

INAUGURAL LECTURE



Professor Nicholas Tete Kwaku Dzifa Dayie

*BSc. (University of Cape Coast), MPhil (University of Ghana),
PhD (University of Copenhagen, Denmark),
Fleming Fellow (London School of Hygiene and Tropical Medicine)
International Programmes Coordinator, College of Health Sciences*

Topic:

**When Microbes Speak and Data Appear
Inconsistent, are we Witnessing Falsehood or Truth?**

Date: Thursday, April 30, 2026

Time: 5.00 p.m.

Venue: Great Hall

ASPIRATION

To transform lives and societies through unparalleled scholarship, innovation and result-oriented discoveries.

VISION

To achieve global impact through innovative research, teaching and learning, using a technology-driven and people-centred approach.

MISSION

To create an enabling environment that makes the University of Ghana increasingly relevant to national and global development through cutting-edge research and quality teaching and learning.

CORE VALUES

Integrity

We demand the highest standards of ourselves to earn the trust of others.

Commitment

We are committed to knowledge generation that positively impacts the lives of those within and outside our university community.

Respect

We provide others with a world-class experience that demonstrates our value for the diversity and contributions of members of our community.

Loyalty

We are committed to giving back selflessly to our university.



Inaugural Lecture

by

Professor Nicholas Tete Kwaku Dzifa Dayie

Topic:

When Microbes Speak and Data Appear
Inconsistent, are we Witnessing Falsehood or Truth?

Chairperson:

Professor Nana Aba Appiah Amfo
Vice-Chancellor

ORDER OF PROCEEDINGS



- 4.30 p.m. – **Arrival/Seating of Guests**
- **Procession**
- **Welcome Remarks/
Introduction of Chairperson:**
Mrs. Emelia Agyei-Mensah, Registrar
- **Introduction of Lecturer:**
Professor Nana Aba Appiah Amfo
Vice-Chancellor
- **Seperewa**
Mr. Osei Korankye
- **Inaugural Lecture:**
Professor Nicholas Tete Kwaku
Dzifa Dayie
- **Musical Interlude:**
Wind Emsemble, Department of Music
- **Presentations**
- **Chairperson's Closing Remarks:**
Professor Nana Aba Appiah Amfo
Vice-Chancellor
- **University Anthem**
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- **Recession**
- **Reception**
- In attendance:**
Ghana Dance Ensemble

ABSTRACT



Antimicrobial Resistance (AMR) refers to the ability of microorganisms to withstand the effects of antimicrobial agents, whether through intrinsic biological properties or through acquired genetic mechanisms, resulting in reduced or complete loss of therapeutic effectiveness. In doing so, microbes 'speak', not in words, but through their resistance patterns, revealing biological adaptation that laboratories must accurately detect and interpret. Thus, AMR is not merely a biological phenomenon; it is also a test of the reliability of the systems constructed to measure it.

In 2019, bacterial AMR was directly responsible for approximately 1.27 million deaths worldwide and a contributing factor to a further five million more deaths. Projections estimate that by 2050, AMR could account for up to 10 million deaths annually, surpassing current global mortality from cancer and disproportionately affecting Africa and Asia. Beyond mortality, AMR poses profound economic consequences, with projected global costs reaching USD 100 trillion and an estimated reduction of global GDP by 2–3 percent. These figures elevate AMR from a clinical challenge to a global health security and development imperative. These global trends are increasingly reflected in clinical practice, where resistant pathogens such as extended-spectrum β -lactamase-producing *Escherichia coli* compromise the effectiveness of commonly used antibiotics such as ceftriaxone, while the emergence of carbapenem-resistant *Klebsiella pneumoniae* threatens the effectiveness of last-line therapies.

Behind these global estimates lie laboratory reports that shape clinical decisions, surveillance systems that inform therapeutic guidelines and aggregated datasets that anchor public health policy. The integrity of AMR surveillance is, therefore, not a matter of secondary importance; it is central to patient safety, institutional credibility and global health security. At the most immediate level, the accuracy of AMR detection is first a matter of patient care. In clinical bacteriology, misclassification of susceptibility to a specific antibiotic is not a statistical anomaly; it is a potential therapeutic

error that may lead to ineffective treatment and adverse clinical outcomes. Thus, correct detection and reporting of resistance mechanisms are cornerstones of safe clinical microbiology practice before they become components of surveillance architecture.

Bacteria and their resistance mechanisms exist independently of how accurately we measure them. A bacterium either harbours resistance determinants or it does not. Laboratories do not create this biological reality; they attempt to identify it accurately. Yet between bacterial biology and national or global surveillance data lies a structured chain of processes such as specimen collection, organism identification, antimicrobial susceptibility testing, interpretive standardisation, reporting, aggregation and governance within which distortion may occur.

When antimicrobial resistance data appear inconsistent across laboratories, institutions or time, a critical scientific question emerges: are we observing genuine biological variation or structural and methodological weaknesses within the systems designed to measure it? Variability in resistance patterns may represent true biological processes such as responses to antibiotic selection pressure, clonal expansion of resistant strains, horizontal gene transfer or ecological shifts in pathogen populations. However, similar patterns may also arise from methodological factors such as deviations in standard operating procedures, poor quality reagents, inconsistent quality control practices, outdated interpretive breakpoints, weaknesses in laboratory quality management systems, fragmented data aggregation processes or variability in the expression of resistance determinants under differing external test conditions. If we cannot distinguish true population-level shifts in resistance from methodological variability or test condition-dependent expression differences, the evidence guiding clinical care and national policy becomes uncertain.

The Mapping Antimicrobial Resistance and Antimicrobial Use Partnership project reported that Ghana's laboratory network comprises approximately 4,841 laboratories, of which only 93 have bacteriology testing capacity. From this subset, national AMR estimates have been derived from 16 laboratories meeting defined analytical criteria. This distribution reflects structural capacity constraints rather than institutional deficiency. When

surveillance coverage is limited, the confidence that can be assigned to national resistance estimates is inherently shaped by the robustness of the surveillance architecture. Further insight was gained through the implementation of Ghana's national AMR Proficiency Testing Scheme supported by the Fleming Fund Scheme. Eighteen laboratories across the one Health spectrum participated, comprising 13 from the human health sector, four from the animal health sector and one from the environmental sector. In the first proficiency testing cycle, four of six major human health laboratories tested did not achieve the predefined 80 percent performance threshold. Performance variability was also observed across other participating sites. These findings were communicated confidentially to participating institutions and informed structured corrective action plans. The results underscore that inconsistency in reported resistance patterns may reflect evolving validation systems rather than purely biological change. In this lecture, therefore, "falsehood" does not denote deliberate deception; it refers to distortion; instances in which laboratory results fail to accurately represent microbial biology because validation structures are incomplete or insufficiently institutionalised.

Truth in antimicrobial resistance surveillance refers to evidence that accurately and reproducibly reflects the biological characteristics of pathogens within defined populations. Such evidence depends on harmonised standard operating procedures, rigorous quality assurance, validated proficiency testing, current interpretive standards, structured data aggregation and effective governance. Without these systems, it becomes difficult to determine whether changes in resistance patterns reflect genuine epidemiological shifts or weaknesses in measurement, thereby limiting the strength of epidemiological inference.

This lecture argues that safeguarding scientific integrity in antimicrobial resistance surveillance requires sustained investment in robust surveillance architecture as a national and global responsibility. As externally funded initiatives transition toward national ownership, surveillance systems must be embedded within durable governance frameworks rather than dependent on donor cycles. Accurate AMR detection is first a clinical safety obligation; surveillance is its population-level extension. Both are scientific duties and matters of public trust. When microbes speak, our systems must hear clearly.



Professor Nicholas Tete Kwaku Dzifa Dayie

BSc. (University of Cape Coast), MPhil (University of Ghana), PhD (University of Copenhagen, Denmark), Fleming Fellow (London School of Hygiene and Tropical Medicine)

International Programmes Coordinator, College of Health Sciences

PROFILE



Professor Nicholas Tete Kwaku Dzifa Dayie is a Professor of Medical Microbiology at the University of Ghana Medical School (UGMS), College of Health Sciences. His scholarly work covers antimicrobial resistance research, laboratory systems strengthening and the development of surveillance architecture that supports evidence-based clinical practice and informs public health decision-making. For nearly two decades, his academic contributions have evolved from pathogen-specific epidemiology to the strengthening of national health systems designed to detect, interpret and govern antimicrobial resistance data with scientific integrity.

EDUCATIONAL BACKGROUND

Professor Dayie began his early education at Anlo State School in Keta, where he completed his Junior High School education between 1991 and 1993. He subsequently attended Bishop Herman College, Kpando, for his Senior High School education from 1994 to 1996.

In 1998, he enrolled at the University of Cape Coast, where he pursued a four-year Bachelor of Science programme in Agriculture and graduated in 2002. Following the completion of his first degree, Professor Dayie applied to pursue postgraduate studies in Agriculture at the University of Ghana. During the admissions process, however, he received an unexpected invitation to attend an interview at the Department of Medical Microbiology, University of Ghana Medical School and was subsequently admitted to pursue graduate studies in Medical Microbiology in 2003. This unforeseen turn in his academic journey would later shape his lifelong engagement with infectious diseases and antimicrobial resistance research. It was during this stage of his training that he came to appreciate a guiding principle: **laboratory evidence must accurately reflect the biological characteristics of bacterial pathogens to inform effective patient care and responsible antimicrobial stewardship.**

EMPLOYMENT HISTORY AND RESEARCH FOCUS

Following the completion of his MPhil degree, he joined the Department of Medical Microbiology at the University of Ghana Medical School in 2006 as an Assistant Lecturer, marking the beginning of his academic career at the University of Ghana. He was subsequently promoted to Lecturer in 2007.

During these formative years of his academic career, he was actively engaged in teaching medical microbiology to medical students and contributing to laboratory-based investigations in clinical bacteriology and antimicrobial susceptibility testing.

At the same time, he was a co-investigator on the Danida-funded Antibiotic Drug Use, Monitoring and Evaluation of Resistance (ADMER) project in Ghana, which ran from 2010 to 2015. As part of the core research team, he contributed to the development of the project proposal and the implementation of studies examining antimicrobial use and antimicrobial resistance patterns in Ghana.

Within the framework of this project, he was awarded a doctoral scholarship to the University of Copenhagen, Denmark, where he pursued PhD studies in Molecular Bacteriology and Infection between 2010 and 2014. His doctoral research focused on the molecular epidemiology and antimicrobial resistance mechanisms of *Streptococcus pneumoniae* and *Enterococcus species* under the supervision of five Professors.

This experience provided him with advanced expertise in bacterial genomics, antimicrobial resistance mechanisms and pathogen adaptation, while strengthening his ability to connect molecular bacteriology with the operational realities of diagnostic laboratories and healthcare delivery. Evidence generated through the ADMER project contributed to the national evidence base used in the review of **Ghana's 2010 Standard Treatment Guidelines**, helping align therapeutic recommendations with emerging antimicrobial resistance trends.

In recognition of his growing contributions to teaching, research and laboratory systems development, he was promoted to Senior Lecturer in 2015, a position he held until 2021, when he

was promoted to the rank of Associate Professor of Medical Microbiology.

From 2015 to 2018, his research expanded to include vulnerable populations, particularly children living with HIV/AIDS and children with sickle cell disease. These studies examined pneumococcal carriage, serotype distribution and antimicrobial resistance trends following the introduction of the 13-valent pneumococcal conjugate vaccine (PCV-13) in Ghana. The findings contributed to a deeper understanding of vaccine effectiveness and serotype replacement dynamics within high-risk populations.

Between 2018 and 2021, Professor Dayie was selected as a Fleming Fellow under the Fleming Fellowship Programme administered through the London School of Hygiene and Tropical Medicine. During this period, he advanced his expertise in antimicrobial resistance genomics, surveillance systems design and laboratory quality management systems. The fellowship strengthened his systems-oriented approach to antimicrobial resistance containment and enhanced his leadership in surveillance governance and laboratory quality assurance frameworks.

In 2025, he was promoted to the rank of Professor of Medical Microbiology at the University of Ghana marking the culmination of nearly two decades of progressive academic leadership within the Department of Medical Microbiology.

CONTRIBUTIONS TO MEDICAL MICROBIOLOGY

Professor Dayie has served as a Technical Lead for national Proficiency Testing initiatives in clinical bacteriology laboratories, strengthening inter-laboratory comparability and improving confidence in antimicrobial susceptibility testing results across Ghana's laboratory network. He significantly contributed to the development of harmonised Standard Operating Procedures across human, animal and environmental sectors and led the development of Ghana's Integrated Antimicrobial Resistance, Antimicrobial Use and Antimicrobial Consumption Surveillance Strategy under the FHI 360-supported EpiC Ghana Global Health Security Project funded by the United States Department of State from 2024 to 2025. He serves as a member of the

Surveillance Technical Working Group of the AMR Platform of Ghana, contributing to the development of national surveillance standards and harmonisation efforts. He is also a member of the AMR Multi-Stakeholder Partnership Platform facilitated by FAO, UNEP, WHO and WOAHA, participating in global cooperation to address antimicrobial resistance.

Professor Dayie has authored and co-authored more than eighty peer-reviewed scientific publications and has contributed to securing competitive research funding from Danida and successive Fleming Fund Country Grants, including Phase I, Transition and Phase II, in partnership with the University of Ghana and Aurum Institute, Ghana. He has also served as co-investigator on multiple National Institutes of Health research grants. Collectively, he has contributed to the successful acquisition and implementation of research and capacity-building grants exceeding 12 million United States dollars in support of antimicrobial resistance surveillance, infectious diseases research and laboratory systems strengthening.

LEADERSHIP ROLES

Within the University of Ghana Medical School, Professor Dayie served as Departmental Examinations Officer from 2016 to 2018 and again from 2021 to 2023. He currently serves as Module Leader for the Infection and Immunity Module, Pre-Clinical Programme Coordinator for the regular medical programme and Phase I manager of the Graduate Entry Medical Programme. Through his teaching and supervision, he has mentored and trained many undergraduate medical students and postgraduate students in medical microbiology, contributing to the development of the next generation of clinicians, researchers and laboratory scientists. At the College of Health Sciences, he serves as the International Programmes Coordinator, where he facilitates international academic partnerships and collaborative initiatives on behalf of the Provost. On several occasions, under formal delegation, he has acted as Dean of the University of Ghana's International Programmes Office.

CAPACITY BUILDING AND CONSULTANCIES

Beyond his responsibilities within the University of Ghana, Professor Dayie contributes to broader academic capacity-

building initiatives. He has been part of a consortium led by King's College, London that developed a transnational curriculum for the award of Postgraduate Certificates in Education, supporting cross-border capacity building in health professions education. In addition, he serves as a regular consultant to the Ghana Tertiary Education Commission, contributing to the review and accreditation of academic programmes in tertiary institutions.

Beyond academia, Professor Dayie has served as Consultant to the American Society for Microbiology, the African Society for Laboratory Medicine, the Fleming Fund and FHI360, supporting capacity-building initiatives across hospitals and laboratories in Ghana aimed at strengthening diagnostic systems and laboratory quality management frameworks.

Through research, policy engagement, academic leadership, and laboratory systems strengthening, Professor Dayie has worked to bridge molecular bacteriology with health systems architecture. His contributions advance the safeguarding of scientific integrity and strengthen the foundations upon which reliable evidence, sound clinical decisions and effective public health action depend.

This intellectual journey, from the study of bacterial pathogens to the strengthening of surveillance systems capable of detecting and interpreting antimicrobial resistance, forms the foundation of his inaugural lecture, which reflects on the scientific responsibility of ensuring that laboratory evidence accurately represents biological characteristics of bacterial pathogens.

FAMILY

Professor Dayie is the son of Professor Grace Yawo Gadagbui (Retired), formerly, Professor at the University of Education, Winneba, whose distinguished academic career helped shape his appreciation for scholarship and education. He is married to Dr. Mrs. Alberta Dzifa Dayie, Lecturer in Chemistry at the University of Cape Coast. Together they are blessed with four children: Eleagbe, Elinam, Eyram and Yayra.

UNIVERSITY ANTHEM



Hail University of Ghana
The nation's hope and glory
The place that bears the star of peace
That bids us all to do our best
Let the great Tower of learning
Inspire both young and old
May we proceed in unity to uphold the public cause.

//: Arise, arise O Legon
Defend the cause of freedom
Proceed in truth and integrity to make
Our nation proud: //

We ask for strength and wisdom
As we climb the hill of learning
May we excel in what'er we do
As we prepare to face the world
With a mind ready at all times
And a conscience quick to feel
May we proceed in unity to uphold the public cause.

//: Arise, arise O Legon
Defend the cause of freedom
Proceed in truth and integrity to make
our nation proud ://

(Prof. Emeritus J. H. Kwabena Nketia)
(1921-2019)



UPCOMING EVENTS

6th May, 2026	Interview on Research and Innovation Agenda on Radio Univers 105.7 f.m. <i>Guest:</i> Prof. Nicholas Tete Kwaku Dzifa Dayie <i>Time:</i> 9:00 a.m
14th May, 2026	Inaugural Lecture by Professor Vincent Boima <i>Topic:</i> From Genes to Mind: Holistic Pathways to Precision Kidney Care for Africa <i>Venue:</i> Great Hall <i>Time:</i> 5:00 p.m.
TBA	UG Student Experience Conference Details soon

twisco

Chocolate Food Drink

VITAMIN D

CALCIUM

VITAMIN C

VITAMINS
B2, B3, B6, B12

IRON

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