

**UNIVERSITY OF JOS, NIGERIA**

**FROM EAST TO WEST, NORTH TO SOUTH:  
CONFRONTING THE “RELUCTANT KILLER”  
THROUGH ONE HEALTH, SCIENCE, AND FAITH**

An Inaugural Lecture Delivered by

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Dean, Faculty of Veterinary Medicine, University of Jos



**Prof. Pwaveno Huladeino Bamaiyi**

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## **NATIONAL ANTHEM**

Nigeria we hail thee,  
Our own dear native land,  
Though tribe and tongue may differ,  
In brotherhood we stand,  
Nigerians all, and proud to serve  
Our sovereign Motherland.

Our flag shall be a symbol  
That truth and justice reign,  
In peace or battle honour'd,  
And this we count as gain,  
To hand on to our children  
A banner without stain.

O God of all creation,  
Grant this our one request,  
Help us to build a nation  
Where no man is oppressed,  
And so with peace and plenty  
Nigeria may be blessed.

## **THE NATIONAL PLEDGE**

I pledge to Nigeria, my country  
To be faithful, loyal and honest  
To serve Nigeria with all my strength  
To defend her unity  
And uphold her honour and glory  
So help me God

## **UNIVERSITY OF JOS ANTHEM**

1. Unijos our Unijos  
Founded in the Lord's glory  
Fountain of knowledge  
Discipline and Dedication.
2. Building leaders in earnest  
Lighting up the nation's path  
With knowledge genuine and pure  
In character and in learning.
3. Unijos our Unijos  
Setting the pace in leadership and in learning  
In the service of God and Man  
To humanity's delight and development.
4. God is our strength  
Growth and excellence is our goal  
In all that is fair and upright  
God's bless our Unijos.

## **DEDICATION**

To my darling daughter, Blessing Divine Pwaveno Bamaiyi, who left us on the 10<sup>th</sup> June, 2021 at the age of 11 in a motor accident and who is watching this inaugural lecture from

Heaven.

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# CITATION OF PROFESSOR PWAVENO HULADEINO BAMAIYI

**The Vice-Chancellor,  
Principal Officers of the University,  
Distinguished Members of Senate,  
Invited Scholars and Distinguished Guests,  
Ladies and Gentlemen.**

It is both an honour and an intellectual privilege to present this formal citation of **Professor Pwaveno Huladeino Bamaiyi**, Doctor of Veterinary Medicine (DVM), Master of Science (MSc), Doctor of Philosophy (PhD), Fellow of the Strategic Institute for Natural Resources and Human Development (FRHD), distinguished scholar, epidemiologist, microbiologist, public health strategist, theologian and transformational academic leader.

As Ralph Waldo Emerson reminds us, *“Do not go where the path may lead, go instead where there is no path and leave a trail.”* Professor Bamaiyi has not merely followed paths in science — he has created new ones.

## **1. Early Life and Family**

Prof. Bamaiyi lived his early life in Kano city before his parents, Mr. and Mrs. Arnobius Tolo Bamaiyi, relocated to the North East where he attended Pare Primary School Numan, in present day Adamawa State, after which he proceeded to the Villanova (Sakato) Government Secondary School also in Numan for his West African School Certificate (WASC) which he obtained in 1988. Professor Bamaiyi’s journey reflects the resilience of northern Nigeria’s intellectual tradition combined with global scholarly ambition.

From the ancient city of Kano to the laboratories of Malaysia and the lecture halls of Uganda, his life story embodies the conviction that excellence is not geographical — it is intentional.

He is a devoted husband to Mrs. GyiHYa Miriam Bamaiyi and a proud father to Precious-Anni, Blessing Divine (who left this world for the land that is brighter than day on 10th June, 2021), and Increase Praise — a family whose very names echo purpose and providence.

Multilingual in English, Hausa, and Bachama, with working knowledge of Malay and Runyankole, he represents scholarship without borders.

## **2. Academic Qualifications**

- Doctor of Veterinary Medicine (DVM), University of Maiduguri, Nigeria (1997).
- Master of Science (MSc), Veterinary Public Health and Preventive Medicine, Ahmadu Bello University, Zaria (2004).

- Doctor of Philosophy (PhD), Public Health (Epidemiology), Universiti Putra Malaysia (2014).

His doctoral work advanced epidemiological modeling and economic impact analysis of zoonotic brucellosis — research that continues to inform policy discussions across Southeast Asia and West Africa.

As Albert Einstein once observed, “*The important thing is not to stop questioning.*” Professor Bamaiyi built his career on that principle.

### **3. Academic and Professional Trajectory**

Professor Bamaiyi’s academic progression reflects steady excellence and global mobility:

- Veterinary Clinician, Bethel Veterinary Practice, Abeokuta, Nigeria.
- Assistant Lecturer to Lecturer I, Adamawa State University, Mubi, Nigeria.
- Senior Lecturer, Universiti Malaysia Kelantan, Malaysia.
- Associate Professor, Kampala International University, Uganda.
- Professor and Dean, Faculty of Veterinary Medicine, University of Jos, Nigeria.

Across three countries, he has contributed to teaching, research, and institutional development with distinction.

### **4. Research Leadership and Scholarly Contributions**

Professor Bamaiyi is internationally recognised for his work in:

- Zoonotic diseases (particularly brucellosis)
- One Health implementation frameworks
- Antimicrobial resistance (AMR)
- Veterinary epidemiology and biostatistics
- Molecular diagnostics
- Food safety systems
- Emerging and re-emerging infectious diseases

His publications span high-impact journals including *Preventive Veterinary Medicine*, *Tropical Animal Health and Production*, *Sains Malaysiana*, *Asian Biomedicine*, and *Zoonoses and Public Health*, among many others.

He has authored and co-authored dozens of peer-reviewed articles addressing:

- Molecular characterization of *Brucella melitensis*
- Economic modeling of zoonotic disease burden
- ESBL-producing pathogens in food systems
- Rabies epidemiology
- Cryptosporidiosis and parasitic infections

- Simulation models for biosecurity threats

His citation metrics reflect measurable global impact:

- h-index: 18
- g-index: 23
- i10-index: 21
- ORCID: 0000-0002-4031-9599
- Scopus Author ID: 55330795700

In the words of Louis Pasteur, “*Science knows no country, because knowledge belongs to humanity.*” Professor Bamaiyi’s scholarship embodies this universality.

## **5. Pedagogical Impact**

Professor Bamaiyi has taught across undergraduate, Masters, and doctoral levels in Nigeria, Malaysia, and Uganda.

His teaching portfolio includes:

- Epidemiology
- Biostatistics
- Preventive Veterinary Medicine
- Veterinary Immunology
- Veterinary Bacteriology and Virology
- Molecular Immunology
- Applied Biometry
- Public Health Nutrition
- Research Methodology

His pedagogy is rigorous yet inspirational, combining statistical precision with translational application.

He has supervised numerous undergraduate projects and postgraduate theses across multiple institutions, nurturing a generation of veterinary scientists and public health scholars.

As Nelson Mandela affirmed, “*Education is the most powerful weapon which you can use to change the world.*” Professor Bamaiyi has wielded that weapon responsibly.

## **6. Transformational Leadership as Dean**

Since 9 December 2022, as Dean of the Faculty of Veterinary Medicine, University of Jos, Professor Bamaiyi has presided over a period of unprecedented transformation.

Under his leadership:

- The Faculty successfully relocated to Naraguta Campus without debt.
- The Deanery building was started and completed.
- The Faculty achieved the highest grant portfolio in the University.
- The first national anthrax public awareness seminar (26/07/2023) was hosted during the July 2023 outbreak.
- International collaborations were strengthened with scholars from USA, Germany, Finland, UK, Malaysia, and Kenya.
- A Brucella Vaccine Laboratory was commissioned.
- Postgraduate programmes in One Health were expanded and recognised nationally.
- The Faculty secured 96.8% in NUC Re-accreditation (December 2024).
- The African Journal of Veterinary Sciences was established.
- A 2025–2029 Strategic Plan was produced.
- A Student Mentorship Programme was instituted.

He has served on major university committees including Direct PhD frameworks, Professor Emeriti guidelines, and senior staff promotion criteria.

Leadership, as John C. Maxwell notes, “*is influence — nothing more, nothing less.*” Professor Bamaiyi’s influence is measurable, visible, and enduring.

## **7. Professional Service and Public Engagement**

Professor Bamaiyi’s service record includes:

- National President, Association of Christian Veterinarians Nigeria (2022–2024).
- Chairman, ACVN Plateau State Chapter (2019–2022).
- Active member, Nigerian Veterinary Medical Association (VCN No. 002945).
- Member of the American Society for Microbiology.
- Member of the World Association for the Advancement of Veterinary Parasitology.
- Fellow, Strategic Institute for Natural Resources and Human Development.
- Cardinal Onaiyekan Foundation for Peace Fellow (2024–2025).

He is a regular public intellectual voice on radio and television, advocating for zoonotic disease awareness and public health preparedness.

## **8. Awards and Recognitions**

Among his many recognitions:

- Great African Merit Award (2008).
- Multiple Excellence in Scientific Publication Awards (Kampala International University, 2016–2018).
- 3-Minute Thesis Awards, Universiti Putra Malaysia (2013).
- Best Oral Presentation Award, International Symposium on Zoonoses (2011).

These honours reflect excellence not as an event, but as a pattern.

## **9. The Research Vanguard: One Health and Zoonoses**

*"Between animal and human medicine there is no dividing line—nor should there be."* —  
**Rudolf Virchow**

Professor Bamaiyi is a leading voice in **One Health advocacy**, focusing on the critical intersection of animal disease and human public health. His research has fundamentally advanced our understanding of:

- **Brucellosis:** His work on the "silent abortionists" has shaped policy and epidemiological understanding across West Africa and Southeast Asia.
- **Antimicrobial Resistance (AMR):** Investigating multi-drug resistant phenotypes in food-producing animals.
- **Emerging and Re-emerging Pathogens:** His recent 2025 contributions include the first report of Rabies in a lioness at the Jos Zoological Garden

## **10. Intellectual Philosophy**

Professor Bamaiyi's career stands at the intersection of science, service, and societal relevance. His work in One Health underscores a central conviction:

Human health, animal health, and environmental health are inseparable.

As he prepares to deliver his inaugural lecture, we are reminded of a timeless truth:

*"There are three kinds of people: those who make things happen, those who watch things happen, and those who wonder what happened."*

**Professor Pwaveno Huladeino Bamaiyi** belongs unmistakably to the first category.

**Vice-Chancellor, Distinguished Ladies and Gentlemen,**

It is with profound respect, scholarly pride, and great anticipation that I present to you an epidemiologist of international standing, a microbiologist of methodological depth, a public health advocate of continental relevance, a mentor of uncommon dedication, and a Dean of transformational leadership —

**Professor Pwaveno Huladeino Bamaiyi — to deliver his Inaugural Lecture.**

Thank you.

## **1. PRELUDE: THE ACADEMIC DEBT**

Mr. Vice-Chancellor, Distinguished Ladies and Gentlemen. Today, I stand before this august assembly to pay a debt—an academic debt. I am grateful to God for the privilege to be presenting the very first inaugural lecture from the Faculty of Veterinary Medicine, University of Jos. This is a watershed moment for me and an epoch-making event that I have been looking forward to for many years. I do not take this privilege lightly and will always remember this day. An inaugural lecture represents intellectual accountability. It is a declaration of scholarly identity, a summation of research trajectory, and a projection of future contribution. Promoted to Professor uniquely on 7<sup>th</sup> September, 2018 after reporting from Uganda, this lecture reflects decades of dedication across Malaysia, Uganda, and Nigeria.

My philosophy remains: “All things are possible when preparation meets purpose” and the “the greatest tragedy in life is not death but a life without a purpose.” Universities are sustained by three pillars: Teaching, Research and Community Service. This lecture demonstrates the integration of these pillars within the One Health paradigm. A professorship is not an end in itself, but a beginning of a deeper accountability to the society that nurtured the scholar. My journey to this chair was neither linear nor local. It spans the diverse landscapes of Malaysia, the high-altitude challenges of Uganda, and the resilient heart of Nigeria. As I often say: 'All things are possible.' This is not mere optimism; it is the scientific reality of a man who has seen pathogens cross borders and seen faith move mountains.

Pardon me as I will be making a lot of reference to my research in Malaysia and Uganda because more than 90% of the work that made me a professor were carried out outside the shores of this country. One of the reasons why I delayed my inaugural lecture till now was to help assess my area of research in Nigeria to be able to talk with some authority on the situation in Nigeria. I assure you that I will be making some fantastic reference to Nigeria because we have a TETFund National Research Fund (NRF) grant that is helping us continue some of the work we started in Malaysia at even a higher and deeper level that we hope will lead to a product.

Pathogenic microorganisms are ubiquitous and as such the same everywhere and so we expect a similar pattern of manifestation of disease and infection. But the control and prevention of disease vary depending on measures adopted by various countries. For example, whereas Malaysia aims to eradicate this “reluctant killer” (prevalence is less than 2%) by culling of animals; in Uganda and Nigeria we treat and rarely vaccinate due to the hydra-headed problems bedeviling our economy and the health sector especially gross inadequate funding which makes it difficult for farmers to be compensated when there is need for a radical approach to the control of this “reluctant killer”.

As a deliver my Inaugural Lecture today it is my hope and prayer that many colleagues who are yet to present theirs will be challenged and inspired to do the same. It is regrettable that some of our universities are losing this important academic culture and some have become lackadaisical about it. I know universities where even the Vice-Chancellors are yet to deliver their Inaugural Lectures and I know colleagues who have retired without delivering their Inaugural Lectures! This is a debt we all owe the academia and indeed our communities, the nation and the world: the earlier we pay the better for us and the better for the world. No excuse is good enough to stop us from paying this academic debt.

When we are employed as Academic Staff our responsibilities are summarized in three categories as Teaching, Research and Community Service. Permit me to mention briefly some of my involvement in teaching, research and community service.

1. **TEACHING:** teaching experience spans undergraduate and postgraduate levels at various institutions:

**University of Jos, Nigeria (2018–Date):**

- **Undergraduate:** Zoonoses, Emerging and Re-emerging Diseases, Preventive Veterinary Medicine, General Veterinary Microbiology, Veterinary Immunology, Veterinary Bacteriology and Mycology, Veterinary Virology, Epidemiology, Environmental Health, and Biostatistics.
- **Postgraduate:** Methods in Veterinary Microbiology, Advanced Veterinary Bacteriology, Advanced Veterinary Mycology, Research Methodology, Molecular Immunology, and Application of Computer in Veterinary Practice.

**Kampala International University, Uganda (2016–2018):**

- **Postgraduate (MPH/MMed):** Fundamentals of Public Health, Public Health Nutrition, Research Methodology, Biostatistics, and Principles of Epidemiology.
- **Undergraduate (MBChB/BMS/BDS):** Clinical Epidemiology, Research Project, and Project Planning and Management (BMLS 4.1D).

**Mountains of the Moon University, Uganda (2018):**

- Public Health Nutrition and Food Safety, and Occupation and Environmental Health for MPH students.

**Universiti Malaysia Kelantan (2014–2016):**

- Pig Diseases, Physiology, Parasitology and Entomology, and Biometry and Experimental Design.

## Adamawa State University, Nigeria (2003–2009):

- Anatomy and Physiology of Animals.
- Introduction to Agriculture

### Supervision of Students

- **PhD Supervision:** Currently supervises or co-supervises doctoral candidates at the **University of Jos, Kampala International University** and the **University of Reading**. Research topics include genomic surveillance of malaria parasites, Peste des Petits Ruminants impact assessment, and characterization of multidrug-resistant *Serratia marcescens* in pigs.
- **Master's Supervision (MPH/MSc):** Guided several master's students to completion on topics such as dairy goat production, factors affecting health facility deliveries, and Hepatitis B vaccination awareness.

**Undergraduate Supervision (MBChB/DVM/BMLS):** Supervision included projects on pediatric malaria prevalence, child feeding patterns, and postoperative recovery, Isolation and Antibigram of *Salmonella* spp. from Quails and various other undergraduate projects in Malaysia, Uganda and Nigeria.

2. **RESEARCH:** A summary of research findings spans several critical areas of veterinary medicine, public health, and molecular epidemiology including:

### Brucellosis and Zoonotic Diseases

A significant portion of the research focus has been on the epidemiology and impact of **Brucellosis**, with key findings including:

- **Seroprevalence and Risk Factors:** Identified a significant seroprevalence of *Brucella melitensis* in goats in Malaysia and evaluated its prevalence among high-risk groups, such as farmers and veterinary technical staff (Bamaiyi et al., 2017).
- **Molecular Characterization:** Work involved the successful isolation and molecular characterization of *Brucella melitensis* from seropositive goats using PCR techniques, providing definitive evidence of the pathogen's presence (Bamaiyi et al., 2012)
- **Economic Impact:** Studies highlighted the economic implications of eradicating zoonotic brucellosis, specifically within the Melaka State of Malaysia (Bamaiyi, Abd-razak, et al., 2012)
- **Regional Updates:** Provided critical updates on the status of brucellosis across Malaysia and Southeast Asia, identifying factors that hinder the control of the disease in developing countries

## Parasitology and Veterinary Epidemiology

Research has also extensively covered parasitic infections in both livestock and wildlife:

- **Livestock Parasites:** Documented the prevalence of haemoparasites and gastrointestinal parasites in one-humped camels in Nigeria and investigated factors affecting helminthosis control in livestock (Bamaiyi et al., 2011) .
- **Zoonotic Parasites:** Research findings included the prevalence of *Cryptosporidium* oocysts in wild birds in Nigeria and a retrospective study of cryptosporidiosis among diarrheic children in arid regions (Bamaiyi et al., 2011).
- **Specific Clinical Cases:** Published findings on unique veterinary cases, such as overgrown horns in Balami sheep and aspergillosis management in poultry farms in Jos, Nigeria (Bamaiyi & Turaki, 2012).

## Public Health, Nutrition, and Food Safety

Broadening the scope to human health and food systems, the findings include:

- **Nutritional Health:** A key study in South Western Uganda found significant malnutrition among HIV patients in selected hospitals.
- **Food and Water Safety:** Conducted food safety analyses of beef and milk in Uganda and explored the potential of using grasshoppers as an alternative protein source.
- **Healthcare Services:** Research also extended to evaluating patient satisfaction with healthcare services in Ugandan health facilities (Bamaiyi, 2015; Kasozi et al., 2018; Odwee et al., 2020).

## Environmental Microbiology and Disaster Management

The work has addressed public health concerns during environmental crises:

- **Flood Water Analysis:** Following the massive 2014 floods in Kota Bharu, Malaysia, we used 16S rRNA sequencing to identify bacterial biodiversity in floodwaters, contributing to better disaster management and pathogen surveillance.
  - **Biosecurity Modeling:** Developed simulation models to assess the potential impact of using biological agents like *Yersinia pestis* or *Vibrio cholerae* in Nigeria, emphasizing the need for robust biosecurity measures (Bamaiyi, 2014; Bamaiyi et al., 2016, 2015).
3. **COMMUNITY SERVICE:** Diverse and extensive record of community service that spans professional, religious, and public communication sectors across Nigeria, Malaysia, and Uganda.

## Professional and Health Outreach

Community service within the professional sphere includes significant leadership and direct outreach efforts:

- **Medical Outreach:** Led the **Association of Christian Veterinarians Nigeria** Veterinary and Medical Outreach to Zagun, Bassa LGA in Plateau State.
- **Public Health Crisis Response:** Served as the Chairman of the **ASUU Fact-Finding Committee** on the "COVID-19 Tea Mix" in 2021, providing scientific oversight during the pandemic.
- **Institutional Leadership:** Held numerous high-level service roles at the University of Jos, including serving as the **Chairman of the Committee of Deans and Directors** (2025–Date) and acting as a Senate representative on various council committees.

## Religious and Humanitarian Leadership

Have been deeply involved in religious community service and humanitarian coordination:

- **Association Leadership:** Served as the **National President of the Association of Christian Veterinarians Nigeria** (2022–2024) and previously as the State Coordinator for the Plateau State chapter.
- **Zonal Coordination:** Held the role of Zonal Secretary for the **Christian Association of Nigeria** in the Mubi Zone (2008–2009).
- **Chaplaincy and Ministry:** Served as a Chaplain at the Adamawa State University Christian Chapel and held multiple ministerial positions within the **Redeemed Christian Church of God** in Nigeria and Malaysia.
- **Youth Mentorship:** Served as a **volunteer secondary school teacher** in Numan, Adamawa State.
- **Elder:** Currently a member of the Board of Elders of the Chapel of Faith, University of Jos.

## Public Communication and Advocacy

Engaged with the public to disseminate knowledge and advocate for national development:

- **Media Presence:** Regular guest on **Unity FM and Unity TV Jos**, participating in the "Unity Train" programme five days a week since 2023 but I later reduced it to 3 times a week.
  - **Digital Education:** Maintain a YouTube channel with over 50 educational videos and provide educational write-ups through personal website to facilitate broader access to scientific knowledge.
4. **National Advocacy:** Served as the Leader and Head of Mobilization and Registration for the **National Consensus Movement of Nigeria**.

Having elucidated my involvement in teaching, research and community service, let me proceed to the main discussion for this inaugural lecture titled **From East to West, North to South: Confronting the “Reluctant Killer” Through One Health, Science, and Faith.**

"The journey of a thousand miles begins with a single step," and today, I invite you to take that step with me into the complex world of a zoonotic disease (disease transmitted from animals to humans) that knows no borders. This pervasive bacterial infection, caused by gram-negative coccobacilli of the genus *Brucella*, continues to inflict serious public health, veterinary, and socioeconomic burdens across the globe, particularly in developing regions where it remains endemic (Bamaiyi et al., 2014; Bamaiyi, 2016). With an estimated 2.1 million human cases recorded annually worldwide (Laine et al., 2023), the disease exerts a devastating toll on the livestock sector, particularly among small-scale farmers who bear the brunt of these financial losses (Bamaiyi et al., 2015). These economic repercussions are profound, with agricultural losses estimated at \$427 million per year for sub-Saharan Africa alone, driven by high rates of abortion, stillbirth, infertility, and reduced milk yields in infected herds (Almuzaini & Elbehiry, 2025).

Beyond these quantifiable agricultural losses, the disease places a significant strain on human healthcare systems and limits the economic potential of individuals, communities, and nations where such development is especially important to diminish the prevalence of poverty (Bamaiyi et al., 2017; Bamaiyi, 2016). The implementation of public policy focused on mitigating the socioeconomic effects of brucellosis in human and animal populations is desperately needed, requiring an interdisciplinary and collaborative, or One Health, approach that consists of public education, the development of an infrastructure for disease surveillance and reporting in both veterinary and medical fields, and campaigns for control in livestock and wildlife species (Bamaiyi, 2016). This collaborative framework is essential because the true burden of brucellosis is often obscured by poor medical and veterinary infrastructures, leading to marked under-reporting in endemic areas (Seleem et al., 2010).

This diagnostic obscurity is further compounded by the disease's ability to masquerade as other febrile illnesses, resulting in a "neglected" status despite its widespread impact on poverty-stricken communities (Almuzaini & Elbehiry, 2025; J Godfroid et al., 2011). Addressing these challenges requires a holistic, One Health approach involving coordinated efforts across veterinary, medical, environmental, and regulatory sectors to effectively control and mitigate its widespread impact (Laine et al., 2023; Scharff, 2012). Historic eradication programmes in the European Union, the United States, and New Zealand demonstrate that elimination is attainable through coordinated efforts combining mass vaccination, test-and-slaughter protocols, strict animal movement controls, and mandatory dairy pasteurization. However, replicating such intensive resource models in low-income nations remains a formidable challenge, necessitating the prioritization of

cost-effective strategies and the demonstration of economic benefits to justify investments in surveillance, management, and animal health sectors (Bamaiyi et al., 2015; Bamaiyi, 2016). It is within this context of persistent adversity and the urgent need for sustainable solutions that my own academic journey was forged, driven by a desire to understand why this "reluctant killer" continues to thrive despite our scientific advancements and to explore how integrated strategies can finally break the cycle of transmission between animals and humans (Almuzaini & Elbehiry, 2025).

## **2. THE RELUCTANT KILLER: UNMASKING THE RELUCTANT KILLER**

Why 'The Reluctant Killer'? Unlike Ebola or Anthrax that strike with sudden, theatrical violence, this disease is a master of stealth. It is the quintessential 'One Health' challenge. From bustling cities to remote villages, a mysterious disease leaves behind a trail of death—not out of malice, but necessity. This gripping narrative follows the journey of a reluctant killer whose actions span continents and cultures, challenging our notions of morality, survival, and fate. This disease ravaged communities before the advent of the invention of Antibiotics and incapacitated even the strongest soldiers during war. In 1943 Time Magazine described the disease thus: “the disease rarely kills anybody, but it often makes a patient wish he were dead”. The disease is the most worldwide zoonosis present in all the continents of the world except Antarctica. From the East to West and from the North to the South of the planet it infects animals and human beings without causing significant fatality but yet significantly affecting the quality of life and causing massive economic losses in communities and nations across the globe. This disease is called brucellosis caused by bacteria of the genus *Brucella*.

*Brucella melitensis*, which is the most pathogenic species of Brucellae, is a Gram-negative coccobacilli bacteria responsible for the serious and economically important zoonotic disease Brucellosis, which affects goats and other domestic animals such as cattle, sheep, dogs, pigs and camels. It has also been reported in marine animals, wild life and various other species of animals (Ayoola et al., 2017; Foster et al., 2007). It is mainly an occupational disease in man but has also been known to affect other humans who may come in contact with infected animal materials such as aborted fetuses, vaginal discharges from infected animals or consumed infected animal products such as milk, cheese and other dairy products (Bamaiyi et. al., 2014; Sofian et al., 2008). Brucellosis remains one of the most persistent zoonotic diseases worldwide. Often neglected, frequently misdiagnosed, and economically devastating, it is what I term the “Reluctant Killer.”

My PhD research in Malaysia established epidemiological patterns of *Brucella melitensis* in goats and humans. Using Rose Bengal Plate Test, PCR confirmation and multivariate logistic regression models, we identified key occupational risk factors. Malaysia adopted

culling and compensation policy frameworks, reducing prevalence below 2%. This demonstrates the power of political will combined with scientific evidence. In my research at Universiti Putra Malaysia, my findings were stark: the introduction of new animals (OR = 5.25; 90 % CI = 1.46, 18.88), younger age category of farms (OR = 5.53; 90 % CI = 1.09, 21.66), and farms with single breed of goats (OR = 8.50; 90 % CI = 1.27, 41.97) were significant risk factors for brucellosis (Bamaiyi et.al, 2014). These are not just numbers; they are the markers of economic ruin for smallholder farmers across the globe. During the years 2000 to 2009 brucellosis remained endemic in Malaysia with low prevalence as another study indicated that analysis of decade-long serosurveillance data (2000–2009), encompassing 119,799 goats across 3,555 farms, revealed an overall caprine brucellosis seroprevalence of 0.91% (95% CI: 0.86–0.96) at the animal level and 7.09% (95% CI: 6.27–7.98) at the farm level. Multivariable analysis demonstrated that the odds of seropositivity were significantly higher ( $P < 0.05$ ) during the latter half of the decade, in herds with larger population sizes, and in states situated in Peninsular Malaysia compared with those in eastern Malaysia. Although brucellosis was detected nationwide, the overall seroprevalence remained relatively low. Notably, border states such as Perlis exhibited higher seroprevalence rates than non-border states, suggesting possible transboundary influences on disease transmission dynamics (Bamaiyi et al., 2015).

In another study among the 446 individuals surveyed, comprising farmers and non-farmers (including veterinary technical staff and other occupations), the overall seroprevalence of brucellosis was 1.35% (95% CI: 0.28–2.42). Multivariate logistic regression analysis conducted at the 90% confidence level identified occupation, age, and consumption of unpasteurized milk as significant risk factors for infection. Specifically, farmers had 7.19-fold higher odds of brucellosis compared with non-farmers (90% CI: 1.16–44.71). Similarly, individuals aged 40 years or younger were 7.16 times more likely to be seropositive than those older than 40 years (90% CI: 1.16–44.41). In addition, consumption of unpasteurized milk was associated with a 4.45-fold increase in the odds of brucellosis compared with non-consumers (90% CI: 1.03–19.15) (Bamaiyi et al., 2017).

It is important to emphasize here that human brucellosis is as a result of animal brucellosis and there is no way to control or prevent human brucellosis as long as there is brucellosis in animals (Bamaiyi et al., 2012; Bamaiyi et. al., 2016). This is why those who handle animals and take animal products are more at risk of brucellosis than those who don't. One of the watershed moments in my brucellosis journey was the loss of one of our Nigerian colleagues, Birdling, to brucellosis many years ago because it was misdiagnosed as Malaria and Typhoid until it was too late. Birdling had handled animals whom he may not have known had brucellosis including animals that aborted fetuses which is characteristic of brucellosis (Bamaiyi & Ismail, 2018). This is where the One Health Concept is germane and critical for the protection and enhancement of public health. Birdling was only confirmed to have brucellosis after a young Veterinary Doctor at the time suggested to the

health team to run a Rose Bengal Plate test on their patient when he heard they had been treating him for a very long time for Malaria and Typhoid fever without success. But unfortunately, they lost the patient who had already suffered a lot of organ and tissue damage to brucellosis (a reluctant killer) due to misdiagnosis and wrong treatment as a result of not using the One Health approach from the onset. It is important to always remember that pathogens do not discriminate between animals and humans and the environment and that is why all hands must be on deck to fight them without professional discrimination.

Our study of brucellosis in Nigeria indicate that it is endemic in the country and this is worrisome considering that sheep and goats live in close proximity to humans especially the farmers and their families. In Bauchi State the serological examination showed that the overall seroprevalence of brucellosis in small ruminants was 16/203 (7.9%, CI 95% 4.90-12.40). Seroprevalence by sex was 7/61(11.50%, CI 95% 5.70-21.80) in male sheep and goat while a prevalence of 9/142(6.3%, CI 95% 3.40 – 11.60) was recorded in the females. We recorded a higher prevalence of 11/111(9.9%, CI 95% 5.60 – 16.90) in sheep compared to a prevalence of 5/92(5.4%, CI95%2.30 – 12.10) in goats.

Our study of brucellosis in goat and sheep farms in Jos, Plateau State came with key findings that overall prevalence in Plateau was 4.0%, Species was a significant risk factor with Sheep significantly more affected, OR = 10.53 ( $p < 0.001$ ). Sex is not a risk factor as there was no significant difference between males and females.

In goat and sheep farms in Abuja FCT we found a prevalence of 19% (CI 95%, 13.5-26.5). the prevalence in Abuja is about 5 times more than Plateau. This may be as a result higher animal movement in FCT, Urban/peri-urban trade intensification, possible introduction from high-prevalence regions, larger herd mixing systems This shows that many farms are infected and many farmers may be exposed. This may be the reason for the many abortions on those farms and low productivity. Brucellosis is a silent killer (Bamaiyi & Ismail, 2018).

Our study in goat and sheep farms in Mubi, Adamawa State showed that overall seroprevalence was 8.4% (95% CI: 4.8–13.6). Sheep exhibited higher prevalence (11.1%) compared with goats (7.3%), while females (10.9%) were significantly more infected than males (2.2%; OR = 5.39,  $p < 0.05$ ). Farm-level clustering was evident, with Farm 2 showing a prevalence of 20% and nearly 10-fold higher odds of infection (OR = 9.75, 95% CI: 1.8–52.7). Mantel–Haenszel analysis confirmed female sex as an independent risk factor (MH-OR  $\approx$  4.9). Logistic regression identified farm location and sex as significant predictors of infection ( $p < 0.01$ ). Approximately 67% of infections were attributable to Farm 2 (PAF). *Brucella melitensis* was successfully isolated from aborted fetal material, confirming active reproductive shedding.

Our findings demonstrate that brucellosis in Mubi South is not randomly distributed but driven by farm-level clustering and reproductive biology, particularly among females. The isolation of *B. melitensis* underscores the zoonotic risk to farmers and consumers. Control strategies should prioritize vaccination, reproductive biosecurity, and One Health interventions. Vaginal swabs, Blood, milk and aborted contents were collected from animals that screened positive and aborted. Upon culture, suspected growths were only observed from the inoculated aborted content. This was sub-cultured to obtain a pure culture, afterwards microscopy was done and the organism was found to be a gram negative (-) coccobacilli and several biochemical tests were carried out thus; catalase (+), Oxidase (+), Urease (+), H<sub>2</sub>S (+), Indole (-), Glucose (-) and Galactose (-).

Combining the data we have from the 3 states and the FCT showed that Brucellosis remains endemic in Nigeria with limited multistate comparative modeling. Cross-sectional serological survey of 707 small ruminants across three states and the FCT Abuja showed overall prevalence of 9.2%. Abuja significantly higher (AOR 4.98), Sheep at higher risk (AOR 1.94), Female animals at higher risk (AOR 1.88). from this we conclude that brucellosis exhibits strong spatial clustering and host-specific risk patterns requiring targeted One Health intervention.

In Uganda in the year 2017, I almost lost a colleague who was a dean to brucellosis of which she was not sure of how she contracted the infection. I suspect that she may have been infected from consumption of unpasteurized milk based on my personal discussion with her. Raw cow milk is commonly consumed all over Uganda and is cheap and readily available especially in Western Uganda where she lived. She underwent 6 weeks of expensive combination therapy before making a complete recovery just like a research assistant had earlier also contracted the infection in Malaysia in the year 2014 in a laboratory and was prescribed rifampicine p.o. once a day combined with doxycycline p.o. twice a day for 6 consecutive weeks before she made a full recovery (Hartady et al., 2014). The same fate was suffered by a postgraduate student in the university of Jos who handled brucella positive animals and culture but made a full recovery after several weeks of combination therapy similar to the research assistant in Malaysia. Brucellosis is endemic across the globe especially in developing countries afflicting both man and animals (Bamaiyi, 2016) with about 2.1 million new cases annually (Laine et al., 2023).

My research career has focused primarily on bacterial and parasitic zoonoses, food safety, and preventive medicine, particularly brucellosis — what I describe as the “Reluctant Killer.”

During my PhD at Universiti Putra Malaysia, where I graduated with a CGPA of 4.0/4.0, my thesis titled: “Prevalence and Risk Factors of *Brucella melitensis* in Goats and Humans and its Economic and Public Health Impact in Malaysia” provided critical epidemiological evidence that influenced control strategies in Malaysia. Malaysia adopted aggressive

culling and surveillance strategies, reducing prevalence to below 2%. In contrast, many African nations rely largely on treatment and limited vaccination due to economic constraints. Some of the research outputs from our research work Malaysia include:

- Seroprevalence studies among farmers and veterinary technical staff

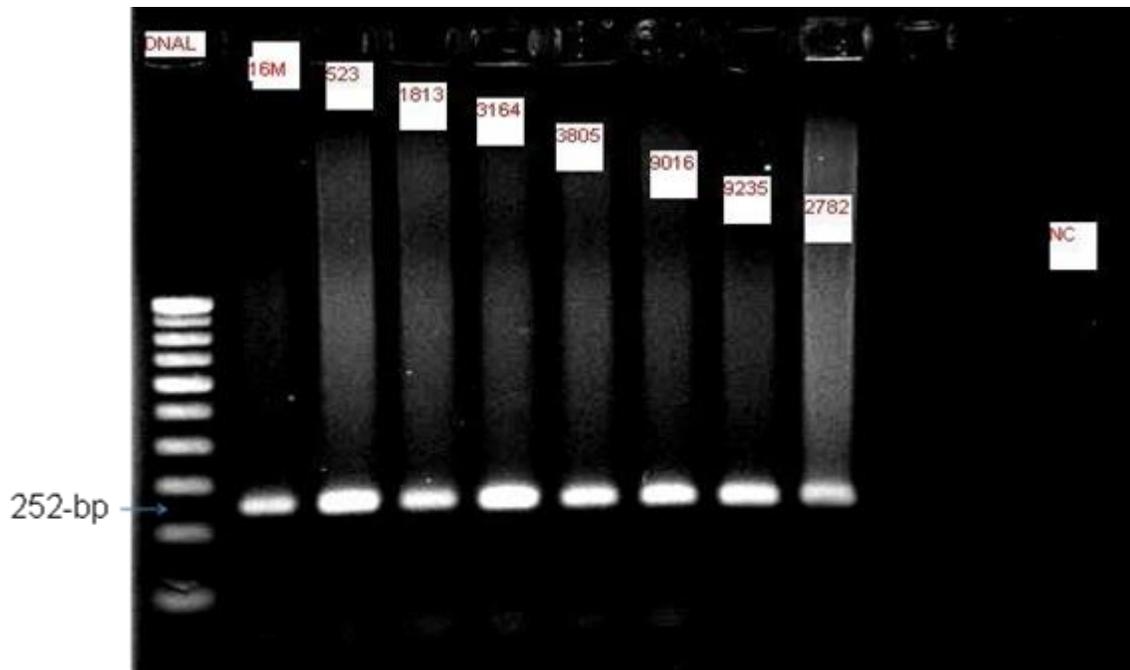
- Molecular confirmation of *Brucella melitensis* via PCR.

- Risk factor analysis in urban and rural Malaysia.

- Flood-related bacterial biodiversity studies using 16S rRNA sequencing.

- Publications in *Sains Malaysiana*, *Asian Biomedicine*, and *International Journal of One Health*.

Science must not only describe problems, it must offer practical solution.



**Figure 2.1** Seven isolates confirmed as *B. melitensis* from seropositive goats in Malaysia.

**Key:** 16M=Positive Control (Veterinary Laboratories Agency, Weybridge, UK); 523 and 1813=Melaka; 3164, 3805 and 2782=Selangor; 9016 and 9235=Negeri Sembilan; PCR product size =252bp

### 3. THE GENESIS OF A PASSION: UNRAVELING BRUCELLOSIS AND OTHER ZONOSSES

"The important thing is not to stop questioning," and "in the middle of difficulty lies opportunity" Albert Einstein once remarked, and it was this relentless pursuit of answers that transformed my initial academic curiosity into a lifelong dedication to understanding the complex biology and transmission dynamics of *Brucella* and other Bacteria species (Bacterial Zoonoses). This curiosity led me to carry out research on different bacteria species, sequence and deposit 62 bacterial (some reported for the first time in Malaysia) sequences in the GenBank including:

**Table 3.1: Sequence submissions to NCBI Gen Bank:  
GenBank sequences for *Brucella melitensis* submitted in 2011:**

S/No.	Accession numbers	Species of bacteria	Species of Animal for isolation
1	JN561153	<i>Brucella melitensis</i>	Caprine
2	JN561154	<i>Brucella melitensis</i>	Caprine
3	JN561155	<i>Brucella melitensis</i>	Caprine
4	JN561156	<i>Brucella melitensis</i>	Caprine
5	JN561157	<i>Brucella melitensis</i>	Caprine
6	JN561158	<i>Brucella melitensis</i>	Caprine
7	JN561159	<i>Brucella melitensis</i>	Caprine

**Table 3.2: Accession numbers for 2014 Kota Bharu, Malaysia flood bacteria submitted to GenBank in 2015:**

S/No.	Submission ID	Accession Number	Bacteria Identified
1	SUB882316 UMK1a1	KR027927	<i>Staphylococcus xylosus</i>
2	SUB882316 UMK1a2	KR027928	<i>Acinetobacter ursingii</i>
3	SUB882316 UMK1b1	KR027929	<i>Aeromonas aquariorum (A. dhakensis)</i>
4	SUB882316 UMK1b2	KR027930	<i>Bacillus pseudofirmus</i>
5	SUB882316 UMK1b3	KR027931	<i>Bacillus altitudinis</i>
6	SUB882316 UMK1c2	KR027932	<i>Acinetobacter radioresistens</i>
7	SUB882316 UMK1d1	KR027933	<i>Acinetobacter radioresistens</i>
8	SUB882316 UMK1d2	KR027934	<i>Lactococcus lactis subsp. Lactis</i>
9	SUB1092331 UMK1e1	KT731961	<i>Acidovoraxcaeni</i>

10	SUB1092331 UMK1e2	KT731962	<i>Acidovoraxcaeni</i>
11	SUB882316 UMK2a1	KR027935	<i>Staphylococcus xylosus</i>
12	SUB1092331 UMK2a2	KT731963	<i>Acidovoraxcaeni</i>
13	SUB882316 UMK2a3	KR027936	<i>Aeromonas veronii</i>
14	SUB1092331 UMK2d1	KT731964	<i>Chromobacteriumviolaceum</i>
15	SUB882316 UMK2e1	KR027937	<i>Staphylococcus xylosus</i>
16	SUB882316 UMK2e2	KR027938	<i>Aeromonas veronii</i>
17	SUB882316 UMK3a1	KR027939	<i>Acinetobacter junii</i>
18	SUB882316 UMK3a2	KR027940	<i>Klebsiella pneumoniae subsp. Rhinoscleromatis</i>
19	SUB882316 UMK3a3	KR027941	<i>Raoultellaterrigena</i>
20	SUB882316 UMK3b1	KR027942	<i>Pseudomonas trivialis</i>
21	SUB1092331 UMK3b2	KT731965	<i>Curvibactergracilis</i>
22	SUB882316 UMK3b3	KR027943	<i>Pseudomonas veronii</i>
23	SUB1092331 UMK3c3	KT731966	<i>Rhodococcusequi</i>
24	SUB1092331 UMK3d2	KT731967	<i>Chromobacteriumviolaceum</i>
25	SUB882316 UMK3d3	KR027944	<i>Bacillus megaterium</i>
26	SUB1092331 UMK3d4	KT731968	<i>Aquitaleamagnusonii</i>
27	SUB1092331 UMK3d5	KT731969	<i>Wautersianumazuensis(Cupriavidusnumazuensis)</i>
28	SUB882316 UMK3e1	KR027945	<i>Exiguobacteriumacetylicum</i>
29	SUB882316 UMK3e2	KR027946	<i>Chryseobacteriumgambrini</i>
30	SUB883111 UMK4a1w	KR048048	<i>Salmonella enterica subsp. Diarizonae</i>
31	SUB883111 UMK4a1y	KR048049	<i>Bacillus idriensis</i>
32	SUB883111 UMK4a2	KR048050	<i>Staphylococcus xylosus</i>
33	SUB882316 UMK4b1	KR027947	<i>Aeromonas aquariorum (A. dhakensis)</i>
34	SUB882316	KR027948	<i>Pectobacteriumcypripedii (Pantoeacycypripedii)</i>

	UMK4b2		
35	SUB882316 UMK4b3	KR027949	<i>Pseudomonas trivialis</i>
36	SUB882316 UMK4c2	KR027950	<i>Bacillus luciferensis</i>
37	SUB882316 UMK4c3	KR027951	<i>Enterobacter asburiae</i>
38	SUB882316 UMK4d2	KR027952	<i>Bacillus luciferensis</i>
39	SUB882316 UMK4d3	KR027953	<i>Aeromonas aquariorum (A. dhakensis)</i>
40	SUB882316 UMK4e1	KR027954	<i>Acinetobacter calcoaceticus</i>
41	SUB882316 UMK4e2	KR027955	<i>Bacillus pseudofirmus</i>
42	SUB882316 UMK5a1	KR027956	<i>Proteus mirabilis</i>
43	SUB882316 UMK5a2	KR027957	<i>Escherichia coli</i>
44	SUB882316 UMK5b1	KR027958	<i>Exiguobacterium mexicanum</i>
45	SUB882316 UMK5d1	KR027959	<i>Bacillus luciferensis</i>
46	SUB883111 UMK6a1w	KR048051	<i>Staphylococcus xylosus</i>
47	SUB883111 UMK6a1y	KR048052	<i>Bacillus pseudofirmus</i>
48	SUB1092331 UMK6a2	KT731970	<i>Acinetobacter calcoaceticus</i>
49	SUB1092331 UMK6b1	KT731971	<i>Rubrivivaxgelatinosus</i>
50	SUB1092331 UMK6b2	KT731972	<i>Acidovoraxcaeni</i>
51	SUB1092331 UMK6c	KT731973	<i>Acidovoraxcaeni</i>
52	SUB882316 UMK6d	KR027960	<i>Raoultellaterrigena</i>
53	SUB882316 UMK6e	KR027961	<i>Pseudomonas vranovensis</i>
54	SUB1092331 UMK6x1	KT731974	<i>Acidovoraxcaeni</i>
55	SUB1092331 UMK6x2	KT731975	<i>Acidovoraxcaeni</i>



interventions are justified within the One Health label (Godfroid, 2017). This led me to dabble into viral diseases such as rabies during an outbreak in dogs in Malaysia (Bamaiyi, 2015) and the first report of rabies in a lioness in the Jos Zoo (Rimfa et al., 2025). Indeed, in addition to calling for transdisciplinary collaboration, and in contrast to the standard common public health paradigm which is anthropocentric, the One Health paradigm aims to promote the well-being of animals and natural resource conservation and management (Godfroid, 2017). This paradigm shift acknowledges that the health of people is inextricably linked to the health of animals and the ecosystems we share, necessitating a profound understanding of infectious agent biology as a prerequisite for any sound One Health approach (Godfroid, 2017). Consequently, my research trajectory has been deeply influenced by the recognition that the study of local wildlife is often neglected, yet these populations represent a critical reservoir of bacteria and other pathogens that can pose a significant threat to domestic livestock and human health. This realization compelled me to investigate the often-overlooked role of wildlife reservoirs, as understanding the biology of infection and the changing epidemiology of *Brucella* is an indispensable prerequisite for integrating these insights into a truly effective One Health response (Almuzaini & Elbehiry, 2025; Moriyón et al., 2023). This perspective is particularly crucial given that different degrees of scientific collaboration and sectoral integration are needed for different types of zoonotic diseases, depending on the health and associated economic gains that can be expected from a One Health approach (Moriyón et al., 2023). For endemic zoonoses like brucellosis, the required integration differs significantly from that of emerging pandemic threats, as the mitigation of persistent, poverty-linked infections demands sustained, context-specific strategies rather than rapid emergency response (Bamaiyi et al., 2014; Moriyón et al., 2023). This distinction is vital because endemic scenarios are often aggravated by global warming and the intensification of breeding to meet growing food demands, creating a complex landscape where disease awareness, stakeholder sensitization, and the building of breeder trust remain unresolved issues (Moriyón et al., 2023). These persistent gaps in awareness and trust underscore the necessity for robust surveillance systems that can accurately capture the true burden of infection across all reservoir populations, a task that requires comprehensive data collection from both domestic and wildlife hosts to effectively predict the establishment of reservoirs and prevent zoonotic spillover at the source.



**Figure 3.2: A Malaysian playing with a Macaque caged in a goat house**

#### **4. REGIONAL VIGILANCE: NIGERIA'S NORTHERN FRONTIER**

In Maiduguri, the 'Home of Peace,' my research focused on the resilient camel—the 'Ship of the Desert.' We found a staggering 92.4% prevalence of gastrointestinal parasites. From *Coccidia* to *Ascaris*, the camel is a reservoir of silent suffering. Simultaneously, our study on *Staphylococcus aureus* in cattle and sheep revealed a 61.7% prevalence in bovine samples, with alarming antimicrobial resistance patterns (Bamaiyi, 2013; Bamaiyi & Kalu, 2011; Bamaiyi & Aniesona, 2013; Bamaiyi & Kalu, 2006). We also looked at cryptosporidiosis in children, another neglected zoonosis (Aniesona & Bamaiyi, 2014). This study investigated the prevalence and epidemiological patterns of *Cryptosporidium* infection among diarrhoeic children in Borno State, North-Eastern Nigeria. Conducted as a retrospective analysis, the research examined 650 stool samples collected between September 2006 and October 2008 from children aged 0–15 years attending major health facilities in Maiduguri (urban), Bama, and Gwoza (rural areas).

##### **Key Findings**

- **Overall Prevalence:** 42.9% (279/650), indicating a high burden of cryptosporidiosis among diarrhoeic children in the region.
- **Geographical Distribution:**
  - Maiduguri (urban): 45.0%
  - Rural areas (Bama and Gwoza combined): 41.8%The difference was not statistically significant ( $P > 0.05$ ).

- **Age Association:**  
Children aged **0–10 years** had significantly higher prevalence (46.8%) compared to those aged **11–15 years** (20.8%) ( $P < 0.05$ ; OR = 3.34). Younger children were over three times more likely to be infected.
- **Gender Distribution:**  
Males showed slightly higher prevalence (44.3%) than females (41.4%), but this difference was not statistically significant.
- **Seasonal Trend:**  
Higher infection rates were observed during the hot dry months (March–April), suggesting seasonal influence.

### **Public Health Implications**

The high prevalence highlighted cryptosporidiosis as a major contributor to childhood diarrhoeal disease in the arid region of North-Eastern Nigeria. Contributing factors likely include:

- Poor sanitation and inadequate sewage systems
- Contaminated drinking water sources
- Close contact between children and livestock (zoonotic transmission potential)
- Possible immunosuppression (including HIV co-infection)

The study underscored the vulnerability of younger children and emphasizes the zoonotic and environmental dimensions of transmission.

### **Conclusions and Recommendations**

We recommended:

- Routine testing for *Cryptosporidium* in children presenting with diarrhoea
- Improved water treatment and sanitation infrastructure
- Boiling or proper filtration of drinking water
- Enhanced hygiene in animal husbandry systems
- Molecular characterization of isolates to determine species and transmission patterns

Overall, our study established cryptosporidiosis as a significant and under-recognized public health problem in North-Eastern Nigeria, particularly among young children living in resource-limited, arid environments (Aniesona & Bamaiyi, 2014).

We are not just fighting the disease; we are fighting the 'militating factors'—finance, infrastructure, and a lack of expert involvement in rural livestock management.

## **5. EXPANDING FRONTIERS: UGANDA EXPERIENCE**

Between 2016 and 2018, I served as Associate Professor of Public Health at Kampala International University, Uganda and also as the Director of the Postgraduate Studies and Research Directorate.

My work expanded into:

- Food safety analysis of beef and milk in Southwestern Uganda.
- Malnutrition among HIV patients.
- Patients' satisfaction with healthcare services.
- *Escherichia coli* contamination risks in raw cow milk.

(Kasozi et al., 2018; Ochan et al., 2018; Odwee et al., 2020)

These studies strengthened interdisciplinary collaboration between veterinary and human health sectors — a practical demonstration of the One Health paradigm.

I also contributed to administrative research and institutional efficiency studies within Central and Western Uganda.

Beyond academia, I served as Parish Pastor, Area Pastor, and regular broadcast speaker in World FM 101.3. These roles shaped my belief that knowledge without character is incomplete and diligence is the key to greatness.

As I tell my students:

“The heights by great men reached and kept, were not attained by sudden flight, but they while their companions slept, were toiling upward in the night.”-Henry Wardsworth Longfellow.

## **6. THE INNOVATION: THE TETFund NRF DNA VACCINE PROJECT**

“All the world's a stage, and all the men and women merely players”-William Shakespeare.

Upon returning to Nigeria in 2018 to join the University of Jos, I intensified research efforts locally.

Key contributions include:

- Clinicopathological studies of leptospirosis in dogs.

- Multidrug-resistant ESBL-producing *E. coli* in poultry.
- Aspergillosis management in poultry farms in Jos metropolis.
- Haematological reference values for Russian Shepherd dogs in Nigeria.
- First report of rabies in a Lioness in Jos Zoo
- Prevalence of brucellosis in Bauchi
- Prevalence of brucellosis in Mubi, Adamawa State
- Prevalence of brucellosis in the Federal capital Territory
- Prevalence of brucellosis in Plateau State
- Isolation and molecular characterization of *Brucella melitensis* and identification of a vaccine candidate against small ruminant brucellosis.

(Ameji et al., 2021; Olopade et al., 2022; Rimfa et al., 2025).

Currently, I serve as Principal Investigator of the TETFund National Research Fund **Project Code: TETFUND/ES/DR & DCE/NRF2021/SETI/AHS/00320/VOL.1** titled: “Development of a DNA-Based Vaccine Against Small Ruminant Brucellosis in Nigeria”.

This project seeks to transition from surveillance to product development and from diagnosis to vaccine innovation. Nigeria must move from consumer of scientific products across the globe from different nations to become a notable and reliable producer of solutions. Science without solutions is mere documentation. With the TETFund National Research Fund (NRF) grant we have set up a *Brucella* Vaccine Research Laboratory at the Faculty of Veterinary Medicine, University Jos, Naraguta Campus. Today, under the TETFund National Research Fund (NRF), we are moving into molecular engineering. We are designing DNA vaccine candidates that will ultimately help win the fight against the “reluctant killer”. With the help of this vaccine candidate, we are targeting the very core of zoonotic transmission. We seek a vaccine that is stable, affordable, and effective, which will be a Nigerian solution to a global scourge.

## **7. THE MAN BEHIND THE MICROSCOPE: FAITH AND FAMILY**

Life has tested the philosophy of 'All things are possible.' I dedicate this lecture to my daughter Blessing Divine Bamaiyi, whose loss taught me that while science seeks to prolong life, it is faith that gives life meaning. I have created a website in her memory ([www.blessing.ng](http://www.blessing.ng)) and registered a business called **Blessing Bamaiyi Ventures** with **REGISTRATION NO. 9318871** and we are about to publish a book titled: “**The blessing of Blessing**” in her evergreen memory. When I was doing my PhD, little Blessing, barely a year old then, used to tell me as I sit on the computer “daddy do your work” as her own way of encouraging me to keep working and excel. I am grateful to God that Blessing witnessed not only my acquiring a PhD but also becoming a professor before transitioning to Heaven on the 10<sup>th</sup> June, 2021. I thank my wife, Gyiha Miriam Bamaiyi, for being the anchor during my years in the Far East and East Africa. I thank the “arrows in the hands of a mighty man”: Increase Praise Bamaiyi and Precious-Anni Bamaiyi. My dearly beloved

Mom, Mrs Nagarta A. Bamaiyi sacrificed her life to raise six of us-her children (5 boys and 1 girl) when we lost our dad in November, 1975. She saw me become a professor before her transition to Heaven in 2021. She was buried on the same day with my daughter Blessing. My many duties over the years in different capacities and my recent role as National President of the Association of Christian Veterinarians Nigeria (ACVN) from 2022-2024 and Chairman Committee of Deans and Directors at University of Jos and at National level of the Faculties of Veterinary Medicine and Veterinary Teaching Hospitals in Nigeria, has taught me that a scientist's greatest lab is the community he serves. That is why we must continue to build virile, strong and egalitarian communities that understand and support our calling as scientists.

Faith is very crucial to successful research. I remember our frustration at our inability to isolate *Brucella melitensis* and our hopeless search for any isolate anywhere and my inability to bring my previous isolates from Malaysia. While we had a number of serologically positive samples we could not isolate *B. melitensis* from any of them until one day I heard a voice, I believe was that of the greatest infinite Scientist of all time and eternity, telling me to take my research assistant with me to Mubi, Adamawa State and that from the positive animals we will get there we will be able to isolate the bacteria and it happened just as I was told!

## **8. MY WORK IN ACTION: EXPLORING THE HEIGHTS AND ADDRESSING THE GAPS**

“Reach for the stars.”

There is nothing impossible because as I often say even impossible says I'm possible. I am looking forward to a fantastic future for our research in brucellosis and other zoonoses in which we will not only explore the heights but also conquer the heights. “The future belongs to those who believe in the beauty of their dreams.” Today, we confront a dream — a dream of a world free from the persistent burden of brucellosis. A disease that lingers quietly across continents, affecting livestock, crippling livelihoods, and inflicting preventable suffering on humanity.

This 'reluctant killer' persists not because solutions are absent, but because unity, innovation, and sustained commitment have often fallen short. Yet history teaches us that science, when guided by purpose and compassion, transforms nations.

### **Science with Purpose**

My journey in Veterinary Public Health has been guided by a singular conviction: that understanding the people behind the problem is as important as understanding the pathogen itself.

Through participatory engagement with rural communities, we have learned that sustainable control begins where science meets culture. Educational interventions targeting high-risk behaviors—such as consumption of unpasteurized milk and unsafe animal handling—demonstrate that knowledge empowers prevention. Prevention is not only better than cure, it is cheaper.

As Albert Einstein wisely noted, “In the middle of difficulty lies opportunity.” In the complexity of zoonotic disease lies the opportunity to redefine collaboration and leverage on the One Health concept for sustainable solution to zoonotic challenges.

### **Next-Generation Innovation**

Current vaccines, though valuable, are imperfect. They challenge diagnosis and carry safety limitations. Our mission is therefore clear: develop DIVA-compatible, next-generation vaccines that are precise, safe, and transformative.

By harnessing genomics, immunoinformatics, and reverse vaccinology, we are identifying conserved antigens to construct multi-epitope subunit vaccines capable of inducing robust cellular immunity. Through computational modeling and rigorous laboratory validation, we are building vaccines designed not merely to control — but to eradicate.

### **Protecting Humanity**

No licensed human vaccine exists for brucellosis. This gap is unacceptable. Our research extends beyond livestock to safeguard those at occupational risk. Through recombinant and nanoparticle-based platforms, we seek to develop safe human vaccines that elicit strong CD4+ and CD8+ T-cell responses without compromising safety.

To defeat an intracellular pathogen, we must strengthen intracellular immunity. We investigate immune evasion mechanisms, memory T-cell exhaustion, and antigen presentation pathways to design rational, evidence-based interventions.

### **The One Health Mandate**

Brucellosis does not respect borders, neither should our response. The One Health philosophy compels us to integrate human, animal, and environmental health into one unified strategy. We are collaborating with our colleagues from the College of Health Sciences University of Jos to ensure that we tackle this “reluctant killer” and other zoonoses adequately.

Guided by the 4Cs: Communication, Coordination, Collaboration, and Capacity Building; we are institutionalizing interdisciplinary platforms that unite veterinarians, physicians, environmental scientists, and policymakers.

As Helen Keller once said, “Alone we can do so little; together we can do so much.” The eradication of zoonoses demands collective courage.

## **Economic and Policy Commitment**

Investment in livestock vaccination yields measurable economic returns. Public-private partnerships and evidence-based policy decisions are not optional — they are imperative. Without political will and sustained funding, even the most brilliant science remains unrealized potential.

## **Educating the Future**

True transformation lies in capacity building. We must train a new generation equipped with genomics, bioinformatics, systems biology, and ethical artificial intelligence. We must nurture leaders who understand that disease control is both a scientific and moral responsibility.

Education is empowerment. Empowerment breaks cycles of poverty. And breaking those cycles dismantles the stronghold of neglected zoonoses.

## **The Way Forward: A Five-Point Strategy for Nigeria**

1. Establish a National Brucellosis Eradication Scheme.
2. Integrate Veterinary Public Health into the Primary Healthcare system.
3. Expand funding for molecular and translational vaccine research.
4. Promote ethical Artificial Intelligence and digital tools for One Health innovation.
5. Institutionalize structured mentorship for future One Health leaders.

## **9. CONCLUSION: A CALL TO ACTION**

East to West, North to South — pathogens know no borders. Science must also know no borders. My journey across Malaysia, Uganda, and Nigeria demonstrates that excellence is transferable, discipline is universal, and impact is intentional. I challenge younger academics: Pay your academic debt early. Publish rigorously. Mentor faithfully. Serve humanity passionately.

Let us confront the reluctant killer together — through science, one health, faith, collaboration, and unwavering commitment.

Thank you and God bless you.

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## FAMILY PICTURE



From left to right: Increase Praise, P.H. Bamaiyi, Gyiha Miriam, Precious-Anni and Blessing Divine