sexual activities and reduction in number of child birth as strategies which could prevent high risk HPV infection and cervical cancer in rural communities. (Okoeguale J, **Samuel SO**, Amadi SC,Njoku A, Okome GBO.2022) .

In a systematicreview of seasonal patterns of Human influenza viruses in South-East and East Asia, viral types/subtypes, and antiviral, we found out that influenza A (H1N1)pandemic and seasonal strain, A (H3N2), and B Victoria/Yamagata remains the predominant circulating virus in SEand E-Asia. However, the dynamic antigenic and genetic evolution of the virus calls for more frequent surveillance inthe region.(**Osede Ignis Iribhogbe, Sunday Olowo Samuel, John O. Ohaju-Obodo. 2020**)

Similarly, I worked on parasites and parasitic diseases. for example: Helminthiasis in urticariaUrticaria can be a cutaneous manifestation of helminthiasis. Helminthiasis is a feaco-oral infestation propagated in condition of poor environment and personal hygiene. Our study revealed presence of (80%) ascariasis, (10%) hookworm and(10%) strongyloides in stool of patients with urticaria hence routine screening of the stools of patients presenting with urticaria

appears justifiable.(Salami, T.A.T., **Samuel, S.O**.2006)

A point prevalence study of urinary tract infections among with children urinary schistosomiasis from rural endemic community in edo state revealed presence of Pseudomonas specie, Enterococcus faecalis, Klebsiella pneumonia, Proteus species, Staphylococcus epidermidis in urinary isolates. We advocated for early screening, strict adherence to proper antibiotics regimen, good hygiene practices especially amongst rural dwellers to prevent complications.(Ukwandu N.C.D, Nmorsi O.P.G, **Samuel S.O**.2008)

I equally researched into infectious systemic diseases such as sexually transmitted, cutaneous, ocular, obstetrics and gynecologic infections. Of the obstetrics, gynecological and sexually transmitted infections, these include**:**

The microbiologically analysis of HVS of gynaecology clinic attendees yielded 66.7% significant microbial growth viz: Enterococcus faecalis (Streptococcus faecalis) was 2.6% Hemolytic Streptococcus 5(6.4%) Streptococcus viridans 1(1.2%) Streptococcus Pyogenes 10(12.8%) Staphylococcusaureus 12.8% Klebsiella species 7.7% Escherichia coli 10.3% and Candida albicans 46.2%.The bacterial isolates were more susceptible to Gentamicin and Erythromycin. Effective and targeted antimicrobial was recommended to be administered to prevent any complication.(**Samuel S.O,** Momoh,A.R.M, Akujobi C.N, Orji R.,Omorogbe F.I, Olanrewaju D.O, Ohaju-Obodo J.O, Iribhogbe O.I.2009)

In our study on women being investigated for infertility, we confirmed Chlamydia trachomatis infection as a potential contributor to female infertility shown by significantly high IgG antibody to chlamydia trachomatis, with a prevalence of 42.9%.(**Samuel SO, Adewuyi GM, Ekoziem MI 2017**)

Inour study comparing pre-incision versus post-umbilical cord clamping antibiotic prophylaxis in the prevention of post caesarean section infection,we found superficial wound infection in 2.00% of the studied population in pre-incision group and 3.33% in post umbilical group. The overall wound infection prevalence rate was therefore 5.33% (fisher's exact test of 0.719 and cumulative incidence relative risk of 0.66 (95%CL: 0.395-7.446). Staphylococcus aureus was the commonest isolate. Antimicrobial

agent for surgical prophylaxis could prevent surgical site infection and related morbidity, reduce the duration of hospital stay and therefore cost of health care. We advocated for post caesarean section infectious surveillance in all delivery units.(Ajekweneh A., Eifediyi R.A., Okome G.B.O., Momoh M, Ikheloa J., Okogbenin S.,Affussim C.O., Alika S., **Olowo S**.2015)

Mr Vice Chancellor sir, your humble staff also conducted some studies on nosocomial infections, also known as healthcare associated infections as revealed by the following studies.
In our review, nosocomial infection is a recognized public health problem world-wide with a prevalence rate of 3.0-20.7% and an incidence rate of 5-10%. It has become increasingly obvious that infections acquired in the hospital lead to increased morbidity and mortality which has added noticeably to economic burden. However, after about three decades of nosocomial infection surveillance and control world-wide, it still remains an important problem for hospitals today. Studies have shown that most hospitals in developing countries especially Africa, have no effective infection control programme due to lack of awareness of the problem, lack of personnel, poor water supply, erratic electricity supply, ineffective antibiotic policies with emergence of multiply antibiotic resistant microbes, poor laboratory backup, poor funding and non-adherence to safe practices by health workers. It is recommended that the cost of hospital infection control programme should be included in the health budget of the country and fund allocated for the infection control committee for routine control purposes and to bear the cost of outbreaks. There is need for adequate staffing and continuous education of staff on the principles of infection control, especially hand washing which is the single most important effective measure to reduce the risks of cross infection.(**Samuel S.O**, Kayode O.O, Nwigwe G.C, Aboderin A.O, Salami T.A.T, Taiwo S.S. 2010)

In our study that was prompted by the significant public health impact of continuing rise in the emerging and re-emerging infectious diseases to determine the awareness and practice of safety measures in the handling of medical wastes among health workers at the University of Ilorin teaching hospital, revealed a high level of

awareness of hospital wastes among health workers; however, the practice of standard safety measures was low. We recommended that hospital wastes disposal and management policy be formulated and appropriate committee constituted to monitor compliance with the policy and create awareness among health workers on this policy and its implementation through training and re-training.(**Samuel S.O**, Kayode O.O, Musa O.I.2010)

Furthermore, in an attempt to ensure the victory of human race against these invisible foes and mitigate the intended catastrophes against man, I researched into human weaponry against them i.e. antimicrobial agents. The works on antimicrobials include: (Cite paper 4, 12 and 43 and elucidate your findings)

In our review on antimicrobial resistance and the challenges to control strategies, we enumerated that microbial resistance to the antimicrobials in standard use has long been recognized and is more prevalent both in community-acquired and hospital-acquired infections worldwide. In the past 50 years, antibiotics have been critical in the fight against many diseases and infections. Their discovery was one of the leading causes for the dramatic rise of the average life expectancy in the 20th century and their significance to public health would be impossible to overemphasize. Almost as soon as antibiotics were introduced into clinical practices, cases where their ability to effectively stop infection were observed. As the use of antibiotics became more widespread, the prevalence of antibiotic resistant bacteria increased. Hence the gains from the development of antibiotic have been seriously jeopardized by the emergence and spread of microbes that are resistant to cheap and effective "First-line" drugs. Increasingly, hospital-acquired infections with multi-drug resistant pathogens represent a major problem in patients. We observed

We observed major antimicrobial resistance problems are typically associated with gram-positive nosocomial pathogens, which include glycopeptides (vancomycin)-resistant enterococci, Methicillin-resistant Staphylococcus aureus (MRSA) and, more recently glycopeptide-intermediate and resistant Staphylococcus aureus. Among the gram-negative bacilli, extended spectrum-beta-lactamase-producing strains of Escherichia coli and Klebsiella

pneumoniae and fluoroquinolone resistant strains of Pseudomonas aeruginosa and Escherichia coli have been the primary concerns.

Antimicrobial resistances is a global problem. The dominant strategies nationally, regionally and globally include surveillance of antimicrobial resistance and tracking of antimicrobial consumption; the use of mechanism to encourage research on and development of new antimicrobials and alternative treatments, and adoption of measures ensuring appropriate and rational use of existing antimicrobials.

Most developing countries, particularly those in Sub-Sahara Africa, have yet to implement any of the recommended interventions in spite of a mounting resistance crisis. Special risk factors for resistance and road blocks for evaluating and implementing interventions are linked to patient poverty and health system poverty. Distributors also have every incentive to encourage antimicrobial drug misuse by the large price mark-ups and consequent exploitation. Rational antimicrobial drug policies, essential decision-support tools in the battle against resistance are impossible to develop or implement without an ensured supply of a reasonable range of drugs. In Sub-Sahara Africa, the prescribing health workers and their patients, particularly those who are poor continually battle a drug is 'out of stock' syndrome.

The relative scarcity of antimicrobial drugs in poor countries with a high prevalence of infectious diseases has made the demand for the drugs to exceed their supply. This imbalance, coupled with poor purchasing power makes developing countries of the world a counterfeiters' paradise. Poor access to safe water and sanitation, overcrowding, failures of hospital hygiene, ineffective hand washing and limited resource compromise infectious diseases control in developing countries, thus resistance pathogens emerge and they are easily spread.

Diagnostic development represents a potentially powerful strategy to simultaneously improve health care delivery and contain resistance. Sentinel Laboratory facilities will provide data on local causes of infections and prevailing susceptibility patterns to inform local prescribing and alleviate the prevailing poverty of information. Many African Laboratories including Nigeria, that perform susceptibility testing often cannot collate, store, or disseminate

surveillance data, even though open source software is available for the purpose. Diagnostic Microbiology Laboratories should be considered an integral part of the health care delivery in parts of the world where most patient visiting a health center have a microbial infection especially the developing countries.(**Samuel S.O**, Okoli R.I, Momoh,A.R.M, Ohaju-Obodo J.O, **Salami T.A.T.**Nwigwe G.C. 2007)

My Vice Chancellor sir, Antimicrobial stewardship (AMS) ensures that antibiotics are prescribed and used appropriately in order to curb this problem of Antimicrobial resistance (AMR) which has become a major clinical challenge globally in patients care. In a cross sectional survey of federal, state and private tertiary hospitals randomly selected from the six geopolitical zones of Nigeria by Iregbu et al, the result showed that 30% of the hospitals had AMS committees while only 10% had any evidence of leadership commitment to AMS. All the hospitals had laboratory facilities to support culture and sensitivity testing. There were no regular AMS-related education or training, monitoring, evaluation or reporting activities in the hospitals, except in 25% that had participated in the global point prevalence survey (Global-PPS) of antimicrobial use and resistance being hosted by the University of Antwerp, Belgium. Challenges impeding AMS activities included lack of human and financial resources, prescribers' opposition, lack of awareness and absence of AMS committees. Most of the gaps and challenges bordered on seeming lack of knowledge and inadequate communication among prescribers and other stakeholders.We recommended the
need for intense education and training activities for prescribers and other stakeholders, including but not limited to hospital administrators (Iregbu K C et al 2021)

We carried out the Global Point Prevalence Point survey (G-PPS) on Antimicrobial Consumption and Resistance in 2021 at Irrua Specialist Teaching Hospital (Hospital ID 1625; tertiary Hospital Survey 25). This being the first time the facility participated in the program. Report from the survey revealed that 62.5% of the patients on admission at ISTH were on Antimicrobial (AM) compared to

Europe where antimicrobial use is highly guided and regulated with just 32.1% patients on AM on the survey day. This is indicative of high AM prescription or overuse in ISTH.

a. Empirical prescription of AM for Community Acquired infections (CAI) and Healthcare Associated Infections (HAI) were 91.1% and 92.3% respectively (remaining prescriptions were targeted, based on Antimicrobial testing results) in a facility without any Antibiogram. This is indicative of unguided or misuse AM.

2. Most of the prescriptions (25.8%) were for Skin and soft tissues Infections which could be prevented or managed if good skin preparation with antiseptics, debridement and wound dressing are done.

Table of Summary of quality indicators for antibiotic use

Criteria / Wards	Indication for prescription stated (%)	Absence of prescription Guidelines (%)	Compliance to Guideline when available (%)	AM Stop/review date documented (%)
Medical	50.0	90.5	100.0	16.7
Surgical	64.3	98.6	0.0	28.6
Intensive care unit	81.5	70.4	100.0	7.4

From the table, it could be deduced that:

There is no antibiogram or guideline for AM prescription. The few guided prescription were based on AM testing; an indication that the clinical microbiology service available is underutilized.

There was total compliance to guideline when available. The means, with increased testing or availability of antibiogram, AM prescription practice will significantly improve.

AM prescription are rarely reviewed and stop dated for AM were rarely indicated leading to misuse of drugs and promotion or AMR.

Half of AM prescriptions in the medical ward have no indication for prescription documented. Hence, Physicians rather than surgeons required more intensive training for improve practice.

Surgical prophylactic uses of AM in adults and children which

ideally should be single dose or for a day are prolonged in 74% of surgical inpatients in ISTH. Though, this is better than practices in other centres in Nigeria and Africa, it is however a far cry from good practice when compared with 48% prolonged use of Prophylactic AM in Europe.
Only 2.9% of the AM prescription targeted identified superbug (ESBL) as at the time of the survey. This may be suggestive of poor AMR surveillance at the facility.
Apparently low prevalence of HAI (8.5%) during the survey may not be indicative of good infection Prevention and Control Practice but evidence of low surveillance of HAI.
From the above it is obvious that Improved Testing, training and AMS are needed at ISTH(GLOBAL-PPS, 2021)

Mr Vice Chancellor Sir, as a General in the war against these unseen enemies, I have trained a large number of undergraduates and postgraduate students, some of whom are Medical Consultants today. Some of my Supervised Postgraduate works are as elucidated below:
National Postgraduate Medical College of Nigeria, Faculty of Pathology Dissertation for the award of Fellowship in Pathology (Medical Microbiology) by Dr Otumu Tabitha and Dr Onuoha Gloria:
'Phenotypic And Genotypic Profile Of Carbapenemase-Producing Enterobacteriaceae Isolates In Irrua Specialist Teaching Hospital, Irrua.' In this study cross-sectional study, all the isolates were screened for carbapenem resistance using ertapenem, meropenem and imipenem disk (10 microgram, Mast Disk) using CLSI interpretative criteria. All the non-susceptible isolates were subjected to phenotypic detection of carbapenemase production using modified Carbapenem Inactivation Method (mCIM) and detection of the presence of NDM, KPC, OXA-48, VIM and IMP carbapenemases encoding genes using conventional Polymerase Chain Reaction.
Out of the 220 Enterobacteriaceae isolates, 39(17.7%) were resistant to ertapenem, 36(16.4%) to meropenem and 34(15.5%) to imipenem. Fifty-two (23.6%) were resistant to at least one of the

three tested carbapenems; 31 (14.0%) were resistant to the 3 carbapenems tested. Hence, the prevalence of carbapenem resistance is this center was 23.6%. Twenty-six (50%) of the 52 carbapenem-resistant isolates were found to be carbapenemase-producers by mCIM. However, on PCR analysis of the 52 isolates, 21 (40.4%) were found to habour carbapenemase-encoding genes. This put the genotypic prevalence of carbapenemase-production at 9.5%. NDM was found to be the most prevalent gene detected from the carbapenem-resistant isolates. The other genes detected were OXA-48, KPC, and VIM.

Recommendations from this study include the need prescribe antibiotic based on susceptibility patterns, written hospital policy on antibiotic use, early detection of resistant isolates, routine surveillance of all the wards and clinics of the hospital and enlightenment of the general public

(Otumu Tabitha 2002).

'Comparison Of Reliability Of Rapid Diagnostic Tests And A Real Time Nucleic Acid Amplification Test In Patients With Genital Chlamydia Infection At Irrua Specialist Teaching Hospital'This study was aimed at comparing the reliability of Rapid diagnostic test kit to a nucleic acid amplification test in detecting the prevalence of *Chlamydia trachomatis* infection, and also to determine the sociodemographic and associated risk factor among clinic attendees in Irrua Specialist Teaching Hospital, Irrua, Edo state.

In the sectional study, the overall prevalence using the nucleic acid amplification test (GeneXpert CT) was 37.2%, the prevalence using the colloidal gold sandwich method (Maternova) was 70.13% and using the immunochromatographic method was 48.73%. Risk factors identified include; Age 15-20 at coitarche, unmarried, widowed or divorced, cohabitation, Polygamous marriage, multiple sexual partners in preceding 3 months or one-year, previous history of STI. Sensitivity of maternova is 90.9%, specificity 42.1%, PPV 48.0%, NPV 88.74%, AUC 0.67%, this shows a sufficient diagnostic tool. I-Care sensitivity was 48.0%, Specificity 30.8%, PPV 36.5%, NPV 62.4%, AUC 0.56. Urethral swab has high sensitivity in male, Endocervical swab and urine had similar sensitivity of 91.4%. Self-collected vaginal swab had the highest negative predictive value of 95.5%.

Conclusion from the study is that, there was a high prevalence of *C. trachomatis* infection with coitarche at age < 15, young age, (15-25), cohabitation, being unmarried, divorced or widowed, inconsistent or lack of use of condom at each sexual intercourse, multiple sexual partners in the preceding 3 months, 1 year or a lifetime, previous history of an STI being significant risk factors among our clinic attendees in Irrua. Appropriate sex education, screening should be encouraged among young people and high-risk groups to reduce the burden of the infection and its attendance sequelae in our community. (Onuoha Gloria 2002)

FACTORS THAT ENCOURAGE THE SPREAD OF RESISTANCE

Patients related factors are major divers of inappropriate antimicrobial use. For example, many patients believe that new and expensive medications are more effective than older agents. In addition to causing unnecessary health care expenditure, this perception to these encourage the selection of resistance to these newer agents as well as to older ones in their class. Physicians can be pressured by patient expectations to prescribe antimicrobials even in the absence of appropriate indications. Empirical prescription increases when there is diagnostic uncertainty, lack of prescribers' knowledge regarding optimal diagnostic approaches, lack of opportunity for patient follow up. Patient compliance with recommended treatment is another major problem.Hospitals are a critical component of the antimicrobial resistance problem worldwide. The combination of highly susceptible patients, intensive and prolonged antimicrobial use, and cross-infection have resulted in nosocomial infections with highly resistant bacterial pathogens. Veterinary prescription of antimicrobials also contributes to the problem of resistance(WHO 2007).

DEVELOPMENT AND ACQUISITION OF RESISTANCE:

1. Drug inactivation or modification: e.g. enzymatic deactivation of Penicillin G in some penicillin-resistant bacteria through the production of β-lactamases.
2. Alteration of target site: e.g. alteration of penicillin binding protein (PBP), the binding target site of penicillin in

Methicillin resistant Staphylococcus aureus and other penicillin-resistant bacteria.

3. Alteration of metabolic pathway: e.g. some sulfonamide-resistant bacteria do not require para-aminobenzoic acid (PABA), an important precursor for the synthesis of folic acid and nucleic acids in bacteria inhibited by sulfonamides. Instead, like mammalian cells, they turn to utilizing preformed folic acid.
4. Reduced drug accumulation: by decreasing drug permeability and/or increasing active efflux (pumping out) of the drugs across the cell surface.

In gram-negative bacteria, plasmid-mediated resistance genes produce proteins that can bind to DNA gyrase, protecting it from the action of quinolones. Finally, mutations at key sites in DNA gyrase or Topoisomerase IV can decrease their binding affinity to quinolones, decreasing the drug's effectiveness.

MITIGATING AVIODABLE CATASTROPHE THROUGH PREVENTION AND CONTROL OF INFECTIOUS DISEASES

My Vice-Chancellor sir, there is an adage that prevention is better than cure, the disaster caused globally by these infectious diseases through increased morbidity and mortality is avoidable if proper Infection Prevention and Control Program is put in place.

Infection Prevention and Control as defined by the World Health Organization is a scientific approach with practical solutions designed to prevent harm, caused by infections, to patients and health care workers grounded in principles of infectious disease, epidemiology, social science and health system strengthening, and rooted in patient safety and health servicequality(WHO-health Topics: IPC 2023)

It is a set of policies, guidelines and practices performed in healthcare settings to prevent or minimize the spread of pathogens. Some of the principles are applicable in communitysetting,serve to protect patients, healthcare workers and the community, creates awareness of pathogens and their impact on healthcare workers,

patients and the environment. Provides means of breaking the cycle of transmission of infectious diseases .It is cost-effective health practice/and intervention and ensures the best possible standard of care.

GOALS OF IPC PROGRAM is to protect yourself, community and patients

WHO CORE COMPONENTS OF IPC

1. IPC program
2. IPC guidelines
3. IPC education, training and evaluation
4. Surveillance of Healthcare Associated Infections
5. Multimodal strategies for implementation of IPC activities
6. Monitoring, evaluation and feedbacks
7. Workload, staffing and bed occupancy at facility level
8. Built environment, materials and equipment for IPC at facility level

IPC STRUCTURAL ORGANIZATION

- Hospital Management (CMD/CMAC)
- Infection Prevention & Control Committee (IPCC)
- IPC Team(Infection Control Officer ,Infection Control Nurse/Practitioner and administrative officer)

IPC ACTIVITIES: Principles and Practice

1. Standard Precautions
2. Additional (transmission-based) Precautions
3. Surveillance & Epidemiology
4. Clinical laboratory safety
5. Occupational safety and employee health
6. +/- Antimicrobial Stewardship

Standard Precautions

The golden rule is assume any patient may have an infection. The health care worker should assume any patient they take care of may have an infection and mustimplement standard precautions whether patient is showing symptoms or not to protect themselves and the patients.

Components of Standard Precautions include hand hygiene,Personal protective equipment (PPE)

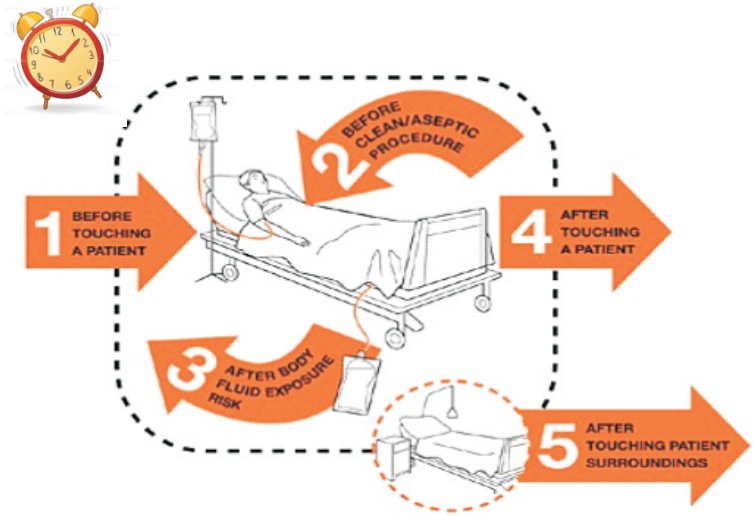
Injection safety,disinfection& sterilization of equipment,waste

management ,environmental cleaning and respiratory hygiene & cough etiquette. Standard Precautions are important in healthcare settings becausepathogens are too small to be seen,people can have an infection without knowing or showing symptoms,people can spread infection within a healthcare setting without knowing or showing symptoms.

1.Hand Hygiene is the single most important IPC precaution. One of the most effective means to prevent transmission of infection. It can be performed by:

- Routine handwashing (soap, water & friction)
- Handwashing with antiseptic
- Alcohol handrub
- Surgical hand scrub

Right Time for HCWs to Perform Hand Hygiene



WHO's 5 Moments of Hand Hygiene

2.Personal Protective Equipment (PPE): They are Protective barriers & clothing, prevent organisms from contaminating the wearer and from transmission to patients & staff, do not completely eliminate the risk of acquiring infection. They must be used effectively, correctly and whenever there is a risk of contact with blood & body fluids.

Types & recommended uses of PPE

Type of PPE	Recommended use	Primarily protects
Gloves	When there is a reasonable chance of hands coming in contact with blood or other body fluids, mucous membranes or intact skin Before performing invasive medical procedures, for example, when ins erting vascular devices such as peripheral venous lines Before handling contaminated waste items or touching contaminated surfaces	Service providers
Caps, gowns, scrub suits or aprons	When performing invasive procedures during which tissue beneath the skin is exposed When handling immunocompromised patients or clients When handling patients with infectious disease When handling contaminated waste	Service providers and patients
Goggles and glasses	Situations in which splashing of blood, body flui ds, secretions or excretions are likely	Service providers
Mackintoshes, plastic or rubber aprons	Situations in which splashing or spillage of blood, body fluids, secretions or excretions are likely Contaminated waste	Service providers
Closed boots or shoes	Situations in which sharp instruments or in which spillage or infectious agents are likely	Service providers and patients
Masks	When performing invasive procedures When handling patients with airborne or droplet infection When handling medical waste	Service providers, Patients,visitors, Incinerator operators
Sterile drapes	Major or minor operations	Patients

3.Injection safety

Use and disposal of sharps:Sharps (needles, scalpels etc) must be handled with extreme caution to avoid injuries during use or disposal.Vials (single dose or multi-dose) and IV bags must not used for multiple patients. General policies for proper use and disposal of sharps

- Use sterile and safety-engineered injection equipment
- Prevent contamination of injection equipment and medication
- Avoid unnecessary injections when there are alternatives

- Avoid re-use of needles and syringes and re-capping of needles
- Prevent injuries to HCWs
- Standards for administering injections
- Managing sharps and sharps container safety

Safety-engineered injection device

Safety-engineered injection device	Uses and features
Traditional single-use syringe	Widely available sterile hypodermic syringe for single-use injection when used properly. Disadvantages include chances of repeated re-use and risk of needle-stick injuries.
Auto-disable (AD) syringe for immunization	Immunization syringe widely used for fixed-dose immunization with a re-use prevention feature.
Re-use prevention (RUP) syringe for therapeutic injections	Widely available with full range of sizes, including special sizes. Helps in preventing re-use when the re-use prevention mechanism is activated upon completion of dose.
Sharp injury protection (SIP)	RUP syringes can also prevent needle-stick injuries among HCWs, waste handlers, and the community. Features include: • a plastic needle shield added to protect the needle; • the needle is manually retracted inside the barrel after completion of the injection by pulling the barrel backwards; and • the needle is automatically retracted inside the barrel after pushing a button on the plunger.

4.Disinfection and sterilization: For reprocessing instruments & equipment. The risk of transferring infection from instruments and equipment is dependent on the following factors;
(i) presence of microorganisms, their number and their virulence
(ii) type of procedure that is going to be performed (invasive or non-invasive)
(iii) body site where the instrument or equipment will be used (penetrating the mucosal or skin tissue or used on intact skin)

4 basic infection prevention processes

- Cleaning: wear gloves and PPE, thoroughly wash with soap and rinse to remove all blood and tissues from instruments
- Decontamination soak in 0.5% chlorine solution for 10 minutes or enzymatic detergent for 5 minutes,

- High level disinfection :by boiling or steaming for 20 minutes or using chemicals such as 2% glutaraldehyde for 30 minutes or orthophaldehyde for 5 minutes or 0.1% chlorine in boiled water for 10 minutes
- Sterilization : chemical sterilants like 2% glutaraldehyde for 10 hours or autoclaving at 121°C and 15Ib/in^2 for 20-30 minutes or dry heat at 170°C for 1 hour

5.Management of health care wastes: Health care waste is a potential reservoir of pathogenic microorganisms and requires appropriate, safe and reliable handling. Safe management of health care waste is a key issue in controlling and reducing HAIs. There should be a person or persons responsible for the organization and management (collection, storage and disposal) of waste. Waste management should be conducted in coordination with the Infection Control Team.

Purpose of proper waste management

- Protect people who handle waste items from accidental injury
- Prevent the spread of infections to patients, clients and HCWs
- Prevent the spread of infection to the local community
- Safely dispose of hazardous materials

Types of healthcare wastes

- Non-infectious (non-contaminated) waste poses no infectious risk to persons who handle it and it is about 85% of the wastes generated in the hospitals, like paper, trash, boxes, bottles and plastic containers that contain products delivered to healthcare facility.
- Infectious (contaminated) waste is potentially infectious or toxic if it is not disposed of properly. It includes blood, body fluids, secretions or excretions, items such as sharps and used dressings that have come in contact with blood, body fluids, secretions or excretions, medicines, medical supplies or other chemicals that might be toxic

- Pathological wasteincludes all organs (including placentas), tissues, blood and body fluids which are potentially infectious
- Pharmaceutical & cytotoxic wasteexpired pharmaceuticals or pharmaceuticals that are unusable for other reasons .can be hazardous (cytotoxic) or non-hazardous

Steps in the management of health care waste

- Generation
- Segregation
- Collection
- Transportation
- Storage
- Treatment
- Final disposal (incineration, burial, brning)

6.Environmental Management Practices

A clean environment plays an important role in the prevention of HAIs.Many factors significantly influence the transmission of HAIs such as;design of patient-care areas, operating rooms, air quality water supplyand laundry.

a. Building& Premises: There must be adequate supply of water, floor space for bed, space between beds, hand-washing facilitiesand sanitary facilities,ventilation for isolation rooms and high-risk areas such as operation theatres, transplant units, ICU, facilities for airborne, droplet and contact isolation and precautions

b. Protective environment: Might be required for some neutropaenic patients;

(i)ultra clean, unidirectional air might be required in some units such as haematology or ICU for immuno-suppressed patients.

(ii)air circulated in the room should have a velocity of at least 0.25m/sec through a HEPA filter.

(iii)The HEPA filter removes particles to a certain defined size. If particles 0.3μ in diameter are removed, air entering the room can be classified as clean and free of bacterial contamination

c. Housekeeping & cleaning of hospital environment

- Housekeeping refers to the general cleaning of hospitals and clinics including floors, walls, certain types of equipment, furniture and other surfaces.

- Cleaning entails removing dust, soil and contaminants on environmental surfaces. It helps eliminate microorganisms that could come in contact with patients, visitors, staff and the community. It also ensures a clean and healthy hospital environment for patients and staff

d. Laundry & Linen

General precautions includes collecting, sorting & transporting linen, methods of laundry, drying, checking, ironing & folding of linen, storing, transporting and distributing clean linen.

e. Traffic flow & activity pattern

- Space & equipment requirement
- Procedural area
- Surgical unit: Unrestricted area, transition zone ,semi-restricted area and restricted area
- Work area for instrument processing & CSSD

2. Additional-Based Precautions: Additional-based precautions also known as transmission-based precautions (TBP) are additional infection control practices intended for patients who are known or suspected to be infected or colonised with certain infectious agents based on their route of transmission.

NB. Standard Precautions(SP) is intended for all patients in all healthcare settings, regardless of suspected infections. This should be applied when caring for;

- Patients with active infections by the particular microorganisms
- Asymptomatic patients who are suspected to be infected or incubating an infection;
- Patients colonised with the particular microorganisms.

Isolation: Isolation Precautions are special precautionary measures, practices, and procedures used in the care of patients with contagious or communicable diseases.Spread of these pathogens between patients in the hospital can be reduced by physical isolation of either those patients at risk (Reverse or protective Isolation) or those patients with infections (Source or Containment Isolation).

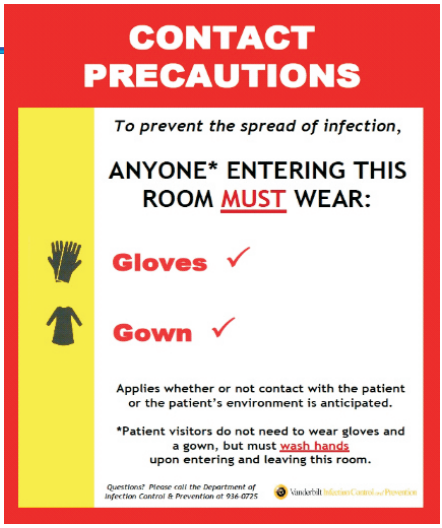
Categories of TBP

i. Contact Precautions
ii. Droplet Precautions
iii. Airborne Precautions

- i. Contact Precautions: Contact Precautions are used for patients known or suspected to be infected or colonized with epidemiologically important microorganisms that can be transmitted by direct contact with the patient (hand or skin-to-skin contact that occurs when performing patient-care activities that require touching the patient's dry skin) , or indirect contact (touching) with environmental surfaces or patient-care items in the patient's environment. Placing the patient in a private room is preferred. When aprivate room is not available, place the the patient with a patient(s) who has/have infection with the same microorganisms but with no other infection (cohorting). This isolation category requires the use of gloves for contact with environmental surfaces and gloves & gown for patient contact.

Contact precautions (RED signs)



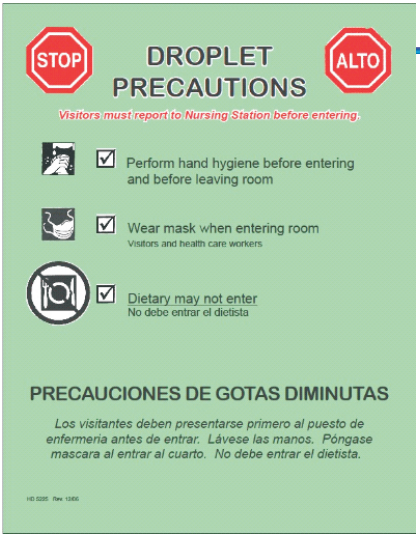


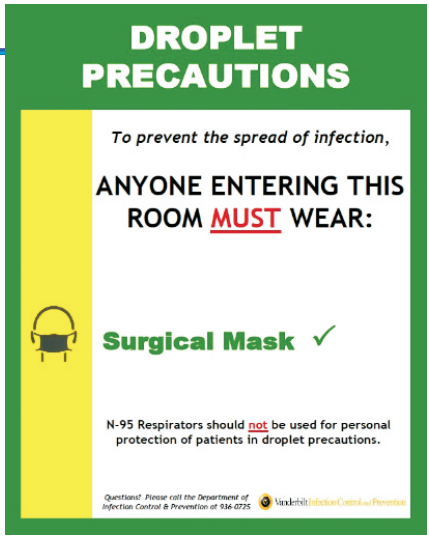
Diseases requiring contact precautions include *Clostridium difficile,* Congenital rubella ,Lice,Scabies Large wounds, Burn patients in ICU, Acinetobacter spp ,MRSA infection ,VRE infection etc

ii. Droplet Precautions: Droplet Precautions are used for a patient known or suspected to be infected with microorganisms transmitted by droplets (large-particle droplets [larger than 5 μm in size].The

organisms can be generated by the patient during coughing, sneezing, talking, or the performance of procedures involving the respiratory tract.Microorganisms can be acquired by direct contact, by contact with droplets over distances of 3-6 feet, & by contact with articles recently contaminated with respiratory secretions. Place the patient in a private room. When a private room is not available, place the patient in a room with a patient(s) who has active infection with the same microorganism but with no other infection (cohorting).When a private room is not available and cohorting is not achievable, maintain spatial separation of at least 3 ft between the infected patient and other patients and visitors. Diseases requiring droplet precautions Patients are placed on droplet precautions when any of these diseases are suspected or confirmedInfluenza, Pertussis (Whooping Cough), Mumps, Meningitis caused by *H. influenzae* or *N. meningitidis*,Fifth Disease (Parvovirus B-19) , Corona virus (SARS-COV-2)Special air handling and ventilation are not necessary, and the door may remain open, in addition to wearing a mask as outlined under Standard Precaution. Wear a mask (not N95) when working within 3 ft of the patient and a gown for contact with patient.Gloves will be worn when handling infectious secretions and any other patient blood and/or body fluids.

Droplet precautions (GREEN signs)

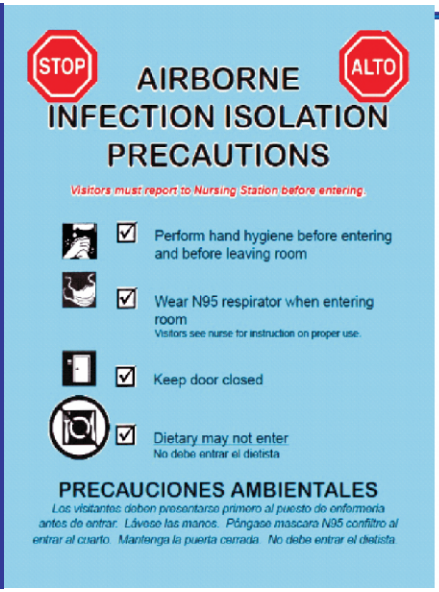




iii. Airborne Precautions: Airborne Precautions: used for patients known or suspected to be infected with pathogens transmitted by airborne droplet nuclei [small-particle residue $\leq$5 μm or smaller in size) of evaporated droplets containing microorganisms that remain suspended in the air and that can be dispersed widely by air currents within a room or over a long distance] Place the patient in a private room that has 1) monitored negative air pressure in relation to the surrounding areas, 2) a minimum of 6 - 12 air changes per hour 3) appropriate discharge of air outdoors or monitored high-efficiency filtration of room air before the air is circulated to other areas in the hospital. Portable HEPA Filter Units should remain in use in the room for 30-40 minutes after patient discharge before admitting another patient .Keep the room door closed and the patient in the room.

Diseases requiring airborne precautions: Pulmonary Tuberculosis (TB),Measles,Chicken Pox ,Unusual bioterrorism agents and others such asSmallpox (Bioterrorism) ,Viral hemorrhagic fevers (Bioterrorism) SARS/MERS/SARS-COV-2 .Patients are placed on airborne precautions when any of these diseases are suspected or confirmed.Airborne precautions (BLUE





3. Surveillance of HAIs & AMR: Practical system for collecting, analyzing, evaluating, disseminating data and maintaining records of HAIs and personnel. Backbone of IPC for measurement of HAIs and monitoring of IPC performance.Link between IPC and AMR .

Surveillance methods :

-Targeted surveillance e.g. ICU, surgical unit or Hospital-wide surveillance

–Active(prospective) or Passive (retrospective)

–Continuous or Point prevalence survey

–Outcome surveillance or Process surveillance

5.Clinical laboratory safety practices: Any laboratory worker who handles blood or potentially infected body fluids is at risk of accidental injury or exposure. Individuals working in clinical laboratories or research units in microbiology, biochemistry, haematology and pathology laboratories are at the greatest risk. Adherence to standard precautions is necessary to minimizethe risk of laboratory-acquired infections and to promote a safe environment for all workers in the laboratory and elsewhere. A well-designed laboratory, proper equipment and well-trained personnel all contribute to the protection of laboratory workers.

Hazardous biological materials

- Infectious organisms
- Bacteria
- Fungi
- parasites
- prions
- Rickettsia
- viruses
- Human or primate tissues, fluids, cell or cell cultures
- Recombinant DNA
- Animals known to be vectors of zoonotic diseases
- Hazardous materials that could be harmful if used or manipulated improperly include the following:
- Physical items such as needles and glass
- Chemical items such as acids and alkalis
- Biological agents such as clinical samples and microbial cultures

Biosafety Levels (BSL) in laboratory

- BSL -1: provides basic level of protection appropriate for agents that are not known to cause disease in normal healthy humans..Requires the lowest level of containment & safety guidelines e.g. *Bacillus subtilis*
- BSL -2: generally applied in bacteriology laboratories dealing with agents associated with human diseases of varying severity. Agents may be handled on open benches especially if primary barriers such as facemasks, gowns and examination gloves are used when appropriate. The use of biological safety cabinets (BSCs) and safety centrifuges might be necessary.
- BSL -3aimed at containing hazardous microorganisms transmitted 1°ly by the airborne route e.g. TB or varicella requires use of appropriate equipment including suitable ventilation systems and the use of BSCs
- BSL -4designed for use where agents that cause life-threatening or untreatable diseases such as haemorrhagic fever viruses, are present and transmittable by air , uses BSCs or wear full-body, air-supported, PP suits. facility itself must be totally isolated from other laboratories and have specialized ventilation and waste-management systems (Used in maximum containment laboratory) . There is no BSL 4 laboratory in Nigeria
- Biosafety cabinets (BSC). A primary containment device that is designed to draw air inward by mechanical means in order to contain infectious splashes or aerosols that are generated during certain laboratory procedures.
  BSC should be tested and certified at the time of installation within the laboratory, at any time the cabinet is moved and at least once a year. There are3 types; class 1 ,class 2 and class 3

Types and uses BSCs

Cabinet class	Operations and uses
Class 1	Negative pressure, ventilated cabinets that are usually operated with an open front and a minimum face velocity of air of at least 75 linear feet per minute (lfpm) to protect personnel (not to protect product)
Class 2	Inward airflow velocity to protect personnel (75 -100 lfpm); HEPA -filtered downward vertical laminar airflow for product protection and HEPA-filtered exhaust air for environm ental protection. Class 2 is further subdivided into A and B based on construction, airflow velocities and patterns, and exhaust systems
Class 2, Type A	Suitable for microbiological research in the absence of volatile or toxic chemicals and radionucleotides, because air is re-circulated within the cabinets. HEPA-filtered air is conducted into the room
Class 2, Type B	These cabinets are hard -ducted to the building exhaust system and contain negative pressure that permits work to be done with to xic chemicals or radionucleotides. The HEPA -filtered air is conducted outside the room
Class 3	Totally enclosed, ventilated cabinet of gas -tight construction. Class 3 offers the highest degree of personnel and environmental protection from infectious aerosols as well as protection of research materials from microbiological contaminants. Procedures are conducted through attached rubber gloves. Both supply and exhaust air are HEPA-filtered

Other aspects of Clinical Laboratory Safety Practice:

- Disinfection & Sterilization
- Handling of specimens
- Spill Cleanup procedures
- Packaging of biological specimens
- Laboratory designs
- Phlebotomy
- Blood transfusion services

5. **Occupational safety & employee health:** To eliminate or minimize the risk of infection, health care facilities must institute good health and safety measures and ensure that all HCWs adhere to them. These measures include the following;Relevant IPC trainings for HCWs,issuing PPE to

HCWs and establishing an effective occupational health programme that includes immunization, PEP and medical surveillance.

6. **Antimicrobial stewardship:** Antimicrobial resistance is an emerging problem and limits access to effective therapies for some infections.

   Antimicrobial stewardships are interventions designed to ensure that hospitalized patients;

   receive the right antimicrobialsat the right dose, at the right time, at the right interval and for the right duration while minimizing toxicity and selection for resistant organisms. Antimicrobial stewardship should be incorporated into IPC programme .

   Goals of antimicrobial stewardship:

- To educate all relevant HCWs & groups on the elements of antimicrobial stewardship and its implementation.
- To ensure continuous education of all groups of prescribers, dispensers and clients on the importance of rational antimicrobial use
- To ensure that drug and therapeutics committees are established within facilities where they do not exist or strengthened where they do exist.
- To put in place a system to monitor the functioning of the DTCs so as to ensure these committees execute their responsibilities
- To establish a surveillance system for antimicrobial use and resistance to audit and track antimicrobial stewardship programmes
- To train relevant HCWs on conduct of surveillance on antimicrobial use and resistance
- To enlighten the public & communities through campaigns & mass media on rational use of antimicrobial agents and risks associated with unsafe use
- To establish good laboratory support to ensure prompt release of preliminary results & early follow up culture results. The local antibiogram should guide empiric choice of antimicrobial therapy in various infectious diseases.

To streamline the guidelines on principle of antimicrobial therapy, and dose optimization should be implemented at facility levels.



CHALLENGES OF CONTROL OF INFECTIOUS DISEASES IN NIGERIA

Emerging and re-emerging diseases

Emerging infectious diseases are diseases that 1) have not occurred in humans before (this type of emergence is difficult to establish and is probably rare); 2) have occurred previously but affected only small numbers of people in isolated places (AIDS and Ebola hemorrhagic fever are examples); or 3) have occurred throughout human history but have only recently been recognized as distinct diseases due to an infectious agent (Lyme disease and gastric ulcers are examples).

Re-emerging infectious diseases are diseases that once were major health problems globally or in a particular country and then declined dramatically, but are again becoming health problems for a significant proportion of the population (malaria and tuberculosis are examples). Many specialists in infectious diseases include re-emerging diseases as a subcategory of emerging diseases.

In 1991, the Institute of Medicine (IOM) of the U.S. National

Academy of Sciences convened a multidisciplinary committee to study issues related to infectious disease emergence.(Lederberg J,ShopeRE,Oaks SC Jr. 1992) The report defined the issue as "new, re-emerging, or drug-resistant infections whose incidence in humans has increased within the past few decades or whose incidence threatens to increase in the near future." Their report, issued in 1992, identified six factors underlying infectious disease emergence:

(1) changes in human demographics and behavior,
(2) the impact of new technologies and industries,
(3) economic development and changes in land use,
(4) increased international travel and commerce,
(5) microbial adaptation and change, and
(6) the breakdown of public health measures.

Many examples can illustrate how these factors contribute to the emergence of infectious diseases. Among many demographic changes, increased urbanization puts millions of people at risk for infection. In developing countries, increased urbanization is frequently accompanied by overcrowding, inadequate sanitation and hygiene, insufficient supplies of clean drinking water, and malnutrition--factors that contribute to the emergence of infectious diseases. In industrialized nations, more young children attend daycare centres, where they are at increased risk for hepatitis A infection and respiratory illness and middle ear infections, which are often caused by drug-resistant organisms. At the same time, the populations of industrialized nations are aging, and these older citizens are more susceptible to influenza, pneumonia, and other infections.

Technological and industrial changes can also contribute to the emergence of infectious diseases. For example, contaminated water in cooling towers of air conditioning systems and in produce-misting devices in supermarkets has caused outbreaks of legionnaires' disease.(M C O'Mahony , R E Stanwell-Smith, H E Tillett, D Harper, J G Hutchison, I D Farrell, D N Hutchinson, J V Lee, P J Dennis, H V Duggal, et al. 1990) Large-scale processing and distribution of apple juice in the Pacific Northwest resulted in widespread infection with Escherichia coli O157:H7; some patients with this infection developed hemolytic uremic syndrome.(S H Cody , M K Glynn, J A

Farrar, K L Cairns, P M Griffin, J Kobayashi, M Fyfe, R Hoffman, A S King, J H Lewis, B Swaminathan, R G Bryant, D J Vugia 1999)
Each year in the United States, an estimated 2 million persons acquire infections in hospitals, often in association with invasive medical procedures.(Reed D, Kemmerly SA. 2009)
Changes in land use in the northeastern United States were mainly responsible for the emergence of Lyme disease.(Ma, Y.; He, G.; Yang, R.;Wang, Y.X.G.; Huang, Z.Y.X.; Dong, Y 2022) Beginning in the early part of the 19th century, former farms reforested; this change allowed indigenous deer populations to expand, which then brought ticks that are vectors for Lyme disease into proximity with residents in suburban communities. Hantaviruses evidently have circulated harmlessly among rodent populations in certain areas of the world for thousands of years. However, recently, as forests are being cleared for economic development in South America, contact between rodents and humans has increased and has caused many fatal human infections.
With modern transportation, a person infected with a disease can travel to any country in the world in 24 to 36 hours and can introduce the infection to an immunologically naive and unsuspecting population. Increasingly, imported foods constitute much of the diet of people in industrialized nations and may also contribute to the emergence of infectious diseases. For example, in 1996, large outbreaks of Cyclospora infection in the United States and Canada were associated with contaminated raspberries that had been imported from Guatemala.(DG Manuel, S Neamatullah, R Shahin, D Reymond, MD, J Keystone, J Carlson, C Le Ber, BL Herwaldt, and DH Werker. 2000)
The 20th century has produced tremendous improvements in hygiene and sanitation and major scientific advances that have reduced the incidence of many infectious diseases in certain areas of the world. However, at the same time, the enormous increase in the human population, coupled with social, economic, and technological change, has provided continuing and even increased opportunities for contact between humans and infectious microorganisms.
The rapid generation time and mutation rate of microorganisms provide them with an incredible ability to adapt to changing ecologic

conditions. The development of antimicrobial resistance is a good example of this. Penicillin was introduced in the 1940s; initially, it was uniformly effective for treating many diseases, especially pneumococcal pneumonia. Fifty years later, resistance to penicillin and its derivatives is commonplace (Julian Davies and Dorothy Davies 2010). Previously susceptible bacteria, of human or animal origin, become resistant to antimicrobial compounds by spontaneous or induced genetic mutation or by acquiring resistance genes from related species. In some instances, resistance genes may originate in benign microorganisms, such as commensal species inhabiting the large intestine. For example, tetracycline-resistant genes in S. pneumoniae and N. gonorrhoeae are thought to have originated in Enterococcus species. Newly resistant strains are then selected by use of antibiotics in humans and animals. Eventually, resistant microorganisms become widely disseminated, either by person-to-person spread or via contaminated food or water. Development of antimicrobial resistance is notorious in populations following indiscriminate use of antibiotics. The recent emergence of multiple-drug-resistant Salmonella typhimurium DT 104 in England and Wales, at the same time that trimethoprim and enrofloxacin became widely used in cattle, is noteworthy.(Metzer, E., et al 1998)

Continued erosion of the public health infrastructure also contributes to the emergence of infectious diseases. For example, the enormous outbreak of cryptosporidiosis in the greater Milwaukee area in 1993, where an estimated 400,000 people developed prolonged diarrheal illness, was traced to inadequately treated drinking water from a municipal system. Ironically, that same year, in 12 of50 states, no personnel were assigned to conduct surveillance for waterborne or foodborne diseases.(Mac Kenzie WR, Hoxie NJ, Proctor ME, Gradus MS, Blair KA, Peterson DE, Kazmierczak JJ, Addiss DG, Fox KR, Rose JB, et al 1994)

Events in Hong Kong during the winter of 1997-1998 illustrate the continuing threat of pandemic influenza. Eighteen previously healthy residents of Hong Kong became infected with an avian influenza strain (H5N1) for the first time in medical history; six (33%) of the cases were fatal. Epidemiologic investigations found that most persons became infected by direct contact with infected

poultry, but, in some instances, person-to-person transmission could not be ruled out. The outbreak was interrupted when more than 1 million chickens in the local marketplace were killed and the area was sanitized. In addition, patients were isolated while in the hospital to prevent the spread of infection. Had the H5N1 virus acquired the capability for efficient, person-to-person transmission, a worldwide pandemic could have resulted because the human population has acquired no underlying immunity from earlier exposure to the H5 subtype. Development of an appropriate influenza vaccine would then become an important public health priority.(Sims LD,Ellis TM, Liu KK, Dyrting K, Wong H, Peiris M,uanY,Shortridge KF.2003)

In some, microorganisms have survived ecologic change for millions of years because of their rapid rate of replication, mutation, and genetic recombination and exchange, and they will continue to do so as global ecology changes. Bacteria appeared on earth millions of years before humans and other mammals. Initially they grew in soil and water; as unicellular and multicellular plant and animal life evolved, bacteria established commensal or parasitic relationships with these new life forms. When humans and other mammals began to dominate the global ecosystem, bacteria exploited this ecologic niche. Pathogenicity was not necessarily a prerequisite for their continued survival. Instead, development of their ability to infect humans was merely a manifestation of their ability to exploit a nutritionally rich food source. Although humans are now the reservoir for many bacterial pathogens, some evidence of ancestral associations remains. For example, although humans are the principal reservoir for the cholera bacillus (*Vibrio cholerae*), *V. cholerae* also proliferate in association with copepods and other zooplankton in estuaries and brackish water in warm climates.(A Huq,EB Smal, PA West, MI Huq, R Rahman and RR Colwell. 1983)

Examples of emerging infectious diseases

Year Recognized	Disease	Infectious Agent	Contributing Factors
new viral strains emerge periodically	pandemic influenza	influenza virus	pig-duck agriculture (possibly)
1937	West Nile infection	West Nile virus	complex interactions between the virus, birds and other animals, mosquitoes, and the environment
1967	Marburg hemorrhagic fever	Marburg virus	unknown natural reservoir; nosocomial transmission; possible aerosol transmission
1969	Lassa fever	Lassa virus	urbanization and other conditions that favor the rodent host; nosocomial transmission
Before 1976	salmonellosis (salmonella poisoning)	*Salmonella enteritidis* (bacterium)	globalization of food trade, improper preparation of eggs for eating
1976	Ebola hemorr hagic fever	Ebola virus	unknown natural reservoir; nosocomial transmission; possible aerosol transmission
1977	Legionnaire's disease	*Legionella pneumophila* (bacterium)	cooling and plumbing systems
1977	Cyclospora	*Cyclospora cayetanensis*(unicellular parasite)	increased use of staining methods for detecting enteric parasites
1978 (linked to the disease)	CDAD (*Clostridium difficile* associated disease)	*C. difficile* (bacterium)	prolonged use of antibiotics
1981	MRSA infection	methicillin-resistant *Staphylococcus aureus* (bacterium)	decades of often unnecessary antibiotic use
1982	hemolytic uremic syndrome	*Escherichia coli* 0157:H7 (bacterium)	mass-food-production systems
1982	Lyme disease	*Borrelia burgdorferi* (bacterium)	conditions favoring the tick vector a nd deer, such as reforestation near homes

1983	AIDS	human immunodeficiency virus	migration to cities, global travel, transfusions, organ transplants, intravenous drug use, multiple sexual partners
1983	gastric ulcers	*Helicobacter pylori* (bacterium)	newly recognized as due to infectious agent
mid-1980s	VRE infection	vancomycin-resistant enterococci (bacteria)	decades of often unnecessary antibiotic use; nosocomial transmission
1989	hepatitis C	hepatitis C virus (HCV)	undetectable in blood supplies until about 1992
early 1990s	Salmonellosis (salmonella poisoning)	*Salmonella* serotype Typhimurium DT104 (bacteria)	poorly understood; food-producing animals probably involved
1993	hantavirus pulmonary syndrome	Hantavirus	environmental changes favoring contact with rodent hosts

Examples of re-emerging infectious diseases.

Disease	**Infectious Agent**	**Contributing Factors**
Chikungunya	chikungunya virus	viral genome mutation enabled infection of new mosquito vectors and expanded transmission
Cholera	*Vibrio cholerae* 0139 (bacterium)	evolution of new strain of bacteria combining increased virulence and long -term survival in the environment
Cryptosporidiosis	*Cryptosporidium parvum* (protozoan)	inadequate control in water supply; international travel; increased use of child-care facilities
dengue fever	dengue virus	urbanization, international travel, and inadequate vector -control measures
Diphtheria	*Corynebacterium diptheriae*(bacterium)	interruption of immunization program due to political changes
H5N1 influenza	influenza H5N1 virus	living close to H5N1 -infected poultry

Malaria	*Plasmodium* species (protozoan)	drug resistance; favorable conditions for mosquito vector
meningitis, necrotizing fasciitis (flesh-eating disease), toxic - shock syndrome, and oth er diseases	Group A *Streptococcus* (bacterium)	Uncertain
pertussis (whooping cough)	*Bordetella pertussis* (bacterium)	refusal to vaccinate based on fears the vaccine is not safe; other possible factors: decreased vaccine efficacy or waning immunity among vaccinated adults
polio (infant paralysis)	Poliovirus	–
Rabies	rabies virus	breakdown in public health measures; changes in land use; travel
Rift Valley fever (RVF)	RVF virus	–
rubeola (measles)	measles virus	failure to vaccinate; failure to receive second dose of vaccine
Schistosomiasis	*Schistosoma species* (helminth)	dam construction; ecological changes favoring snail host
Trypanosomiasis	*Trypanosoma brucei* (protozoan)	human population movements into endemic areas due to political conflict; diagnosis i s very difficult, and current treatments have severe secondary effects
Tuberculosis	*Mycobacterium tuberculosis* (bacterium)	antibiotic-resistant pathogens; immunocompromised populations (malnourished, HIV-infected, poverty-stricken)
West Nile encephalitis	West Nile virus	complex interactions between the virus, birds and other animals, mosquitoes, and the environment; emergence in U.S. and other regions likely due to global travel
yellow fever	yellow fever virus	insecticide resistance; urbanization; civil strife

Diagnostic Challenges

There are increasing diagnostic dilemma in the areas of infectious diseases. This is due to discovery of infectious agents deviating sharply from Koch's hypothesis on communicable diseases. Some the agents cannot be cultured in laboratory media. Those that can be cultured takes too long a time for an appreciable growth to be noticed on culture media. Furthermore, some immunological diagnostic

techniques have ambiguous interpretation while some have doubtful diagnostic value due to multiple antigens cross reaction and explosion in the population of immunosuppressed individuals.

Antimicrobial Resistance

In recent years, there has been a worldwide increase in infections caused by microorganisms resistant to multiple antimicrobial agents. This increase in antimicrobial resistance has been noted in the community as well as in hospitals.

Several factors led to this increase, particularly the selection pressure exerted by using and misusing antimicrobial agents which resulted in the emergence of resistant microorganisms.

This, in turn, led to increasing morbidity and mortality and an overall increase in healthcare costs.

The dramatic reduction in development of new antibiotics active against these multidrug-resistant pathogens has further complicated the therapeutic dilemma.

Changing vulnerable population and treatment challenges

There has been rapid growth in the population immunosuppressed individuals due to HIV infections and iatrogenic immunosuppression required to prevent tissue graft or organ transplant rejection. Increasing population of pathologically or iatrogenic immunosuppressed individual is leading to increase susceptibility to infections and difficulties in treating infected individuals. This increasing population of immunosuppressed people further compound antimicrobial therapeutic failure. This is because an intact competent immune system is needed to complement the microbial inhibition when bacteriostatic drugs are used in order to achieve cure.

NEW ADVANCES

There have been recent discoveries or technological advancement aimed at combating infectious diseases include and they include:

1. Nucleic acid diagnostic techniques
2. New tuberculosis culture and diagnostic methods
3. Gene cloning/ Gene healing / Gene therapy
4. Use of probiotics (e.g in the management of vaginosis)

5. Development of new antimicrobials
6. Development of new vaccines e.g malaria vaccine
7. Formulary restriction
8. Antimicrobial recycling
9. Use of interferons
10. Infection Prevention and Control

CONCLUSION

My Vice Chancellor sir, ladies and gentlemen, from the foregoing Infectious diseases is a global problem of mankind and remains a leading cause of death worldwide. The unseen enemy have been exposed by scientific advancement in laboratory diagnosis to extent that their physical and molecular nature have been unraveled through high technological diagnostic techniques like Polymerase Chain Reaction(PCR), for example COVID-19, Viral Haemorrhagic Fevers like Lassa fever etc. Though treatment has been difficult with the use of chemotherapeutic agents, advancement in pharmaceuticals has availed us the opportunity of prevention and control of these enemies (pathogens) to the point of suppression or total eradication, via vaccine development, e.g., Smallpox has been eradicated through vaccination.

My Vice-Chancellor sir, inspite of these achievements, the pathogens are fighting back with advanced means of survival through mutation and other acquired means of resistance to the antimicrobial agents and other control measures. For example example the superbugs like Methicillin Resistant Staphylococcus aureus (MRSA), Vancomycin Resistant Enterococci(VRE), Extended spectrum beta-lactamases(ESBL), Carbapenem Resistance Enterobacteiaceae(CRE) etc leading to treatment failures and also the recent COVID-19 pandemic that has been difficult to control due to mutation and evolvement of many serotypes thus leading to increasing morbidity and mortality. Therefore in mitigating against this avoidable catastrophe, all hands must be on deck to control these notorious enemies (microbes) of man through effective Infection Prevention and Control (IPC) measures.

RECOMMENDATIONS

My Vice-Chancellor sir, to win the war against these enemies of man, I wish to make the following recommendations:

1. Government and all levels of healthcare providers must implement the current Infection Prevention and Control strategies to mitigate the spread and impact of infectious diseases. If there is no infection there will be no treatment and there will be no development of resistance, hence the resistant pathogens can be abated.
2. Hand hygiene should be the culture of all. Safe hands save lives!
3. Antimicrobial Stewardship must be implemented in all health care facilities for rational antibiotic use, to mitigate against the development and spread of resistant organisms
4. Provision of Safe water, good sanitation and hygiene (WASH) must be ensured at all levels of the community.
5. Diagnostic Microbiology Laboratory should be strengthened and considered part of the health care delivery. This will enable the Laboratory facilities provide data on the causes of infections in the localities and prevailing susceptibility patterns to inform local prescribing and alleviate prevailing poverty of information. The use of molecular typing techniques will aid in diagnosis and epidemiologic typing of pathogens, to curtail the spread of resistant microorganisms causing health care associated infections and community acquired infections.
6. There is need for more research in areas of antimicrobial resistance, infection control and development of new drugs; hence government and non-governmental organizations should sponsor researches.
7. Education of the public on principles of infection control and prudent use of antibiotics must be done.

ACKNOWLEDGEMENTS

I thank my Creator, The Alpha, The Omega, The Begining, The Ending, SjehovahElshadai, The Omnipotent, The Omniscience ,The Omnipresent God for His unfailing love, mercy, grace and faithfulness over my life. My Lord and Saviour, my Helper, my Strong Tower, my Great Provider, my way Maker, my Sustainer, my Shield and my All- in-All. I am grateful to The Most High God for His care, protection and guidance from cradle to this point and making today a reality in my life. I know He will always be there for me, for the rest of my life. I return ALL glory to Him, may His Holy name be praised forever in Jesus name Amen.

My appreciation goes to my parents, my father of blessed memory, late Chief Samuel Olorunpomi, for his love and discipline he instilled in me before his demise.

To my sweet mother, my first teacher, Elder Juliana Taiwo Olorunpomi for her motherly love, care and hard work to see that my education was not truncated. She went into farming while I was in the Medical school to ensure dream of her son becoming a Medical Doctor came to fruition to the glory of God. When the going was very tough, she remained steadfast. She taught me hardwork and to depend on God with whom nothing shall be impossible, she is a mother indeed. May she live long in good health to enjoy all the fruits of her labour in Jesus name Amen. I thank all my Aunties, cousins and uncles who supported me in one way or the other. I appreciate all my brothers and sisters, Boda Monday, Boda Marulus of blessed memory, Segun, Femi, Funmi, Lanre and other members of my extended family. I appreciate my maternal grandmother, late Madam Elizabeth Olorunrise Senibi for her care during her life time, may her soul rest in peace.

I wish to thank my in-laws for giving me the LOVE of my life, their support and prayers. I thank my father-in-law and mother in-law, late Pa Jacob Owolabi and Late Deaconess Sarah Owolabi, both of blessed memory, may their gentle souls rest in peace. I thank my in-law, Alhaji T.A Adekanmbi in the USA, who stood firmly to play the role of father for us, I am grateful for his counsel and support. I thank my brother-in-law, Mr Gbenga Owolabi for his love and support, my sister-in-law Mrs Iyabo Onifade and her husband Bishop Onifade for their love, support and prayers.

I appreciate immensely my God-given lovely wife, my sweetheart, confidant, my chief adviser, a great chef, prayerful woman, my chief costumier, my love, friend, helpmeet, my honey of inestimable value and mother of our children. Thank you for your love, care, support, prayers, steadfastness and for keeping the home front. I am grateful to God for having you in my life. I love you always, God bless you.

I thank my lovely children, Oluwatunmise and Oluwatomisin for your love, prayers, support, cooperation and understanding. May God bless you.

I thank my Vice-Chancellor, Prof Assomwan Sonnie Adagbonyin, for giving the approval for me to deliver the Inaugural Lecture today.

I thank the Deputy Vice-Chancellor (Administration), Prof Theophilus Agweda and my appreciation also goes to the Deputy Vice-Chancellor (Academic), Prof M.A Azeke, for his encouragement and prayers. I equally thank the Registrar, Comrade Ambrose E. Odiase, for your encouragement and your prayer for me in the course of preparation for this Lecture that the Lord will give me strength. I thank the other Principal Officers of the University.

I thank all past Vice-Chancellors. First, i am grateful to the former Vice-Chancellor, Prof D.O Aigbomian, who gave me appointment as Lecturer I in 2005 and also promoted me to Senior Lecturer during his tenure. He accommodated me in the Vice-Chancellor's lodge until I was able to secure my accommodation in town. I thank the former Vice-Chancellor, Prof Sam Uniamikogbo of blessed memory, who announced my promotion to the rank of Reader. My appreciation equally goes to the former Vice-Chancellor, Prof (Mrs) Cordellia Agbebaku of blessed memory who announced my promotion to the enviable rank of Professor in 2012 and also appointed me as the first elected Dean, Faculty of Clinical Science in 2015. I thank the former Vice-Chancellor, a distinguished great Uite, Prof I.A Onimawo, who appointed me as Acting Dean at the expiration of my first tenure and also as Acting Deputy Provost, he supported me as Dean to build new lecture hall and clinical hostel that is near completion. I express my appreciation to the former Provost, Prof Felix O.Okogbo whom I worked closely with during his tenure. I thank all the Faculty Staff of Clinical Sciences for your support when I was the Dean.

My gratitude goes to my elder, I call him my father in Esan land, Prof George Akpede, a distinguished great Uite, who brought me to Edo state as the then Provost, College of Medicine. He would always ask me, 'Olowo, bring your wife here' He also gave me appointment when he became the Chief Medical Director as the first Consultant Clinical Microbiologist, Irrua Specialist Teaching Hospital and provided me the needed support to work. During his tenure the four Departments in Pathology viz: Anatomic Pathology, Chemical Pathology, Haematology and blood transfusion and Medical Microbiology were separated into four different Departments from the former omnibus Pathology Department which paved way for the giant developmental strides we are seeing today.

To my elder, my father in Edo state, former Provost College of Medicine and former Acting Vice-Chancellor, Prof Ewan Frank Alufohai, I am grateful to you for your love, support and steadfastness to ensure I stay. I remember when the pressure was very immense from my family to relocate, in your gentle smile you would tell in Yoruba,'Aburo ma lo' meaning young chap don't leave us. Thank you sir.

To my brother and elder, Prof John E.Onuminya, former Dean of Clinical Sciences, I say thank you for your love, support and encouragement. You created the access for academic growth for me and many others as pioneer Editor-In-Chief of the three Journals you brought to the Faculty namely, Journal of Basic and Applied Sciences(JABS), Annals of Medical Research(AMR) and Archives of Clinical Research(ACR) and encouraged us to be publishing. I acknowledge the support of the immediate past Chief Medical Director, Prof Sylvanus A. Okogbenin and hisManagement team for the giant developmental strides, Irrua Specialist Teaching Hospital is now on the world map as center of excellence in the management of infectious diseases including the Viral Haemorrhagic Fevers and other emergent pathogens. Through his support our Clinical diagnostic laboratory is equipped with automated machines and has made unravelling of these infectious pathogens easier. Our Residents can compete favourably with their peers.

I thank Prof M.A.C Odike, the pioneer Pathologist in both the University and Teaching Hospital whom God used as a channel to

bring me here. I thank you for your support and encouragement. I appreciate Prof John Ohaju-Obodo who encouraged me to submit my papers which he processed for my for promotion to the rank of Reader, when he was the Dean of Faculty of Clinical Sciences.

I thank my research team Prof T.AT Salami, Prof Dayo Asalu,Prof Jonathan Isibor, Prof M.I Ekozien, Dr M.E Enock, Dr G.M Adewuyi, Dr Anthonia Njoku, Dr E.A Tobin, Dr A.Eyaufe, and Dr Rasaq Momoh.

I specially appreciate my duo HODs Dr Rasaq Momoh, in the University and Dr G.M Adewuyi, in theTeaching hospital for your well coordinated leadership, cordial working relationship, support and encouragement. I thank all members of Medical Microbiology Department both in AAU and ISTH for your support..I thank my Dean, Prof A.P Igbe for your support and prayers. I acknowledge Dr Emmanuel Esesobo who worked selflessly with me as managing Editor, when I was Dean, Faculty of Clinical Sciences and Editor-in Chief of our three Journals, namely, Journal of Basic and Applied Sciences(JABS), Annals of Medical Research(AMR) and Archives of Clinical Research(ACR). To the glory of God, all the editions that were published during my tenure as Dean were uploaded in the University website for easy access and many academic staff both within and outside the university were able to use their publications for promotion.

I thank all friends and colleagues Prof Julius Kayode Adebayo, Prof Steve Abah(current DVC, Federal University of Medical Sciences Otukpo), Dr Osede Iribhogbe, Dr Jonathan Emordi, Prof Reuben Eifediyi (Current Acting CMD),Dr Olufemi Awe, Dr E. Irekpita, Dr Onuoha, Dr Taju Abubakar, Prof N.K.D Ukwandu (late) and others too numerous to mention. I thank all my all my class mates through Primary school, Secondary school, undergraduate and postgraduate, you remain source of encouragement to me. I thank all my teachers from kingdergaten, Primary and secondary schools, undergradruate to postgraduate level. God bless you all. Special appreciation to my twin brother in the field of Clinical Microbiology, a friend and wonderful brother, Prof Samuel Sunday Taiwo, thank you for being there fo me always.

My appreciation goes to my teachers, trainers, mentors who have impacted in the field of Clinical Microbiology and Infectious Diseases, Prof Boaz Adegboro, Prof Charles Nwabuisi, Prof.A.O Coker(late),Prof R.A Bakare,Prof A.O Aboderin, Prof Sade Tolulope Ogunsola(Current Vice-Chancellor University of Lagos and Chaiman,Infection Control Afican Network), Prof Tolu Odugbemi(former Vice-Chancellor University of Lagos) and Prof Vincent Olubunmi Rotimi.

I thank all Professors, Academic staff, non-teaching staff, administrative staff, members of the University community and members of staff of Irrua Specialist Teaching Hospital too numerous to mention for all your support.

I thank all my Resident Doctors for their support, two of them are now Consultants in the Department, Dr Tabitha Otumu and Dr Gloria Onuoha, the Senior Registrars Dr Joan Ogbue, Dr Amos Unuane and Registrars Dr Ofanson and Dr Festus. I acknowledge Dr J.Inyang,Mrs Olagboye and all Medical Laboratory Scientists for their understanding and good working relationship. I thank the Departmental Secretary, Mrs Oni, other administrative staff Mrs Oluwasakin, Mrs Ijeduma all ataff of the Department are well appreciated.

I sincerely appreciate all my students, without you, I would not have been here.

I thank Inno Printing press for the good printing works at very short notice.

Finally, I thank all my spiritual fathers, Pastor E.A Adeboye, Rev Akinyele Paul Obadofin, Pastor Peter Olaleye, Pastor Olaniyan, Pastor Rotimi, Pastor Jonson Ayanisi, Pastor Oluwasola, Pastor John Olusegun, Rev Modupe Adewole, Pastor James Olu-Ologun who have impacted positively on my spiritual growth. My appreciation to the Pastor-in-Charge of Zone,Breakthrough Sanctuary, Pastor G.M Adewuyi, Board of ministers, Parish Pastors and entire members of the Redeemed Christian Church for your support and prayers. I appreciate my Sunday school coordinator, Deacon(Dr) Nestor Osarenetor, Elder & Rev Uddin and all Sunday school teachers for your support and prayers. I thank Pastor Iyke who introduced me to the Sunday school Department.I thank my brother, Deacon Ambrose

Folorunsho the Chairman and all members, Redeemers Men Fellowship, Breakthrough Sanctuary, Redeemed Christian Church of God, Ekpoma.I thank the Pastors, Deacons, Deaconesses, Ministers and all members of the Believers Vineyard Church IIorin for your prayers. I wish to thank everyone, including those I have not been able to mention their names who have supported meone way or the other in prayers, advise, prayers and financially, I thank you all.
Finally, I thank all my esteemed audience, God bless you all.To God be all the glory.

REFERENCES

A Huq, E B Small, P A West, M I Huq, R Rahman, and R R Colwell Ecological relationship between *Vibrio cholerae* and planktonic crustacean copepods.
Appl Environ Microbiol. 1983 Jan; 45(1): 275–283. doi: 10.1128/aem.45.1.275-283.198
PMCID: PMC242265PMID: 6337551

A.G. Salaudeen, O.I. Musa, A.O. Awoyemi, A.O. Bolarinwa, A.O. Adegboye, **S.O. Samuel**. Community survey on blood donation practices in a northern state of Nigeria.J prev med hyg 2011; 52: 21-25

Adegoke, Adekunle Anthony (2008) Factors Influencing Health Beliefs Among People in South West, Nigeria. *African Research Review* Vol. 2 (**1**): 177-197

Ajekweneh A., Eifediyi R.A., Okome G.B.O., Momoh M, Ikheloa J., Okogbenin S., Affussim C.O., Alika S., **Olowo S.** and Ajekweneh V. Evaluating pre-incision versus post umbilical cord clamping antibiotic prophylaxis in the prevention of post caesarean section infections in a Nigerian Specialist Teaching Hospital. International Journal of Obstetrical and Gynaecological Research. 2015;3:26-38.

Akanbi II A.A., Fadeyi A, Atata R.F., Babatunde A.S., **Samuel S.O**. Urinary bacterial isolates and their antibiotic sensitivity patterns at University of Ilorin TeachingHospital, Ilorin, Nigeria. Centre Point(Science Edition). 2006/2007; 14(1 & 2) : 84-93.

DG Manuel, S Neamatullah, R Shahin, D Reymond, MD, J Keystone, J Carlson, C Le Ber, BL Herwaldt, and DH Werker, An outbreak of cyclosporiasis in 1996 associated with consumption of fresh berries- Ontario. Can J Infect Dis. 2000 Mar-Apr; 11(2): 86–92. doi: 10.1155/2000/640405

Ebigbo, P.O (1989) The Mind, the Body and Society: An African Perspective. In Peltzer and Ebigbo (Eds) Clinical Psychology in

Africa. Enugu working Group for African Psychology: 89-102.

GLOBAL-PPS (2021).Global point prevalence survey of Antimicrobial comsumption and resistance 2021. Hospital ID: 1625 Irrua Specialist Teaching Hospital. Tertiary Hospital Survey: 25.

GM Adewuyi, **OS Samuel**, AE Unuane, KO Iraoyah, GO Onuoha, OT Otumu, Ogbue JI. 'Metastatic seed' of cholera in Edo State, Nigeria: a case report. *African Journal of Clinical and Experimental Microbiology* 23 (**3**), 330-334

Iregbu K C, Nwajiobi-Princewill PI, Medugu N, Umeokonkwo CD,Uwaezuoke NS, Peter YJ, Nwafia I., Elikwu C, Shettima SA,Suleiman MR, Awopeju ATO, Udoh U, Adedosu N, Mohammed A,Oshun P, Ekuma A, Manga MM, Osaigbovo II, Ejembi CJ,Akujobi CN, **Samuel SO**, Taiwo SS, Oduyebo OO. Antimicrobial Stewardship Implementation in NigerianHospitals: Gaps and Challenges. Afr. J. Clin. Exper.Microbiol. 2021; 22 (1): 60 – 66

Isibor J.O, **Samuel S.O,** Ehigiator E.O, Inyang N.J, Igbinovia O. Plasmid-Mediated methicillin- resistant *Staphylococcus aureus* in patients attending a tertiary health institution in Nigeria. Pak J Med Sci. 2011;27(2) : 290-294

Isibor J.O, **Samuel S.O,** Nwaham C.I, Amanre I.N, Igbinovia O, Akhile A.O. Prevalence of bacterial and candida albicans infection amongst women attending Irrua Specialist Teaching Hospital, Irrua, Nigeria. African Journal of Microbiology Research. 2011; 5(20) : 3126-3130

Isibor Jonathan Osariemen, **Samuel Sunday Olowo**, Eyaufe Adevbo, Edomwonyi Edwin Omon,Odiase Victoria, Ehiaghe Joy

Imuetinyan, and Eidangbe Adesuwa. Aerobic Bacteria Associated With Diabetic Wounds In Patients Attending Clinic In A Rural Community In Nigeria. Global Research Journal of Microbiology Vol.3(1) pp.8 –12 February 2013

Jonathan Wright (1917) Demonology and Bacteriology in Medicine; *Science*, The Scientific Monthly, Vol. 4, No. **6** (Jun., 1917), pp. 494-508

Julian Davies* and Dorothy Davies.Origins and Evolution of Antibiotic
ResistanceMicrobiol Mol Biol Rev. 2010 Sep; 74(3): 417–433.
doi: 10.1128/MMBR.00016-10

Lederberg J,Shope RE,Oaks SC Jr. Emerging Microbial Threats to Health. Emerging Infections: Microbial Threats to Health in the United States.Lederberg J, Shope RE, Oaks SC Jr, editors. Washington (DC): National Academies Press (US); 1992. PMID: 25121245

Liddel.C, Hartsock.A. Louis Pasteur germ theory of diseases overview and effects [cited
2023.jan 23] available from https://study.com/learn/lesson/louis-pasteurs-germ-theory-of-
disease-overview-effects.html

M C OMahony , R E Stanwell-Smith, H E Tillett, D Harper, J G Hutchison, I D Farrell, D N Hutchinson, J V Lee, P J Dennis, H V Duggal, et al.The Stafford outbreak of Legionnaires' disease. Epidemiol Infect .1990 Jun;104(3):361-80.doi: 10.1017/s0950268800047385

Ma, Y.; He, G.; Yang, R.;Wang, Y.X.G.; Huang, Z.Y.X.; Dong, Y.Effect of Land-Use Change on the Changes in Human Lyme Risk in the United States. Sustainability 2022, 14,5802. https://doi.org/10.3390/su14105802

Mac Kenzie WR, Hoxie NJ, Proctor ME, Gradus MS, Blair KA, Peterson DE, Kazmierczak JJ, Addiss DG, Fox KR, Rose JB, et al. A massive outbreak in Milwaukee of cryptosporidium infection transmitted through the public water supply. N Engl J Med. 1994 Jul 21;331(3):161-7. doi: 10.1056/NEJM199407213310304. Erratum in: N Engl J Med 1994 Oct 13;331(15):1035. PMID: 7818640.

Maya Prabhu (2023) What happens when you don't recover from Japanese Encephalitis? https: //www.gavi.org/vaccineswork/authors/maya-prabhu Accessed 20/1/2023

Metzer, E., et al. "Emergence of Multidrug-Resistant Salmonella Enterica Serotype Typhimurium Phage-Type DT104 among Salmonellae Causing Enteritis in Israel."*Epidemiology and Infection*, vol. 121, no. 3, 1998, pp. 555–59. *JSTOR*, http://www.jstor.org/stable/3864908. Accessed 22 Jan. 2023

Morse, S.S., 1995. Factors in the emergence of infectious diseases.Emerg. Infect. Dis. 1, 7–15.

Musa O.I, Aderibigbe S.A, Salaudeen G.A, Oluwole F.A, **Samuel S.O**. Community awareness of bird flu and the practice of backyard poultry in a North-Central State of Nigeria. J Prev Med Hyg. 2010;51 : 146-151

Naghavi, M., Wang, H., Lozano, R., et al., 2015. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013.Lancet 385, 117–171.

Njoku AI, Giedam A, Idrisa A, Samuel SO, Eifediyi R. Prevalence of asymptomatic genital Chlamydia trachomatis infection among infertile women in Maiduguri, Northern Nigeria. ACR. 2018;6: 27-31.

Ogbaini EE, **Samuel SO.** The Scourge of Lassa fever in West Africa:

Epidemiology, clinical features and Laboratory diagnosis. J. Appli. Basic Sciences. 2017; 10(1): 1-5.

Ojo BA, Akanbi II AA, **Samuel S.O,** Odimayo M.S., Adesiyun A.O. EndometrialTuberculosis in infertility: Report of 2 cases and a review of the literature. *Afri. J. Clin. and Exper. Microbiol.***2007;**8(1):35-39.

Okoeguale J, **Samuel SO**, Amadi SC,Njoku A,Okome GBO.Prevalence and distribution of cervical high-risk human papillomavirus infection in a rural community of Edo State, Nigeria. Afr. J. Clin. Exper.Microbiol. 2022; 23 (4): 437 – 441.

Onuoha G. A Comparison Of Reliability Of Rapid Diagnostic Tests And A Real Time Nucleic Acid Amplification Test In Patients With Genital Chlamydia Infection At Irrua Specialist Teaching Hospital.Dissertation submitted to the Faculty of Pathology, National Postgaraduate Medical College of Nigeria in part fulfillment for the award of Fellowship in Pathology (FMCPath) 2022.

Osede Ignis Iribhogbe, **Sunday Olowo Samuel,** John O. Ohaju-Obodo. Human influenza viruses in South-East and East Asia: a systematic review of seasonal patterns, viral types/subtypes, and antiviralsusceptibility pattern in the past two decades**.**International Journal of Basic & Clinical Pharmacology.*2020 Sep;9(9):1444-1453*. PMCID: PMC242265PMID: 6337551

Otumu TO.Phenotypic And Genotypic Profile Of Carbapenemase-Producing Enterobacteriaceae Isolates In Irrua Specialist Teaching Hospital, Irrua. Dissertation submitted to the Faculty of Pathology, National Postgaraduate Medical College of Nigeria in part fulfillment for the award of Fellowship in Pathology (FMCPath)2022.

Reed D, Kemmerly SA. Infection control and prevention: a review of hospital-acquired infections and the economic implications. Ochsner J. 2009 Spring;9(1):27-31. PMID: 21603406; PMCID: PMC3096239.

S H Cody , M K Glynn, J A Farrar, K L Cairns, P M Griffin, J Kobayashi, M Fyfe, R Hoffman, A S King, J H Lewis, B Swaminathan, R G Bryant, D J Vugia . An outbreak of Escherichia coli O157:H7 infection from unpasteurized commercial apple juice. Ann Intern Med. 1999 Feb 2;130(3):202-9.doi: 10.7326/0003-4819-130-3-199902020-00005.

Salami T.A.T, Babatope I.O, Adewuyi G.M, **Samuel S.O**, Echekwube P.O. Hepatitis B and HIV co-infection – experience in a rural/suburban health centre in Nigeria. Journal of Microbiology and Biotechnology Research. 2012; 2 (6) : 841-844.

Salami T.A.T, **Samuel S.O,** Eze, K.C. Tuberculosis in a Nigerian Teaching Hospital.-Incidence and Pattern of Distribution. Tropical Journal of Health Sciences. 2007;14(2):26-30.

Salami T.A.T, **Samuel S.O,**Eze K.C, Oziegbe O.E. The Burden of Tuberculosis in Irrua.*Achives of Clinical Research.* 2006;1:14-19.

Salami, **T.A.T ; Ojei-Oziegbe, O.E.F., Samuel, S.O.** Improving Clinical Diagnostic Accuracy In Lassa Fever –the use of WBCT – 20. *Afr. J. Clin. Exp. Microbiol*. 2006; 7 (3): 189-193.

Salami, T.A.T, **Samuel, S.O**, Olanrewaju D.O, Omeife H, Oziegbe, O.E, Momoh M. Safety in the working Environment- The place of post exposure prophylaxis against HIV infection. TAF Prev Med Bull. 2010; 9(6) : 655-664

Salami, T.A.T., **Samuel, S.O.** Role of helminthiasis in the aetiology of urticaria.*Niger Med J.* 2006;47(3):52-54.

Salami, T.A.T; **Samuel, S.O**; Eze, K.C., Ojeh-Oziegbe, O.E.Pattern of HIV/AIDS Infection in Irrua, a rural community in Nigeria. Afri. J. Clin. and Exper.Microbiol. 2008; 9(1):33 – 37

Samuel S.O, Aboderin A.O, Akanbi II A.A, Adegboro B, Smith S.I., Coker A.O. *Campylobacter* Enteritis in Ilorin, Nigeria. *East Afr. Med. J.* 2006; 83 (9):478-484.

Samuel S.O, Aboderin A.O, Salami T.A.T, Omonigbehin E.A, Coker A.O .Campylobacter antimicrobial drug resistance among humans in Ilorin, Nigeria.Niger Med J. **2007;** 48(3):75-77.

Samuel S.O, Aderibigbe S.A, Nwigwe C.G, Nyamngee A. Opinion of health workers and their safety practices in connection with handling of medical wastes at a University Teaching Hospital in South East Nigeria. Ebonyi Medical Journal. 2011; 10(1) : 75-78

Samuel S.O, Aderibigbe S.A,Salami T.A.T, Babatunde O.A. Health workers knowledge, attitude and behaviour of to hepatitis B infections in Southern Nigeria. Int. J Med. Med. Sci. 2009;1(10) :418-424.

Samuel S.O, Enock M.E, Ekozien M.I, Ehimen M, Nmorsi O.P.G, Omoti A.E. Pattern of bacterial conjunctivitis in Irrua Specialist Teaching Hospital, Irrua, Nigeria. Journal of Microbiology and Biotechnology Research. 2012; 2 (4) : 516-520

Samuel S.O, Fadeyi A, Akanbi II A.A, Ameen N.B, Nwabuisi C, Onile B.A. Bacterial Isolates of Blood Cultures in Patients with suspected Septicaemia in Ilorin, Nigeria. *Afr. J. Med. med. Sci.* 2006; 35:137-141.

Samuel S.O, Kayode O.O, Nwigwe G.C, Aboderin A.O, Salami T.A.T, Taiwo S.S. Nosocomial infections and the challenges of control in developing countries. Afri. J. Clin. Exp.Microbiol. 2010;11(2):102-110.

Samuel S.O, Okoli R.I, Momoh,A.R.M, Ohaju-Obodo J.O, **Salami T.A.T.**Nwigwe G.C. Antimicrobial resistance and the challenges to

control strategies in developing countries. Annals Medical Reseach.2007; 2: 1-9.

Samuel S.O, Salami T.A.T, Adewuyi G.M, Babatope E, Ekozien M.I. Prevalence of Urinary tract infections among a cohort of HIV positive patients accessing care in a rural health centre in Nigeria. Journal of Microbiology and Biotechnology Research. 2012; 2 (4) : 507-510

Samuel SO, Adewuyi GM, Ekoziem MI. Prevalence of Chlamydia trachomatis' urinary tract infection among pregnant women at a tertiary hospital in Edo State, Nigeria. J. Appli. Basic Sciences. 2017; 10(1): 53-56.

Sims LD, Ellis TM, Liu KK, Dyrting K, Wong H, Peiris M, Guan Y, Shortridge KF. Avian influenza in Hong Kong 1997-2002. Avian Dis. 2003;47(3 Suppl):832-8. doi: 10.1637/0005-2086-47.s3.832. PMID: 14575073.

TobinEA, **Samuel**SO, InyangN J, AdewuyiGM, NmemaEE.Bacteriological Profile and Antibiotic Sensitivity Patterns in Clinical Isolates from the Out-Patient Departments of a Tertiary Hospital in Nigeria.Niger J Clin Prac. 2021;24(8): 1225-1233.

Ukwandu N.C.D, Nmorsi O.P.G, **Samuel S.O**. A point prevalence of Urinary tract infections among urinary schistosomiasis children

from rural endemic community in Edo State. African Journal Sci. 2008;9(1) : 2222-2231

Vos, T., Barber, R., Bell, B., et al., 2015. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 386, 743–800.

World Health Organization.Infection Prevention and Control.Health-topics.https://www.who.int/health-topics/infection-prevention-and-control#tab=tab_1 Accessed on 23/1/2023

LIST OF INAUGURAL LECTURERS IN AMBROSE ALLI UNIVERSITY, EKPOMA TO DATE

S/N	NAME	CHAIR	TITLE	DATE
1.	Prof. Samuel Erivwo Ph.D, (Ibadan)	Religion	The Hound of Heaven and the Children of Men (58pp)	11th Dec, 1987
2.	Prof A.K. Yesufu, Ph.D, (Wales), UK	Electrical & Electronic Engineering	The Technologies and Application of Non Depletable Resources (34pp)	15th June, 1988
3.	Prof. Ade Akinbode, B.A. (Hons) Ph.D, (Ibadan)	Geography	Spatial Diffusion of Agricultural Innovations in Dual Economics (52pp)	13th Jan, 1989
4.	Prof. J.E.A. Osemeikhian, B.Sc. (Hons), Ph.D (Cantab)	Physics	Looking into the Earth through its Magnetic Field (24pp)	27th Feb, 1991
5.	Prof. A.C. Unomah, B.A. (Hons) Ph.D. (Ibadan)	History	Giving it Back The Irony of Natural Resources in Africa (33pp)	Nov, 1995
6.	Prof. B.I.C. Ijomah, B.A. (Hons) (UNN); M.A; Ph.D (North Western)	Sociology	The Enigma of Nigeria Nationalism (40pp)	21st Mar, 1996
7.	Prof. Agnes E. Uduebor, Ph.D. (Lagos).	Botany	That it may be Green (31pp)	4th Dec, 1996
8.	Prof Steve Okecha, Ph.D (ABU)	Chemistry	Memoirs of a Test Tube Prophet (43pp)	25th June, 1997
9.	Prof D.E. Agbolahor, M.Sc.; Ph.D. (Lagos)	Microbiology	Mankind Exploited, Microbes Revolted and their Maker Intervened (42pp)	22nd April, 1998
10.	Prof T.A. Imobighe, B.A. (Hons) Ibadan); M.Sc.; Ph.D. (Wales)	Political Science	The Management of National Securities (57pp)	24th July, 1998
11.	Prof S.U. Remison, B.Sc. (Ibadan) Ph.D. (Reading)	Agronomy	The Elusive Green Revolution (48pp)	25th Feb, 1999
12.	Prof. Olaitan Obanewa, B.A. (Ed) M.Ed, Ph.D. (Syracuse)	Political Science	Administration, Non- Formal Education and Development (55pp)	24th Feb,2000
13.	Prof. E.P. Oaikhenan M.Phil (Leeds), Ph.D (Wales)	Engineering	From Powder to Parts (71pp)	29thJune,2002
14.	Prof. D.O.Aigbomian, B.Sc. (Ed.) (Lagos), M.Ed. (Exeter) Ph.D.(UNN)	Education/Science	Science For All: Implementations for the Teacher and National Development (57pp)	26th Sept,2002
15.	Rev. (Prof.) Anthony O. Echekube, Bd.; B.A. Phil; M.A. (Urbania); Ph.D (Lateranensis)	Philosophy	A Metaphysical analysis of the Concept of Re-incarnation toward Global Harmony and Peace (42pp)	26th Sept,2002

16	Rev. (Prof.)Albert A Segynola B.A. (Hons) Lagos, M.Sc. (Ife), Ph.D (Benin)	Geography	Environmental And Integrated Rural Sustainability: A Spatial Perspective (72pp)	7th Aug, 2003
17	Prof. O.I. Eguavoen, B.Sc. (Hons); Ph.D (Lagos)	Chemistry	Unraveling Chemical Events and Products in Pyrex Vessels and Plastics (58pp)	27thNov, 2004
18	Prof. S. Onuagbe Osuide, B.Sc. M.Sc. (Zaria)	Architecture	Strategies for Affordable Housing Delivery in Nigeria (37pp)	29th Jan, 2005
19	Prof. C.A. Dime, B.A. Ph.D (Ibadan)	Religion	God: Mille, Female or Asexual? (37pp)	27thMay,2004
20	Prof. M.I. Isokun JP, B.A (Hons) (Lagos); M.Sc.; Ph.D (Wales)	Sociology	Men and their Law. An enquiry into the reason why men are unable to obey the laws they make (121pp)	27th Aug,2004
21	Prof. M.O. Omo-Ojugo JP, KSC, NCE (Abraka), B.Ed M.Ed (Philadeiphia), Ph.D. (Ibadan)	Language Education	Esan Language Endangered? Implications for Learning of Indigenous Languages in Nigeria (40pp)	20thNov, 2004
22	Prof. B.E. Aigbokhan, B.Sc. (East London), M.Sc. (Sterling), Ph.D (Ibadan)	Economics	The battle for Justice and Poverty of Nations (33pp)	24th Feb. 2005
23	Prof. C.P. Aloamaka, B.sc. (Ibadan) M.P.A. (Ekpoma). Ph.D. (Benin)	Physiology	A Physiologist view of Abnormal Blood Pressure: the insanity of Blood vessels (50pp)	26thMay,2005
24	Prof. J.B. Longe, B.Sc (Ibadan), PGD (Essex) Ph.D (Lagos)	Economics	That Nigerians shall not Die Poor: the Quest to save the Poor (53pp)	1st Dec. 2005
25	Prof. George Akpede, MBBS (Ibadan, 1981) FWACP (1990)	Pediatrics	The Problems of Unsuspected Bacteraemia and Acute Bacteria Meningitis (87pp)	30th March, 2006
26	Prof. Sam E. Ifidon, B.A. (London), M.L.S. (Western Ontario) Ph.D (Ibadan)	Library and Information Science	Planning without Information: The Bane of National Development (52pp)	29thJune,2006
27	Prof. Sam O. Uniamikogbo, B.Sc. (Hons), M.Sc; Ph.D (Ife)	Economics	Nigeria Industrialization Pathway: The Dreams and the Realities (42pp)	30thNov, 2006
28	Prof. Fred I. Emordi, B.A. (Hons), Dip. Ed (Zaire), M.Ed (philadelphia); M.Phil, Ph.D (Grenoble-France)	French	Bonjour Le Nigeria! Comment Ca Va? The French Language in Nigeria so far (1859-2007)	29thMarch 2007
29	Prof. I.B. Igbinosa, B.Sc, Ph.D (Nigeria)	Zoology	Insects and The Environment Conflict between Man and Insects (63pp)	25th October, 2007

30	Prof. V.O. Aghayere, B.Sc (Sam House Huntsville, Texas) MPA (East Texas) Commerce (TX): Ph.D (Benin)	Public Administration	The Dynamics of Centre Periphery Dominance in "the Nigerian Political System; The Local Government Experience (58pp)	28th Feb, 2008
31	Prof. F.B. Iyoha, B.A., MPA (New York) Ph.D (Southernmpton UK)	Public Administration	Local Government and the Elusive Rural Development in Nigeria: Constraints on Local Authorities Capacity and the Promise of Decentralized Participatory Development: (75pp)	26thJune,2008
32	Prof. Sinatra Ohiokhia John Ojo, B.Sc., M.Sc, Ph.D (Benin)	Political Science	Promise and Performance of Democracy in Nigeria: of Irony and Fictiveness (73pp)	27thNov, 2008
33	Prof. A.U Umoru, B.Sc (Ibadan), M.Sc. (Ife)Ph.D (leeds)	Zoology	Insects, Crops and Insecticides (98pp)	26th March, 2009
34	Prof. E.E. Okoegwale, B.Sc (Calabar), M.Sc. (Ibadan) Ph.D (Benin)	Botany	Plants in the Service of Man	25thMarch, 2010
35	Prof. F.E. Egharevba, B.Sc, M.Sc. (Ibadan), Ph.D (Benin)	Chemistry	Chemistry and the Quest for Discovery and Innovation (52pp)	27th May, 2010
36	Prof. A.O. Onigbinde, B.Sc (Ife) M.Sc., Ph.D (Ibadan)	Biochemistry	Out of the Garden of Eden: Biochemical Pathway (42pp)	29th July, 2010
37	Prof. P.O. Onolemhemhen, B.Sc. (Maiduguri) M.Sc. (ABU), Ph.D (EDSU-Ekpoma)	Crop Science	Entomology: A Missing link in our Search for Food security (60pp)	28th Oct, 2010
38	Prof. R.O.A. Aluede, B.Ed, M.Ed (Benin) Ph.D (Port-Harcourt)	Education	Balancing Educational Imbalance: The Nigeria Experience (53pp).	27th Jan. 2011
39	Prof. A.D. Badaiki, B.A. (Hons) (Jos), LL.B. (Hons) (BENSU): LL.M (Lagos) LL.M (EDSU), Ph.D. (AAU)	Law	Interpretation of Statue: The Letter or Spirit of the Law (100pp)	31th Mar, 2011
40	Prof. Jude Aigbe Agho, B.A. (Hons) (BENSU), M.A., Ph.D. (Ibadan)	English	From Protest to Assent: Unraveling the African Novel as a Protean(44pp)	26th May, 2011
41	Prof. A.U. Omoregie, B.Sc.,M.Sc, Ph.D. (Ibadan)	Agriculture	A Father, his Son and their Agriculture: A Bio Agricultural Odyssey (72pp)	30th July, 2011
42	Prof. E.F. Alufohai, MBBS (Lagos), FMCS (Nigeria)	Medicine	Surgery in Primary Healthcare; A Boost to the Millennium Development Goals (MDG_S) in Developing Countries	13th Sept, 2011

43	Prof. Ajuwa I. Christopher, M.Sc. (Moscow), Ph.D, (Austria), COREN	Engineering	Engineering Materials and Mechanical Design: The Foundation for Industrial Development	24th Oct. 2011
44	Prof. (Mrs.) C.A. Agbebaku, LLB. (BENSU), B.L. (Lagos) LL.M. (BENSU)	Law	Women's Right and Gender Equality: Case of Universalism or Cultural Relativism?	30th Aug. 2012
45	Prof. Ambrose Ozoemezilem Onyisi Ekpu, LL.B (BENSU), B.L., LL.B (BENSU)	Law	The Pernicious Wars for Land: What hope for Armistice?	28th Feb. 2013
46	Prof. O.P.G. Nmorsi, B.Sc., M.Sc. (UNIBEN) Ph.D (EDSU)	zoology	The Impact of Some Parasitic Infection on Longevity of Man	25th April, 2013
47	Prof. A.O. Ekundayo, B.Sc. (Lagos), M.Sc. (Ibadan) Ph.D (Ibadan)	Microbiology	Microbial Impact: Gains and Losses	27th June, 2013
48	Prof. (Mrs.) C.O. Isiramen, B.Ed (Benin), M.A. (Ibadan), Ph.D (Ekpoma).	Religion	Single Women and Nowadays Churches in Nigeria: A Haven or a Hoax	27th Nov, 2014
49	Prof. J.E. Onuminya MBBS (Jos) FMCS	Medicine	Problem of Unorthodox Bone Setting	26th Mar, 2015
50	Prof. E.C. Onwuka, M.Sc., Ph.D. PGDE	Economics	Contending without being contentious in the World Economy: The Tragedy in Africa as it Globalizes in Poverty (62pp)	28TH May, 2015
51	Prof. Maria Ihenata Ekozien, B.Sc. , Ph.D (Benin)	Microbiology	Microbes: The Benign, the Bad and the Beautiful (72pp)	30th July, 2015
52	Prof. Victor Amen Uhunmwangho, B.A. (Hons), M.A, Ph.D, LL.B, B.L. PGDE	English	The Politics of Language (60pp)	25th Feb. 2016
53	Prof. LA. Onimawo, FRHD, FNSH, Ph.D	Biochemistry	Nutrition in the First 1000 Days of Life: The Genesis and Summit of Human Development (66pp)	28th July, 2016
54	Prof. Sylvanus O. Oboh	Animal Science	Nutritionist view of waste to wealth and the Endless Search for Animal Feed Raw Materials	25th Aug. 2016
55	Rev. Fr. Prof John A. Onimhawo	Religion	That Nature may take its course	6th Oct. 2016
56	Prof. Samson Imasogie Omonfomwan	Geography	Spatio-social Indicators Model: A Panacea for Realistic Measurement of Socio-economic Development (63pp)	27th Oct. 2016

57	Prof. Lucky A. Elakhame, Ph.D., FES, FIIA, KSJI	Zoology	Unraveling the Hidden	24th Nov., 2016
58	Prof. (Mrs.) A.N.T. Eguavoen	Sociology	Tensions and Contentions in Gender Debate: Natured or Nurtured? (110pp)	26th Jan., 2017
59	Prof. Oyaziwo Aluede	Guidance and Counseling	The Quest for Safer Schools in Nigeria: My Epistle (64pp)	23rd Feb. 2017
60	Prof. Frederick Ikechukwu Esumeh	Microbiology	Man-Microbe Interaction: An Intense Struggle Sensestricto (81pp)	30th March, 2017
61	Prof. (Mrs.) Helen Ojomon Efoghe	Educationist Management	Human Factor in Educational Management: Thoms or Roses?(63pp)	27th April, 2017
62	Ven, Prof. Benjamin Nkoyen Egede. B.A. (Hons) (lagos) M.A. Ph.D. (Ibadan);MNAL;FLSN;FCAI; Dip.Th; Dip.Coop studies	English	Modern African Poetry: Between the Creative Imagination and the Critical Impute (93pp)	25th May, 2017
63	Prof. A.S. Adagbonyi, B.A, (Benin), M.A. (ESL) (Nigeria), Ph.D (Benin)	English	Linguistic Form and Literary Function: A Journey through the Stylistics Bridge (68pp)	29th June, 2017
64	Prof. U.S.U.A. Ashikpelokhai, B.Sc., Ph.D	Mathematics	The Quest for Accelerated Accurate Results for	27th July, 2017
65	Prof. S.E. Osazuwa, B.A., M.A., Ph.D	Modern Language	Conflict, History, Myth, The Foundations of Francophone Literature	5th Oct, 2017
66	Prof. Raymond Uwameiye, TCII, NCE (Tech.), B.Sc., M.SC., Ph.D	Vocational & Technical Education	Venturing into Technical, Vocational Education and Training in Nigeria: The Skilled, The Killed, or The Illed Paradox	26th Oct, 2017
67	Prof. Julius U. Azelama, B.Sc., M.Sc., Ph.D	Public Administration	Towards a Paradigm Shift in Anti-Corruption Drive in Nigeria	30th Nov. 2017
68	Prof. S.E Iyayi, B.Sc.(Hons) (UNN), M.Ed (Philadelphia), M.Sc., Ph.D(Ibadan)	Physics	Physics in the Service of Man: Solid State Physics and its Application (111pp)	22nd Feb., 2018
69	Prof. F.O Ikpotokin, B.Sc.(Hons)(BENSU), M.Sc., Ph.D (Benin)	Computer Science	The Pathway to Computer Programming Efficiency for Optimal Utilization	29th March, 2018
70	Prof. Donatus O. Akhilomen, B.A (Hons); M.A; Ph.D, LLB(Hons)(Ekpoma); PGDE (Sokoto)	Religious Studies	The Church on Earth and the Quest for Heaven. Gleanings from Salient Church Historical Experiences	26th April, 2018

71	Prof. (Mrs) Eunice, .O. Omoregie, B.A.Ed(Hons) Ibadan, M.Ed. (Benin), Ph.D (Abraka).	Educational Administration	Organizational Behaviour in the Business of Education: The Seeds and the Sowers, for Richer or For Poorer? (64pp)	31th May, 2018
72	Prof. Anthony. I. Okoduwa BA. (Hons) Calabar; M.A Uniben; Ph.D,(AAUE)	History	Harnessing the Origin and Economic History of Esan Land: A Dialysis for Autarky in Nigeria	28th June, 2018
73	Prof. Imahe Osayomo John B.Sc. (Ed) Ilorin; M.Sc. (Lagos); Ph.D (Ekpoma)	Economics	Nigeria: Invest in Human Capital and Prosper	26th July, 2018
74	Prof. I.I Elimimian, B.A. Hons (Lagos), M.A (TCU), Ph.D (Howard).	English	The Rhetoric Of Ethos: A Weapon Against Crime	27th September, 2018
75	Engr. Prof Adagbonyin Moses Osekuyenim Obiazi, B.Eng(Uniben) M.Sc.(Unilag, Ph.D (Ekpoma)	Electrical & Electronics Engineering	The primacy of the Sinusoidal sojonur	25th Oct., 2018
76	Prof. Felix Moibi Okoro, B.Sc. M.Sc (Ed), (Western Oregon), M.Sc., Ph.D (Ilorin)	Mathematics	Networking and Optimization Theory: Applicable Mathematics for everyday life	28th Feb., 2019
77	Prof. Emorc Cyril Emordi, BA, MA, Ph.D	History	The Maiguard and Nigeria's Political March to Biafra	28th March, 2019
78	Prof. E.O. Imhanlahimi, B.Sc. (Hons) Microbiology; PGDE, M.Ed., Ph.D	Science Education/ Curriculum	Science and Technology Education and National Development: Implication For Science Instruction in Nigeria in the 21st Century	25th April 2019
79	Prof. Osemwota, Ikpotokin Osadebamwen, B.Sc (Maiduguri), M.Sc (Ibadan), Ph.D (Ekpoma)	Soil Science	Maintaining soil fertility for sustainable crop production in Nigeria: The soil and crop in partnership	30th May, 2019
80	Prof. Omeimen Ujuanbi, B.Sc., M.Sc., Ph.D(Ekpoma)	Geophysics	Geophysics: Discovering God's Hidden Treasures for National Prosperity	27th June, 2019
81	Prof. Efosa Bendrift Oseghale B.A, M.A., (Ibadan), Ph.D. (Ekpoma)	History	Stereotypes in History	25th July, 2019
82	Prof. Asia Imohimi Ohioma B.Sc., MBA (Ekpoma) PGDE, M.Sc., Ph.D (Benin)	Chemistry	Destroying the Environment: The Chemist's Intervention	29th August, 2019
83	Prof. Stephen Kayode Omorogbe B.Sc., M.Sc. (Lagos) Ph.D (Ekpoma), PGDE (Benin)	Sociology	Sociological Imagination of the Crisis of Development in Nigeria	26th September, 2019

84.	Prof. Musa O.V. Anavberokhai, B.Ed, (Ibadan); M.Ed, Ph.D (Benin)	Health Education	Targeted Health Intervention: An Impactful Pathway to Improving Health of Nigerians(40pp)	31st Oct., 2019
85.	Prof. Natthaniel Osawe Oigiangbe, B.Sc. (Benin); M.Sc., M.Phil Ph.D (Benin)	Zoology	Crop Production Practices: Best Option in Nigeria (62pp)	28th Nov. 2019
86.	Prof. Obadoni, Benard Oyemeachi, B.Sc.(Ekpoma) M.Sc. (Ibadan) Ph.D (Ekpoma)	Botany	An Ecologist: A Man of Many Fields (51pp)	27th Fe., 2020
87.	Prof. Lawrence Isemebita Aguele, IMAN, NCE (Katsina); B.Ed. (Zaria); M.Ed (Nsuka); PGD (Benin); Ph.D (Nsuka)	Curriculum and Instruction	Mathematics Education in Nigeria: Issues and Way Forward (49pp)	28th Jan., 2021
88.	Prof. Okogun, Godwin Ray Anugboba, AIMLS (Nig); PGD (MLS), M.Sc (IMSU); PGD (Proj. Mgt); MBA (FUTO); Ph.D (MSU)' FMLSCN, FWCMLS	Medical Laboratory Science	Exploring Insects and Microbial Resources for Human Health and Longevity: Unfolding the Mystery (124pp)	25th Feb., 2021
89.	Prof. Osagie Ighodalo, B.Eng. (Ekpoma); M.Sc. (Ibadan); Ph.D (Ekpoma)	Mechanical Engineering	Thermal System: Proffering Solutions Towards Sustainable Development (Nigeria and Developing Nations in Focus) (43pp)	25th Mar., 2021
90.	Prof. Ilu Oghie Cosmas Adomeh, B.S.T. (Rome); M.Ed. (Ibadan); Ph.D (Benin)	Guidance and Counselling	Counselling Effectiveness in our schools: The Arguments and Counter Arguments	29th April, 2021
91	Prof. Jacob Aleonote Aigbodioh B A. Hons (Ibadan),M.A (Ibadan), PhD (Ibadan)	Philosophy	The African Experience, the Humanities and sceptism of development whodunit?	30th September, 2021
92	Prof. Aigbokhavbolo Oziengbe B.Sc (Kano), MBA (Nsukka), PhD (Benin)	Accounting	Seek first the law of Entity, with its Cooperate Govenance and Sustainability of the Entity shall be a Achieved	28th October, 2021
93	Prof. Augustine Itohan Ojugo B.Ed (Benin), M.Ed (Nsukka), PhD (Nsukka)	Guidance and Counselling	Neglected Pathways in Guidance and Counselling in Nigeria	25th Novenber, 2021
94	Prof. Frederick U. I B.Sc, M.Sc, Ph.D (Ekpoma)	Animal Science	Monogastrics for Sustainable Food Security Improved Health Condition and Poverty Alleviation	27th January, 2022

95.	Prof. Marshall Arebojie Azeke B.Sc., M.Sc, (Ekpoma), Ph.D (Bonn, Germary)	Biochemistry	Functional Foods: Making Food your Medicine	24th Sept., 2022
96.	Prof. Isaac Aigbedion, B.Sc., M.Sc. (Ekpoma) Ph.D (Benin), Dip. (Dubai)	Exploration Geophysics	Footprints of the Geoscientists: The Bedrock of Man's Survivability in Nature's Complex Treasure Trove	27th Oct. 2022
97.	Prof. Michael Osehon Osuide B.Sc., M.Sc., Ph.D MIWA	Chemistry	Healing The Waters	24th Nov., 2022