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15TH INAUGURAL LECTURE

THE DIVINITY BEHIND THE TRIPOD: MAN, THE INVISIBLE WORLD AND DEATH

BY

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Preface

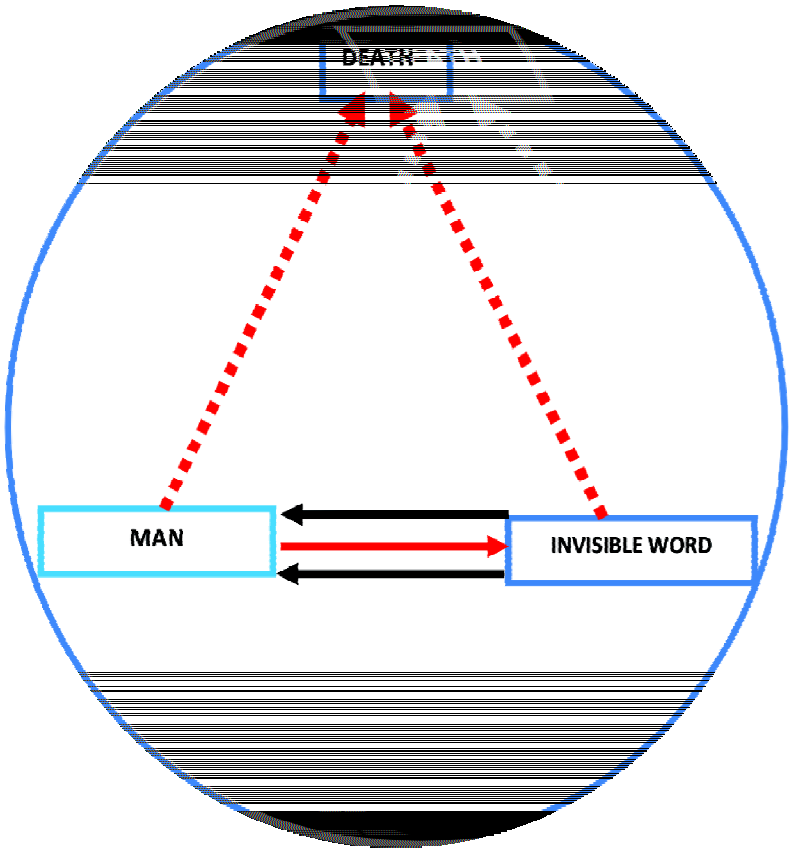
I welcome you all to this very unique and remarkable moment marking an important stage into my academic life cycle. This is coming barely 16 months after my elevation to the rank of *Professor of Medical Microbiology and Immunology* by the Council of the Niger Delta University. I must felicitate the Vice-Chancellor and the management of this University for ensuring that Professors of the Niger Delta University profess publicly within the shortest possible time of being promoted or appointed into the cadre.

My Vice-Chancellor sir, the uniqueness of this lecture lies in the fact that this is the first inaugural from the College of Health Sciences, being delivered by the first tenure professor of the Faculty of Basic Medical Sciences, the first/pioneer Head of Department of Medical Laboratory science. As a young and unassuming fellow from a very humble background, whose un-educated parents understood the importance of education, resisted being swallowed by ignorance; set out in search of knowledge through education. Education I say: is a tree that must be watered with an insatiable thirst for knowledge. That thirst for knowledge parachuted me over the frontiers of my home country Cameroon and I landed in Nigeria in the mid 90's, this very great country I call "**MY HOME**". As I sailed through the

valleys and shadows of hardship and other life challenges in search of education. I collided with different systems and men of substance, great men who input atoms of greatness in me. As I young lad who dreamt to be a conqueror of air space as a pilot, providence made me to embrace the study of the invisible word: "Microorganisms" as a career, indeed I study them; I also interacted with them at different levels. I served as host to these little creatures at some stage of my existence, I battled them using magic bullet antibiotics and its likes. In the course of my interaction with them, I realized that God Word is true and must come to pass.

My Vice-Chancellor, distinguished ladies and gentlemen,

I present to you "**THE DIVINITY BEHIND THE TRIPOD: MAN, THE INVISIBLE WORLD AND DEATH**"



1.0 Introduction

Etymologically speaking, the term man is derived from a Proto-Indo-European root. The Slavic forms" *muzh* "meaning man, male". The Proto-Germanic forms *"mannaz"* or *"manwaz*"meaning "man, person". The word developed into Old English*man, mann* meaning primarily "adult male human" but secondarily capable of designating a person of unspecified gender, "someone, one" or humanity at large (AHD, 2013). However, *man* in traditional usage refers to the species, to humanity (mankind) as a whole. The usage persists in all registers of English although it has an old-fashioned tone. Several definitions of Man have emanated from different backgrounds. Rene Descartes defined Man as a "Rational Animal" simply because of his ability to think. I define man as a complex entity characterized by complex differences, namely religious, tribal/ethnic, genetic, hygienic, social, mental, and educational differences.

The origin of Man has been debated upon in many quarters, many faith based opinions have settled for the easy and dogmatic approach. "Man is God creature". Science and its theory of evolution and common ancestry between living things navigate some nautical miles away from the religious dogma. Archeological and genetic evidences have shown that Man shared common ancestry with other animals, hence

postulating than Man originated from a speciation event (SA, 2005). Ladies and Gentlemen, in as much as science and religion have not harnessed their opinions on the origin of man, no scientific evidence so far has explained the origin life on earth both in the visible and invisible world.

The invisible world, the world microorganisms cannot be entirely disconnected from the visible forms of life. They represent an important member the ecosystem. These are little living things that are not visible with naked eyes, we require the use of an instrument called microscope to visualize them. Microorganisms are ubiquitous, i.e found everywhere around us, can be transported from one site to the other by wind, water, humans or other vector movement. Tatfeng *et al.* (2005) reported that cockroaches amongst others played an important role in moving pathogenic organisms within our household. Microorganisms are etiologies of myriads of infectious diseases. Their beneficial uses have also been identified in our lives. Microbes have been found to be useful in medical sciences, pharmaceutical sciences, and agriculture, textile and food industries. Above all, they can also cause death of their host.

Death, I say is a total, absolute and complete system shut down. Different religious opinions perceived death in many and different facets.

2.0 Perception of death by Christianity

a. A terror

"The terrors of death are fallen upon me. Fearfulness and trembling are come upon me. And horror has overwhelmed me" (Psa. 55:4-5), he expressed the sentiments of vast multitudes who have faced the prospect of death. Bildad, Job's friend, characterized death as the "king of terrors" (Job 18:14). And the writer of Hebrews spoke of those "who through fear of death were all their lifetime subject to bondage" (Heb. 2:15).

b. A Sleep

Death is a sleep. The New Testament speaks of them "that are fallen asleep in Jesus" (1 Thes. 4:14). The term "sleep" is used in the Scriptures to describe the state of the *body* in death. Only the body of man sleeps in death. This is revealed in Daniel 12:2 where the dead are described as those who "sleep in the dust of the earth." Here, it is obvious that the part of man that is placed in the dust of the earth is that which sleeps. But it is man's body that is placed in the earth. Thus, it is the body that sleeps in death, not the spirit.

c. A Sentimental journey

Death is a departure. Death occurs when the spirit leaves the body (Jas. 2:26). When Dorcas died, Christian widows stood near her body and showed the garments she had made "while

she was with them" (Acts 9:39). Her body was there, but "she" (i.e., her spirit or personality) was gone!

Paul thought of death as a departure (Phil. 1:23). Interestingly, the apostle here uses the term analuo (loosed up). At death, though the body is "loosed down" (see above on 2 Cor. 5:1), the spirit of man is "loosed up." When Lazarus died, his spirit "was carried away by the angels into Abraham's bosom" (Lk. 16:22). These passages, and a host of others, are devastating to the materialistic theories that assert that man is a wholly physical being.

d. A blissful reunion with love ones

Death is a reunion with righteous loved ones. It is written of the patriarch Abraham, "Abraham gave up the ghost, and died and was gathered to his people" (Gen. 25:8). This cannot refer to the interment of Abraham's body. He was buried near Mamre in Palestine. Yet his ancestors had been entombed hundreds of miles away in distant lands! The expressions "gathered to his people," and "going to his fathers" (Judg. 2:10), are constantly distinguished from being buried and denote reunion with loved ones in Sheol.

e. Face-to-face with Christ

For those who die in Christ, death is union with the Lord. Jesus informed the dying thief, "Today you shall be with me in paradise" (Luke. 23:43). And as previously observed, Paul longed to depart to be "with Christ" (Phil. 1:23).

d. The agony

For the wicked, death begins an eternity of suffering. Though it is not a popular theme in contemporary society, the doctrine of hell is still a vital part of the Bible. At death, all who have lived in rebellion to God will enter a spirit state characterized by pains, trouble, and sorrow (Psa. 116:3). They will be immersed in shame and contempt (Dan. 12:2). It will be a realm of anguish, suffering, and torment (Mt. 22:13; 25:46; Mk. 9:48; Lk. 16:24; 2 Thes. 1:9; Rev. 20:10).

3.0 Death Perception by Islam

Islam believes that the present life is a trial in preparation for the next realm of existence. When a Muslim dies, he or she is washed and wrapped in a clean, white cloth (usually by a family member) and buried after a special prayer, preferably the same day. Muslims consider this a final service that they can do for their relatives and an opportunity to remember that their own existence here on earth is brief. The Prophet taught that three things continue to benefit a person even after death - charity which he had given, knowledge which he had taught, and supplication on his behalf by a righteous Muslim.

A day will come when the whole universe will be destroyed, and the dead will be resurrected to stand before God. That day will be the beginning of a life that will never end. And that day every person will be rewarded by God according to his or her good or evil deeds.

The explanation that the Qur'an gives about the necessity of life after death is exactly what the moral consciousness of man demands. If there were no life after death, the very belief in God would become meaningless, or even if one believed in God, it would then be an unjust and indifferent deity, having once created man and no longer being concerned with his fate. Surely, God is just. He will punish the tyrants, whose crimes are beyond count - having killed hundreds of innocent people, created great corruption in society, enslaved numerous persons to serve their whims, etc. Because man has a very short life span in this world and because numerous individuals are affected by one's actions, adequate punishments and rewards are not possible in this life. The Qur'an very emphatically states that the Day of Judgment must come and that God will decide the fate of each soul according to his or her record of deeds.

4.0 Death by Buddhism

In the teaching of the Buddha, all of us will pass away eventually as a part in the natural process of birth, old-age and death and that we should always keep in mind the impermanence of life.

To Buddhism, however, death is not the end of life, it is merely the end of the body we inhabit in this life, but our spirit will still remain and seek out through the need of attachment,

attachment to a new body and new life. Where they will be born is a result of the past and the accumulation of positive and negative action, and the resultant karma (cause and effect) is a result of one's past actions.

This would lead to the person to be reborn in one of 6 realms which are; *heaven, human beings, Asura, hungry ghost, animal and hell* according to the severity of one's karmic actions, Buddhists believe however, none of these places are permanent and one does not remain in any place indefinitely. So we can say that in Buddhism, life does not end, merely goes on in other forms that are the result of accumulated karma. Buddhism is a belief that emphasizes the impermanence of lives, including all those beyond the present life. With this in mind we should not fear death as it will lead to rebirth.

The fear of death stemmed from the fear of cease to be existent and losing one's identity and foothold in the world. We see our death coming long before its arrival, we notice impermanence in the changes we see around us and to us in the arrival of aging and the suffering due to losing our youth. Once we were strong and beautiful and as we age, as we approach our final moments of life, we realize how fleeting such a comfortable place actually was.

It is natural to grieve the loss of family members and others we knew, as we adjust to living without their presence and missing them as part of our lives. The death of a loved one, or even someone we were not close to, is terribly painful event, as time goes on and the people we know pass away along the journey of life, we are reminded of our own inevitable ends in waiting and everything is a blip of transience and impermanent (Tang, 1999).

5.0 Causes of Death

Death is the termination of all biological functions that sustain a living organism. Phenomena which commonly bring about death include biological aging (senescence), predation, malnutrition, disease, suicide, homicide, starvation, dehydration, and accidents or trauma resulting in terminal injury. Our focus is mainly on causes of death due to diseases. Diseases are pathological conditions of a body part, an organ, or a system resulting from various causes, such as infection, genetic defect, or environmental stress, and characterized by an identifiable group of signs or symptoms. Depending on the etiology, diseases can be basically divided into communicable and non-communicable diseases.

6.0 Historical Perspective of Communicable Diseases

Although detailed account of the history of infectious diseases is scarce in sub-Sahara countries, volumes of documentation recounting the scourge of infectious diseases have been recorded throughout the history of European countries. In ancient Greece and Egypt infection histories, there are accounts of epidemics of smallpox, leprosy, tuberculosis, meningococcal infections and diphtheria. The morbidity and mortality of infectious diseases considerably shaped politics, commerce and culture. In epidemics, none was spared (Watts, 1997). Smallpox likely disfigured and killed Ramses V in 1157 BCE, at times political upheavals or trouble inflamed the spread of disease. The Spartan wars caused massive dislocation of Greeks into Athens triggering the Athens epidemic of 430-427 BCE that killed up to one half of the population of ancient Athens (Garret, 1994).

The sheer magnitude and mortality of early epidemics is difficult to imagine. Medicine and religion both strove to console the sick and dying. However before the underlying science of health, medicine lacked effective tools and religious explanations for disease dominated. The most devastating epidemics that hit mankind remain the bubonic plague and its coinfections, measles smallpox and syphilis. In 160 CE, the plague contributed to the collapse of the Han empire and six

years later the Roman empire was ravaged by the Antonine Plague, which likely killed both co-emperors Lucius Verus (130-169 CE) and Marcus Aurelius (121-180CE) along with 5 million others (Fears, 2004). Plague and other communicable diseases flourished in the cities of the Roman Empire and eventually contributed to its final demise. The plague or Black Death as it was then called struck repeatedly across Europe centuries after and spread to Egypt leaving 24 million Europeans dead and 40 million deaths worldwide (Duncan, 2005).

The first epidemic of smallpox was in 1350 BCE during the Egyptian Hittite war. In addition to Ramses V, typical smallpox scars were observed on the faces of mummies from the time of the 18th and 20th Egyptian dynasties (1570-1085 BCE). Smallpox was disseminated during the Arabian expansion, the discovery of the West Indies and the colonization of the Americas (Garret, 1994).

Syphilis is another epidemic infectious disease of great historical importance. It became epidemic in the 1490s as a highly contagious disease in Spain, Italy and France.
Man has continually sought for the understanding of the natural forces and determinants affecting the patterns of diseases and death in society. These theories have evolved as

our knowledge of the natural world has advanced, sometimes slowly, sometimes when there are profound breakthroughs. Although wrong theories have hindered advances in understanding of diseases (Kenrad and Carolyn, 2005).

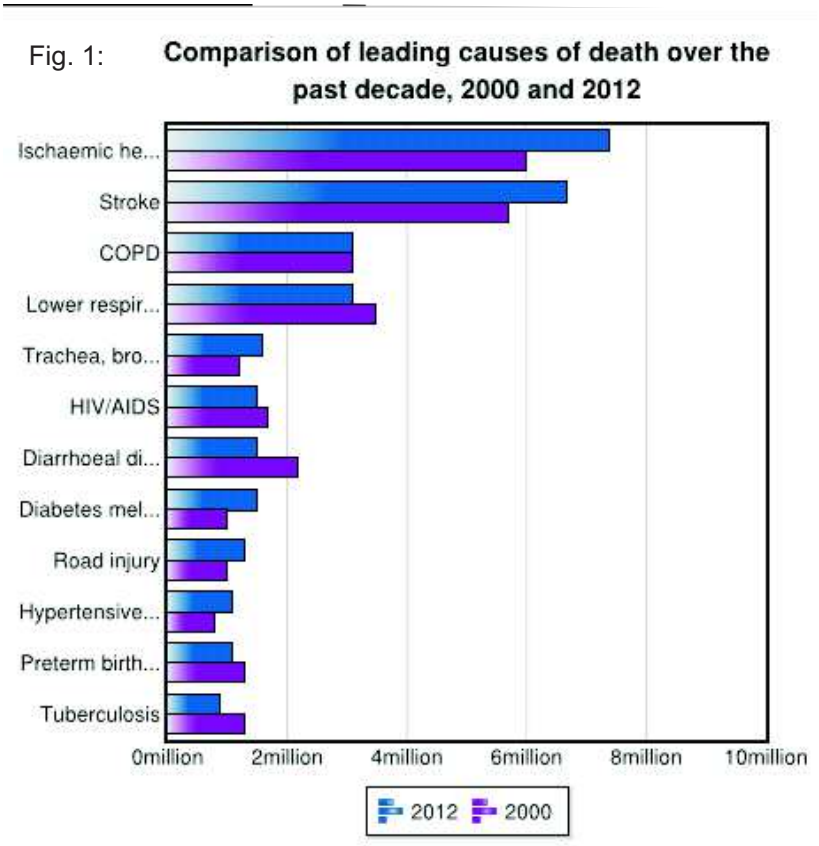
7.0 Communicable or Infectious Diseases: A Natural Disaster for Developing Countries

Communicable diseases have over the years played a leading role as causative agents of death in the Sub-Sahara Africa. The most devastating ones remain, acquired immunodeficiency syndrome (AIDS), malaria, respiratory infections, gastroenteritis, hemorrhagic fever (Ebola, Lassa fever, etc...), sexually transmitted infections etc… Infections have a worldwide distribution, spreading rapidly in regions of poor sanitation, over crowdedness and resource poor settings. They present sometimes as epidemics, pandemics or endemics. The occurrence of these infections in our communities has impacted negatively on the economic, psychological and political emancipation of nations.

Generally, in the World Health Organization ranking, of the 10 leading causes of death (Fig1), ischemic heart disease, stroke, lower respiratory infections and chronic obstructive lung disease have remained the top major killers during the past decade. In the low income countries, respiratory infections,

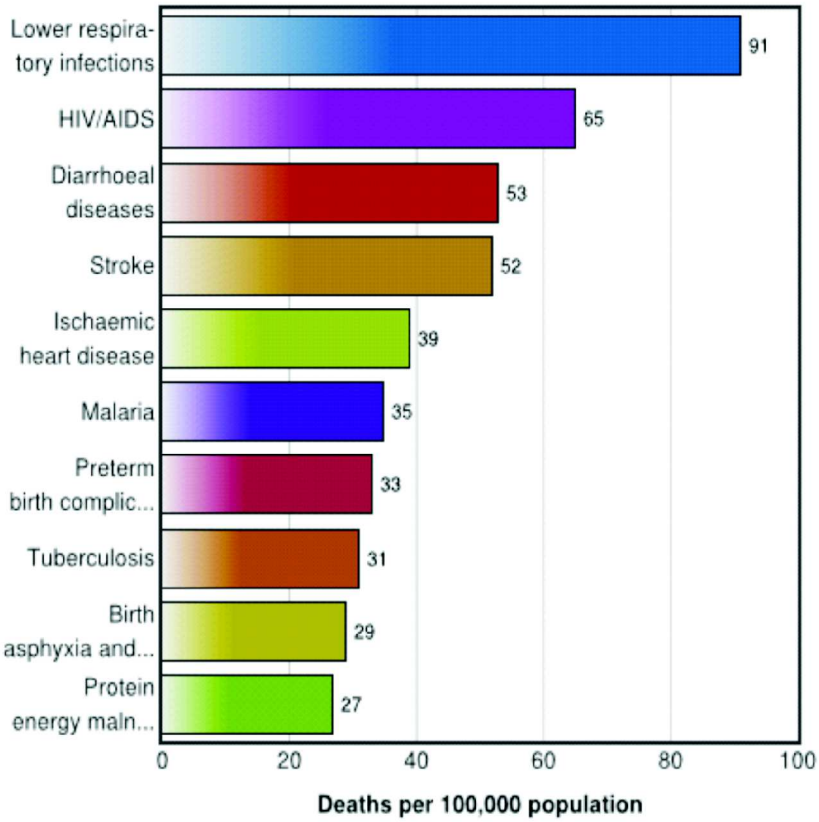
HIV/AIDS, diarrheal diseases, malaria and tuberculosis are topping the list of infectious diseases (Fig. 2). Of recent times, sporadic outbreaks of hemorrhagic diseases have been recorded across Africa (WHO, 2014).

Fig. 1: **Comparison of leading causes of death over the past decade, 2000 and 2012**



(WHO,2014)

Fig. 2: **Top 10 causes of death in low-income countries**
2012



(WHO, 2014).

Communicable or Infectious Diseases: My story

As young student of the school of Medical Laboratory Science, University College Hospital, Ibadan, I was attracted to the field of Medical Microbiology by the beautiful colors of culture media used for the isolation and identification of bacteria. Little did I know, understand or imagine the scope and the importance of what Medical Microbiology was ushering me into. The field of infectious diseases which I always referred to as the "Africa Natural Disaster or Africa Death Mill" eventually became my passion.

My first exposure into this field at the undergraduate level was animated by the thirst of personally isolating; identifying, determining the susceptibility pattern and documenting the microorganisms involved in some prevailing infections such as urinary tract infections, gastrointestinal infections, wounds and septicemia in malnourished children etc… Although volumes of literatures existed on the etiologies of these infections, current update on the status of these diseases were necessary from time to time.

Urinary tract infection (UTI) is a disease of the urinary tract affecting people of all age group. The commonest agents of UTI has been reported to be bacterial (Ellen *et al.,* 1994). Tatfeng *et al.*(2003) reported the presence *Candida albicans* in

a chronic urinary tract infection in Edo State.

Diarrheal diseases assume the leading cause of death in sub-Sahara (WHO, 2014) of which parasitic agents are also incriminated especially in HIV infected individuals. Several protozoa parasites have been associated with chronic diarrhea in HIV disease, they include, *Cryptosporidium parvum, Isospora belli and Cyclosporacayetenensis* (Pollock and Forthing 1997). Okodua*et al,* (2003) identified the prevailing intestinal parasites among HIV infected and HIV negative individuals. There was no statistical difference in the prevalence in both groups; however, *cryptosporidium parvum* was isolated among the HIV infected group.

By virtue of immune supression in malnutrition, septicemia develops with massive liberation of bacteria into the blood stream from an infected focus. Septicemia mostly occurs in association with gastroenteritis, respiratory tract infections and malnutrition (Berkowitz, 1984). Tatfeng *et al.* (2003) reported a high prevalence of *Staphylococcus aureus, Klebsiellapneumonie and Pseudomonas aeruginosa* as the primary etiological agents of septiceamia in malnourished children in Ibadan. They also reported that these microorganisms where highly sensitive to cephalosporinesand quinolones group of antibiotics.

Tatfeng *et al.*(2002) also isolated and identified the bacterium

Pseudomonas aeruginosa as the predominant organism in post-operative wounds in Ibadan. In their study, this bacterium was found to be resistant to many antibiotics.

My sailing out of Ibadan to Benin in search of Post Graduate education was divine. This was the turning point in my academic journey. There begun my interest in the most discussed, researched and funded infectious diseases: HIV, Malaria and Tuberculosis.

9.0 Discovered in America and Devastating Africa: The HIV/AIDS Story.

The origin of AIDS and HIV has puzzled scientists ever since the illness first came to light in the early 1980s. For over twenty years it has been the subject of fierce debate and the cause of countless arguments, with everything from a promiscuous flight attendant to a suspect vaccine programme being blamed.

The first recognized cases of AIDS occurred in the USA in the early 1980s. A number of white gay men in New York and California suddenly began to develop rare opportunistic infections and cancers that seemed stubbornly resistant to any treatment. At this time, AIDS did not yet have a name, but it quickly became obvious that all the men were suffering from a common syndrome.

The discovery of HIV, the Human Immunodeficiency Virus, was made soon after. While some were initially resistant to acknowledge the connection (and indeed some remain so today), there is now clear evidence to prove that HIV causes AIDS.

HIV is a lentivirus, and like all viruses of this type, it attacks the immune system. Lentiviruses are in turn part of a larger group of viruses known as retroviruses. The name 'lentivirus' literally means 'slow virus' because they take such a long time to produce any adverse effects in the body. They have been found in a number of different animals, including cats, sheep, horses and cattle. However, the most interesting lentivirus in terms of the investigation into the origins of HIV is the Simian Immunodeficiency Virus (SIV) that affects monkeys, which is believed to be at least 32,000 years old (Worobey *et al.,* 2010). It is now generally accepted that HIV is a descendant of a Simian Immunodeficiency Virus because certain strains of SIVs bear a very close resemblance to HIV-1 and HIV-2, the two types of HIV.

HIV-2 for example corresponds to *SIVsm*, a strain of the Simian Immunodeficiency Virus found in the sooty Mangabey (also known as the White-collared monkey), which is indigenous to western Africa.

The more virulent, pandemic strain of HIV, namely HIV-1, was until recently more difficult to place. Until 1999, the closest counterpart that had been identified was *SIVcpz*, the SIV found in chimpanzees. However, this virus still had certain significant differences from HIV.

Sub-Saharan Africa has the most serious HIV and AIDS epidemic in the world. In 2012, roughly 25 million people were living with HIV, accounting for nearly 70 percent of the global total. In the same year, there were an estimated 1.6 million new HIV infections and 1.2 million AIDS-related deaths (UNAIDS, 2013).

As a result, the epidemic has had a widespread social and economic consequences, not only in the health sector but also in education, industry and the wider economy.
HIV prevalence varies greatly between regions in sub-Saharan Africa as well as individual countries (Table 1).

Table 1: HIV prevalence in selected countries across Sub-Saharan Africa in 2012.

Country	HIV prevalence (%)
Southern Africa:	17.9
Botswana	23
Swaziland	26.5
West Africa	
Senegal	0.5
Cameroon	4.5
Nigeria	3.1
East Africa:	
Kenya	6.1
Uganda	7.2
Tanzania	5.1

(UNAIDS, 2013)

10.0 HIV and Nigeria: My experience

The first two cases of HIV and AIDS in Nigeria were identified in 1985 and were reported at an international AIDS conference in 1986. In 1987 the Nigerian health sector established the National AIDS Advisory Committee, which was shortly followed by the establishment of the National Expert Advisory Committee on AIDS (NEACA).

At first the Nigerian government was slow to respond to the increasing rates of HIV transmission and it was only in 1991 that the Federal Ministry of Health made their first attempt to assess Nigeria's AIDS situation. The results showed that around 1. 8 percent of the population of Nigeria was infected with HIV. Subsequent surveillance reports revealed that during the 1990s HIV prevalence rose from 3. 8% in 1993 to 4.5% in 1998. When Olusegun Obasanjo became the president of Nigeria in 1999, HIV prevention, treatment and care became one of the government's primary concerns. The current HIV distribution among states is shown below (Fig 3).

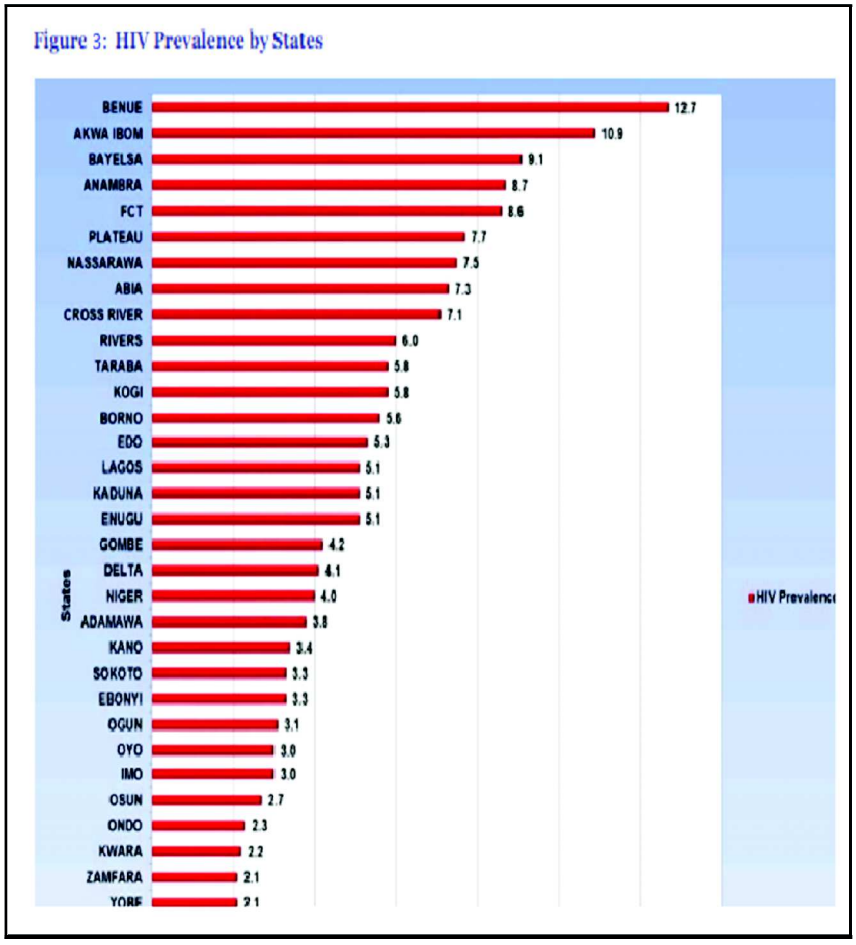


Figure 3: HIV Prevalence by States
BENUE 12.7
AKWA IBOM 10.9
BAYELSA 9.1
ANAMBRA 8.7
FCT 8.6
PLATEAU 7.7
NASSARAWA 7.5
ABIA 7.3
CROSS RIVER 7.1
RIVERS 6.0
TARABA 5.8
KOGI 5.8
BORNO 5.6
EDO 5.3
LAGOS 5.1
KADUNA 5.1
ENUGU 5.1
GOMBE 4.2
DELTA 4.1
NIGER 4.0
ADAMAWA 3.8
KANO 3.4
SOKOTO 3.3
EBONYI 3.3
OGUN 3.1
OYO 3.0
IMO 3.0
OSUN 2.7
ONDO 2.3
KWARA 2.2
ZAMFARA 2.1
YOBE 2.1
States
HIV Prevalence

(NACA, 2014)

The President's Committee on AIDS and the National Action Committee on AIDS (NACA) were created, and in 2001, the government set up a three-year HIV/AIDS Emergency Action Plan (HEAP). In the same year, Obasanjo hosted the Organization of African Unity's first African Summit on HIV/AIDS, Tuberculosis, and Other Related Infectious Diseases.

Since then, Nigeria HIV story took a new dimension. Accessibility to antiretroviral (ARVs) improved, awareness campaign was boosted and many other strategies to reduce transmission were introduced. Studies were initiated by researchers from both government and private sectors to assess the performance of antiretroviral and the state of the pandemic across the nation. HIV/AIDS is a disease characterized by several symptoms and signs ranging from weight loss, coughing, anemia, diarrhea to CD4 cells depletion.

Tatfeng *et al.*(2005) assessed the CD4 count and viral load of patients on Lamivudine, Stavudine and Niverapine in Edo State. Their study revealed that some patients experienced a reduction in viral load and increase in CD4 count, however some did not. They recommended HIV typing for patients before commencement of the therapy as the ARVs formulae adopted by Nigeria was not effective against all the strains of the virus.

The mode of transmission is clearly understood, mainly through unsafe sexual behaviours and blood transmission. The damage it inflicts on the immune system encourages other pathogens to set in; hence the term opportunistic infections.

11.0 Malaria, Tuberculosis and HIV association: the bad, the wicked and the beast

The association between HIV and other pathogens in Nigeria has been thoroughly investigated in Nigeria. Tatfeng *et al.* (2007) reported a high prevalence of malaria in HIV patients. In the same study, they reported that HIV/malaria association could contribute towards progression to AIDS. Hence the need for initiating a malaria programme for HIV management.

The existence of tuberculosis has been recognized and recorded since archaeological history and its association with HIV presents a public health importance (Stead and Dutt, 1988).

In Nigeria, report from the Federal Ministry of Health revealed that the prevalence of HIV among pulmonary tuberculosis patients range between 4% and 35% in Nigeria. Okodua*et al.*(2004) in their study on HIV-related pulmonary tuberculosis in Edo State revealed a significantly higher

prevalence of HIV among women. They further revealed that the HIV- TB co infection prevalence was 16% in the state. This relative high prevalence raised a major concern from both public and private sector.

In a similar study conducted in Abeokuta, Okodua *et al.*(2010) examined the association between HIV/AIDS, tuberculosis and helminthiasis. They revealed higher intensity of helminthes among HIV-PTB patients when compared to their counterparts with HIV or PTB alone.
In another development, Tatfeng and Adesuwa (2012) investigated the prevalence of *Toxoplasmosis gondii* among HIV seropositive patients in Abuja. The study revealed a very low prevalence of *Toxoplasma gondii* in HIV infected patients.

The impact of HIV infection on the immune system cannot be overemphasized; however several studies in Nigeria have mainly focused on CD4 as marker for determining the immunological status of HIV and other infections. Markers such as cytokines which play a tremendous role in immune response have been poorly investigated. This actually drove my interest in embarking in the study of cytokines in HIV, Malaria and malaria markers of resistance in my PhD under the supervision of Prof DE Agbonlahor. At completion, the

thesis which was selected by the Ambrose Alli University Post graduate board as University's best PhD thesis in 2007 and eventually ranked among the Nigeria outstanding PhDs thesis by the National Universities Commission (NUC) in 2009. It is my pleasure to inform you that six publications were written out of that thesis of which three have been presented at international conferences in Italy and South Africa. One of which earned my humble self a prize of R10, 000.00 at the last South Africa Immunological Societies conference in Cape Town, South Africa in 2013.

Cytokines are biological mediators secreted by immunological cells to activate other immune cells during a response. They are majorly secreted by dendritic cells, macrophages, Th1 and Th2 sub-population of CD4, Cytotoxic T8 or CD8 cells and B lymphocytes. Malaria parasites have been shown to stimulate HIV replication through the production of cytokines by activated lymphocytes (Xiao *et al.*, 1998).

Tatfeng *et al.* (2008) assayed the proinflammatory cytokines of Th1 types in HIV patients with uncomplicated malaria, it was reported that there was a significant reduction of IFN-ᵞ concentration in HIV/malaria and HIV when compare to malaria infected subjects. Furthermore a significant reduction

of CD4 and CD8 cells was reported. These findings further demonstrate that the poor response in HIV infected individuals is not restricted to CD4 and CD8 alone. Poor response can also be recorded as a result poor release of IFN-ɣ and TNF-α against HIV and any other infection.

In another study, Tatfeng *et al.* (2010) assayed other cytokines (IL-4, IL10) which are secreted by Th2 cells along CD4 and CD8 count in HIV/Malaria co-infection, they reported a significant lowered concentration of these cytokines in HIV, HIV/malaria subjects when compared to those infected with malaria only. All these biological mediators have been shown to play a major in the response against arrays of infections.
From these findings, it became necessary that malaria infection be given serious attention in the management of HIV in African countries. However in the early 21st century, the challenges in malaria management became obvious, chloroquine the drug of choice was confronted with the emergence of resistance genes (*Pfcrt, Pfmdr, dhps*and*dhfr*), hence the call for its withdrawal and the introduction of newer molecules such as Artemisinin Combination Therapy (ACT). The occurrence of several resistance genes were reported by Happi*et al*. (2005) in Ibadan.

In Edo state, Agbonlahor and Tatfeng (2008) reported a high prevalence of *Plasmodium falciparum* multidrug resistance (pfmdr) in sickle cell anaemia. Tatfeng *et al.* (2008) also reported a high prevalence of Pfcrt in the same state. These findings justified the call for the withdrawal of chloroquine in Edo State.

12.0 Lassa fever and Ebola Virus Disease (EVD): Birds of the Same Feather

Lassa and Ebola virus diseases are both hemorrhagic fever diseases mostly confined within the Sub-Sahara region of Africa. It is striking to observe that most countries that have been affected by Lassa fever have had a feel of Ebola virus disease or vice-versa. Even though the two infections differ in their origin, there are a lot of similarities in their transmission, symptomology and severity. The first case of Lassa fever was recorded in Nigeria in 1969 in Lassa village of Borno State and since then has remained endemic in some parts of Edo state, Ebonyi state and also in some countries in West Africa. The first outbreak of Ebola virus disease was recorded in Democratic Republic of Congo (former Zaire) in 1976 with 318 cases recorded and 280 deaths (WHO, 1978). Early 2013, there was an outbreak of Ebola virus disease in the West Africa Sub-region involving three countries: Guinea, Sierra-Leone and Liberia. It entered Nigeria for the

first time on July 20th 2014 through a 40 year old Liberian born American Patrick Sawyer who flew into Lagos on board Sky Airlines. He eventually died on the 24th of July 2014 after infecting several medical personnel of the First Consultant Clinic where he was admitted. On September 8th, 2014, the Federal Ministry of Health reported 19 laboratory confirmed cases and 7 deaths. The disease came under control as a result of concise isolation strategies adopted by the Ministry of Health. With the absence of an effective treatment for Ebola virus disease, the virus continues to claim lives in affected countries. Several drugs are at their experimental stages. Zmapp, the experimental drug used on two Americans who worked in Liberia was not made available to African countries.

The nanosilver solution was labeled as pesticide by the United States as attempt to import the solution into the country by a US based Nigerian scientist was initiated. The Ministry of Health demonstrated her lack of confidence in Nigerian scientists by quickly corroborating with the Americans and stopping the importation of the drug into the country. Several studies before the outbreak of Ebola had reported its antimicrobial potentials.

Tatfeng *et al.* (2012) reported the antimicrobial potentials of Nanosilver particles against clinical bacterial and fungal

isolates at very low concentrations, however in their study, they did not assayed the antiviral potential nor the safety of the solution.

Lassa fever also accounts among the most virulent hemorrhagic diseases in Africa. After its first outbreak in Lassa village 1969, the most fatal outbreak occurred in Ekpoma, Edo state in 1989. The Emoike's family along Ihumudumu road was badly hit as it lost two of its sons who were both medical doctors practicing in United States of America and Benin city the same day. Through the intervention of Profs. DE Agbonlahor and O. Tomori on a WHO mission, the mystery surrounding this strange infection was unraveled; the causes and the origin of the diseases were established. Until 2007, this infection could not be diagnosed in Nigeria. Samples were then sent to South Africa for laboratory confirmation.

In 2007, I and Prof DE Agbonlahor representing Lahor Research Centre led our collaborators from Harvard University to Irrua where a Memorandum of Understanding (MoU) was signed between Irrua Specialist Teaching Hospital/Harvard University/Lahor Research Centre in Benin. The greatest achievement of this collaboration is the development of Rapid Diagnostic Test Kit and the

establishment of a molecular laboratory at the ISTH for Lassa fever studies. It is quite unfortunate that we missed out along the line in the partnership.

Challenges in the management of infections in Nigeria

Diagnosis is the key in effective management of infectious diseases. Unfortunately, diagnosis of infections in Nigeria is still at an embryonic stage. There are myriads of diagnostic tools and equipment available in the country the quality of such materials is sometimes compromised due to storage and the inefficient regulation on the importation of biomedical materials encouraged the introduction of faulty biomedicals. Tatfeng and Bawo (2008) evaluated the performance of a rapid diagnostic test (RDT). Findings from their study revealed the traditional thick blood film staining performed better than the RDT. However, the kit showed a greater sensitivity when used on children than adults' blood samples. Some of these detailed are never provided information sheet accompanying the kit. Seto *et al.* (2012) carried out a comparative study on the performance of 5 malaria RDTs manufactured from different countries. The test kits were found to have varied sensitivity and specificity which were different from those stated in the kit information sheet. A similar study was carried out by Ehiagie *et al*. (2011) on the serodiagnostic potentials of Tuberculosis test kits. Sensitivity

and specificity results were also at variance with values reported in the kit information sheet. These studies underline the need to reevaluate and assess biomedical materials imported into the country. The management of infectious diseases in Nigeria is also hampered by numerous challenges ranging from individual's attitude to institutional obstacles.
The population perceptions and practices have not aided the management of infectious in Sub-Sahara countries. Hygiene, traditional practices and beliefs, self-medication have contributed tremendously to the spread and difficulties of treating infections. Tatfeng (2008) assessed the attitude of patients towards the treatment of malaria infections in Edo State, findings revealed that a larger percentage of patients had embarked on self-medication before reporting to a health facility, and in most cases, the self-administered medication did not meet the required dosage or sometimes did not adhered to timing and duration of the treatment.

Treatment being an integral component of infection management, it is seriously confronted with the emergence of resistance. Hence, the need for continuous development and search of newer molecules. Traditional medicine is not left out as several herbal preparations are marketed with claims that are sometimes not verified. Although some of these products may actually possess some medicinal properties, the

processing may make the demerits outweigh their merits. Tatfeng *et al.* (2010) assessed the microbial populations in some herbal preparations used for the treatment of malaria. Findings from this study revealed that the bacterial population included with *Bacillus* sp (Aerobic spore bearers) and *Mucor* spp, yeasts and *Mucor* spp, *Staphylococcus epidermidis, Pseudomonas aeruginosa, Escherichia coli*0157H7*, Proteus mirabilis, Enterococcus feacalis, Serratiamarcensces and Staph. Aureus.* Some of these organisms are known pathogens of medical importance; hence, posed a serious health hazard for consumers.

On the other hand, researchers in our institutions have rather deviated from research norms and embraced the politics of administration. Little attention is given to professional services and cutting-edge researches.

The involvement of Government and its health institutions in combating and managing infectious diseases cannot be overemphasized as they remain the major stakeholder in health care delivery system. In Nigeria, our universities are not given the attention they deserved by Government. Equipment and consumables for diagnosis and research are never readily available. The unavailability of diagnostic and research materials has obviously denied our health/research

institutions opportunities to carry out efficient diagnosis and embark problem-solving or cutting-edge researches.

The Politics of infectious diseases

The field of infectious disease over the year has not spared by political manipulations. The origin of some infections till today have rocked the polity that one begin to wonder if ascribing the infection source to a particular region will restrict the infection to that region. The recent Ebola outbreak of recent was ascribed to West Africa including Nigeria. We are surprised today to notice that, while listing the countries affected by Ebola by some foreign media, a country such as United States is not listed and Nigeria is boldly mentioned. The question is; did the way Ebola got into Nigeria different from the way it got into US?

HIV origin seems to have been settled amidst many unanswered questions. The virus was traced to be a descendant of a Simian Immunodeficiency Virus found in the sooty Mangabey (also known as the White-collared monkey), which is indigenous to western Africa. But this virus was found among **white gays**.

15.0 The Untold Story About HIV/AIDS

AIDS is undoubtedly known for attacking people the dominant society considers "undesirables": gays, injection drug users (IDUs), prisoners, and people of color. The commonly cited US statistic that African Americans have twice the AIDS rate as white Americans undermines the problem because it is based on the total number of cases since 1981. While white gay men constituted the large majority of cases in the early days, by the early 1990s the rate of new cases among Latinos was 2.5 times higher than among whites, and the black/ white ratio was even starker at 5-1 for men and 15-1 for women. By 1993, AIDS had become the leading cause of death among African Americans between the ages of 25 and 44. Internationally, the racial disparity is even worse: About 80 percent of the world's 9 million AIDS deaths through 1995 have occurred in Africa, where 2 million children have already been orphaned.

The correlation between AIDS and social and economic oppression is clear and powerful. What is more, the pattern meshes neatly with an extensive history of chemical and biological warfare (CBW) and medical experiments which have targeted people of color, Third World populations, prisoners, and other unsuspecting individuals. In the first North American example of CBW, early European settlers

used smallpox infected blankets as a weapon of genocide against Native Americans. A few centuries later, the US Army conducted hundreds of tests that released "harmless" bacteria, viruses, and other agents in populated areas; one was to determine how a fungal agent thought mainly to affect black people would spread. Washington also subsidized the pre marketing tests of birth control pills before a safe dosage was determined on Puerto Rican and Haitian women who were not warned of the potentially severe side effects. Since the 1940s, the US has conducted 154 tests on 9,000 people, soldiers, mental patients, prisoners many of whom had no idea of the risks involved. On another level, the drug plague in the ghettos and barrios whether by intent or not has the effect of chemical warfare against these communities.

The most apposite example is the four decade long Tuskegee syphilis study. Starting in 1932, under US Public Health Service auspices, about 400 black men in rural Alabama were subjects in an experiment on the effects of untreated syphilis. They were never told the nature of their condition or that they could infect their wives and children. Although penicillin, which became available in the 1940s, was the standard of treatment for syphilis by 1951, researchers not only withheld treatment but forbade the men from seeking help elsewhere. This shameful "experiment" was stopped in 1972, only after a

federal health worker who was involved blew the whistle. Beginning in 1989, 1,500 children in West and East Los Angeles and Inglewood were given an experimental measles vaccine as part of a government sponsored trial. Most of the subjects were Latino or African American. The parents of these children were never told that they were part of an experiment with an unlicensed drug, and thus had a less than adequate basis for giving their consent. The Edmonston-Zagreb, or E-Z vaccine was also tested in Senegal and Guinea-Bissau and Haiti, Guinea, and more than a dozen other Third World countries.

In the US, the number of deaths due to AIDS-related complications reached an all-time high in 1995, which was the same year that clinical trials for ARVs were initiated and then approved as standard treatment by the FDA in 1996. In Africa, the numbers look rather different. A special report by UNAIDS states that AIDS-related deaths in Africa only began to decline in the year 2007. Why the gap? Why did AIDS deaths in the US begin to decline immediately after the development of ARVs, while AIDS deaths in Africa took over ten years longer? Millions of people in Africa died during the time between when ARVs came to market and when people in Africa had access to them. Many of those deaths could have been prevented if people had had access to ARVs. Why didn't they?

The drugs were too expensive. The price of brand named ARVs at the time was $10,000 USD per person per year. This price was completely unaffordable to most people in Africa, where the market for ARVs consisted of just 1% of the pharmaceutical industry's total revenues. Africans themselves could not afford the medicine, and groups like Doctors without Borders and others could not afford to treat their patients in Africa (amFAR, 2014).

Why are ARVs so expensive? Most people attribute high prices of drugs to the fact that drug companies have to recoup their extremely high R&D costs through sales. Thus, the current patent system is designed to give drug companies exclusive rights to sell their drug at their chosen price for twenty years in order to incentivize their investment in the development of new drugs, a process that takes many years and a lot of money. This is the system that we have. Pharmaceutical companies blocked access to lifesaving drugs for millions of people because they were afraid that allowing Africans to import generics would set a precedent that would ultimately diminish their own profits. This was only overcome after years and years of hard work by activists, journalists and many others coming together to put pressure on Washington DC and other western governments to allow importation of generics. Finally, Western countries turned a blind eye when South Africa began importing the generic

ARVs, but this would not have happened if it were not for the intense amount of political pressure and criticism that they were facing (amFAR, 2014).

16.0 What does the future hold for us at NDU?

Sub-Sahara Africa in general and Nigeria in particular are very slow in embracing cutting-edge technologies that will improve the quality of diagnosis and research in the field of infectious diseases. Molecular diagnostic tools are currently the state-of-art approach in the field.

My Vice chancellor sir, Ladies and Gentlemen, it is my pleasure to inform you that the Department of Medical Laboratory Science, Niger Delta University is now equipped with MOLECULAR BIOLOGY LABORATORY which my humble self established. This is the second Molecular Biology in the South-South after Lahor Research Centre in Benin City. The Laboratory is equipped with tools used for the extraction and amplification of DNA from humans, plants and microorganisms for diagnostic and research purposes.

I also want to inform you that the laboratory contributed a great deal in achieving the recent FULL ACCREDITATION status of the Bachelor of Medical Laboratory Science Programme by the Medical Laboratory Science Council of Nigeria.

Since inception in February 2014, the Laboratory has assisted over 5 PhD, 4 masters and 3 undergraduate students from various Universities to complete their research work which were all molecular biology related.

Our future endeavours aside research include provision of special laboratory services using molecular tools such as rapid detection of parasitic, fungal, bacterial etiologies of respiratory, Urinary, Vaginal and intestinal infections within a day as against 3 to 5 days with older methods.

17.0 Conclusion

Distinguished guests, living things for the sake of continuity of their species exert pressure on their immediate environment. Such pressure sometimes becomes unbearable for other habitants of the ecosystem. Man has developed different antimicrobials to protect himself against microbial invasion; microbes in return develop strategies to resist these antimicrobials.

Since man does not want rest until he is laid to rest, his unwarranted pressure on microorganisms surely ends after his death. Microbe's pressure on man must be sustained for the word of God to be true. “Back to the Dust”, The Bible speaks of “decomposition” of the body. It is, therefore, man's lot to return to the dust of the ground (Gen. 3:19; Ecclesiastes 12:7). This is achieved by microorganisms.

It is sad that some of us refuse to acknowledge the fate of the body, spending vast sums of money in attempting to preserve their mortal remains in hope of resuscitation. In spite of claims to the contrary, ***physical immortality*** *will never be achieved by the medical profession.*

In Man exploited, microbes revolted and their maker intervened by Agbonlahor (1998), it is obvious that Man and

Microbes cannot live independently from each other. Man need to review, rethink and redirect his activities and supremacy over other little creatures of God, rather than propagating the eradication theory of diseases, I settle for control strategies.

All that God created is good and has a purpose, is it Man that will eradicate it? Live and let live.

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