



**MBARARA UNIVERSITY OF
SCIENCE AND TECHNOLOGY**

20th ANNUAL
**ANNUAL RESEARCH
DISSEMINATION
CONFERENCE
(ARDC) 2025**

THEME: "Catalyzing Sustainable
Development Through Research,
Science, Technology and AI"

DATE: 21st November, 2025

VENUE : Las Vegas Hotel, Mbarara

Acknowledgement

Special thanks go to the Editorial and Organizing Team, headed by Assoc. Prof. Joel Bazira, who also serves as Chair of the Directorate of Research and Graduate Training (DRGT) board. We extend our gratitude to the Director of DRGT, Assoc. Prof. Vincent Batwala, and the staff for establishing a strong secretariat that has supported the organizing committee throughout this conference.

Special appreciation is also extended to the IT team, led by Mr. Owen Muhangi, for expertly managing and overseeing the technical aspects of abstract submissions and associated processes.

Our gratitude goes to the University's leadership and management for their ongoing financial support of this critical academic event at MUST. We also extend a sincere thank you to everyone who contributed to the success of this conference, the Mentorship/Supervisors' Workshop, and the PhD Symposium.

We are especially thankful to our partners and sponsors for their invaluable support in making this event possible.

Finally, to all our development partners, we are deeply grateful for your continued generosity, and to the entire MUST community and our service providers, we thank you wholeheartedly.

@2025 MUST ARDC

Preamble Message from the Vice Chancellor

It is my pleasure to welcome you to the 20th Annual Research Dissemination Conference of Mbarara University of Science and Technology (MUST). I congratulate the Directorate of Research and Graduate Studies led by Dr Vincent Batwala and the Conference Organising Committee led by Dr Joel Bazira for the hard work put into this. Thank you very much.

This annual event is uniquely structured as a 3-in-1; integrating the Mentors' Workshop, the PhD Symposium, and the Research Dissemination Conference. It is a profound reaffirmation of our core institutional commitment and Vision "To be a center of Academic and Professional Excellence in Science and Technology." The events are meticulously designed to foster this mission:

The Mentors' Workshop is designed to equip mentors with the skills and knowledge needed to effectively support and guide their mentees.

The PhD Symposium provides great opportunity for our students to share their research, receive feedback, and develop skills.

The Research Dissemination Conference is a great platform for dissemination of findings, dialogue, and serves as the vital link for transferring knowledge to policy

makers, industry, and the community for real-world application.

This Conference showcases the incredible research and innovation happening at MUST. This year's theme is "Catalysing Sustainable Development through Research, Science, Technology and Artificial Intelligence. The abstracts in this book represent the culmination of hard work and dedication from our researchers, students, and staff. The program features plenaries, panel discussions, and poster presentations. I hope you find the program rich, inspiring and thought-provoking.

I encourage you to engage with our researchers, ask questions, form research networks and explore potential collaborations. Let this 20th Annual Research Dissemination Conference be the ignition point for the next wave of transformative, community-focused research. Together, let's continue to drive progress and improve lives.

Thank you all for joining us and I wish you a productive and inspiring conference.

Prof. Pauline Byakika-Kibwika
Vice Chancellor



Communication from the Chairperson Organizing Committee

It is a great honor and joy for me to welcome you to the

20th Annual Research Dissemination Conference at Mbarara University of Science and Technology. This is a big deal because it marks 20 years of great academic research and innovation.

The theme of this year's conference is "Catalyzing Sustainable Development through Research, Science, and AI". This shows how committed we are to using the latest research and technologies to come up with new solutions. In a time when global problems require people from different fields to work together, this platform shows how scientific research and artificial intelligence can help promote progress that is both inclusive and long-lasting.

The conference brings together a lively group of researchers, academics, students, policymakers, and business leaders to share ideas, spark debate, and build

collaborations that will help create a future where science benefits everyone. As we celebrate our 20-year journey, we remember not just how far we have come but also how much more we can do.



I want to thank all the presenters, attendees, keynote speakers, sponsors, and organizing committee members from the bottom of my heart for their hard work that made this event a success. Let us take this chance to think, connect, and come up with new ideas for a better tomorrow.

Thanks for coming to this celebration of learning and change. I wish you a successful

and enriching conference.

Prof. Joel Bazira

Chairperson of the Organizing Committee

20th Annual Research Dissemination Conference

Mbarara University of Science and Technology (MUST)

Welcome Remarks by the Director, DRGT at the 20th ARDC, 21st Nov. 2025

It is my honour to welcome you to the 20th Annual Research Dissemination Conference (ARDC). This year's theme, "Catalysing Sustainable Development through Research, Science, Technology and Artificial Intelligence," speaks directly to the evolving global landscape and our commitment to contributing to national and international development agendas.

The Directorate of Research and Graduate Training (DRGT) has had the privilege of organizing this conference from the 14th edition in 2018 to date. Over this period, we have gained substantial experience in the planning and management of this important event, and indeed, we have registered remarkable and consistent improvements every year. As a result of these enhancements, the number of abstracts submitted has grown steadily from 40 in 2018 to 107 this year.

I wish to sincerely commend the University Management and our development partners for their unwavering commitment to mobilizing research funds, even during difficult and unpredictable periods.

I also extend our gratitude to the Government of Uganda for deliberately allocating seed funds to support research. These resources have served as a catalyst for scientific inquiry across multiple departments, promoting the formation of interdisciplinary research teams and stimulating innovation. In response to the third call for proposals during FY2025/2026, we registered 64 applications. Thus far, 26 teams have been funded, receiving a total of 519,339,300/= with 9 in the first quarter and 17 in the second. Additional awards will be made in the forthcoming releases.



You may recall that from the inception of the ARDC in 2005 until 2018, the conference dates were not part of the University's official calendar and were instead dependent on the availability of the Chief Executive Officer. The DRGT raised this matter before Senate, and after deliberation, Senate approved that this important annual event be held every third Friday of November. This has since become an institutional tradition, enabling both the University and our stakeholders to plan effectively.

Over the years, however, we have observed a concerning trend: some staff members have developed a habit of neither participating in nor attending this conference. This is a serious matter, and on 26th

August 2025, Top Management resolved to revert to the rotational model of organizing the conference. Subsequently, the Faculty Deans were informed through our letter of 23rd September 2025.

In line with this directive, Faculties shall follow a scheduled calendar in organizing future ARDC events.

I would like to extend my heartfelt appreciation to the Uganda Government, University Management, ARDC Organizing Committee, our esteemed partners, and all individuals who have consistently dedicated their time and effort to making this conference a success.

Thank you.

Assoc. Prof. Batwala Vincent

Director, DRGT

Message from the Chairperson, Scientific Committee

I welcome you to the 20th Annual Research Dissemination Conference (ARDC). This year, I am personally overjoyed to report that our research community has responded to this call with unprecedented enthusiasm. We received 107 abstracts, an increase from last year which demonstrates the vibrant and active research culture at

MUST. This rich program is the direct result of the dedication and hard work of the entire organising committee. The primary responsibilities of the Scientific Committee included: managing and quality control during submissions and review; developing the conference program that includes launching the call for abstracts, managing the review process, and creating the final conference schedule; and finally selecting the best junior researchers from each faculty.

This year also marks a significant leap forward in our processes. We have been instrumental in guiding the building of the ARDC software, a new platform to streamline our abstract management. This was an advocacy our committee championed, and I must sincerely congratulate our colleagues in the



ICT committee for taking on this vision and executing it so brilliantly.

Finally, our vision for this work does not end today. We believe that the

research presented at the ARDC deserves a wider audience and a permanent, citable record. As members of the MUST Journal steering team, we hold strong hopes and are actively exploring pathways for our conference papers to be published in the journal in the future. This will give a prominent shine to your work and create

a powerful synergy between our premier conference and our flagship journal.

Congratulations to all authors whose work fills these pages. I encourage you to engage deeply with the presentations, ask challenging questions, and forge the new collaborations that will catalyze sustainable development for the next many years to come.

I wish you a fruitful and inspiring conference.

Dr. Richard Kimera (PhD),

Chair, Scientific Committee of the RDC

@2025 MUST ARDC

Anthems

UGANDA

1. Oh Uganda! may God uphold thee,
We lay our future in thy hand.
United, free,
For liberty

Together we'll always stand.

2. Oh Uganda! the land of freedom.
Our love and labour we give,
And with neighbors all
At our country's call
In peace and friendship we'll live.

3. Oh Uganda! the land that feeds us
By sun and fertile soil grown.
For our own dear land,
We'll always stand

The Pearl of Africa's Crown.

EAST AFRICAN

1. Ee Mungu twaomba ulinde
Jumuiya Afrika Mashariki
Tuwezeshe kuishi kwa amani
Tutimize na malengo yetu.

Chorus
Jumuiya Yetu sote tuilinde
Tuwajibike tuimarike
Umoja wetu ni nguzo yetu
Idumu Jumuiya yetu.

2. Uzalendo pia mshikamano
Viwe msingi wa Umoja wetu
Natulinde Uhuru na Amani
Mila zetu na desturi zetu.

3. Viwandani na hata mashambani
Tufanye kazi sote kwa makini
Tujitoe kwa hali na mali
Tuijenge Jumuiya bora.

MBARARA UNIVERSITY

Mbarara University succeed we MUST
With God's will, we shall make the best of MUST
Let us unite and cooperate, to build the nation in different sectors
Our Pride and ego MUST will shine forever and we'll be victors
My alma mater long live x2 Mbarara University Ultimum viva

1. MUST we shall hail and salute thee
The frontier of true knowledge
For through advancing novelty
Your excellence will ever grow

2. CRADLE of efficient teachers
Doctors, Scientists and future leaders
Hope of the generation unborn
MUST you are our country's pride

3. WITH God's help Mbarara will shine
As the bright star among the others
To light the way for the future generation
To follow the light yonder

MUST 20 TH ARDC ORGANIZING COMMITTEE

Assoc. Prof. Joel Bazira	Chairperson	D R G T BOARD
Assoc. Prof. Vincent Batwala	Director	DRGT
Dr. Simon Kawuma (PhD)	Deputy Director	DRGT
Ms. Angella Nakato Muyingo		PRO
Mr. Owen Muhangi		ICT
Ms. Annet Kembabazi		GHC
Ms. Niinye Sheila		IRO
Dr. Richard Kimera (PhD)	Chair, Scientific Committee	(FCI)
Prof. Jerome Kabakyenga	Member Scientific Committee	(IMNCH)
Prof. Grace Kagolo	Member Scientific Committee	(FOS)
Dr. Wasswa William (PhD)	Member Scientific Committee	(FAST)
Dr. Tugiramasiko Miriam (PhD)	Member Scientific Committee	DRGT
Dr. John Emenyu (PhD)	Member Scientific Committee	(FOS)
Dr. Jeninah Atwebembeire (PhD)	Member Scientific Committee	(FOS)
Dr. Prudence Kemigisha(PhD)	Member Scientific Committee	(FIS)
Dr. John Baguma Kule (PhD)	Member Scientific Committee	(FBMS)
Dr. Tuhamize Barbra (PhD)	Member Scientific Committee	(FOM)
Frank Turyatunga		Finance
Ismail Bahati		AR
Martin Kijuumi		ICT
Peter Bambaza		ICT
Dr. Esther C. Atukunda		FOM

Conference Sub-themes

Environment and Climate Change Mitigation and Adaptation
Natural Resources Management and Biodiversity Conservation
Agricultural Production Enhancement for Sustainable Resilient Livelihoods
Food Safety, Security and Innovation (value chains addition)
Earth Sciences, Scientific Insight and Engineering
Industry, Energy and Emerging Technologies
Natural Products Validation and Development
One Health
Population and Public Health research
Responsive Health Delivery Systems
Design and validation of software technologies
Policy, Social Development and Gender
Entrepreneurship, Business Accounting and Economic Advancement
Inclusive Education and Educational Reforms

Program Summary	
OPENING PLENARY	
21 NOVEMBER 2025	
08:00 - 08:15 am.	Arrival and registration of participants at Las Vegas Hotel, Mbarara
8:30 – 10:30	Parallel sessions (Plenary attendees, Panelists and rapporteurs at Las Vegas – various rooms)
10:30 - 10:40 am.	Singing the Anthems and Prayer: National, East African Community, and MUST
10:40 – 10:50 am	Remarks by Chair Organising Committee - Assoc. Prof. Joel Bazira
10:50 – 11:00 am	Welcome remarks by DRGT Director – Assoc. Prof. Vincent Batwala
11:00 - 11:10 am	Presentation: Challenges and opportunities in outbreaks research - (Prof. Klaudia Porten)

11:10 - 11:20 am	Establishing the National ORCID Consortium in Uganda: Insights from the RENU Launch
11:20 - 11:40 am.	Opening Remarks by the Vice Chancellor – Prof. Pauline Byakika Kibwika
11:40 - 11:45 am	Pre launch of the MUST Journal
11:45 - 12:20am	Keynote address – Proffessor David Bangsberg
12:20 - 12:55pm.	Chief Guest - Hon. Dr. Musenero Monica Masanza
12:55 - 1:00 pm	Group photograph
1:00 – 2:00 pm.	Lunch (Las Vegas)
02.00 - 05.00 pm.	Parallel sessions (Plenary attendees, Panelists and rapporteurs at Las Vegas Hotel – various rooms)
5:00 - 5:10 pm	Humanity for Socio-economic Development; Contributions of Uganda Red Cross Society-60 years thus far. Dr Harriet Rachel Kagoya Kibuule (PhD)
5:10 – 5:25 pm.	Closing remarks, presentation of awards and selection of 2026 ARDC host
05:30 pm –	Cocktail party – At Las Vegas Hotel

Detailed Program

PARALLEL SESSION 1 LAS VEGAS HOTEL, ROOM 1 (MAIN HALL - LEVEL 4)	
Sub-theme: Population and Public Health Research	
Session Chairs: Prof. Ngonzi Joseph, Dr. Janet Kasozi, Assoc. Prof. Maling Samuel, Dr. Deus Tusubira, Assoc. Prof. Gertrude Kiwanuka, Peace Katusiime (Rapporteur), Ketty Namajja (Rapporteur)	
Time allocation	8.30 – 10.25 am: (Each presenter will have 10 minutes for their presentation. After a few presenters, there will be a combined Q&A session for the preceding presentations)
	Title/Presenting Author

8.30 - 8.40	Transboundary Migration Surveillance Controls and Infectious Disease Monitoring Practices: Insights from West Nile Uganda-DRC Borderline, Birungi Spencer
8.40 – 8:50	Assessing Transfusion Safety in Cancer Care: Bacterial Contamination of donor blood and RBC Alloimmunization among patients with cancer in Uganda, Taremwa Ivan Mugisha
8.50 - 9.00	Client and Provider Perspectives on Interventions for Unhealthy Alcohol Use Among People with HIV and TB in Uganda, Adrine Mbabazi
9.00 - 9.10	Unhealthy alcohol use and readiness to quit among people with HIV & TB in Uganda, Naomi Sanyu
9:10 - 9:20	Enhancing Primary Health Care (PHC) Services by Clinical Residents at Mbarara University of Science and Technology, Southwestern Uganda, Peter Chris Kawungezi
9:20 - 9:30	Combined Q&A Session
9.30 - 9.40	Long-term trends in HIV-related stigma among older-age people with and without HIV: Cohort study from Southwestern Uganda. Flavia Atwiine
9.40 – 9:50	Validity of point-of-care urine tenofovir testing to differentiate viremia versus suppression on TLD. Daniel Omoding
9.50 - 10:00	Lived Experiences Of Caregivers Of Children With Cerebral Palsy And Feeding And/Or Swallowing Difficulties In Southwestern Uganda: A Phenomenological Study, Asiimwe Busiinge
10:00 - 10.10	Prevalence, Associated Factors of Intradialytic Hypotension among Patients with Kidney failure on Maintenance Hemodialysis at Kiruddu National Referral Hospital, Uganda, Dauglas Nkoyooyo
10:10 - 10:30	Combined Q&A Session
10:30 - 2:00	PLENARY, LUNCH
Session two	Sub-theme: Population and Public Health Research (Cont'd) (MAIN HALL - LEVEL 4)
Session Chairs	Session Chairs: Dr. Imelda Tamwesigire, Dr. Janet Kasozi, Assoc. Prof. Maling Samuel, Dr. Deus Tusubira, Assoc. Prof. Gertrude Kiwanuka, Peace Katusiime (Rapporteur), Ketty Namajja (Rapporteur)

Time allocation	2.00 – 5.00 pm (Each presenter will have 10 minutes for their presentation. After a few presenters, there will be a combined Q&A session for the preceding presentations)
	Title/Presenting Author
2.00 – 2.10	Healthy-Families PrEP Trial – Cluster-randomized trial to promote PrEP use during periconception, pregnancy and postpartum periods for women in rural Uganda, Esther Atukunda
2.10 – 2.20	Biorisk Management Performance And Associated Factors Among Public Health Laboratories In Southwestern Uganda, Joseph Nkodyo
2.20 – 2.30	Lack Of Clarity On “Fair” Compensation In Medical Research Compromises Responsible Practices Among Investigators In Uganda, Mary Namukisa
2.30 – 2:40	Smart Discharges for Mom and Baby: The epidemiology of post-discharge mortality, readmission and care-seeking among postpartum women and newborns in Uganda, Clare Komugisha
2:40 - 2:50	Prevalence of postpartum depression and its association with Diabetes mellitus among mothers in public health facilities in Mbarara, southwestern Uganda, Catherine Atuhaire
2:50 - 3:00	Combined Q&A Session
3.00 – 3.10	Socioeconomic Livelihoods and Fertility Preferences in Rural Southwestern Uganda: A Qualitative Analysis. Catherine Atahigwa
3.10 – 3.20	Resilience Amid Stigma; Analyzing The Agency And Well Being Of Teenage Mothers In The Rural Uganda, Miriam Tugiramasiko
3:20 – 3:30	Hazardous Alcohol Use and Lung Damage in People with HIV and Tuberculosis, Anacret Byamukama
3:30 – 3:40	Prevalence and Causes of Visual Impairment among Patients with Diabetes Mellitus at Gulu Regional Referral Hospital, Northern Uganda, Bob Rolex Opiot
3:40 - 3:50	Prevalence and Correlates of Structural Lung Abnormalities among People with and without HIV in Uganda (Population and Public Health), Anacret Byamukama
3:50 - 4:15	Combined Q&A Session

4:15 - 4:25	Prevalence and factors associated with the multiple morbidity of postpartum depression, diabetes mellitus and hypertension among mothers in Mbarara district, south western Uganda: a parallel convergent mixed methods study.Catherine Atuhaire
4:25 - 4:35	Transforming Adolescent Health in Rural Uganda through Digital Stories: A Qualitative Study, Richard Ntwari
4:35 -4:45	Combined Q&A Session
4:45- 5:00	POSTER SESSION
5.00 – 5:25	Closing remarks by Deputy Vice Chancellor (AA)
PARALLEL SESSION 2 LAS VEGAS HOTEL, ROOM 2 (KIDEPO HALL - LEVEL 2)	
Sub-themes: 1. Responsive health delivery systems, 2. Natural Products Validation and Development, 3. One health	
Session Chairs: Dr. Sesaazi Duncan, Dr. Casim Tolo Umba, Assoc. Prof. Mwanga Juliet, Eng. Anke Weisheit , Kyokwebaza Mackline (Rapporteur), Janipher Tumwebaze (Rapporteur)	
Session one:	8.30 – 10.25 am: 15 min per presenter (10 min for presentation and 5 min for questions after every presentation)
Time allocation	Title/Presenting Author
8.30 - 8.40	Knowledge of Chronic Kidney Disease and associated factors Among Diabetic Patients in Eastern Uganda: A cross-sectional study, Eva Zalwango
8.40 – 8:50	Foxp3 And P53 Expression In Prostate Carcinoma And Their Correlation With Histological Grades Among Archived Tissue Blocks At Uganda Cancer Institute, Nuwashaba Nicholas
8.50 - 9.00	One Health Implications Of Antibiotic Residues In Broiler Chicken Liver Tissues And Resistance Profiles Of Isolated Bacteria, Patience Amutuhare
9.00 - 9.10	Sex Differences In Alcohol Use And Perceptions Of Cognitive Health In Rural Uganda, Emmanuel Maleka
9:10 - 9:30	Combined Q&A Session
9.30 - 9.40	Transforming Field Epidemiology Training for Humanitarian Impact: The FETCH Program Experience, Sophie Masson

9.40 – 9:50	Operational research in outbreaks: Use of observational data to assess safety of the hepatitis E vaccine in pregnancy, Robin Nesbit
9.50 - 10:00	Analysis of the carbon footprint of a vaccine clinical trial in Mbarara: lessons for reducing the impact, MariaLouise Namulwana
10:00 - 10.10	Multi-site pilot study on the deployment of cholera rapid diagnostic tests in the Democratic Republic of Congo and Niger, Wendelin Moser
10:10 - 10:30	Combined Q&A Session
10:30 - 2:00	PLENARY, LUNCH
Session two	Sub-themes: 1. Responsive health delivery systems, 2. Natural Products Validation and Development, 3. One health (Cont'd) (KIDEPO HALL - LEVEL 2)
Session Chairs	Dr. Sesaazi Duncan, Dr. Casim Tolo Umba, Assoc. Prof. Mwanga Juliet, Assoc. Prof. Alele Paul, Kyokwebaza Mackline (Rapporteur), Janipher Tumwebaze (Rapporteur)
Time allocation	Title/Presenting Author
2.00 – 2.20	Opportunities in ADRD research across the globe; Atlantic fellowship, ISTAART Jeremy Tanner.
2.20 – 2.35	Machine Learning and cognitive assessments. Robert Paul
2.35 – 2.50	The Past, Present, and Great Potential of Aging and Cognition Research at MUST, Mark Siedner.
2.50 – 3:00	ADRET Fellowship Q&A. Francis Bajunirwe and Samuel Maling
3.00 – 3.10	Effect of history of prior screening on individual risk of cervical cancer among women in Southwestern Uganda: a case-control study, Rogers Kajabwangu
3.10 – 3.20	Prevalence and Antimicrobial Susceptibility Profiles of Uropathogens isolated among Pregnant Women Attending Antenatal Care at Mbarara City Health Centre IV, Southwestern Uganda, Angura Basil
3:20 – 3:30	Association Of Serum Apolipoproteins A1 And B With Diabetic Retinopathy Among Diabetic Patients In Western Uganda, David Tenywa
3:30 – 3:40	Hpv Vaccination Uptake And Associated Factors Among Adolescent Girls In Mbarara, Namatovu Shakillah

3:40 - 3:50	Depression Among Pregnant Teenagers Receiving Antenatal Care From Primary Healthcare Facilities In Mbarara City, Southwestern Uganda, Moses Muwanguzi
3:50 - 4:15	Combined Q&A Session
4:15 - 4:25	HIV Testing and Treatment Cascades in Crisis: Impact of HIV Funding Cuts in Uganda, Gabriel Nuwagaba
4:25 - 4:35	Bridging Worlds of Care: Exploring the Feasibility and Acceptability of Traditional Healer–Led Paediatric HIV Testing in Southwestern Uganda. Fredrick Atwine
4:35 - 4:45	Minion Whole Genome Sequencing Of Blood/ Cerebrospinal Fluid For Diagnosis Of Cryptococcus Meningitis From Archived Samples At Mbarara Regional Referral Hospital, Uganda. Fredrickson B Wasswa
4:45 - 5:00	Combined Q&A Session
5.00 – 5:25	Closing remarks by Deputy Vice Chancellor (AA)
PARALLEL SESSION 3 LAS VEGAS HOTEL, ROOM 3 (NILE HALL - LEVEL 1)	
Sub-themes: 1. Earth Sciences, Scientific Insight and Engineering, 2. Inclusive Education and Educational Reforms, 3. Policy, Governance, Social Development and Gender Equality, 4. Entrepreneurship, Business Accounting and Economic Advancement	
Session Chairs: Assoc. Prof Lejju Julius, Dr. Kijjambu Nsambu, Dr. Manasseh Tumuhimbise, Assoc. Prof. Grace Birungi, Tumushabe Jovita (Rapporteur), Koburunga Enid (Rapporteur)	
8.30 - 8.40	Experiences and challenges of business incubation services in fostering the growth of MSME's.Ariyo
8.40 – 8:50	Invisible Yet Resilient". Understanding the Vulnerability and Integration Pathways of South Sudanese Older Refugees in Uganda, Ahimbisibwe
8.50 - 9.00	Strengthening Inclusive Education policy Planning and Management for Quality Higher Educational reforms in Uganda, Leticia Komba Rwakijjuma
9.00 - 9.10	Science Laboratory Availability and Functionality in Secondary Schools of Mbarara City, Uganda: A Qualitative Investigation, Preeti Kumari
9:10 - 9:30	Combined Q&A Session

9.30 – 9.40	Analysis of the influence of Demographic Variables on Teacher's Job Satisfaction in Secondary Schools of Kashari North County, Mbarara District, Uganda, Yobu Nasasira
9.40 – 9:50	Modeling Learners' Van Hiele Progression in Transformation Geometry: Mediations by Attitude Change and Moderation by Instructional Strategy, Issa Ndungo
9.50 - 10:00	Factors influencing the performance of Emyooga Livelihood Program in Uganda, Ariyo
10:00 - 10.10	Bridging The AI Accessibility Gap: An Offline Educational AI System For Low-Resource Learning Environments, Adam Katongole
10:10 - 10:30	Combined Q&A Session
10:30 - 2:00	PLENARY, LUNCH
Session two	Sub-themes: 1. Earth Sciences, Scientific Insight and Engineering, 2. Inclusive Education and Educational Reforms, 3. Policy, Governance, Social Development and Gender Equality, 4. Entrepreneurship, Business Accounting and Economic Advancement ROOM 3 (NILE HALL - LEVEL 1)
Session Chairs	Assoc. Prof Lejju Julius, Dr. Kijjambu Nsambu, Dr. Manasseh Tumuhimbise, Assoc. Prof. Grace Birungi, Tumushabe Jovita (Rapporteur), Koburunga Enid (Rapporteur)
Time allocation	2.00 – 5.00 pm, 15 min per presenter (10 for presentation and 5 for questions)
	Title/Presenting Author
2:00-2:15	Nutrient Enrichment Of Maize Flour For A Dietary Balanced Breakfast: Fortification With Jackfruit, Justine Nakintu
2.15 – 5.00	POSTER SESSION
5.00 – 5:25	Closing remarks by Deputy Vice Chancellor (AA)
PARALLEL SESSION 4 LAS VEGAS HOTEL, ROOM 4 (MURCHISON HALL - LEVEL 2)	

Sub-themes: 1. Design and validation of software technologies, 2. Industry, Energy, and Emerging Technologies, 3. Environment and Climate Change Mitigation and Adaptation, 4. Agricultural Production Enhancement for Sustainable Resilient Livelihoods, 5. Natural Resources Management and Biodiversity Conservation. 6. Food Safety, Security and Innovation (value chains addition)

Session Chairs: Dr. John Bosco Nkurunungi, Dr. Jeninah Atwebembeire, Dr. Medard Twinamastsiko, Dr. Matin Karuhanga, Winnie Twikiriize (Rapporteur), Kyimpaye Berina (Rapporteur)

Time allocation	8.30 – 10.25 am: 15 min per presenter (10 min for presentation and 5 min for questions after every presentation)
	Title/Presenting Author
8.30 - 8.40	The Role Of Strategic Communication In Coordinating Industry, Energy, And Emerging Technology Synergies For Renewable Energy Transition In Uganda. Wilson Okaka
8.40 – 8:50	Enhancing Clean Energy Access In Uganda Through Gender-Inclusive Renewable Energy Technology Diffusion And Climate-Resilient Engineering Solutions. Patrick Okori
8.50 - 9.00	Drivers and Barriers of Soil Nutrient Management Adoption in Finger Millet Production: Evidence from Smallholder Farming Systems in Southwestern Uganda, Immaculate Nakazibwe
9.00 - 9.10	A Framework for Ethical Blockchain Adoption in Health Information Systems in Uganda: Navigating Data Privacy and Patient Autonomy, Caroline Atuhaire
9:10 - 9:30	Combined Q&A Session
9.30 - 9.40	Predicting Multi-Factor Authentication Adoption Using Machine Learning And The Utaut Framework, Ronald Kato
9.40 – 9:50	Lingo Baraza: A Focused Web-Based Platform-Independent Data Collection Tool for Low Resource Languages, David Sabiiti Bamutura
9.50 - 10:00	Design And Validation Of Trust-Weighted Machine Learning Models For Predicting Multi-Factor Authentication Adoption, Ronald Kato

10:00 - 10:10	A comparative assessment of environmental impacts of production, use, and disposal of a parabolic solar cooker and charcoal for cooking in Uganda, Justus Asasira
10:10 - 10:30	Combined Q&A Session
10.30-2.00	PLENARY, LUNCH
Session two	Sub-themes: 1. Design and validation of software technologies, 2. Industry, Energy, and Emerging Technologies, 3. Environment and Climate Change Mitigation and Adaptation, 4.Agricultural Production Enhancement for Sustainable Resilient Livelihoods, 5. Natural Resources Management and Biodiversity Conservation. 6. Food Safety, Security and Innovation (value chains addition)
Session Chairs	Prof Grace Kagoro, Dr. Jeninah Atwebembeire, Dr. Medard Twinamastsiko, Dr.Matin Karuhanga, Winnie Twikiriize (Rapporteur), Kyimpaye Berina (Rapporteur) - (MURCHISON HALL - LEVEL 2)
Time allocation	2.00 – 5.00 pm, 15 min per presenter (10 for presentation and 5 for questions)
	Title/Presenting Author
2.00 – 2.10	Phytochemical profiling and Antibacterial potential of <i>Rhoicissus tridentata</i> : A Metabolomics-Guided, and In silico evaluation, Mukasa P
2.10 – 2.20	Internet Of Things Adoption In Community Healthcare: Enabling Integrated Monitoring, Aggrey Obbo
2.20 – 2.30	Determinants Of Shea Nut Marketing Arrangements In Northern Uganda, Deborah Akatwetaba
2.30 – 2:40	Endophytic Fungi isolated from medicinal Plants in Uganda exhibit Activity against Drug-Resistant Bacteria, Tonny Chemutos
2:40 - 3:00	Combined Q&A Session
3.00 – 3.10	Bridging Traditional Uses of Propolis in Uganda with GC-MS Metabolomics and Chemometric Modelling, Ivan Kahwa
3.10 – 3.20	Predicting Drug Pharmacokinetics from Chemical Structures with an Artificial Intelligence-Assisted Classical Model, Kityo Robert

3:20 – 3:30	Indole alkaloids from the Tribe Naucleeae as Potential Inhibitor of Plasmodium falciparum dihydroorotate dehydrogenase (PfDHODH): Molecular Docking, MM-GBSA, MD Simulations and Mlmodels.Joel O. Onoja
3:30 - 3:40	Effectiveness Of Agricultural Production Enhancement Engineering Technology For Sustainable Household Food Nutrition Security And Resilient Livelihoods In The Cattle Corridor Districts Of Uganda, Dorah Nambua
3:40 – 4:00	Combined Q&A Session
4:00 - 4:10	Lung dysfunction among young adults in Uganda. Turyasingura Winfred
4:10 - 4:20	Analysing the Extent of Compliance with Certificates of Approval for Environmental and Social Impact Assessments by Oil Companies in and around Murchison Falls National Park.Tom Ogwang
4:20 - 4:30	Phytochemical analysis, acute and sub-acute toxicity of a polyherbal cough mixture of G. amygdalinum, Z. officinale and E. globulus in wistar albino rats, Emmanuel Maleka
4:30 - 4:40	On Hypercyclic Bilinear Operators On The Normable Fréchet Spaces, Alituha Joseph
4:40 - 5:00	Combined Q&A Session
5:00 - 5:25	Closing remarks by Deputy Vice Chancellor (AA)
POSTER PRESENTATIONS (ROOM 4): 8:30 AM - 5:00 PM (Session Leads - Dr. Prudence Kemigisha and Dr. John Baguma Kule)	
Sub Theme: Population and Public Health Research, One Health	
Knowledge And Attitudes Towards Telemedicine For Sexual Reproductive Health Services Among University Students, Edison Byamugisha	
Global Preventive and Management Strategies and Their Effectiveness in Patients with Secondary Lymphedema: A Scoping Review. Mwesigye Vicent	
Propagation of solitons in an obliquely magnetized e-p-i plasma with non-thermal electron and Positrons, Lukiya Nazziwa	
Barriers and facilitators to uptake and utilization of the WHO mental health Gap Action Programme-Intervention Guide (mhGAP-IG) for dementia assessment and management in primary healthcare settings in Uganda using the COM-B framework. Christine K. Karungi	
Development and Optimization of a Conventional PCR Assay for Direct Detection of Streptococcus pneumoniae from Nasal Swabs, Kristen Bastug	
Self-care among people with heart failure in Uganda: Challenges and Potential Solutions, Nampijja	

From Crisis to Care: Delivering Integrated Health Services through the URCS Mobile Clinic, Christian Mwebaza
Strengthening Community-Based Disease Surveillance and Epidemic Preparedness through the One Health Approach in Kyangwali Refugee Settlement, Christian Mwebaza
Drivers and Barriers of Soil Nutrient Management Adoption in Finger Millet Production: Evidence from Smallholder Farming Systems in Southwestern Uganda, Isabella Epajja
Sub-themes: 1. Design and validation of software technologies, 2. Industry, Energy, and Emerging Technologies, 3. Environment and Climate Change Mitigation and Adaptation, 4.Agricultural Production Enhancement for Sustainable Resilient Livelihoods, 5. Natural Resources Management and Biodiversity Conservation. 6. Food Safety, Security and Innovation (value chains addition)
The Role Of Uganda National Oil Company (Unoc) In Enhancing Environmental Conservation For Community-Based Climate Change Mitigation And Adaptation In Uganda,Patrick Okori
Contamination And Susceptibility Patterns Of Enterobacteriaceae In Uncooked Beef And Chicken From Supermarkets: A Cross-Sectional Study In Kampala Central Division, Opolot Andrew
A Machine Learning Predictive Model For Early Detection Of Pre-Eclampsia Among Antenatal Mothers In South Western Uganda. NYAKAISHIKI MERCY
Biofertilizer for enhanced crop production on onions in Mukono Municipality, Mukono district, Uganda, Uzamukunda Mackline
Smart Biochar-Compost Hubs: Community-Driven Waste Transformation for Climate Resilience, Seruyange Innocent

Sub-theme: Population and Public Health Research

Transboundary Migration Surveillance Controls and Infectious Disease Monitoring Practices: Insights from West Nile Uganda-DRC Borderline

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Abstract

Background: Transboundary migration contributes significantly to the spread of infectious diseases, posing challenges for public health management along border points of entry.

Research Problem: Despite significant risks posed by diseases (COVID-19, Yellow fever, Ebola, and accelerated by human travel, the health monitoring practices remain inadequately integrated into the transboundary migration surveillance systems.

General Objective: This study explored and analyzed the factors why the infectious diseases monitoring practices are not mainstreamed, functional, and adhered to in the transboundary migration surveillance controls at border points of entry along the West Nile, Uganda-DRC borderline. Specific objectives: to describe the transboundary migration patterns; to explore the infectious disease monitoring in practice; to establish the association between the transboundary migration surveillance controls and the practices in monitoring infectious diseases; and to describe the adherence to protocols for infectious disease monitoring before, during, and after the outbreaks.

Methodology: Using a mixed-methods design, the research survey interviews with immigrants, key informant interviews with border officials, Focus Group Discussions with community stakeholders, In-depth interviews with selected community members, and Observations at points of entry and health centers iiis, Quantitative data were analyzed using STATA, and qualitative data through thematic analysis with NVIVO.

Findings: Results show intense cross-border movement with frequent crossings, motorcycles as primary transport, limited health screenings, and existence of health protocols despite lax enforcement. Key barriers; lack of awareness, equipment shortages, inadequate training, porousness and poor inter-agency coordination.

Conclusion and Implications: This research contributes to the understanding of the complexities of border health governance in high-mobility settings and informs policy and practice for improved epidemic control.

Recommendations: The study calls for establishing health posts at major border points, strengthening policy frameworks, capacity-building and enhancing collaboration with DRC authorities to improve epidemic monitoring

Key Words: Border, Migration surveillance, Infectious disease, Monitoring

Assessing Transfusion Safety in Cancer Care: Bacterial Contamination of donor blood and RBC Alloimmunization among patients with cancer in Uganda

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Background: Patients with cancer may frequently experience cytopenias that necessitate blood and component transfusions. Although transfusion is a lifesaving intervention, the use of allogeneic donor blood is associated with significant risks.

Objectives: This study aimed to : (1) assess the level of bacterial contamination in stored whole blood and blood components intended for transfusion to patients with cancer; (2) determine the prevalence and specificities of red blood cell (RBC) alloantibodies among patients with hematological malignancies in Uganda.

Methods: Objective 1 used a pre-transfusion aliquot of donor blood or components for blood culture. In addition, transfused patients were investigated 48 hours posttransfusion. Positive cultures were identified, and their antibiotic susceptibility pattern was determined. Objective 2 enrolled patients with hematological malignancies who had been multiply transfused. Their plasma was screened for the presence of RBC alloantibodies, and positives were identified using hemagglutination techniques. Data were presented as proportions.

Results: Objective 1; out of the 376 blood units tested, 4 (1.1%; 95% confidence interval [CI]: 0.4-1.8%) had bacterial contamination, with *Staphylococcus hominis*, *Staphylococcus capitis*, and *Bacillus subtilis*. Isolates were sensitive to benzylpenicillin, oxacillin, moxifloxacin, linezolid, and tigecycline but resistant to various antibiotics. There was no post-transfusion infection risk among recipients. Objective 2; of the 427 patients (mean age, 38.9 years; standard deviation 19.2 years), 25 (5.9%; 95% CI: 3.8-7.9%) possessed RBC alloantibodies against Rh, Kell, Duffy, Lewis, and MNS blood group antigens.

Conclusions: The study found a low bacterial contamination rate in stored blood and components; however, the isolates were resistant to common antibiotics, posing a potential risk of transmitting resistant strains to recipients. The prevalence of RBC alloantibodies was moderate, and these targeted antigens of varied blood group systems. **Implications:** Given the frequent need for transfusions among patients with cancer, these findings

highlight the need for improved transfusion safety in our setting.

Keywords: Transfusion safety, Cancer care, RBC Alloantibodies.

Client and Provider Perspectives on Interventions for Unhealthy Alcohol Use Among People with HIV and TB in Uganda

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Background: Unhealthy alcohol use among people with HIV (PWH) and TB hinders HIV viral suppression and TB treatment success in sub-Saharan Africa. Few studies describe client and provider perspectives on alcohol interventions in PWH and TB. We interviewed PWH and TB and key informants in Mbarara, Uganda to explore their perspectives on current and future alcohol-related interventions across socio-ecological model (SEM) levels.

Methods: We conducted in-depth interviews between November 2023 and September 2024 with 13 PWH and TB with hazardous alcohol use (AUDIT score >8) and 12 providers (including public health officials). Interviews covered existing resources addressing alcohol use, and ideas for other interventions. We coded transcripts using NVivo. Key themes were identified using an SEM-guided codebook thematic approach.

Results: Clients were 38% female, mean age 38+8 years, 77% at risk of alcohol use disorder (AUDIT >15); providers were 33% female, 67% with >10 years' experience. Individual-level interventions included one-on-one counselling - currently available with limited follow-up and only for clients intoxicated at appointments. Pharmacotherapy was generally unavailable but considered effective, despite pill burden concerns. At the interpersonal level, participants indicated an interest in group counselling, to reduce loneliness and boredom and family counselling, as participants mentioned that family influenced alcohol use/cessation. At the clinic level, participants suggested dedicated clinic days for alcohol interventions. Community-level

proposals included targeted public health messaging and outreach. At the policy level, participants mentioned a need for better education on alcohol-related harms. Cross-cutting challenges identified included resource limitations, stigma, and other implementation barriers.

Conclusion: Effective interventions for unhealthy alcohol use among PWH and TB require a multi-level approach. Future research should evaluate integrating alcohol interventions into HIV/TB treatment settings to improve HIV and TB outcomes. More research on identifying and reducing barriers to and facilitators for these interventions is needed, with emphasis on sustainability.

Key words: Perspectives, interventions, alcohol, HIV

Unhealthy alcohol use and readiness to quit among people with HIV & TB in Uganda

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Abstract

Background: Unhealthy alcohol use remains a significant barrier to HIV and TB treatment success. Our aim was to assess if readiness to quit alcohol use at the time of TB diagnosis (baseline) is predictive of self-reported change in drinking behaviors during TB treatment among people with HIV (PWH) initiating TB treatment in Mbarara, Uganda.

Methods: We assessed baseline demographics and readiness to quit alcohol among PWH reporting alcohol consumption at baseline. Readiness to quit was stratified into 3 stages: pre-action (thinking about quitting), action (actively trying to quit) and maintenance (quit). Alcohol use was measured using the Alcohol Use Identification Test-Consumption (AUDIT-C) at baseline and 3-months. AUDIT-C scores were at-risk if AUDIT-C ≥ 3 (women) or ≥ 4 (men) and low risk if scores were below these thresholds. Chi-square tests were used to assess associations between readiness to quit and change in AUDIT-C score between baseline and 3 months.

Results: Of 96 PWH (mean age 38 [SD 11.8] years, 60% male) 80% had at-risk drinking at baseline. At baseline, 24% were in the pre-action, 32% action, and 44% maintenance stage. There were no differences in baseline characteristics by stage. At 3 months, 42% quit, 22% decreased from at-risk to low-risk drinking, 32% maintained at-risk drinking, and 4% maintained low-risk drinking. Readiness to quit was associated with change in drinking at 3 months. Sixty-four percent of those in the maintenance stage quit drinking at 3 months compared to 23% in action and 26% in pre-action stages. However, 45% of those in the action stage and 17% in the maintenance stage maintained at-risk drinking at 3 months.

Conclusion: Readiness to quit is an important but imperfect metric for predicting alcohol use in the first 3 months of TB treatment. Tailored interventions are necessary to achieve sustained reductions in alcohol use among PWH with TB.

Keywords: Readiness to quit, AUDIT-C, HIV, TB

Enhancing Primary Health Care (PHC) Services by Clinical Residents at Mbarara University of Science and Technology, Southwestern Uganda

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Introduction: The Mbarara University of Science and Technology (MUST)'s First Mile Community Health Program (FMCH) has facilitated community placement of clinical residents at Primary Healthcare (PHC) facilities within the MUST catchment area in southwestern Uganda. However, little is known about how these placements have strengthened PHC service delivery in the region.

Objective: To describe the perspectives of PHC facility leaders on the impact of clinical residents' community placements on PHC services in southwestern Uganda between 2018 and 2023.

Methods: This was a cross-sectional study based on qualitative data-collection techniques. This study focused on MUST clinical residents and PHC facilities in the MUST catchment in southwestern Uganda. Key informant interviews (KII) were conducted with the PHC facility leaders

until saturation, transcribed, and analyzed. The specialties included internal Medicine, Surgery, Obstetrics and gynecology; pediatrics and child health; Ophthalmology, Ear Nose and Throat (ENT); Family Medicine, Medical Laboratory Science, Anesthesia, and Emergency Medicine.

Results: From July 2018 to December 2023, 152 clinical residents from ten specialties were placed at PHC facilities in southwestern Uganda. We conducted KIIs with 15 health facility leaders at PHC Facilities. Residents strengthened their PHC services across the following thematic areas: empowering and engaging people, reorienting the care model, coordinating services, and creating an enabling environment for PHC providers.

Conclusion: Clinical residents played a transformative role in strengthening PHC services. To fully harness this potential, there is an urgent need to institutionalize partnerships between universities and PHC facilities. Strategically deploying clinical residents in remote and underserved areas not only bridges critical workforce gaps but also reinforces the foundations of equitable and resilient health systems.

Recommendations: Investing in these collaborations is not optional; it is essential for advancing the quality and reach of primary healthcare and, hence, Universal Health Coverage.

Key words: Universal health coverage, health systems strengthening, community placement, service delivery gaps, health professional, medical practice.

Long-term trends in HIV-related stigma among older-age people with and without HIV: Cohort study from Southwestern Uganda

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Introduction: Perceived stigma is associated with lower rates of HIV diagnosis and management among people without HIV, and reduced antiretroviral therapy adherence and worse mental health outcomes among people with HIV. During the current treat-all era in HIV treatment, it is unknown how perceived stigma may have fluctuated among older adults with and without HIV in sub-Saharan Africa.

Objective: To characterize changes in perceived stigma using data collected during the current treat-all era with current ART regimens.

Methodology: We analyzed data from six waves of study visits from 2015 to 2024 across two observational cohort studies: the Ugandan Non-Communicable Diseases & Aging Cohort Study (UGANDAC) and the Quality of Life and Aging with HIV in Rural Uganda Study. Participants completed 15-item questionnaires to capture their stigma level at each of their study visits. We fitted linear and logistic generalized estimating equations (GEE) regression models to characterize perceived stigma trends by HIV serostatus.

Results: Perceived stigma significantly decreased in 2017 ($b=-0.66$, 95% CI -1.14 to -0.18), 2018 ($b=-1.28$, 95% CI -1.93 to -0.63), and 2024 ($b=-0.94$, 95% CI -1.53 to -0.23), compared to 2015. Yet, this result was largely driven by people with HIV, as perceived stigma rebounded in 2022 among people without HIV before decreasing again in 2024. Results were similar in models that considered stigma as a dichotomous variable.

Conclusion: We found perceived stigma has decreased over the past decade among adults living with HIV, but increased before returning to levels seen 7 years ago among people without HIV in Uganda.

Recommendations: Our findings highlight the need to maintain reduced stigma among people living with HIV, given the potential future disturbances in HIV treatment programs, and to more effectively manage the sources of persistent stigma among people without HIV.

Keywords: Antiretroviral therapy, HIV, Stigma

Validity of point-of-care urine tenofovir testing to differentiate viremia versus suppression on TLD

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Introduction: A point-of-care lateral flow assay detecting recent tenofovir (TFV) adherence in urine has been developed and validated.

Objective: We sought to assess the validity of the urine TFV assay to differentiate viremia versus viral suppression among people taking tenofovir-lamivudine-dolutegravir (TLD).

Methodology: We conducted a nested case-control study within the DISCO study, which followed adults with HIV on TLD as first-line antiretroviral therapy (ART) in Uganda and South Africa. Cases had ³¹ viremic episode (viral load ³⁵⁰ copies/mL) after ³²⁴ weeks on TLD. Controls were never viremic on TLD. Using the optimal pair method, pairs were propensity score-matched 1:1 based on sex, age, ART duration, and regimen before TLD, if any, with exact matching by country and ART-experienced versus ART-naïve status at TLD start. We fit conditional logistic regression models with presence of TFV in urine as the predictor and viremia as the outcome. We calculated TFV test performance characteristics and positive and negative predictive values (PPV; NPV), assuming population viremia prevalences of 1-30%.

Findings: We identified 123 cases and 123 matched controls from 1,173 participants; 44% were female, median age was 38 years (IQR 31-46), and median ART duration was 4.0 years (IQR 0.0-7.6). Individuals with absent urine TFV were significantly more likely to have viremia than those with TFV present (90% vs 43%, OR 11.33, 95% CI 3.48-36.90, p<0.001). Absence of

TFV had 97% specificity and 29% sensitivity to detect viremia (Table). NPV is >95% when prevalence of viremia is <5%; PPV is optimized with higher prevalences (Table).

Conclusions: Absent TFV was associated with increased odds of viremia on TLD. For groups with high pre-test probability of viremia, absent TFV suggested viremia. For groups with low pre-test probability of viremia, present TFV suggests viral suppression.

Recommendations: Urine TFV tests may prove useful in assessing presence of HIV viremia.

Keywords: HIV, Urine tenofovir testing, dolutegravir, adherence, viral suppression

Evaluating the feasibility and acceptability of using a smart watch for atrial fibrillation detection among inpatients in southwestern Uganda.

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Abstract

Background/Introduction: Atrial fibrillation (AF) affects an estimated 37.6 million people, and its prevalence is projected to increase by more than 60% by 2050. Low- and middle-income countries (LMICs) are showing rapid increases in AF prevalence. Addressing AF is particularly important in Uganda, where there is a paucity of data despite high rates of both AF's risk factors and ischemic stroke. The tools for detecting AF are limited in Uganda, and new, wearable technologies are an exciting opportunity to improve diagnosis.

Purpose: Few studies have looked at the feasibility and acceptability of smart watches in LMICs. We conducted a study evaluating the feasibility and acceptability of FitBit watches as compared with Holter monitor in detection of AF among high-risk inpatients in rural southwestern Uganda.

Methods: Between Nov 4, 2024, and Jan 28, 2025, we recruited adult patients admitted with a clinical diagnosis of heart failure or ischemic stroke detected on CT to the Mbarara Regional Referral Hospital in Mbarara,

Uganda. Participants were monitored concurrently with Holter Monitor and FitBit Charge5 watch for 24 hours. Both presence and duration of AF were recorded. Baseline clinical information was collected, and a transthoracic echocardiogram was performed on all patients. We assessed concordance of Holter and FitBit findings and used the Proctor framework to assess key implementation, service, and client outcomes, as well as through in-depth qualitative interviews with patients and healthcare providers, to assess implementation of AF detection devices into clinical care in Uganda.

Results: We recruited 50 patients, of whom 30 (78%) were women, 28 (56%) had heart failure, and 22 (44%) had ischemic stroke. AF was detected in 23 (46%), with a mean duration of 650 mins (SD 123.8). Concordance between FitBit watch and Holter monitor was 52%, driven by the need for regular rhythm spot checks with FitBit since continuous rhythm monitoring is not yet available in Uganda. The System Usability Score was 63.6 (Standard Deviation [SD] 1.7), below the target of 70. The Acceptability of Intervention Measure, Intervention Appropriateness Measure, and Feasibility of Intervention Measure were all above the target score of 3 and were 4.6 (SD 0.1), 4.3 (SD 0.1), and 4.1 (SD 0.1), respectively. In qualitative interviews, patients and providers found watches easy to use and associated with more attentive medical care. Both groups were excited about the possibility of smart watches improving health both inside and outside the hospital, though noting logistical issues (cost, access to charging and repair) limiting its broader use.

Conclusions: We found the FitBit watch had high feasibility and acceptability on 3 of 4 metrics but had suboptimal AF detection when compared to a Holter monitor, likely due to logistical and country-specific limitations. Further work should focus on ensuring continuous monitoring in Uganda and conducting population-level studies to understand AF prevalence.

Prevalence, Associated Factors of Intradialytic Hypotension among Patients with Kidney failure on Maintenance Hemodialysis at Kiruddu National Referral Hospital, Uganda

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Abstract

Introduction: Intradialytic hypotension (IDH), a frequent hemodialysis complication, is associated with increased morbidity, reduced quality of life, and increased mortality in patients with kidney failure. Data on the burden and associated factors of IDH in sub-Saharan African settings, including Uganda are limited.

Objectives: To determine the prevalence and associated factors of IDH among patients with kidney failure attending the dialysis unit of Kiruddu National Referral Hospital (KNRH), Uganda. **Methods:** A cross-sectional study enrolled adult patients (aged ≥ 18 years) at KNRH from November 2024 to January 2025. IDH was defined as per European Best Practice Guidelines (SBP decrease >20 mmHg or MAP decline >10 mmHg with symptoms requiring intervention) or nadir criteria (SBP <90 mmHg). Sociodemographic, clinical, and dialysis-related data were collected using interviewer-administered questionnaire. We used multivariable logistic regression to identify associated factors.

Results: 186 participants were enrolled with a median age of 46.5 (inter-quartile range = 34–58) years; 56.9% were male. 25 developed IDH for a prevalence of 13.4% (95% CI: 9–19%). Heart failure (aOR=6.41, 95% CI: 1.29–31.77, $p=0.023$), diabetes mellitus (aOR=4.85, 95% CI: 1.15–20.40, $p=0.031$), and low hemoglobin (<6 g/dL) (aOR=6.35, 95% CI: 1.91–21.15, $p=0.003$) were significantly associated with IDH. **Conclusion:** IDH affects one in ten patients with kidney failure at KNRH, and was significantly associated with heart failure, diabetes mellitus, and severe anemia.

Keywords: Intradialytic hypotension, Kidney failure, Prevalence, Uganda

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SEX DIFFERENCES IN ALCOHOL USE AND PERCEPTIONS OF COGNITIVE HEALTH IN RURAL UGANDA

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ABSTRACT

Introduction: Dementia is a significant public health issue affecting over 50 million people worldwide. Alcohol consumption has been identified as a modifiable risk factor for dementia and its progression.

Objective: We explored the sociocultural factors influencing sex differences in alcohol consumption and community perceptions of its potential cognitive effects in rural Uganda.

Methodology: We employed a qualitative study design in the Ibanda and Lira districts, guided by the Gender Analysis Framework (GAF). We conducted in-depth interviews with 20 older adults (≥ 60 years) who consume alcohol and 10 key informant interviews with community leaders. We used a deductive thematic analysis approach to generate themes using GAF.

Results: Four main themes are presented in this study: Access to resources, Practices and participation, Beliefs and perceptions, and Institutions, laws and policies. We found men having greater access to alcohol due to their economic independence and social norms, often drinking in social settings, facilitated by peer relationships and the acceptance of drinking. Women's access to alcohol was limited by household responsibilities and cultural expectations, with consumption mainly at home and in smaller quantities. Community norms discouraged alcohol consumption by women and were associated with shame and family disruption. Most participants believed that alcohol could cause memory problems, although other factors such as age, could contribute to cognitive decline. Weak enforcement of alcohol regulations and religious influences were reported, with women being more receptive to religious guidance on quitting alcohol consumption.

Conclusion: Gender disparities exist in alcohol access, consumption patterns, and social norms in rural Uganda. Participants associated alcohol use with short-term memory problems, perceptions that are consistent with early cognitive effects of alcohol but not with later stages of dementia.

Recommendation: There is need for gender-specific interventions to address alcohol consumption and to raise awareness about its potential impact on cognitive health in this population.

Keywords: Alcohol use; Dementia; Sex differences; Older adults; Rural Uganda.

LACK OF CLARITY ON “FAIR” COMPENSATION IN MEDICAL RESEARCH COMPROMISES RESPONSIBLE PRACTICES AMONG INVESTIGATORS IN UGANDA

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Introduction: Fair compensation in research fosters participants' trust. Although investigators and Research Ethics Committees (REC) must ensure fair compensation, Ugandan guidelines do not clearly define what is “fair” or “excessive.” This study explored compensation practices and influencing factors among investigators and REC members to inform context-specific guidance for ethical research conduct.

Objectives

1. To determine the common research compensation practices utilized in medical research conducted in Uganda.
2. To identify the factors influencing research compensation in medical research in Uganda.

Methods: Using mixed methods, data on compensation practices and influencing factors were extracted from 223 REC-approved medical protocols, and 25 in-depth interviews with investigators and REC members across Uganda. Quantitative data were analyzed using descriptive statistics and logistic regression. Qualitative data were thematically analyzed to explore experiences and perceptions influencing compensation.

Results: Out of 223 protocols reviewed, only 58(26%) [95% CI: 20.4–32.3%] proposed compensation. More than half of the 58 (53.5% (n = 31) offered money only, with a median of UGX 20,000 (IQR: 10,000–40,000). Transport reimbursement was the main reason for compensation 46 (79%). The odds of proposing compensation were high in non-academic studies AOR = 9.59, 95% CI [4.15–22.19], studies whose investigators were affiliated with institutions other than that of the REC AOR = 2.80, 95% CI [1.08, 7.25], and studies involving 6–17 year AOR = 9.30, 95% CI [1.49, 58.20]. Emerging themes included nonmonetary compensation practices, compensation in

challenging studies, changes over time, and sponsors decision.

Conclusion: Compensation in Uganda is inconsistently applied due to financial and regulatory gaps. National context-specific guidelines are needed to guide investigators and RECs to protect participants' welfare without compromising ethical research conduct.

Recommendation: UNCST should develop detailed and operational national guideline to guide compensation. Further studies should explore perspectives of research participants on compensation.

Key words: Compensation, reimbursement, 'challenging studies', investigator, REC Member

Prevalence of postpartum depression and its association with Diabetes mellitus among mothers in public health facilities in Mbarara, southwestern Uganda

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Abstract

Background: Postpartum Depression (PPD) is a major health challenge with potentially devastating maternal and physical health outcomes. Development of diabetes mellitus has been hypothesized as one the potential adverse effects of PPD among mothers in the postpartum period but this association has not been adequately studied especially in low resource settings. This study aimed at determining prevalence of postpartum depression and its association with diabetes mellitus among mothers in Mbarara District, southwestern Uganda.

Methods: We conducted a facility based cross sectional study of 309 mothers between 6th week to 6th month after childbirth. Using proportionate stratified consecutive sampling, mothers were enrolled from postnatal clinics of two health facilities, Mbarara Regional Referral Hospital and Bwizibwera Health center IV. PPD was diagnosed using the Mini-International Neuropsychiatric Interview (MINI 7.0.2) for the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5). Diabetes mellitus was diagnosed by measuring Hemoglobin A1c (HbA1c). Logistic regression was used to determine the association of PPD and diabetes mellitus among mothers.

Results: The study established that PPD prevalence of PPD among mothers of 6th weeks to 6th months postpartum period in Mbarara was 40.5% (95% CI: 35.1-45.1%) and it was statistically significantly associated with

diabetes mellitus in mothers between 6 weeks and 6 months postpartum. The prevalence of diabetes mellitus among mothers with PPD was 28% compared to 13.6% among mothers without PPD. Mothers with PPD had 3 times higher odds of being newly diagnosed with diabetes as compared to those without PPD (aOR=3.0, 95% CI: 1.62-5.74, p=0.001).

Conclusion: Mothers with PPD between 6 weeks and 6 months postpartum are more likely to have diabetes mellitus as compared to those without PPD. Well-designed prospective analytical studies are needed to conclude on the risk of diabetes mellitus in relation to PPD. Early screening of PPD may be considered in postpartum mothers.

Keywords: Postpartum, diabetes mellitus, depression, prevalence, maternal mental health

Socioeconomic Livelihoods and Fertility Preferences in Rural Southwestern Uganda: A Qualitative Analysis.

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Introduction: Fertility rates in rural Uganda remain persistently high despite improvements in education, health, and family planning services. While existing research emphasizes demographic and educational factors, the influence of socioeconomic livelihoods, particularly land ownership and informal employment, on fertility preferences remains underexplored.

Objective: This study aimed to explore how land ownership and informal employment shape fertility preferences and reproductive decision-making in rural southwestern Uganda.

Methodology: A qualitative design was employed, involving 15 focus group discussions and 11 in-depth interviews with men and women of reproductive age. Participants were purposively selected to reflect diverse socioeconomic backgrounds. Data were transcribed, translated, and analyzed thematically using NVivo 12.

Results: Three key themes emerged: (1) Land as a resource shaping fertility decisions; land ownership reinforced men's pronatalist ideals and was associated with masculine identity and intergenerational legacy; (2) Dual influence of informal employment; informal work gave women

some economic agency but limited reproductive autonomy due to income insecurity and entrenched gender norms; and (3) Economic constraints on reproductive choices; financial barriers reduced access to family planning, while cultural expectations sustained large family ideals.

Conclusion: Socioeconomic livelihoods strongly shape fertility preferences through structural and gendered pathways. Land ownership sustains pronatalist norms, while precarious informal work constrains women's ability to act on fertility preferences. Addressing these structural drivers is critical for promoting equitable reproductive decision-making.

Recommendation: Policy efforts should strengthen women's land rights and economic empowerment, alongside engaging men and community leaders to shift pronatalist norms and enhance reproductive autonomy.

Keywords: Land ownership, Informal employment, Fertility preferences.

RESILIENCE AMID STIGMA; ANALYZING THE AGENCY AND WELL-BEING OF

TEENAGE MOTHERS IN THE RURAL UGANDA

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Abstract

Teenage motherhood remains a significant public health and socio-economic challenge in rural

Uganda where social stigma persists. Despite extensive research on teenage pregnancy, little

attention has been given to how teenage mothers exercise agency to improve their well-being.

Objectives:

To analyze the agency applied by teenage mothers to improve their well-being in the rural Uganda particularly in Kanungu District.

Methodology/Approach: The study used a phenomenological research design. Data were collected through in-depth interviews, focus group discussions (FGDs), and key informant interviews (KIIs).

Results /Findings: Supportive family relationships were found to strengthen resilience and self-confidence, "My grandmother and mother take care of me and my baby" "They supported me in taking a hairdressing course" "I sometimes support my mother..." "My parents never gave up...", "I make baskets to sell in weekly markets". Neglectful and harsh environments compounded

vulnerability and isolation. "My mother kept telling me to ask the father of my son for support...", "My father told me to go and find the person who impregnated me when my child

got sick"

Conclusions and limitations: Restricted funding from government limited teen mothers from accessing funds for start up capital for skilling

Recommendations: The government to strengthen family support systems, integrating tailored vocational and financial programs to advance the agency and well-being of teenage mothers in Uganda.

Key words: Teenage Mothers, Agency, Vulnerability, Well-being, Support systems.

Hazardous Alcohol Use and Lung Damage in People with HIV and Tuberculosis

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Introduction: Tuberculosis (TB) is a major driver of morbidity and mortality in people with HIV (PWH), and alcohol use is common in PWH and increases the risk of poor TB outcomes.

Objective: We examined whether hazardous alcohol use is associated with structural and functional indices of lung damage in PWH at TB treatment initiation.

Approach: PWH initiating TB treatment in Uganda completed Alcohol Use Disorder Identification Tests (AUDIT: 0 = none, 1–7 = non-hazardous, ≥ 8 = hazardous drinking), spirometry, chest CT scans, and respiratory symptom assessment (St. George's Respiratory Questionnaire, SGRQ) to assess functional and anatomic variables relative to alcohol misuse. We fit multivariate regression models adjusted for age, sex, prior TB, and CD4 count to estimate associations.

Results: Of 200 PWH (mean age 37 years, 53% male), 43% reported hazardous alcohol use. PWH with AUDIT ≥ 8 were predominantly male, had lower body mass index (BMI), higher prevalence of smoking and secondhand smoke exposure but similar median CD4 counts (184 vs 168 cells/mm³). Those with AUDIT ≥ 8 had lower median FEV1/FVC, higher prevalence of FEV1/FVC < 0.70 and chronic CT abnormalities, but similar prevalence of acute restrictive CT patterns. PWH with hazardous drinking reported worse breathing related psychosocial function. Smoking and male sex were consistently associated with worse lung function and CT abnormalities. Hazardous alcohol use was not associated with lower FEV1/FVC ($\beta = -0.04$, 95%CI [-0.09, 0.01]), acute restrictive or obstructive CT patterns.

Conclusion: In this cohort of PWH with TB, lung damage was common at baseline, with hazardous alcohol use linked to worse lung function, CT abnormalities, and psychosocial function in unadjusted analyses. Future work should explore whether alcohol impacts the healing process in PWH treated for TB.

Key words: Spirometry, CT scan abnormalities, Functional indices, Smoking

Prevalence and Correlates of Structural Lung Abnormalities among People with and without HIV in Uganda

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Introduction: Chronic lung disease (CLD) is a major cause of morbidity and mortality among people with HIV (PWH). HIV drives lung disease through immune dysregulation, lung infections like tuberculosis, and behavioral risks such as smoking. Most studies rely on spirometry to quantify lung disease, which limits early detection since structural lung changes may precede abnormal spirometry.

Objective: To quantify the prevalence and correlates of CT-based structural lung abnormalities (SLA) among people with and without HIV in Uganda.

Approach: We analyzed non-contrast chest CT images from participants in an observational cohort in Uganda. PWH were at least 40 years old and on anti-retroviral therapy, and people without HIV (PWoH) were age- and sex- similar. All participants completed study questionnaires, tuberculin skin testing (TST), and chest CT scans. We classified SLA phenotypes based on Fleischner Society definitions and used multivariable logistic regression to identify factors associated with SLA subtypes.

Results: Among 564 participants (median age 57, 48% PWH, and 49% women), SLA were highly prevalent (68% overall): nodules (43%), emphysema (32%), septal thickening (18%), bronchiectasis (14%), and fibrosis (13%). PWH more commonly had emphysema (40% vs. 25%, $p < 0.001$), bronchiectasis (18% vs. 10%, $p = 0.003$), and fibrosis (17% vs. 9%, $p = 0.007$). In adjusted models, correlates of SLA included low body mass index (aOR 2.36 for septal thickening, aOR 3.39 for fibrosis, aOR 3.06 for bronchiectasis), older age (aOR 1.02–1.06 per year for fibrosis, septal thickening, nodules, bronchiectasis and ground glass opacities), male sex (aOR 1.72 for emphysema), HIV (aOR

1.9 for emphysema, aOR 2.19 for bronchiectasis) and respiratory symptoms (aOR 2.43, 1.86, 2.04 for fibrosis, emphysema, bronchiectasis).

Conclusion: Structural lung disease is common among PWH in Uganda. These findings highlight the importance of integrating lung disease screening into HIV care, for people living in sub-Saharan Africa.

Keywords: Computed Tomography, Emphysema, Bronchiectasis, Fibrosis

Prevalence and factors associated with the multiple morbidity of postpartum depression, diabetes mellitus and hypertension among mothers in Mbarara district, south western Uganda: a parallel convergent mixed methods study

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Background: The occurrence of multiple morbidities of postpartum depression (PPD), hypertension and diabetes mellitus (DM) among postpartum mothers poses a health care challenge because it not only affects the mother but also the life of the new born baby and that of close family members. Therefore, this study aimed at examining the prevalence and factors associated with these comorbidities among mothers in public health facilities in Mbarara, south western Uganda.

Methods: We conducted a facility based cross sectional study using parallel convergent mixed methods to collect information from 309 postpartum mothers from 6 weeks to 6 months after childbirth. Using consecutive sampling, mothers were enrolled from postnatal clinics of two health facilities. A MINI 7.0.2 for DSM-5 was used. DM was diagnosed by measuring Hemoglobin A1c (HbA1c). Hypertension was diagnosed when a person's systolic blood pressure (SBP) was ≥ 140 mm Hg and/or their diastolic blood pressure (DBP) was ≥ 90 mm Hg following repeated examination. The primary outcome was multiple morbidity defined as co-occurrence of PPD, hypertension and DM. Logistic regression was used. In the qualitative phase, 20 key informant interviews were conducted purposively. The interviews were audio recorded, transcribed verbatim and translated from the local dialect of Runyankore to English and analyzed thematically.

Results: The prevalence of multiple morbidity was 13.6% (95% CI: 10.2-19.3%). The prevalence of multi - morbidity did not vary significantly across age categories, $p=0.056$. Having high cortisol levels between 6 weeks and 6 months postpartum was the only factor significantly associated with multi-morbidity among mothers with PPD in both bivariate analysis and

multivariate analysis adjusted OR = 6.9, (95% CI: 3.29- 14.47), $p < 0.001$. In addition, this study revealed that psychological and socioeconomic factors, intimate partner violence and life style changes were likely to predispose the mothers to multiple morbidities.

Conclusion: Both quantitative and qualitative data offered complementary insights. The quantitative analysis highlighted high cortisol levels and diabetes mellitus as key biological factors associated with the multiple morbidity of PPD, hypertension and DM and qualitative findings enriched this understanding by illustrating the psychological, socioeconomic hardships, IPV and lifestyle changes context of these biological changes as they were frequently reported, offering a more holistic view of the factors influencing multiple morbidity among postpartum mothers.

Keywords: Multiple morbidity, postpartum depression, hypertension, diabetes mellitus, non-communicable.

LIVED EXPERIENCES OF CAREGIVERS OF CHILDREN WITH CEREBRAL PALSY AND FEEDING AND/OR SWALLOWING DIFFICULTIES IN SOUTHWESTERN UGANDA: A PHENOMENOLOGICAL STUDY

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Introduction: Feeding and swallowing difficulties (FSD) are common in children with cerebral palsy (CP), posing significant physical, emotional, and social challenges for caregivers. However, little is known about caregivers' experiences in rural Uganda, yet understanding them is vital for developing family-centered, context-appropriate rehabilitation strategies.

Objective: To explore caregivers' lived experiences in caring for children with cerebral palsy and feeding and/or swallowing difficulties.

Methodology: The design used was qualitative phenomenological. Nine primary caregivers of children with CP and FSD (Eating and Drinking Ability Classification System level III or above) were chosen through purposive sampling. A semi-structured guide was used to conduct in-depth interviews and used the Dedoose v10.0.25 software to do a thematic analysis.

Results: Five main themes emerged: (1) Support and healthcare services, (2) Adaptive feeding and care, (3) Psychosocial challenges, (4) Economic status, and (5) Physical care burden. Caregivers reported limited health information, stigma, financial strain, exhaustion, and disrupted livelihoods, yet demonstrated love, resilience, and adaptability in meeting their children's feeding and care needs.

Conclusion: Caregivers face diverse challenges when caring for children with CP and FSD, but they persevere and adapt. Improving caregiver wellbeing and child outcomes requires bolstering multidisciplinary rehabilitation, caregiver education, and psychosocial support networks.

Recommendations: The study recommends enhancing caregiver training on feeding management, integrating speech and language therapy into pediatric rehabilitation, and developing community-based support structures for caregivers of children with disabilities.

Keywords: Cerebral palsy, feeding difficulties, caregivers, lived experience, swallowing difficulties.

Transforming Adolescent Health in Rural Uganda through Digital Stories: A Qualitative Study

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Introduction: Digital storytelling, a participatory, arts-based methodology, holds promise in bridging communication gaps between health systems and adolescents. Despite its growing use, its potential within adolescent health programmes remains underexplored.

Objective(s): This qualitative study examined how digital stories influenced adolescent-focused health engagement and actions within the Healthy Adolescents and Young People (HAY!) initiative in Uganda.

Methodology / Approach:

Focus group discussions and in-depth interviews were conducted with school nurses, health workers, trainers, senior men and women, and

Headteachers involved in HAY! activities across Bushenyi and Rubirizi districts. Participants included users of digital stories addressing topics such as reproductive health, mental wellness, and gender-based violence. Interview data were transcribed and analyzed thematically using Braun and Clarke's framework and supported by Atlas.ti software.

Results / Findings:

Findings revealed three central themes: Engagement, Implementation, and Action. Users described digital stories as creating emotional resonance, relatability, and cognitive engagement among health workers, adolescents, families, and community members prompting reflection and empathetic dialogue on sensitive issues. Participants reported behavioral and structural changes, including improved counseling practices, integration of health themes into school curricula, and the establishment of adolescent-friendly services. Story-based learning also stimulated community-wide action planning and increased collective responsibility for adolescent well-being. Notably, digital stories facilitated a shift from punitive to empathetic approaches in adolescent support, triggering long-term attitudinal and practical change.

Conclusion / Implications:

This study demonstrates that digital stories serve as a communication tool and catalyst for emotional engagement, individual and participatory reflection, and actionable change in adolescent health interventions. Their success within the HAY! initiative signals potential for broader integration into health education and capacity-building efforts, especially in low-resource settings.

Recommendations: Sustained use of digital stories requires ongoing support, community engagement, and continuous digital storytelling practice. Future research should explore scalable models for embedding digital storytelling in national adolescent health programs.

Keywords: Digital Stories, Adolescent Health Promotion, Participatory Health Interventions, Uganda

Healthy-Families PrEP Trial – Cluster-randomized trial to promote PrEP use during periconception, pregnancy and postpartum periods for women in rural Uganda

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Introduction: Periconception, pregnant, and postpartum women in HIV-endemic settings are at high risk for acquiring HIV. In Uganda, fertility rates (4.7 children/woman) and HIV prevalence (8%) are high, and many women conceive with partners with HIV who are not virally suppressed. PrEP is a highly effective strategy for reducing HIV-acquisition and approved for use during pregnancy and breastfeeding.

Objective(s): This study aims to support women to use HIV prevention strategies while trying for and during pregnancy by adapting and testing an intervention through a cluster randomized trial. We developed an effective intervention to support women to use PrEP during these high-risk periods and now propose to adapt and implement the program in public sector clinics.

Methodology/Approach: From 2019-2023, we designed and pilot-tested a 3-session Healthy Families-PrEP intervention at the Immune Suppression Syndrome (ISS) Clinic at the Mbarara Regional Referral Hospital. Women planning for pregnancy were counseled on how to conceive while avoiding HIV acquisition; offered oral PrEP; and, for those choosing PrEP, provided with quarterly adherence support. For women with pregnancy, adherence persisted over 9 months. Following this, we are conducting formative research with key stakeholders and clients to adapt the intervention to include postpartum women in community clinics.

Results/Findings: Formative findings will inform a cluster-randomized control trial, to be undertaken in 2026 to test the intervention compared to standard of care with periconception, pregnant, and postpartum women accessing 12 community clinics in Mbarara and Sheema districts.

Conclusion/Implications: While HIV-exposed women choose to have children, PrEP for periconception, pregnant, and postpartum women has not been widely implemented. Our work will advise future intervention implementation for women in Uganda.

Recommendations: Adapting this Healthy Families PrEP intervention and testing effectiveness

aligns with global and Ugandan Ministry of Health goals to reduce HIV incidence among women of reproductive age and eliminate perinatal transmission.

Keywords: HIV prevention, PrEP, EMTCT, pregnancy, randomized control trial

Multi-site pilot study on the deployment of cholera rapid diagnostic tests in the Democratic Republic of Congo and Niger

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Introduction: Integrating rapid diagnostic tests (RDT) into surveillance systems could improve early detection of cholera, strengthen monitoring and guide vaccination decision-making.

Objectives: To investigate different aspects of the integration of RDTs into routine surveillance.

Methodology: In six health zones in DRC, consenting, over one-year suspect cholera cases admitted to CTCs were asked to provide stool samples, which were analyzed with direct and enriched RDTs (Crystal VC 01/0139 and for a subset SD Bionline and Crystal VCO1), cultures, and qPCR. The RDT-positive incidence based on different sampling schemes were computed and statistically compared with the incidence based on exhaustive RDT data. In two health zones in DRC and Niger, the integration of RDTs into the surveillance system according to new Global Taskforce on Cholera Control (GTFCC) surveillance guidelines (probable outbreak threshold and sampling

scheme) was evaluated under real-world conditions.

Results: All RDTs reached similar sensitivity (72%-77%) and SD Bioline highest specificity (82%, 95% CI, 78%-85%), which was significantly higher compared to Crystal VC01. Enrichment reduced sensitivity significantly (SD Bioline and Crystal VC01) and increased specificity for all RDTs. In high-incidence areas, applying the best performing sampling scheme (testing the first 3 cases per day per CTC), provides accurate incidence estimates and conserves up to half the RDTs. In a surveillance unit with minimal study team involvement in DRC and Niger, a probable cholera outbreak was correctly identified using the GTFCC threshold.

Conclusion: RDTs are an essential tool to improve cholera surveillance, particularly for rapid outbreak detection and monitoring. The new RDT based threshold proved to be a valuable tool for independent detection. A sampling scheme provides robust incidence estimates for monitoring and saves RDTs.

Recommendations: In cholera endemic countries, RDT should be integrated into the surveillance system via regular training and supervision to ensure solid RDT data for decision making.

Keywords: Cholera, surveillance, Rapid diagnostic tests

Effect of history of prior screening on individual risk of cervical cancer among women in Southwestern Uganda: a case-control study

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Introduction: There's a disparity in the cervical cancer incidence and mortality between resource-rich and resource-limited countries and this has been explained by the effective screening programs and high screening uptake in the former. Although data has consistently shown the effect of screening on the incidence of cervical cancer by country and region, very few studies have compared the risk of cervical cancer in individuals with and without history of screening. This study aimed to determine the association between history of screening and invasive cervical cancer among women at a tertiary hospital in Southwestern Uganda.

Methods: This was a secondary analysis of data from an unmatched case-control study on 470 women (157 cases of cervical cancer and 313 controls without cervical cancer), at the cervical cancer clinic of Mbarara Regional Referral Hospital. The exposure was history of cervical cancer screening using either HPV DNA testing, Visual Inspection under acetic acid or cytology. We used multivariable binary logistic regression analysis to determine the association between history of screening it's with cervical cancer adjusted for potential confounders.

Results: Cases were significantly older than controls: 52.4 ± 13.15 versus 41.9 ± 11.9 respectively, $p < 0.001$. Women with no prior history of screening were 2 times more likely to have cervical cancer compared to those who had screened (aOR-2.00; 95% CI 1.33-3.27). Age ≥ 45 years (aOR-2.83; 95% CI 1.80-4.44), lack of formal education (aOR-5.16; 95% CI 2.52-10.58) and HIV infection (aOR-2.22; 95% CI 1.41-3.52) were also associated with cervical cancer.

Conclusion: Compared to those with prior screening, women without prior screening are more likely to develop cervical cancer. Efforts to improve access such as setting up more cervical cancer clinics and carrying out cervical cancer screening outreaches should be intensified.

Prevalence and Antimicrobial Susceptibility Profiles of Uropathogens isolated among Pregnant Women Attending Antenatal Care at Mbarara City Health Centre IV, Southwestern Uganda

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Abstract

Background: Urinary tract infections (UTIs) are among the most common bacterial infections in pregnancy, contributing to maternal and neonatal complications. In Uganda, diagnosis is often empirical, contributing to antimicrobial resistance (AMR). This study assessed the prevalence, identified causative pathogens, and assessed antimicrobial susceptibility profiles among pregnant women at Mbarara City Health Centre IV.

Methods: A cross-sectional study was conducted from July to September 2024 among 389 pregnant women attending antenatal care. Socio-

demographic and clinical data were collected. Midstream urine samples were analysed by dipstick, microscopy, and culture. Isolates were identified by Gram stain and biochemical tests. Antimicrobial susceptibility was determined using the Kirby-Bauer method and interpreted per CLSI 2024 guidelines. Data were analysed in STATA 17.

Results: The prevalence of culture-confirmed UTI was 36.5% (142/389; 95% CI: 31.7–41.3). Gram-negative bacteria predominated, with *Escherichia coli* (42.9%) and *Klebsiella* spp. (38.3%) as the leading pathogens, while *Staphylococcus aureus* accounted for 13.5% of isolates. Most isolates were susceptible to ceftazidime (81.7%), gentamicin (77.5%), and imipenem (76.5%), but 26.3% exhibited multidrug resistance, mainly *E. coli* and *Klebsiella* spp.

Conclusion: The burden of UTI among pregnant women at Mbarara City HCIV was high, with *E. coli* and *Klebsiella* spp. as predominant uropathogens. While ceftazidime, gentamicin and imipenem remain effective, the emergence of multidrug-resistant strains highlights the need for routine culture and antimicrobial stewardship in antenatal care.

Keywords: Urinary tract infection, Pregnancy, Uropathogens, Antimicrobial resistance, Uganda

ASSOCIATION OF SERUM APOLIPOPROTEINS A1 AND B WITH DIABETIC RETINOPATHY AMONG DIABETIC PATIENTS IN WESTERN UGANDA

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Introduction: Diabetic retinopathy (DR) is a leading cause of visual impairment globally. Serum apolipoproteins A1 (ApoA1) and B (ApoB) have emerged as potential biomarkers for DR progression, but data from Sub-Saharan Africa, particularly Western Uganda, remain scarce.

Objective: To determine the correlation between serum ApoA1 and ApoB levels and diabetic retinopathy among adult diabetic patients in Western Uganda.

Methodology: A hospital-based cross-sectional study was conducted among 190 adult diabetic patients enrolled consecutively. DR was diagnosed by fundoscopy, while serum ApoA1 and ApoB were quantified using the Mispai3 analyzer. Socio-demographic, clinical, and lifestyle data were collected through structured questionnaires. Data were analyzed using descriptive statistics, correlation tests, and Poisson regression to identify independent

factors associated with DR. A p-value <0.05 was considered statistically significant.

Results: The prevalence of DR was 18.9%. Serum ApoA1 showed a significant negative correlation with DR ($r = -0.377$, $p = 0.001$), whereas ApoB demonstrated a strong positive correlation ($r = 0.765$,

$p = 0.001$). Independent predictors of DR included elevated ApoB (aPR = 3.02, 95% CI: 1.57–5.82, $p = 0.001$), poor glycemic control (aPR = 2.38, 95% CI: 1.14–4.99, $p = 0.021$)

Conclusion: ApoA1 and ApoB are significant biomarkers associated with DR among diabetic patients in Western Uganda.

Recommendation: Routine measurement of serum ApoA1 and ApoB should be integrated into diabetic care to enable early identification and monitoring of patients at risk of DR.

Keywords: Diabetic retinopathy, Apolipoprotein A1, Apolipoprotein B

HPV VACCINATION UPTAKE AND ASSOCIATED FACTORS AMONG ADOLESCENT GIRLS IN MBARARA

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Introduction: Cervical cancer is leading cause of cancer deaths among women in Uganda. Human papillomavirus (HPV) vaccination is an effective prevention measure, yet uptake and influencing factors among adolescent girls remain unclear in Uganda.

Objective: To assess HPV vaccination awareness, uptake, and identify factors associated with uptake among female adolescents aged 10–14 years in Mbarara District, Uganda.

Methods: A cross-sectional study was conducted among 236 female adolescents in selected primary schools in Mbarara District. Data were collected using a structured questionnaire and analysed in STATA. Descriptive statistics summarised vaccination status and awareness; bivariate analysis explored associations.

Results: A total of 236 adolescents were enrolled from 5 schools in October 2025. The median age was 13. HPV vaccination awareness was high (222, 94.3% agreed girls their age should be vaccinated). Since age nine, 218

(92.5%) had received any vaccination and 188 (79.7%) at least one HPV dose; while 120 (50.8%) received at least two doses. Parental support (191, 81.1%), school outreach (173, 73.3%), and health-worker advice (137, 58.3%) were mentioned as factors that promoted uptake. Concerns about HPV vaccination were low (36, 15.2%) and stock-outs rare (4, 1.9%).

Conclusion: HPV vaccine uptake is high for initiation (≥ 1 dose: 79.7%) but moderate for completion (≥ 2 doses: 50.8%) in Mbarara District, driven by parental, school, and health-worker support. Findings confirm that community-based strategies and sensitisation are needed to promote high coverage for the second dose and align with national prevention goals.

Recommendations: Strengthen school-based record keeping and ensure consistent vaccine supply to achieve full two-dose completion.

DEPRESSION AMONG PREGNANT TEENAGERS RECEIVING ANTENATAL CARE FROM PRIMARY HEALTHCARE FACILITIES IN MBARARA CITY, SOUTHWESTERN UGANDA

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Abstract

Background: Depression risk is high among women during pregnancy. The risk is higher among pregnant teenagers due to developmental, hormone-mediated physical and psychosocial pregnancy changes, with significant negative impacts on the unborn baby and the mother.

Objective: To determine the prevalence of depression and associated factors among pregnant teenagers in Mbarara city, southwestern Uganda.

Methods: This cross-sectional study enrolled pregnant teenagers (13-19 years) attending antenatal care at 4 selected lower healthcare facilities in Mbarara City, southwestern Uganda. We assessed depression, resilience, social support, and household food insecurity. Depression was defined as a score >10 on the Edinburgh Postnatal Depression Scale. Resilience was assessed using the 14-item Wagnild and Young Resilience Scale, the Multi-dimensional Scale of Perceived Social Support assessed perceived social support, and the Household Food Insecurity Access Scale assessed food insecurity in addition to sociodemographic variables. We run logistic regression analysis to determine factors associated with depression.

Results: Among a total of 373 participants with median age of 19 (IQR: 18–19) years, 59% attained primary level education. Depression was among 35.9% (95% CI: 31.1%–41.0%). Associated factors included current alcohol use (aOR=1.98, 95% CI: 1.18–3.32, p=0.010), food insecurity (aOR=2.24, 95% CI: 1.25–4.01, p=0.006), resilience (aOR=0.93, 95% CI: 0.91–0.97, p=0.001), and family social support (aOR=0.94, 95% CI: 0.88–0.99, p=0.031).

Conclusions: Depression prevalence is significantly high, with food insecurity and current alcohol use associated with higher odds, while resilience and family social support are associated with lower odds of depression.

Recommendations: Mental health services should be integrated into the antenatal care clinics to address food insecurity and alcohol use during pregnancy while reinforcing resilience and mobilizing social support to address the mental health needs of pregnant teenagers. Further studies should explore the lived experiences, focusing on the challenges and further understanding of their coping strategies and other possible confounders of depression.

Keywords: Depression, pregnant teenagers, resilience, alcohol use, food insecurity, social support.

HIV Testing and Treatment Cascades in Crisis: Impact of HIV Funding Cuts in Uganda

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Introduction: Uganda's progress toward the UNAIDS 95-95-95 targets has relied heavily on donor-funded programs providing peer support, adherence counseling, and community outreach. In early 2025, abrupt U.S. funding cuts dismantled these services, threatening HIV treatment continuity and

testing coverage.

Objectives: To examine how funding cuts disrupted HIV program sustainment and to assess the role of community partners, including traditional healers (TH), in maintaining treatment and testing access.

Methodology / Approach: From July–September 2025, in-depth interviews were conducted with 10 clinicians, 10 caregivers, and 10 TH in southwestern Uganda. Guided by the EPIS framework, interviews explored contextual and bridging factors shaping service continuity and community response. Interviews were conducted in Runyankore, transcribed, translated, and thematically analyzed.

Results / Findings: TH described increased client load as facility services declined: “People now come here because the hospital is full.” Healers reported counseling clients fearful of stigma and drug shortages: “Patients are halving tablets... they think drugs will disappear.” Clinicians noted burnout and reduced follow-up capacity: “Work that was done by five is now done by one or two.” PLWH shared, “We used to call counselors...but now there is no one.” Across sites, loss of peer educators, reduced drug stocks, and halted outreach contributed to treatment interruption, viral rebound, and rising distress. Healers frequently provide psychosocial support, symptom monitoring, and (re)linkage to care, illustrating community-based task-shifting potential.

Conclusion / Implications: Donor cuts exposed the fragility of Uganda’s HIV care cascade but revealed the resilience and untapped potential of community networks, including TH, in sustaining engagement and supporting clients when formal systems struggle.

Recommendations: Integrating trained community cadres such as TH into differentiated service delivery and task-shifting models could preserve treatment continuity. Local contingency plans and donor–government coordination are critical to protect HIV services and maintain patient trust during funding transitions.

Keywords: HIV care cascade; donor funding; Uganda; task-shifting; community partnerships

Bridging Worlds of Care: Exploring the Feasibility and Acceptability of Traditional Healer–Led Paediatric HIV Testing in Southwestern Uganda

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Introduction: Despite strong PMTCT programs, paediatric HIV testing in Uganda remains limited—only half of children under five have ever been tested. Persistent barriers such as low antenatal attendance, home births, and stigma, restrict facility-based testing. Traditional healers (THs), often serve as first-line care providers and have successfully increased adult HIV testing. Partnering with THs could bridge remaining gaps in early paediatric HIV diagnosis.

Objective: As part of an ongoing paediatric clinical trial, this sub-study explored the feasibility and acceptability of TH-led paediatric HIV testing from the perspectives of clinicians, healers, and caregivers of children under five years.

Methodology / Approach: In July 2025, 15 THs, 15 clinicians, and 18 caregivers participated in in-depth interviews in southwestern Uganda. Guided by the EPIS framework, we explored contextual and bridging factors influencing the introduction of TH-led HIV testing. Interviews were conducted in Runyankore, transcribed, translated, and thematically analyzed.

Results / Findings: Clinicians acknowledged the reach and trust healers hold in their communities, noting: “many caregivers prefer healers because they feel judged or exposed at health facilities.” Though some clinicians expressed initial skepticism, many recognized the shift: “We realized traditional healers are very important—sometimes even more than us biomedical providers.” Healers expressed enthusiasm to expand their roles—“If services were available through us, more children would get tested”—and caregivers echoed strong support, citing confidentiality, proximity, and comfort.

Conclusion / Implications: Traditional healers represent a feasible, acceptable community platform for paediatric HIV testing in Uganda. Integrating them into localized testing efforts may enhance early diagnosis and linkage to care.

Recommendations: Begin with targeted training and mentorship of participating THs, establish clear referral systems with nearby clinics, and engage communities to ensure ethical oversight and community trust. Insights will guide refinement for broader implementation in Mbarara and similar rural settings.

Keywords: Traditional healers; paediatric HIV testing; Uganda; community partnerships; EPIS framework

MINION WHOLE GENOME SEQUENCING OF BLOOD/ CEREBROSPINAL FLUID FOR DIAGNOSIS OF CRYPTOCOCCUS MENINGITIS FROM ARCHIVED SAMPLES AT MBARARA REGIONAL REFERRAL HOSPITAL, UGANDA.

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Abstract

Introduction: *Cryptococcus neoformans* (*C. neoformans*) is an environmental fungus that causes an opportunistic infection in patients with HIV cryptococcal meningitis (CM). In immunocompromised individuals, it disseminates into the bloodstream from where it crosses the blood-brain barrier tissues into the central nervous system, where it disseminates into cerebrospinal fluid (CSF). Although improvements in the management, like the use of fluconazole and Amphotericin B, and early detection diagnostic methods like the *Cryptococcus* antigen test (CrAg), the death rate is still high

Objective: To evaluate the use of MinION WGS for both identification and genomic characterization (virulence genes, resistance markers) from *C. neoformans* in serum, plasma, and CSF samples from patients with cryptococcal meningitis at Mbarara Regional Referral Hospital.

Method: *C. neoformans* DNA was extracted from stored serum, plasma, and CSF using the chemical method. ITS1 and ITS2 primers were used to confirm whether samples had *C. neoformans* using the conventional PCR method. Direct sequencing using MinION without PCR amplification was performed. The library was prepared using a Rapid sequencing DNA V14 barcoding (SQK-RBK114.24) kit following the manufacturer's instructions.

Results: Of 114 positive PCR samples, 38 had low DNA, while of the 78 samples, 60 did not have bands, resulting in 16 samples being sequenced. Only 6 CSF samples had reads that could be used for the identification of *C. neoformans* and the detection of the virulence enzymes.

Conclusions: MinION WGS of clinical samples with *C. neoformans* from the ASTRO study without PCR amplification was observed with a few CSF samples, but not with plasma and serum.

Recommendation: A study that would focus on the use of freshly collected clinical samples to compare whole blood or plasma, or serum DNA extract for *C. neoformans* with CSF would be recommended to be conducted.

Keywords: *C. neoformans*, PCR, and MinION Whole Genome Sequencing

SEX DIFFERENCES IN ALCOHOL USE AND PERCEPTIONS OF COGNITIVE HEALTH IN RURAL UGANDA

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Introduction: Dementia is a significant public health issue affecting over 50 million people worldwide. Alcohol consumption has been identified as a modifiable risk factor for dementia and its progression.

Objective: We explored the sociocultural factors influencing sex differences in alcohol consumption and community perceptions of its potential cognitive effects in rural Uganda.

Methodology: We employed a qualitative study design in the Ibanda and Lira districts, guided by the Gender Analysis Framework (GAF). We conducted in-depth interviews with 20 older adults (≥ 60 years) who consume alcohol and

10 key informant interviews with community leaders. We used a deductive thematic analysis approach to generate themes using GAF.

Results: Four main themes are presented in this study: Access to resources, Practices and participation, Beliefs and perceptions, and Institutions, laws and policies. We found men having greater access to alcohol due to their economic independence and social norms, often drinking in social settings, facilitated by peer relationships and the acceptance of drinking. Women's access to alcohol was limited by household responsibilities and cultural expectations, with consumption mainly at home and in smaller quantities. Community norms discouraged alcohol consumption by women and were associated with shame and family disruption. Most participants believed that alcohol could cause memory problems, although other factors such as age, could contribute to cognitive decline. Weak enforcement of alcohol regulations and religious influences were reported, with women being more receptive to religious guidance on quitting alcohol consumption.

Conclusion: Gender disparities exist in alcohol access, consumption patterns, and social norms in rural Uganda. Participants associated alcohol use with short-term memory problems, perceptions that are consistent with early cognitive effects of alcohol but not with later stages of dementia.

Recommendation: There is need for gender-specific interventions to address alcohol consumption and to raise awareness about its potential impact on cognitive health in this population.

Keywords: Alcohol use; Dementia; Sex differences; Older adults; Rural Uganda.

Sub-themes: 1. Responsive health delivery systems, 2. Natural Products Validation and Development, 3. One health

BIORISK MANAGEMENT PERFORMANCE AND ASSOCIATED FACTORS AMONG PUBLIC HEALTH LABORATORIES IN SOUTHWESTERN UGANDA

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Introduction: Public health laboratories (PHLs) handle hazardous biological materials posing significant infection risks to staff and community. Although Uganda's Ministry of Health has initiatives to strengthen biorisk management (BRM), data on its performance are limited. This study assessed BRM performance and associated factors in southwestern Ugandan PHLs.

Objective(s): To assess the level of BRM performance and identify factors associated with its effective implementation among PHLs in southwestern Uganda, to guide interventions enhancing laboratory biosafety and biosecurity.

Methodology: A cross-sectional study in 110 PHLs across the Ankole, Kigezi, and Rwenzori subregions used a standardized BRM tool. Performance was dichotomized (acceptable/unacceptable). Associated factors were analyzed using binary logistic regression.

Results: Only 17.1% (18/110) of PHLs demonstrated acceptable BRM performance. Bivariate analysis identified significant associations with facility accreditation (cOR=6.64, 95% CI: 2.17–20.3), SLMTA program participation (cOR=0.20, 95% CI: 0.07–0.60), staff with a master's degree (cOR=5.4, 95% CI: 1.84–15.8), and staff with a PhD (cOR=8.34, 95% CI: 1.3–54). In the multivariable model, only facility accreditation remained significantly associated with acceptable BRM performance (aOR=5.02, 95% CI: 1.15–21.9).

Conclusion: BRM performance in most PHLs was suboptimal. Laboratory accreditation emerged as the strongest independent predictor of acceptable BRM highlighting its critical role in ensuring adherence to biosafety standards and mitigating risk.

Recommendations: To strengthen BRM, laboratory accreditation must be prioritized with policies to support it and research to address its barriers and facilitators

Keywords: Biorisk Management, Public Health Laboratories, Laboratory Accreditation, Uganda

Smart Discharges for Mom and Baby: The epidemiology of post-discharge mortality, readmission and care-seeking among postpartum women and newborns in Uganda

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Introduction: Maternal and newborn morbidity and mortality is a global concern. Understanding the epidemiology of post-discharge complications could identify opportunities for interventions. We aimed to quantify mortality, care seeking events and readmission among mothers and newborns in Uganda following facility-based delivery.

Methods: This prospective observational study (Mar 2022-Sep 2023) enrolled women presenting for delivery at two regional referral hospitals in Uganda. Data were collected during admission and six weeks after delivery by phone.

Results: Overall, 7131 women delivered 7359 newborns of whom 7129(99%) women and 6968(94%) newborns were discharged alive. The newborn mortality rate was 2.7% and 32% of deaths occurred post-discharge. Following discharge, 230(3%) women and 287(4%) newborns were readmitted. Suspected sepsis and infections were the most common reason for readmission among mothers (62.2%) and newborns (89.9%). Caesarean

delivery (OR:2.26[1.75-2.93]) and perinatal death (OR:3.18[2.09-4.69]) were associated with post-discharge maternal readmission. Both maternal and newborn readmission were associated with household food insecurity during pregnancy (maternal OR:1.56[1.15-2.08]; newborn OR:1.73[1.31-2.25]). Newborn resuscitation with oxygen was associated with maternal readmission (OR:2.24[1.24-3.78]), newborn readmission (OR:2.74[1.54-4.56]) and newborn death (OR:4.01[1.73-8.21]). Although >99% of women had ≥ 1 antenatal care visit, only 511(7%) had ≥ 1 routine postnatal care visit. There were no routine postnatal care visits among 211(91.7%) readmitted mothers, 276(96.2%) newborns and 57(91.9%) newborns who died.

Conclusion: Post-discharge complications occur in a context of low routine postnatal care use. Risk-informed discharge planning, postnatal care and health education strategies may improve outcomes in mothers, newborns

Endophytic Fungi isolated from medicinal Plants in Uganda exhibit Activity against Drug-Resistant Bacteria

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Introduction ; Endophytic fungi are ubiquitous microorganisms that reside within plant tissues without causing harm. They exhibit significant pharmaceutical potential when associated with medicinal plants. Given the global challenge of antimicrobial resistance, which causes approximately 700,000 deaths annually, these fungi present a promising source for novel antimicrobial compounds.

Objective; This study aimed to isolate and evaluate the antibacterial potential of endophytic fungi obtained from surface-sterilized leaves and stem bark of three medicinal plants in Uganda against pathogenic bacteria.

Methods; The endophytic fungi were identified based on morphological traits and confirmed using the ITS molecular barcode. Fermentation was carried out for up to 25 days in potato dextrose broth (PDB) and (PDA). The antibacterial activity of the fermentation extracts was evaluated using agar well diffusion, and MICs were determined by broth microdilution assays.

Results; Both ethyl acetate and aqueous extracts exhibited strong antibacterial activity. EA extracts demonstrated MIC as low as 4.88 $\mu\text{g/mL}$ against *Staphylococcus aureus* and 9.76 $\mu\text{g/mL}$ against *Escherichia coli*. Notably, *Talaromyces* spp. ALA, HSL2, and HLI1 showed activity against MRSA, with MICs of 156.25, 156.25, and 39.06 $\mu\text{g/mL}$, respectively. Furthermore, isolate HSL2 was active against ESBL-producing *E. coli*, with

MIC and MBC values of 39.06 and 312.5 µg/mL, respectively.

Conclusion; Endophytic fungi from selected Ugandan medicinal plants produce metabolites with antibacterial activity against drug-resistant pathogens and may serve as valuable leads for drug development.

Recommendation: Safety evaluation of the extracts, isolation and structural elucidation of Bioactive compounds, mode of action and characterization of Biosynthetic gene clusters in highly active endophytic fungi.

Keywords: endophytic fungi, medicinal plants, antibacterial activity, bioactive metabolite

Knowledge of Chronic Kidney Disease and associated factors Among Diabetic Patients in Eastern Uganda: A cross-sectional study

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Background: Up to 40% of diabetics develop CKD, frequently diagnosed at advanced stages. Enhancing CKD knowledge may reduce incidence, enable early detection, slow progression, and improve health outcomes. In Uganda, data on CKD knowledge among diabetic patients is limited. This study assessed the level of knowledge of CKD and identified factors associated with poor knowledge among adult diabetic patients attending Tororo General Hospital, Eastern Uganda.

Methods: A cross-sectional study was conducted using an interviewer-administered questionnaire adapted from a validated CKD knowledge tool. Data on CKD knowledge, sociodemographic, clinical, behavioural, and facility-related factors were collected and analysed using descriptive statistics and multiple logistic regression, with significance set at $p < 0.05$.

Results: A total of 180 diabetic patients participated. The mean age was 54.2 years (SD $\pm$ 15.6), and 113 (62.8%) participants were female. The average score on knowledge was 5.3 out of 10 (SD $\pm$ 2), with 89 (49.4%) participants having poor knowledge. Only 41 (22.8%) participants knew that urine appearance or smell may indicate kidney disease. Awareness of dialysis as treatment was low with only 21 (11.7%) participants aware, and, only 27 (15%) participants knew that CKD can be asymptomatic. Poor CKD knowledge was associated with older age, as younger participants (<30 years) had lower odds (AOR 0.01, $p = 0.009$). Comorbidities increased odds (AOR 5.54, $p = 0.012$). HIV positivity reduced odds (AOR 0.02, $p = 0.002$). Community health education access was protective (AOR <0.01, $p = 0.039$).

Conclusion: CKD knowledge among diabetic patients was poor and linked to older age and comorbidities, while HIV positivity and community health education were protective. Integrating CKD education into routine diabetes care targeting older patients and those with comorbidities, and, scaling up community health education programs should be prioritized to improve awareness, enable early detection, and reduce CKD burden.

Key words: Chronic kidney disease; Knowledge; Diabetes mellitus; Community health education; Uganda

FOXP3 AND P53 EXPRESSION IN PROSTATE CARCINOMA AND THEIR CORRELATION WITH HISTOLOGICAL GRADES AMONG ARCHIVED TISSUE BLOCKS AT UGANDA CANCER INSTITUTE

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ABSTRACT

Background: Prostate carcinoma remains a leading cause of cancer-related morbidity and mortality among men in Uganda. Immunohistochemical markers such as Foxp3 and p53 have emerged as potential indicators of tumor aggressiveness, but their expression patterns in Ugandan prostate carcinoma blocks remain underexplored.

Objective: To determine the immunohistochemical expression of Foxp3 and p53 and assess their correlation with histological grades in prostate carcinoma tissue blocks at the Uganda Cancer Institute.

Methods: We conducted a retrospective cross-sectional study on formalin-fixed paraffin-embedded prostate carcinoma tissue blocks that were diagnosed between December 2024 to January 2021. Hematoxylin and

eosin staining was used for histological grading, and immunohistochemistry was performed to detect Foxp3 and p53 expression. The correlation between markers' expression and histological grades were analyzed using Spearman's correlation test, and a p-value of ≤ 0.05 was deemed significant.

Results: Foxp3 expression was absent in 81.9% of blocks and detected in only 18.1%, predominantly in Grade Group 1 tumors. However, the association between Foxp3 expression and histological grade showed a negative correlation. In contrast, p53 was expressed in 100% of the tissue blocks analyzed and showed a statistically significant positive correlation with higher histological grade.

Conclusion: The aggressiveness of prostate carcinoma was shown by overexpression of p53 and the absence of Foxp3 in most of the prostate tissue blocks.

What this study adds: This study gives information on the relevance of Foxp3 and p53 expressions in prostate cancer diagnosis and prognosis in Uganda.

Keywords: Foxp3, p53, histological grades, prostate Carcinoma , Uganda.

ONE HEALTH IMPLICATIONS OF ANTIBIOTIC RESIDUES IN BROILER CHICKEN LIVER TISSUES AND RESISTANCE PROFILES OF ISOLATED BACTERIA.

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Introduction;Antibiotics are widely used in poultry production, often without proper regulation, leading to residues in edible tissues and the emergence of antimicrobial resistance (AMR). In Uganda, there is limited evidence on the presence of antibiotic residues in chicken and their public health implications. This study contributes to the One Health agenda by assessing risks posed to humans, animals, and the environment through consumption

of contaminated broiler products.

Objective; To detect antibiotic residues in broiler chicken liver tissues and determine the resistance profiles of bacteria isolated from these tissues in Ishaka-Bushenyi municipality, Uganda.

Methodology; A cross-sectional study was conducted from March to November 2023. Twenty broiler liver samples were collected from markets in Ishaka and Bushenyi. Antibiotic residues were detected using microbiological inhibition tests against *E. coli* ATCC 25922 and *S. aureus* ATCC 25923. Bacteria were isolated using standard culture techniques, and antimicrobial susceptibility was evaluated through disk diffusion testing.

Results: Among samples tested against *E. coli* ATCC 25922, 20% from Ishaka and 10% fromm Bushenyi contained antibiotic residues. All samples (100%) tested against *S. aureus* ATCC 25923 were positive. The predominant isolates were *Escherichia coli* (45%), *Klebsiella* spp. (35%), and *Staphylococcus aureus* (20%). All isolates showed 100% resistance to metronidazole, but high susceptibility to meropenem was observed: 88.9% in *E. coli*, 100% in *S. aureus*, and 85.7% in *Klebsiella* spp.

Conclusion; Broiler chicken liver samples from Ishaka-Bushenyi contained antibiotic residues, and the isolated bacteria exhibited high resistance to commonly used human antibiotics. These findings underscore significant threats to public health within the One Health framework.

Recommendations: There is a need for stricter regulation of antibiotic use in food animals, enhanced surveillance, and further analytical studies to identify and quantify residues against established maximum residue limits.

Keywords: Antibiotic residues; One Health; Broiler chickens; Antimicrobial resistance.

Phytochemical profiling and Antibacterial potential of *Rhoicissus tridentata*:

A Metabolomics-Guided, and In silico evaluation

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Introduction: *Rhoicissus tridentata* is traditionally used in Uganda to manage

dog bites, which often lead to polymicrobial infections. However, limited scientific data exist on its phytochemical profile, and antibacterial potential mechanism.

Objective: The study determined the phytochemicals in the root extracts of *R. tridentata* and evaluated their antibacterial mechanism in selected bacterial species models isolated from the oral cavity of indigenous dogs in Uganda.

Methodology: The roots extracts were analyzed by Ultra-High-Performance Liquid Chromatography coupled with High Resolution tandem Mass spectrometer UHPLCHRMS/MS) and the phytochemicals annotated using Global Natural Product Social (GNPS) Feature-Based Molecular networking. The compounds annotated were analyzed for: pharmacokinetics, drug-likeness using SwisADME. For network pharmacology, Gene Ontology (GO) enrichment and KEGG analysis was performed using Shiny GO, while molecular docking and dynamics simulations were carried out using AutoDock Vina and iMODS server respectively.

Results: GNPS-FBMN annotated 15 bioactive polyphenolics majorly flavonoids and tannins, of which 13 compounds possessed favourable drug-likeness and pharmacokinetic properties. Two selected compounds; isokaempferide and fisetin (with the lowest molecular weight) were predicted to target 44 and 101 bacterial proteins in *Streptococcus aureus* and *Escherichia coli* (bacteria with high prevalence in oral cavities of indigenous dogs) respectively. Network pharmacology and protein protein interaction analysis identified key targets involved in protei and amino acid biosynthesis pathways, indicating the potential of the compounds to interfere with the survival of the bacteria. Molecular docking revealed strong binding affinities of isokaempferide to key protein targets, especially gltX (-10.5 kcal/mol) and argF (-9.4 kcal/mol). MDS further confirmed stable interactions with gltX, argS, and argR protein targets.

Conclusion: *R. tridentata* contain phytochemicals with antibacterial potential and promising pharmacokinetic and safety profiles, supporting its traditional use and a possible source of alternative antimicrobial agents.

Recommendation: The findings justify further exploration and validation of the plant for lead compounds of antibacterial drug development.

Key words: *Rhoicissus tridentata*, Dog bites, metabolomics, network pharmacology

Operational research in outbreaks: Use of observational data to assess safety of the hepatitis E vaccine in pregnancy

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Introduction: Hepatitis E genotypes 1 and 2 cause high mortality among pregnant women and fetal loss. Hecolin is the only licensed vaccine against hepatitis E with 100% efficacy in clinical trials. Despite being disproportionately affected, pregnant women were excluded from vaccine clinical trials resulting in a dearth of safety information for this priority group. In 2015, the WHO recommended Hecolin for outbreak response. In 2022, the first mass reactive vaccination campaign using Hecolin was conducted in South Sudan, including pregnant women.

Objective (s): We aimed to assess whether vaccination against hepatitis E in pregnancy increases the risk of fetal loss in a cohort of vaccinated and unvaccinated pregnant women. Secondly, we aimed to demonstrate that observational data can be used to answer relevant research questions using appropriate analytical methods that address biases inherent in non-randomized data.

Methodology: Alongside the reactive vaccination campaign, we conducted an exhaustive pregnancy census in Bentiu internally displaced persons camp. Pregnant people aged 14-45 years were included and revisited 28 days after delivery to document pregnancy outcome. We used an emulated target trial framework to address biases inherent in observational studies. Vaccinated and unvaccinated participants were matched to estimate cumulative incidence functions for fetal loss in a competing risks framework using the Aalen-Johansen estimator.

Results: We followed 3421 participants between May 16 and June 30, 2022. Among the 2407 women retained in the matched analyses, the cumulative

risk of fetal loss among individuals vaccinated during pregnancy was 7.2% (95%CI 5.6-8.7) compared with 6.1% (3.7-9.2) among unvaccinated individuals, implying a risk ratio of 1.2 (95%CI 0.7-1.9).

Conclusion: No evidence of increased risk of fetal loss was found among individuals vaccinated during pregnancy.

Recommendations: Pregnant women should be offered the hepatitis E vaccine in outbreak response. Analysis of observational data can provide evidence to answer research questions when clinical trials are not feasible.

Keywords: Hepatitis E, pregnancy, vaccination, emulated target trials, observational data, outbreak response

INTERNET OF THINGS ADOPTION IN COMMUNITY HEALTHCARE: ENABLING INTEGRATED MONITORING

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Introduction

The implementation of Internet of Things (IoT) in Southwestern Uganda faces obstacles due to insufficient staffing, unreliable power, and internet connectivity problems, which hinder real-time monitoring. Although digital tools are being utilized, there is a continued lack of technical expertise. Employees recognize advantages such as decreased paperwork, but have concerns about potential data misuse and threats to their job security.

Main Objective

This study explores the implementation of IoT in community healthcare, suggesting the use of data warehousing to consolidate health information. It presents a monitoring framework based on IoT that facilitates data-informed policies and aims to enhance patient outcomes in areas with limited resources.

Methodology

A qualitative research study examined the views of healthcare professionals regarding the incorporation of IoT technologies into community health services in Southwestern Uganda. The study employed thematic analysis and NVivo 14, using the TOE framework for guidance, to evaluate interviews

and focus groups involving nurses, VHTs, and administrators. The results encompassed six thematic areas, including limitations, perceived advantages, and ethical concerns, which contribute to the digital transformation of public health in resource-constrained settings.

Results

The adoption of IoT in Southwestern Uganda encounters significant obstacles: insufficient staffing, inconsistent power supply, and inadequate internet access, which impede real-time monitoring. Although fragmented digital tools are utilized, a shortage of technical skills presents a challenge. Staff recognize advantages such as diminished paperwork but are concerned about data abuse and the stability of their jobs.

Recommendations

This study examines the implementation of IoT in community healthcare, highlighting both obstacles and potential benefits. It suggests employing data warehousing to bring together various data sources for enhanced decision-making and presents a framework for IoT-based monitoring. The objective is to promote data-informed policy and markedly enhance health outcomes in areas with limited resources.

Sub-themes: 1. Earth Sciences, Scientific Insight and Engineering, 2. Inclusive Education and Educational Reforms, 3. Policy, Governance, Social Development and Gender Equality, 4. Entrepreneurship, Business Accounting and Economic Advancement

Transforming Field Epidemiology Training for Humanitarian Impact: The FETCH Program Experience

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Introduction: Humanitarian crises demand rapid, evidence-based public health responses. However, field epidemiologists often lack practical experience in such contexts. To address this gap, Epicentre and MSF developed FETCH—French acronym for Field Epidemiology Training in Humanitarian Context—a competency-based training program tailored to humanitarian operations.

Objective(s): To professionalize field epidemiologists through a one-year, practice-based training program that enhances autonomy, technical skills, and integration into humanitarian missions.

Methodology / Approach: FETCH combines in-person and online modules

(surveillance, outbreak investigation, surveys, R programming) with field assignments in MSF missions. Fellows are mentored by senior epidemiologists and evaluated through continuous assessments and final presentations. The program is certified by a University Degree by a French Public Health University Institut.

Results / Findings: Since 2023, 16 fellows completed the program; 14 remain active in MSF missions. Fellows reported increased confidence and competence in epidemiological tasks. Tutors observed improved autonomy and integration within field teams. The mission coordination teams reported an increased participation of the field epidemiologists into the programmatic decision.

Conclusion / Implications: FETCH successfully bridges the gap between academic training and field practice, enhancing MSF's capacity for evidence-based decision-making. It demonstrates the value of structured mentorship and tailored training in humanitarian epidemiology.

Recommendations: Expanding such training programs through partnerships with universities in the Global South could foster more inclusive and context-relevant epidemiological capacity. Collaborations beyond MSF, involving other humanitarian organizations, would further enhance the impact and utilization of field epidemiology in diverse crisis settings.

Keywords: Field Epidemiology, Humanitarian Training, MSF, FETCH Program, Public Health Capacity

Experiences and challenges of business incubation services in fostering the growth of MSME's.

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Abstract

Amidst the interminable high rate of business failure, business incubation services (BIS's) are seen as a reliable solution for advancing enterprises, particularly in developing economies. This research examines the experiences and challenges associated with business incubation services in Uganda and their impact on MSMEs. It has been demonstrated that there is a necessity for improvement in crucial areas, including service delivery, mentorship, and networking, along with support for diverse sectors in unconventional ways. The study also advocates for strengthening incubators through Public-Private Partnerships (PPPs), providing additional funding sources

for MSMEs. Furthermore, the study emphasizes the need for project-based education that aligns with the interests of the participants and is influenced by political and market incentives, with professional registration provided by NCHE, DIT, and UBTEB to offer geopolitical context. The accurate targeting of trainees is also underscored as essential in enhancing the impact of business incubation services, especially when trainees are selected. The study also recommends the introduction of a specific MSME policy to address the non-banking informal sector, including women, youth, and refugees who also actively contribute to economic development. Additionally, the paper underscores the necessity of establishing regional business incubators to ensure national equilibrium, particularly in rural areas, and promotes the provision of tax incentives and holidays to SMEs by benchmarking best practices from countries where SMEs are flourishing.

Key words; Business Incubation, MSME's, Policy reforms, PPP's Non-banked sector, Tax holidays

Invisible Yet Resilient". Understanding the Vulnerability and Integration Pathways of South Sudanese Older Refugees in Uganda

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Forcibly displaced older persons in Africa have not largely been the object of academic research. Recent scholars conducted a scoping review about the situations and care for displaced older persons in Africa and identified several gaps in the literature, including paying attention to the displaced older persons' integration in the host societies. Our study contributes to filling this gap by analysing the vulnerability of older refugees and identifying ways of reducing their vulnerabilities and opportunities for integrating them in the host societies.

The study is based on the qualitative primary data collected from South Sudanese refugees in Pagirinya Settlement in Adjumani district, Uganda; and thematically analyzed in conjunction with integration framework and vulnerability theory. The study finds that despite the vulnerability of older refugees such as in poor healthcare, poor nutrition, poor housing and information gap; opportunities such as special consideration in humanitarian services, verbal dissemination of information, leveraging their skills and social gatherings in the settlement, helped to reduce their vulnerability and integrate them in the host communities.

The study concludes that providing older refugees with special socio-economic support helps them to curtail vulnerabilities and live a reasonably decent life and integrate in the host communities. The study recommends that further interventions should aim to integrate older refugees into socio-economic programs and have special considerations for them in the available humanitarian services, devise appropriate means and avenues for passing information about the available services, and settlements' programs should continue to promote social gatherings and participation of older refugees in the affairs of their communities such as leadership, to help them remain physically and emotionally active and integrate in the host society.

Keywords: Vulnerability; Older Refugees; Integration; South Sudan; Uganda.

STRENGTHENING INCLUSIVE EDUCATION POLICY PLANNING AND MANAGEMENT FOR QUALITY HIGHER EDUCATIONAL REFORMS IN UGANDA

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Introduction: This paper examines the current vital challenges and opportunities in strengthening inclusive education policy planning and management to enhance quality higher education reforms in Uganda. Despite policy commitments to inclusive education, implementation remains fragmented due to limited institutional capacity, inadequate financing, and weak coordination among education stakeholders. Inclusive education is essential for achieving equitable access, quality learning outcomes, and national development goals aligned with SDG 4 on quality education.

Objective(s): The main objective is to analyze strategies for improving inclusive education policy planning and management for effective higher educational reforms. Specifically, the study seeks to assess existing policy frameworks, institutional mechanisms, and management practices influencing inclusivity, quality, and equity in Uganda's higher education sector.

Methodology / Approach: A systematic literature review and policy document analysis were conducted, supported by a qualitative interpretive approach. Data were drawn from academic publications, government policy reports, and UNESCO frameworks. The study applied an educational policy analysis model and thematic content analysis to identify patterns, gaps, and best

practices in inclusive education management

Results / Findings: Findings reveal significant progress in legal and policy frameworks but persistent barriers in implementation, monitoring, and resource allocation. Institutional management practices lack adequate inclusion strategies for learners with disabilities, marginalized groups, and gender equity. Effective reforms require robust governance, inclusive budgeting, and capacity development for educators and administrators.

Conclusion / Implications: Inclusive education reform demands integrated planning, participatory management, and evidence-based policymaking to promote fairness and academic excellence in higher education.

Recommendation Strengthen policy coherence, institutional accountability, and capacity-building programs; increase funding for inclusive education; and foster collaboration between government, academia, and civil society.

Keywords: Inclusive education, policy planning, higher education reform, equity, Uganda.

Science Laboratory Availability and Functionality in Secondary Schools of Mbarara City, Uganda: A Qualitative Investigation

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The science laboratory is crucial for teaching general science and natural science subjects. It provides a space to apply theoretical knowledge and promotes engaging and visual learning. Students can express their creativity, ignite their enthusiasm for scientific inquiry, and develop their critical problem-solving abilities through hands-on experiences. This paper is one of the objectives of the doctoral thesis, which aims to assess the state of science laboratories in secondary schools in Mbarara City, Uganda. The study was conducted in 36 secondary schools, which include both Government and Private schools in Mbarara City, from January 2025 to April 2025, to investigate and identify the issues in the science laboratories of schools. For

this particular objective the study used a qualitative approach, and data was gathered encompassing both government and private secondary schools, through interviews with 30 headteachers and non-participant observations of the laboratories of all selected schools. The findings indicated that school laboratories mainly serve general purposes, with a notably inadequate system of specialized labs for each science discipline, particularly in private schools, due to limited funding and resources. 82.75% of the total sampled schools have inadequate resources. Regarding laboratory tools, chemicals, and specimens, government schools are generally better equipped than their private counterparts. Apart from the inadequate resources, other issues like teachers' unavailability,

scarcity of books, and many other issues also arose, directly or indirectly hampering the science laboratory's availability and functionality. The study will shed light on the need for timely monitoring of different aspects of science laboratory teaching at schools. Schools were sampled only in Mbarara city, limiting the findings' generalizability. Each school was observed only once, restricting the range of teaching-learning activities and observer effect can influence conclusions based on observation and data analysis.

Keywords: Science Laboratories, Scientific Inquiry, Innovation, Laboratory Facilities.

Analysis of the Influence of Demographic Variables on Teacher's Job Satisfaction in Secondary Schools of Kashari North County, Mbarara District, Uganda

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Abstract

Any nation's education system is always as good as its teachers and their professional satisfaction and demographic characteristics directly determines their efficacy and the quality of the services rendered. The study aimed at providing insights into how different demographic variables influence teachers' job satisfaction in secondary schools of Kashari North County, Mbarara District, Uganda. The objective of the study was to establish the relationship between demographic factors and teachers' job satisfaction. From 245 teachers in ten secondary schools, the study drew data from a sample of 150 teachers obtained with the help of the statistic kingdom at confidence level of 95% and margin of error of 5%. Respondents were Sampled sequentially following stratified, proportionate and simple random sampling techniques. A cross-sectional research design was adopted. Data was obtained using structured questionnaires and data analysis was conducted utilizing frequencies, means, percentages, standard

deviation and linear regression. The study findings showed that there was a statistically significant relationship between both years of teaching experience and monthly income range on teachers' job satisfaction $F(2, 141) = 4.256, P < 0.05$, where years of teaching and monthly income range had a negative effect ($B = -0.158, \beta = -0.265, t = -3.002, p < 0.05$) and positive effect ($B = 0.177, \beta = 0.290, t = 3.288, p < 0.05$), on teachers' job satisfaction respectively. The study concluded that while increase in years of teaching experience decreases job satisfaction, higher monthly income lead to increased teacher job satisfaction and age has no significant role it plays on job satisfaction. The study recommended that amendments be made by policymakers in the current educational policy framework on teacher's emolument to account for the years of experience of teachers rather than base on subjects taught, development and implementation of a structured incentive program comprising of experience-based rewards, setting up income generating projects by schools to supplement on teachers' salaries, and School administrators designing school programs using years of teaching experience criteria.

Key words: Demographic characteristics, Job satisfaction, Uganda, Secondary school teachers

Modeling Learners' Van Hiele Progression in Transformation Geometry: Mediation by

Attitude Change and Moderation by Instructional Strategy

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Abstract

In geometry, effective pedagogy must support conceptual reasoning and positive learner attitudes as emphasised by Uganda's Competency-Based Curriculum (CBC) for critical thinking, problem-solving skills, and cognitive development. This study investigated whether changes in students' attitudes toward geometry mediate the relationship between instructional strategy and progression through Van Hiele Levels, and whether this mediation is moderated by the type of instruction: Technology-Enhanced Van Hiele Phased Instruction (TVHPI) or Conventional Van Hiele Phased Instruction (CVHPI). A Difference-in-Differences approach and Generalized Ordered Logit models were used to analyze data.

Results showed that geometry attitudes both pre-instruction ($\beta = 0.0155$,

$p = 0.911$) and post instruction ($\beta = 0.0889$, $p = 0.631$), did not significantly predict VHL. Attitude change did not mediate the instructional effect ($\beta = -0.0997$, $p = 0.565$). However, instructional strategy was a strong predictor ($\beta = 0.6480$ to 1.1227 , $p < 0.001$). A marginally significant interaction ($\beta = -0.6210$, $p = 0.075$) suggests attitude change may be more influential under CVHPI.

The findings highlight the limited mediating role of attitudes and the dominant influence of instructional design, particularly technology integration. CBC implementation should emphasize technology-enhanced strategies that directly support cognitive growth while recognizing the role of attitudes in conventional settings.

Keywords: Transformation Geometry, Van Hiele Phased Instruction, Technology-Enhanced

Learning, Moderation, and Mediation.

Factors influencing the performance of Emyooga Livelihood Program in Uganda

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Abstract

To improve mass production and include more people in the financial system, the government of Uganda launched the Emyooga program to boost household income. Although the program had good intentions, its implementation has received mixed reactions from stakeholders. Therefore, the purpose of this paper was to understand the factors central to the performance of Emyooga government program in Uganda.

A sample of 175 members participated in the study using a close ended administered questionnaire. Descriptive design was employed to produce exploratory factor analysis (EFA), using SPSS.

The findings identified five factors: financial literacy, economic transformation, Sacco governance, business growth and business sustainability as the critical factors contributing 64.4% on the success of Emyooga government program.

The study provided important insights that stakeholders should strengthen to improve the performance of the program and other related government

policies to achieve social economic transformation in Uganda.

Keywords: financial literacy; sustainability; governance; economic transformation; livelihood program

BRIDGING THE AI ACCESSIBILITY GAP: AN OFFLINE EDUCATIONAL AI SYSTEM FOR LOW-RESOURCE LEARNING ENVIRONMENTS

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Introduction: Access to AI-powered educational tools is largely dependent on stable internet connectivity, excluding learners in rural and low-income regions. These systems also raise data sovereignty and alignment concerns, as they rely on remote servers and general-purpose content. This study introduces Walimu Academy, an offline-first AI education platform that addresses these challenges in Sub-Saharan Africa.

Objective: To design and assess a scalable offline AI solution for education that enables students to access ChatGPT-like tutoring without internet access, improves data privacy, and increases equitable learning opportunities nationally.

Methodology / Approach: The study proposes a hybrid deployment model: (1) local inference on smartphones and laptops using open-source lightweight language models, and (2) AI Hub microservers in libraries and schools. The platform integrates open educational resources (OER) and quantized 3B–7B parameter models. Projected benchmarks are based on prior deployments of similar systems.

Results / Findings: Projected performance includes 90–92% educational query accuracy, <500ms average response time, and operation within 4–8GB RAM. The AI hub enables shared access in device-limited settings via local Wi-Fi or SMS, with no cloud dependence. Expected satisfaction metrics are above 5.7/7 based on comparable models.

Conclusion / Implications: Offline AI tutoring is technically feasible and impactful for low-resource education. Walimu Academy offers a blueprint for AI deployment that centers accessibility, privacy, and local context; key for national EdTech strategies.

Recommendations: Integrate offline AI hubs into school ICT policy, promote AI literacy for teachers, and invest in localized model fine-tuning for multilingual support.

Keywords: Offline AI, Walimu Academy, Educational Technology, Low-Resource Settings, Sub-

Saharan Africa

ON HYPERCYCLIC BILINEAR OPERATORS ON THE NORMABLE FRÉCHET SPACES.

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Introduction: We study the notion of bihypercyclicity of bilinear operators on a normable Fréchet space through the approximation of the elements in the orbit with a dense set in the (normable Fréchet) space. The associated bihypercyclic problem is formulated as follows: Given a Fréchet space, does there exist a bilinear map on E such that the orbit of a vector (x, y) under is dense in?

Main objective: To provide an alternative proof for the existence of bihypercyclic bilinear operators on certain Fréchet spaces.

Methodology: We obtained information from research publications from journals and published books, discussed and analyzed it to come up with our own findings.

Results:

If E is an infinite-dimensional separable normable Fréchet space, then there exists a continuous bihypercyclic bilinear operator on E .

If E is a finite-dimensional separable normable Fréchet space, then there exists a continuous bihypercyclic bilinear operator on E .

Conclusions: If E is a separable normable Fréchet space, then there exists a continuous bihypercyclic bilinear operator on E .

Recommendation for further research: There is need to investigate and provide a direct and constructive proof for the existence of bihypercyclic bilinear operators on the non-normable Fréchet spaces.

Key words: Hypercyclicity of a bilinear operator; Bihypercyclicity of a bilinear operator; Normable Fréchet space; Non-normable Fréchet space.

Sub-themes: 1. Design and validation of software technologies, 2. Industry, Energy, and Emerging Technologies, 3. Environment and Climate Change Mitigation and Adaptation, 4. Agricultural Production Enhancement for Sustainable Resilient Livelihoods, 5. Natural Resources Management and Biodiversity Conservation. 6. Food Safety, Security and Innovation (value chains addition)

Lung dysfunction among young adults in Uganda

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Introduction: Chronic Obstructive Pulmonary disease (COPD) is the 3rd leading cause of death worldwide and a major cause of morbidity with sub-Saharan Africa being the most affected. Despite COPD continuously becoming a significant public health concern, lung health is not well understood among young adults in Uganda. This study, therefore, aims to explore lung function and how it's influenced by sex and HIV Sero-status.

Methods: We enrolled young adults aged 18-40years with HIV, in HIV care at Mbarara Regional Referral Hospital, and on ART for at least 3 years, and age and sex matched HIV-negative comparators from the same catchment area. Participants completed the study questionnaire about demographic data, medical history, health, and completed lung function testing using the spirometer. Our primary outcome was lung COPD defined as FEV1/FVC < 7. We summarized the proportion of the cohort with COPD and compared proportions by sex and HIV serostatus using the chi-square test. We fit the logistic regression models to characterize the influence of HIV and sex on each lung function, and adjust for confounders, including age, socioeconomic status, and prior TB.

Results: We enrolled 111 participants with a median age of 33(IQR=29,36) years; 56(50.5%) were women, and 59(53.2%) were people with HIV. Overall, 60 participants (54.1%) had normal weight, and 27 (24.3%) were in the highest quartile of asset ownership. These characteristics did not differ significantly by HIV status. Most participants (95; 85.6%) were never smokers, with a higher proportion among people without HIV (94.2%) compared to 78% of those with HIV ($p = 0.003$). A history of pneumonia and tuberculosis was reported in 2 (1.8%) and 6 (5.4%) participants, respectively, all of whom were people with HIV. Overall, 75(67.6%) of the participants had at least any of the respiratory symptoms, and cough was the most common symptom among

55(49.6%) of the participants. A total of 105 (94.6%) had ATS-acceptable lung function test, of whom 96 (91.4%) had normal spirometry, and overall COPD was among 5(4.8%) of the participants. In this cohort, age (OR=1.04, CI=0.82-1.31, p=0.74) sex (OR=0.72, CI=0.06-8.96, p=0.80) HIV status (OR=0.87, CI=0.11-6.68, p=0.90), prior tuberculosis(OR=3.65, CI=0.20-67.84, p=0.39) , and socioeconomic status(OR=1.19, CI=0.15-9.61, p=0.87) height ((OR=1.00, CI=0.85-1.17, p=0.98) were not the predictors of COPD.

Conclusion: COPD does not differ by sex and HIV status among young adults. Further research, probably involving a larger sample size is required to measure the prevalence of COPD and associated factors among young adults.

Keywords: Chronic Obstructive Pulmonary disease (COPD), HIV, spirometry.

Analysis of the carbon footprint of a vaccine clinical trial in Mbarara: lessons for reducing the impact

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Introduction: Healthcare systems contribute 4–5% of global GHG emissions, with clinical trials being a significant yet under-assessed source. We evaluated the carbon footprint of the YEFE trial (NCT02991495) in Mbarara, Uganda—a randomized, controlled study involving 900 participants and 19 FTEs for the 3.7 years of trial implementation across several countries. The assessment covered all phases, from design to dissemination, to quantify emissions and identify key drivers and reduction opportunities.

Methodology: Activity data was collected retrospectively (€ spent on conducting the study, number of samples taken, kilometers traveled, liters of fuel consumed, etc.) to calculate GHG emissions. This data was then multiplied by a specific emission factor for each activity to estimate its impact in terms of the amount of CO₂ equivalent emitted. The approach complies with the relevant international standard (ISO 14064) and follows the Greenhouse Gas (GHG) Protocol methodology.

Results: The carbon footprint for the activities conducted for the YEFE trial was estimated at 513 tCO₂e. The main driver of emissions were the study site staff, accounting for an estimated 163.6 tCO₂e (32.3%), followed by laboratory activities (15.5%), including the shipment of samples from Mbarara to Dakar for analysis at the Pasteur Institute, which accounted for 8.3%. International travel accounted for 46.47 tCO₂e (9.2%) and participants' travel for 41.7 tCO₂e (8.2%).

Over the 11-year study, implementation was the most CO₂e-intensive phase (69% of total emissions). Sample storage, lasting 5 years, contributed 10%

(52.4 tCO₂e) of the footprint.

Conclusion: The YEFE study highlights the importance of considering all phases of studies when quantifying their carbon footprint.

Recommendations: To reduce environmental impact, several measures can be taken. For sample storage: improve building insulation, use solar energy, shorten storage duration, and optimize locations. For travel: promote low-emission vehicles nationally and strengthen local capacity and infrastructure internationally to enable on-site biological analyses and limit global travel.

Key word : Carbon footprint, sustainable clinical research, Low-carbon healthcare

THE ROLE OF STRATEGIC COMMUNICATION IN COORDINATING INDUSTRY, ENERGY, AND EMERGING TECHNOLOGY SYNERGIES FOR RENEWABLE ENERGY TRANSITION IN UGANDA

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ABSTRACT

Introduction: This paper examines how strategic communication enhances coordination among industry, energy, and emerging technology sectors to accelerate Uganda's renewable energy transition. Uganda's energy landscape faces persistent challenges such as limited access, high dependence on biomass, and low technological integration. Effective communication strategies are essential to bridge institutional gaps, promote innovation diffusion, and mobilize public-private partnerships for sustainable energy development.

Objective(s): The main objective of the study is to assess the role of strategic communication in harmonizing multi-sectoral synergies that drive renewable energy transition. Specifically, it aims to explore how communication frameworks can facilitate stakeholder engagement, knowledge exchange,

and policy coherence within Uganda's energy ecosystem.

Methodology / Approach: The paper employed a systematic literature review and document analysis based on national energy policy reports, industrial development plans, and academic publications. Guided by the diffusion of innovation and stakeholder theory, qualitative data were analyzed to identify best practices, communication gaps, and integration pathways among industry, energy, and technology actors.

Results / Findings: Findings reveal that effective strategic communication fosters collaborative planning, information sharing, and adoption of emerging technologies such as solar photovoltaics, biogas, and smart grid systems. The study found that communication failures often hinder policy implementation, technology uptake, and investor confidence, while inclusive communication strategies enhance trust, awareness, and coordination among key stakeholders.

Conclusion / Implications: Strategic communication is a catalyst for aligning industrial innovation, energy transformation, and technological advancement in Uganda. Strengthening intersectoral communication frameworks supports sustainable energy transition and national development goals. **Recommendations:** The study recommends institutionalizing energy communication platforms, integrating communication training into policy programs, and supporting public awareness campaigns for renewable technologies.

Keywords: Strategic Communication, Renewable Energy Transition, Industry Synergies, Emerging Technologies, Uganda.

ENHANCING CLEAN ENERGY ACCESS IN UGANDA THROUGH GENDER-INCLUSIVE RENEWABLE ENERGY TECHNOLOGY DIFFUSION AND CLIMATE-RESILIENT ENGINEERING SOLUTIONS

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ABSTRACT

Introduction: This paper examines how gender-inclusive renewable energy technologies (RETs) and climate-resilient engineering solutions can promote universal clean energy access in Uganda. It addresses gender disparities that limit the diffusion of renewable energy solutions and emphasizes the importance of including women and rural populations in energy planning. We highlight the need for strategic policies that combine innovation and gender equity to drive sustainable energy transitions. The research aligns with Uganda's Fourth National Development Plan (NDP IV) and global commitments under Sustainable Development Goals (SDGs) 7 and 13.

Objectives: The main objective is to examine how gender-responsive RET diffusion and climate-resilient engineering innovations can foster universal clean energy access. It also aims to identify challenges and opportunities for scaling gender integration in Uganda's energy sector.

Methodology / Approach: Using a systematic literature review and policy analysis, the study evaluates frameworks, case studies, and best practices from Uganda and globally. Qualitative data from expert interviews with policymakers and stakeholders supplement the analysis to identify barriers and implementation opportunities.

Results / Findings: The findings reveal that gender equity in energy planning enhances technology adoption, sustainability, and community engagement. Women's involvement improves project relevance, expands livelihood opportunities, and promotes socio-economic inclusion. Localized engineering innovations strengthen energy infrastructure resilience, particularly in rural areas.

Conclusion / Implications: Integrating gender and engineering innovations bridges energy access gaps, enhances community resilience, and accelerates Uganda's transition toward inclusive green growth. Gender equity emerges as both a social and economic driver for sustainable energy systems.

Recommendations: Mainstream gender in energy policies, expand women's technical training, support women-led projects, and promote public-private partnerships for climate-smart energy innovations.

Keywords: Gender Inclusion; Renewable Energy; Climate Resilience; Energy Access; Uganda

Drivers and Barriers of Soil Nutrient Management Adoption in Finger Millet Production: Evidence from Smallholder Farming Systems in Southwestern Uganda

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Introduction: Smallholder finger millet production plays a crucial role in enhancing household food security and climate resilience in Uganda. Yet, its yields remain low, largely due to suboptimal soil nutrient management practices.

Objective(s): This study investigates the socio-economic, agronomic, institutional, and policy factors shaping farmers' nutrient management decisions in finger millet cultivation.

Methodology / Approach: Using a mixed-methods approach, quantitative data from a farmer survey were complemented by qualitative insights from focus group discussions and key informant interviews. Quantitative data from farmer surveys were analyzed using descriptive and inferential statistics to summarize patterns and test relationships among variables, in R software. The qualitative data in the transcripts was coded and themes generated in Nvivo version 15.

Results / Findings: 268 millet farmers participated in the survey, 9 focus group discussions and key informant interviews were conducted with millet farmers and sub-county agricultural officers respectively from three districts of southwestern Uganda (Isingiro, Rubirizi and Rubanda). The survey captured farmers' demographic characteristics, a range of agronomic and nutrient management practices. Additional data were gathered on farmers' access to training, sources of agronomic information, and challenges experienced in millet production.

Conclusion / Implications: Preliminary insights suggest that adoption of improved nutrient management practices is influenced by factors such as education level, access to extension training, land size, and input availability. However, barriers including high input costs, limited access to quality inputs, limited access to reliable advisory services, and labour constraints remain prevalent. The qualitative findings reveal a complex relationship between farmers' socio-economic conditions and their perceptions of risk and profit, offering deeper insight into how structural and behavioural factors jointly influence sustainable nutrient management in smallholder farming systems.

Recommendations: The completed analysis will generate empirical evidence to inform policies and interventions that support integrated soil fertility management in finger millet farming across southwestern Uganda.

Keywords: Adoption, finger millet, nutrient management, smallholder farmers

A Framework for Ethical Blockchain Adoption in Health Information Systems in Uganda: Navigating Data Privacy and Patient Autonomy

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Introduction/problem: Healthcare data breaches are a critical issue globally, with over 133 million patient records reported to have been compromised in 2023 alone. In Uganda, healthcare particularly health information systems (HIS) also face persistent data integrity, security and privacy challenges (Sseggujja, 2024). The existing centralized HIS infrastructure is vulnerable to data breaches, unauthorized access and inefficiencies in patient data sharing, hindering effective healthcare delivery. Blockchain technology offers a potential solution, with frameworks demonstrating enhanced security through decentralized ledgers and cryptographic techniques. However, its adoption in healthcare raises notable ethical concerns, and its applicability to Uganda's unique socio-technical context remains unclear due to lack of a contextually relevant ethical and operational framework. Existing frameworks focus primarily on operational and technical readiness, competitive pressures and organizational factors while neglecting critical ethical dimensions such as patient autonomy. This gap necessitates a tailored blockchain adoption framework for Uganda's HIS, addressing ethical, regulatory and socio-technical factors. This research therefore developed such a framework, building on existing solutions while incorporating context-specific adaptations to enhance patient trust and HIS integrity.

Methodology: The study employed a Design Science Research (DSR) methodology, which guided the systematic development and evaluation of an ethical blockchain adoption framework. The process began with a scoping review conducted in accordance with the PRISMA-ScR guidelines whose insights informed the design and development of a multi-layered framework embedding privacy, ethics and regulatory compliance logics to prioritize patient data privacy and autonomy. The framework was then evaluated by expert stakeholders including IT experts, doctors and medical records officers and their overall analysis showed strong consensus that the framework achieves its intended goal.

Results: The study's findings revealed significant ethical and technical gaps in existing health information systems and blockchain adoption frameworks in Uganda and similar low resource settings. Key issues included inadequate governance structures, weak consent mechanisms, insufficient privacy safeguards, limited infrastructure and interoperability. In response, a context-specific ethical blockchain adoption framework was developed,

integrating patient autonomy, privacy and regulatory compliance logics tailored to Uganda's HIS realities. Expert stakeholder validation showed strong consensus that the framework achieves its intended goal.

Conclusions: This study establishes a foundation for ethically grounded blockchain integration in Uganda's healthcare system, offering a framework that can be adapted to similar low-resource settings to strengthen data privacy, patient autonomy and overall health information systems effectiveness.

Future work: Future work should prioritize piloting the proposed ethical blockchain adoption framework within Uganda's health information systems to enable real-world validation. Developing modular decision support tools tailored to institutional needs and regulatory contexts could enhance usability, while integrating AI techniques such as machine learning may support dynamic identification of emerging ethical and technical risks. Comparative studies across healthcare institutions and regions would further refine scalability, adaptability, and relevance in diverse low-resource settings.

Key words: Blockchain adoption, Health Information Systems, Data privacy, Patient autonomy, Ethical considerations, Regulatory compliance

PREDICTING MULTI-FACTOR AUTHENTICATION ADOPTION USING MACHINE

LEARNING AND THE UTAUT FRAMEWORK

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Introduction: Cybersecurity in financial ecosystems is increasingly threatened by fraud and identity compromise, especially in low-resource environments where authentication practices remain inconsistent. Multi-Factor Authentication (MFA) offers robust protection, yet its adoption is hindered by usability concerns, trust deficits and infrastructural gaps. Understanding and predicting MFA adoption dynamics is critical for designing secure and inclusive financial technologies.

Objective(s): This study aimed to design and validate a predictive framework integrating machine learning with the Unified Theory of Acceptance and Use of Technology (UTAUT) to model and predict MFA adoption.

Methodology: We analyzed the FinScope Uganda 2023 dataset (n = 3,176) by extracting behavioral, demographic and security-related variables aligned with UTAUT constructs. A binary proxy for MFA adoption was engineered using security perception indicators. Four machine learning classifiers; Logistic Regression, Random Forest, Gradient Boosting and XGBoost, were trained and evaluated.

Model explainability was done through SHAP-based feature attribution for policy and design insights. Results: Gradient Boosting demonstrated superior predictive power with accuracy = 0.838, F1-score = 0.835 and AUC-ROC = 0.928. Key adoption drivers included security perception, mobile device access and peer influence. The framework confirmed the feasibility of combining theory-driven features with advanced machine learning for robust adoption prediction.

Conclusion: By aligning SHAP values with UTAUT constructs, this study provides a validated software pipeline for predicting and enhancing MFA uptake. Findings highlight the importance of trust building strategies and mobile-first design for financial inclusion.

Recommendations: Policymakers and developers should prioritize lightweight MFA technologies,

targeted trust campaigns and inclusive design principles to strengthen financial cybersecurity in low resource contexts.

Keywords: Multi-Factor Authentication, UTAUT, Machine Learning, Cybersecurity, Financial

Inclusion

Lingo Baraza: A Focused Web-Based Platform-Independent Data Collection Tool for Low Resource Languages

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Abstract

Introduction: African languages remain significantly under-represented in publicly available corpora utilized for building Natural Language Processing (NLP) systems. Addressing the scarcity requires community-driven collection supported by easy-to-use, auditable tools effective in bandwidth-constrained environments. This study addresses this critical gap by introducing LingoBaraza, a focused open source platform designed for depth and high precision.

Objective(s): This study sought to build a tool, LingoBaraza, to overcome the limitations of shallow per-language data by facilitating the structured collection, validation, and preparation of multimodal data (speech and parallel text) for specific Ugandan languages i.e., Luganda Runyankore & Rukiga.

Approach: This study used a design science approach for Lngobarara. The system uses role-based portals (Contributor, Validator, Admin) and the MediaRecorder API for in-browser audio capture. Quality control is built-in via expert review, suggestions, and voting workflows. A pilot evaluation employed purposive sampling to obtain volunteers (seed users) across Luganda and Runyankore to validate end-to-end data flows and assess performance.

Findings: The platform processed 6,196 sentence contributions among 158 registered users, including 155 active contributors. Key outcomes included 282 validated parallel text pairs (with a low 0.0142% rejection rate) and 0.32 hours of validated English audio (288 clips). Validators maintained an acceptance rate of approximately 97%. User feedback confirmed that in-browser recording and batched review improved overall workflow efficiency.

Conclusion / Implications LingoBaraza successfully operationalizes community-driven collection of parallel speech and text for African languages, integrating built-in quality control mechanisms. Its lightweight architecture facilitates deployment on modest infrastructure. This approach is crucial for generating necessary resources to address the linguistic resource scarcity gap.

Recommendations Key recommendations include implementing offline capture capabilities with background synchronization, integrating automated Quality Assurance checks (e.g., SNR estimation for audio) and establishing robust export pipelines for open data releases.

Keywords: Crowdsourcing, Speech & Text Corpora, Luganda, Runyankore and Rukiga Language resources

DESIGN AND VALIDATION OF TRUST-WEIGHTED MACHINE LEARNING MODELS FOR PREDICTING MULTI-FACTOR AUTHENTICATION ADOPTION

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Introduction: The design of robust authentication technologies requires not only algorithmic aspects but also related validation against human trust and usability concerns. Multi-Factor Authentication (MFA) faces uneven adoption in financial services in Uganda despite being widely promoted. This study responds by designing and validating a trust-weighted machine learning framework grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT). The framework emphasizes the dual direction of software technology design through predictive reliability and socio-technical acceptance.

Objective(s): To (i) design a machine learning pipeline that integrates UTAUT constructs with trust weighted scores, (ii) validate its predictive performance on real and synthetic datasets filtered for a support threshold of 600 and (iii) demonstrate how authentication technologies can be engineered for both security efficacy and adoption readiness.

Methodology: A Gradient Boosting model was developed using the 2023 FinScope Uganda dataset and a synthetically generated dataset. Trust-weighted scores were derived from security perception metrics and incorporated into UTAUT features. Validation employed stratified sampling at $n = 600$ support to ensure balanced representation. Performance evaluation combined Accuracy, F1-scores and AUC-ROC with calibrated analysis to test generalizability across contexts.

Results: The trust-weighted model significantly outperformed the baseline design. On real data,

accuracy rose from 78.5% to 84.1%, F1-score from 0.69 to 0.75 and AUC-ROC from 0.78 to 0.84. Synthetic validation confirmed robustness by maintaining performance above 82% accuracy with stable precision-recall balance. Importantly, the support of 600 preserved reliability by reducing variance in class representation by strengthening claims of design validity.

Conclusion: This study demonstrates how integrating behavioral trust into algorithmic design yields validated, high-performing predictive technologies

for MFA adoption. The findings advance the theme of Design and Validation of Software Technologies by showing that secure systems succeed not only through technical optimization but also through socio-technical calibration.

Recommendations: Future designs should extend trust-weighted modeling across jurisdictions to

validate cross-cultural resilience. Software practitioners are encouraged to embed behavioral constructs into early-stage technology validation cycles.

Keywords: Multi-Factor Authentication, UTAUT, Machine Learning, Trust-Weighted Design, Software Validation

A comparative assessment of environmental impacts of production, use, and disposal of a parabolic solar cooker and charcoal for cooking in Uganda

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Introduction: Solar cookers can substantially reduce reliance on charcoal, yet the comparative life-cycle impacts of a solar cooker with thermal energy storage (TES) versus charcoal cooking have not been quantified.

Objective: To assess and compare the environmental impacts of using a solar cooker with a charcoal-based cookstove in Mbarara City.

Methods: We conducted an attributional life-cycle assessment (LCA) for Mbarara City, Uganda, using ecoinvent v3.10 and Environmental Footprint 3.0. The functional unit is cooking two meals per day over 10 years for a typical household (3–6 people). Three scenarios capture different charcoal consumption levels. The solar system comprises a parabolic dish with aluminium components, a vegetable-oil TES, and end-of-life (EoL) treatment.

Results: Across scenarios, solar cooking markedly lowers impacts: for most categories, burdens are ~8–9× lower than charcoal. Weighted single-score results range from 141.5–302.9 points for charcoal and 64.4–82.3 points for the solar cooker (ratio ~2.2–3.7). The most influential categories are climate change, human toxicity (non-cancer), photochemical ozone formation, and water scarcity—each lower for solar. The main exception is freshwater ecotoxicity, which is higher for the solar option due to aluminium production, EoL processing, and disposal of vegetable-oil residues from TES; repurposing these residues could mitigate this burden. In contribution analysis, freshwater ecotoxicity accounts for >67% of the solar cooker's weighted score, whereas climate change contributes >45% of the charcoal model.

Conclusion: Overall, the parabolic solar cooker exhibits the lowest life-cycle impacts across categories and scenarios. Results are generalizable to regions with similar climatic, production, and distribution conditions; areas with >325 sunny days per year are likely to achieve even lower solar-cooking impacts.

Recommendations and contribution: We recommend expanding ecoinvent coverage for Africa (particularly East Africa and tropical regions) to improve modelling accuracy. This study extends prior work by assessing a broad set of midpoint indicators and identifying five priority categories, four of which favour solar over charcoal.

Keywords: solar cooking, charcoal cooking, indoor air pollution, life cycle assessment, Uganda

Indole alkaloids from the Tribe Naucleaeae as Potential Inhibitor of Plasmodium falciparum dihydroorotate dehydrogenase (PfDHODH): Molecular Docking, MM-GBSA, MD Simulations and ML models

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ABSTRACT

Background: Malaria, a mosquito-borne disease, remains a major global health challenge, particularly in Africa, due to widespread drug resistance and the lack of effective vaccines. Plasmodium falciparum dihydroorotate dehydrogenase (PfDHODH) is a clinically validated target for antimalarial drug development.

Objectives: This study explores indole alkaloids from the Tribe Naucleaeae (Rubiaceae) as potential PfDHODH inhibitors using computer-aided drug design (CADD).

Methods: A library of 190 alkaloids was docked against PfDHODH (PDB ID: 6GJG) using Schrödinger's Maestro interface. Binding free energies were estimated via molecular docking, Molecular mechanics with generalized Born and surface area solvation (MM-GBSA), and 100 ns molecular dynamics (MD) simulations were performed to assess ligand-protein stability. Machine learning (ML) predictions were obtained from the Ersilia Model Hub (identifiers: eos2gth-MAIP antimalarial potential, eos7d58-ADMET-AI).

Results: Nauclorienine (-8.879 kcal/mol) and naucleactonin C (-8.825 kcal/mol) formed stable hydrogen bond interactions with His185 and Arg265, similar to the co-crystallized ligand F1T (-9.921 kcal/mol). MD simulations confirmed their binding stability, while ML models identified naucleactonin C

as the most promising hit (MAIP score: 40.599).

Conclusion: Both compounds show strong potential as PfDHODH inhibitors and valuable leads for antimalarial drug discovery. Further in vitro and in vivo studies are required to validate these findings.

Keywords: Antimalarial, Indole alkaloids, PfDHODH, Molecular docking, MM-GBSA, MD Simulation, Machine learning

DETERMINANTS OF SHEA NUT MARKETING ARRANGEMENTS IN NORTHERN UGANDA

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Introduction: The shea nut value chain is a critical source of livelihood and income, particularly for women in northern Uganda. However, local actors often rely on less competitive marketing

arrangements, which limits their profits and economic advancement. Understanding the factors driving actors' choices among available market options is essential for formulating effective strategies to enhance their competitiveness and sustainability.

Objective: This study sought to assess the factors influencing shea nut actors' choices of marketing arrangements (spot markets, informal contracts, formal contracts) in northern Uganda.

Methodology: A cross-sectional survey was conducted, collecting data from a sample of 325 shea nut actors, comprising collectors (78%), traders (16%), and processors (7%). The collected data was analyzed using descriptive statistics and a multinomial logit model to determine the probability of actors choosing each specific marketing arrangement.

Results: The dominant practice among collectors (73%) and traders (43%) was the spot market, while 45% of processors used informal contracts. Formal contracts were the least common arrangement across all actor groups. The choice of marketing arrangement was significantly influenced by actor characteristics, including experience, education, access to credit, access to extension, training, and awareness of value addition institutions.

Conclusion: The heavy reliance on informal arrangements indicates that most actors, especially collectors, lack the stable linkages required for market competitiveness. The findings imply that improving actor characteristics and institutional support such as enhancing access to credit and extension is key to promoting participation in more rewarding formal contract arrangements.

Recommendations: Efforts to increase formal market participation should focus on: 1) Providing targeted extension and training on contractual business management; and 2) Creating awareness about institutions that support value addition to reduce market transaction costs and increase actor competency.

Keywords: Informal contracts, Formal contracts, Shea nut, Shea nut actors, Uganda.

Endophytic Fungi isolated from medicinal Plants in Uganda exhibit Activity against Drug-Resistant Bacteria

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Introduction ; Endophytic fungi are ubiquitous microorganisms that reside within plant tissues without causing harm. They exhibit significant pharmaceutical potential when associated with medicinal plants. Given the global challenge of antimicrobial resistance, which causes approximately 700,000 deaths annually, these fungi present a promising source for novel antimicrobial compounds.

Objective; This study aimed to isolate and evaluate the antibacterial potential of endophytic fungi obtained from surface-sterilized leaves and stem bark of three medicinal plants in Uganda against pathogenic bacteria.

Methods; The endophytic fungi were identified based on morphological traits and confirmed using the ITS molecular barcode. Fermentation was carried out for up to 25 days in potato dextrose broth (PDB) and (PDA). The antibacterial activity of the fermentation extracts was evaluated using agar

well diffusion, and MICs were determined by broth microdilution assays.

Results; Both ethyl acetate and aqueous extracts exhibited strong antibacterial activity. EA extracts demonstrated MIC as low as 4.88 µg/mL against *Staphylococcus aureus* and 9.76 µg/mL against *Escherichia coli*. Notably, *Talaromyces* spp. ALA, HSL2, and HLI1 showed activity against MRSA, with MICs of 156.25, 156.25, and 39.06 µg/mL, respectively. Furthermore, isolate HSL2 was active against ESBL-producing *E. coli*, with MIC and MBC values of 39.06 and 312.5 µg/mL, respectively.

Conclusion; Endophytic fungi from selected Ugandan medicinal plants produce metabolites with antibacterial activity against drug-resistant pathogens and may serve as valuable leads for drug development.

Recommendation: Safety evaluation of the extracts, isolation and structural elucidation of Bioactive compounds, mode of action and characterization of Biosynthetic gene clusters in highly active endophytic fungi.

Keywords: endophytic fungi, medicinal plants, antibacterial activity, bioactive metabolite

Bridging Traditional Uses of Propolis in Uganda with GC-MS Metabolomics and Chemometric Modelling

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Abstract:

Introduction: Bee propolis is a resinous substance produced by bees from plant exudates and is commonly used in traditional Ugandan medicine. Nonetheless, its chemical makeup and medicinal uses are not yet well understood.

Objectives: This study evaluated public awareness, medicinal applications, and challenges in propolis use, along with analysing its chemical variation through GC-MS and multivariate chemometric methods.

Methodology: An online survey with 212 participants assessed awareness, accessibility, and uses of propolis. Samples from nine agroecological zones were analysed via headspace and derivatisation-based GC-MS. Chemometric analyses involved PLS-DA, VIP scores, heatmap clustering, and OPLS-DA.

Results: Most respondents (85.4%) were familiar with propolis, mainly associating it with wound treatment (49.1%), respiratory health (24.1%), and immune support (16.0%). It was commonly used as a tincture (18.9%) and an ointment (17.0%). GC-MS profiling revealed bioactive compounds, e.g. monoterpenes, sesquiterpenes, diterpenes, triterpenoids, phenolic acids, alkylresorcinols, and resin acids, known for antimicrobial, antioxidant, and anti-inflammatory properties. Chemometric models showed distinct regional clustering and agroecological markers, with OPLS-DA highlighting compositional differences linked to geography and botany.

Conclusion: Integrating sociocultural perceptions with chemical profiling demonstrates the therapeutic relevance of Ugandan propolis.

Recommendations: Policies should support quality control, value addition, and traditional healthcare integration, alongside further bioactivity validation and public education.

Keywords: propolis; GC-MS; chemometrics; Uganda; traditional medicine; regional characterization

Predicting Drug Pharmacokinetics from Chemical Structures with an Artificial Intelligence-Assisted Classical Model

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ABSTRACT

Background: Predicting drug pharmacokinetic (PK) parameters is a critical component of early drug development, as it provides insight into absorption, distribution, metabolism, and excretion (ADME) profiles. Traditional in vivo experiments, however, are costly, time-consuming, and raise ethical concerns due to animal testing. Artificial intelligence (AI) and classical PK models provide a faster, cost-effective, and more ethical alternative. This

study introduces a hybrid AI-assisted classical approach to predict drug PK parameters directly from chemical structures.

Methods: A pre-trained AI model was integrated with a classical one-compartment PK model to form a hybrid prediction framework. The AI model predicted initial PK-related molecular descriptors, which were then used as inputs to the classical PK equations. Predicted PK values were compared with reported in vivo human data using the Pearson correlation coefficient and evaluation metrics including Mean Absolute Error (MAE), Root Mean Square Error (RMSE), and Coefficient of Determination (R^2). A Django-based web application, ADMEKit, was developed to enable real-time PK predictions and concentration–time curve simulations.

Results: The hybrid model predicted six PK parameters. Strong predictive performance was achieved for LogP (MAE=0.69; RMSE=1.09; R^2 =0.83; r =0.923) and moderate performance for LogD (MAE=1.27; RMSE=2.19; R^2 =0.57; r =0.923) and f_u (MAE=0.15; RMSE=0.21; R^2 =0.65; r =0.821). Prediction accuracy was lower for V_d (MAE=4.16; RMSE=6.21; R^2 =0.11; r =0.273), CL (MAE=9.8; RMSE=27.33; R^2 =0.18; r =0.352), and $t_{1/2}$ (MAE=30.31; RMSE=107.58; R^2 =0.06; r =0.262). ADMEKit successfully demonstrated dynamic PK simulations and visualized concentration–time curves.

Conclusion: The hybrid AI–classical model approach effectively predicted key PK parameters, particularly LogP, LogD, and f_u . Although performance for V_d , CL, and $t_{1/2}$ was limited, the framework demonstrates the potential of AI-assisted modelling in drug development.

Recommendations:

Future work should incorporate physiologically based PK (PBPK) models, advanced molecular descriptors, user testing, and regulatory validation to improve prediction accuracy and expand ADMEKit's functionality.

Keywords: PK prediction, AI, drug development, ADMEKit, PBPK modelling.

EFFECTIVENESS OF AGRICULTURAL PRODUCTION ENHANCEMENT ENGINEERING TECHNOLOGY FOR SUSTAINABLE HOUSEHOLD FOOD NUTRITION SECURITY AND RESILIENT LIVELIHOODS IN THE CATTLE CORRIDOR DISTRICTS OF UGANDA

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Introduction: This paper presents the effectiveness of agricultural production enhancement engineering technologies in strengthening sustainable household food nutrition security and resilient livelihoods within Uganda's cattle corridor districts. The research addresses the problem of declining food productivity, erratic rainfall, and land degradation caused by overgrazing and climate change. These challenges threaten household nutrition and income security, particularly among pastoral and agro-pastoral communities.

Objective(s): To evaluate how innovative agricultural engineering technologies—such as solar-powered irrigation, rainwater harvesting systems, mechanized tillage, and post-harvest handling innovations—contribute to improving crop and livestock productivity, food diversification, and livelihood resilience.

Methodology / Approach: A systematic literature review was employed, combining document analysis, lessons learned, case studies, and best practices. Data were collected from selected districts within the cattle corridor. Data were collected to identify patterns in technology adoption, production outcomes, and resilience indicators.

Results / Findings: Findings reveal that households adopting improved agricultural engineering technologies experienced a 35% increase in crop yield and a 27% improvement in dietary diversity scores. Access to solar irrigation and efficient post-harvest technologies significantly reduced food waste and enhanced income stability.

Conclusion / Implications: Agricultural production enhancement engineering technologies play a critical role in transforming subsistence farming systems into sustainable and resilient livelihoods within Uganda's cattle corridor.

Recommendations: Government and development partners should scale up access to affordable technologies, strengthen capacity-building programs, and integrate engineering innovations into national food security policies. **Keywords:** Agricultural engineering, food nutrition security, resilient livelihoods, cattle corridor, Uganda

Analysing the extent of compliance with the certificate of approvals for environmental and social impact assessments by oil companies in and around Murchison Falls National Park.

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Abstract

The expansion of oil and gas exploration in biodiversity-sensitive landscapes presents profound challenges for environmental governance and conservation. This study critically analyses the extent of compliance with the Certificates of Approval (CoAs) for Environmental and Social Impact Assessments (ESIAs) issued to oil companies operating in and around Murchison Falls National Park (MFNP), Uganda's most ecologically significant protected area. Against the backdrop of global debates on resource governance, biodiversity loss, and climate change, the paper interrogates the intersection between extractive industries, regulatory mechanisms, and socio-ecological outcomes. Drawing on field interviews, documentary analysis, and policy review, the study assesses corporate adherence to environmental safeguards and examines resultant ecological, social, and economic risks.

Findings reveal significant compliance gaps, linked to governance weaknesses, institutional fragmentation, and political-economic pressures, with cascading impacts on habitat integrity, species distribution, and ecosystem services.

The analysis contributes to scholarly debates on environmental governance and resource management by bridging ESIA compliance theory with socio-ecological systems thinking. It also offers policy recommendations to strengthen institutional capacities, enforce biodiversity safeguards, and integrate climate-smart conservation practices into Uganda's oil and gas sector.

Keywords: biodiversity conservation, environmental governance, oil and gas, socio-ecological systems

Phytochemical analysis, acute and sub-acute toxicity of a polyherbal cough mixture of *G. amygdalinum*, *Z. officinale* and *E. globulus* in wistar albino rats

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ABSTRACT

Background: Upper respiratory infections (URI) remain a significant cause of global morbidity, with a high prevalence in Uganda. A polyherbal mixture of *Gymnanthemum amygdalinum* (bitter leaf), *Zingiber officinale* (ginger), and

Eucalyptus globulus is widely used in traditional Ugandan medicine for its purported synergistic effects in managing cough symptoms. However, its safety profile and phytochemical composition have not been scientifically validated.

Objective: We analyzed the phytochemical constituents and evaluated the oral toxicity of this polyherbal mixture.

Methods: The phytochemical composition of the aqueous-extracted polyherbal mixture was qualitatively screened using standard assays. Acute oral toxicity was assessed in line with OECD Guideline 425. Twelve Wistar rats were given a single oral dose (175, 550, 1750, or 5000 mg/kg) using the 'up-and-down' procedure, with clinical observations made for 14 days. Another 25 rats were used for biochemical, hematological, and histopathological analysis following a single dose.

Results: Phytochemical screening of the aqueous extract of the polyherbal mixture revealed the presence of alkaloids, saponins, tannins, terpenoids, flavonoids, glycosides, phlobatannins, and carbohydrates. Cardiac glycosides were absent. LD was found to be >5000 mg/kg, classifying the extract in GHS Category 5. Dose-dependent transient clinical signs (piloerection, hyperventilation, and diarrhea) were observed at higher doses but no mortality occurred. Biochemical analysis showed a significant ($p < 0.05$), dose-dependent reduction in serum ALP and amylase activity. A significant decrease in platelet count was observed across all treatment groups, though values were within a broad physiological range. Histopathology revealed mild hepatic vacuolations only at the 5000 mg/kg dose, with no significant lesions in the kidneys or spleen.

Conclusion: The polyherbal cough mixture is rich in bioactive compounds with known anti-inflammatory and antimicrobial properties and exhibits a high acute safety profile in Wistar rats. The observed biochemical alterations and mild hepatic changes at the highest dose warrant further investigation, but the overall findings support its traditional use and provide a foundational safety basis for its further standardization.

Keywords: Phytochemical; Polyherbal cough mixture; Acute toxicity; *G. amygdalinum*; *Z. officinale*; *E. globulus*; Median lethal dose; Wistar rats.

NUTRIENT ENRICHMENT OF MAIZE FLOUR FOR A DIETARY BALANCED BREAKFAST: FORTIFICATION WITH JACKFRUIT

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Introduction: Maize meals are staples of Ugandan diets particularly for rural populations and in schools. However, unfortified maize meals are deficient in essential nutrients including vitamins, minerals and proteins. Consumption of unfortified maize meals leads to insufficient intake of vitamins, minerals and proteins that are necessary for body system functions. Despite the enactment of a regulation in 2011 to have companies producing about 20 metric tons per day to fortify the maize flour, the costs involved prompt maize mill business owners to reduce their production volume per day to remain below the threshold and not fortify the product.

Objectives: This study explored a cheap option of fortifying maize flour with vitamins, carotenoids, minerals, proteins and other phytochemicals of medicinal importance using jackfruit powder.

Methodology: Jackfruit powder was produced from the pulp, rind, seed, rags, and rachis of four Ugandan varieties: Serebera, Namata, Kanaanansi and Namusaayi. It was blended with maize flour at 10–50% proportions by weight and analyzed for nutrient enrichment. Vitamins and phytochemicals were determined by HPLC, minerals by ICP-MS after acid digestion, and protein by UV spectrophotometry using Bradford reagent. Sensory evaluation was conducted with 12 trained panelists and 100 consumers, and data analyzed using Origin Software.

Results: Adding 10% jackfruit powder increased vitamin and protein content by approximately 5% and 4%, respectively. The fortified flour also showed enhanced mineral levels (including Fe, Zn, Mg, Ca, and K) and contained health-promoting phytochemicals such as catechin, quercetin, gallic acid, and carotenoids. Sensory tests indicated that porridge fortified at 30% was most preferred (average hedonic score 7.5/9), though the jackfruit flavor was the least liked attribute (score 2.3/9).

Conclusion: The study demonstrates that jackfruit powder is a cost-effective natural fortificant that enhances the nutritional quality of maize flour.

Recommendation: Future work should focus on improving flavor acceptability to promote wider adoption of jackfruit-fortified-maize flour.

Keywords: Vitamins, Minerals, Proteins, Phytochemicals, Jackfruit-fortified maize flour

POSTER ABSTRACTS

KNOWLEDGE AND ATTITUDES TOWARDS TELEMEDICINE FOR SEXUAL REPRODUCTIVE HEALTH SERVICES AMONG UNIVERSITY STUDENTS

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Introduction: Telemedicine offers accessible sexual and reproductive health (SRH) services for university students facing barriers including inadequate infrastructure and confidentiality concerns. Despite 95% mobile phone ownership among Ugandan university students, telemedicine uptake remains low due to limited awareness and negative perceptions.

Objective(s): To assess prevalence and determinants of knowledge and attitudes toward telemedicine for SRH services among undergraduate students at Mbarara University of Science and Technology.

Methodology / Approach: A cross-sectional study among 398 undergraduate students using convenience sampling. Data were collected via online survey adapted from the Telemedicine Awareness, Knowledge, Attitude & Skills Questionnaire and analyzed using descriptive statistics and logistic regression.

Results / Findings: Overall, 67.6% demonstrated adequate knowledge while attitudes were evenly split (51.0% positive, 49.0% negative). Knowledge was significantly associated with prior SRH education (aOR = 2.86, 95% CI: 1.64–4.98, $p < 0.001$) and seeking services from university clinics (aOR = 2.32, 95% CI: 1.33–4.06, $p = 0.003$). Positive attitudes were linked to willingness to attend telemedicine training (aOR = 2.68, 95% CI: 1.34–5.37, $p = 0.005$) and previous STD treatment-seeking (aOR = 1.66, 95% CI: 1.04–2.67, $p = 0.036$).

Conclusion / Implications: While most students possess adequate knowledge, attitudes remain divided. Healthcare engagement and SRH education significantly influence both outcomes, highlighting university health services' role in promoting digital health literacy.

Recommendations: Strengthen telemedicine policies; integrate awareness programs into university health services, develop targeted educational interventions, leverage university clinics as telemedicine advocacy platforms.

Keywords: Telemedicine, sexual and reproductive health, university students, digital health literacy

Global Preventive and Management Strategies and Their Effectiveness in Patients with Secondary Lymphedema: A Scoping Review.

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Abstract

Introduction: Secondary lymphedema results from lymphatic system damage due to infections, inflammatory diseases, cancer treatments, or trauma. It causes fluid retention, swelling, and mobility impairments, severely affecting quality of life. The condition remains a major public health concern, particularly in low-resource settings where both prevention and management are limited.

Objectives: This scoping review aimed to examine global preventive and management strategies for secondary lymphedema, evaluate their effectiveness and feasibility especially in low-resource environments and explore causative agents and knowledge gaps among patients and healthcare workers in endemic areas.

Methods: The review followed the Joanna Briggs Institute (JBI) methodology and adhered to PRISMA-ScR reporting guidelines. Literature searches were conducted in four databases: PubMed, Embase, Web of Science, and African Index Medicus. Studies included were published in English between 2014 and 2024 and focused on lower or upper limb secondary lymphedema and related interventions. Two reviewers performed data extraction independently, resolving discrepancies through discussion. A narrative and descriptive synthesis was used to summarize findings.

Results: A total of 3,192 articles were identified: PubMed (1,467), Embase conference (386), Embase articles (550), Web of Science (713), and Africa Index Medicus (76). After removing duplicates and ineligible studies, 45 articles were included in the final synthesis. Microsurgical techniques showed greater clinical effectiveness compared to conservative approaches. In endemic areas, hygiene-based and self-care strategies were commonly used for filarial lymphedema and podoconiosis. Programs such as Mass Drug Administration (MDA) and Morbidity Management and Disability Prevention (MMDP) had limited success in halting disease progression. Adjunct therapies like low-level laser therapy, cryotherapy, and kinesio taping showed promise in improving limb function and quality of life. Geographically, lymphatic filariasis was the main cause in tropical regions, podoconiosis in volcanic highlands, and cancer-related lymphedema in high-income countries. Persistent knowledge gaps and stigma among patients and healthcare providers continue to hinder effective management.

Conclusion: While microsurgical interventions provide fast and effective clinical outcomes, they are less accessible in low-resource settings. In contrast, hygiene-based and self-care approaches remain the most practical and scalable strategies for managing filarial and podoconiosis-related lymphedema in such areas.

Recommendation: Efforts should prioritize scaling up community-based hygiene education, self-care training, and stigma reduction programs. Enhancing healthcare worker training and integrating context-appropriate, low-cost interventions into public health strategies is essential for sustainable lymphedema management in low-resource environments.

Keywords: filariasis, Kamwenge, Lymphedema, Neglected Tropical Diseases, Podoconiosis, Uganda.

Propagation of solitons in an obliquely magnetized e-p-i plasma with non-thermal electron and Positrons

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Abstract

Introduction: Ion-acoustic solitary structures (IASSs) are special kinds of nonlinear waves that form in plasmas when two effects balance each other: the tendency of the wave to steepen due to

nonlinearity, and the tendency to spread out due to dispersion. This balance allows the wave to travel long distances without changing shape, much like a "solitary pulse" moving through the plasma. These structures are very important because they help us understand how energy and disturbances move in both laboratory and space plasmas. They appear in many natural plasma environments, including the solar wind, auroral regions, the magnetotail, and pulsar magnetospheres places where strong magnetic fields and energetic charged particles interact.

Objective: To investigate the formation, propagation, and characteristics of nonlinear ion-acoustic solitary structures in a magnetized super thermal electron-positron-ion plasma.

Methods: The reductive perturbation method was employed to derive the Korteweg-de Vries (KdV) equation, and the steady state solution of the KdV equation was obtained, providing a framework for exploring the solitary structures based on empirically observed ranges in space and astrophysical plasmas for various parameter such as super thermal electrons, ($k_e = 2, 4, 50$), unperturbed positron to electron density ratio ($p = n_{p0}/n_{e0}$), ion-to-electron temperature ratio ($\delta = T_i/T_e$), electron-to-positron temperature ratio, ($\sigma = T_e/T_p$) and oblique propagation angles ($\theta = 0, \pi/10, \pi/4$).

Results: From the expression KdV equation, the coefficient P represents the nonlinear effects, whereas Q describes the dispersive properties of the medium, together governing the formation and characteristics of solitary wave structures in the plasma. The derived solitary wave (soliton) profile whose functional form follows the square of the hyperbolic secant (sech²-type) reveals how these parameters modulate the amplitude, width, and polarity of electrostatic solitary waves. The numerical results show that, the non-linear equation solution allows only compressive (positive) soliton structures to exist. The results further demonstrate that soliton properties are highly sensitive to plasma parameters, increasing superthermality or positron concentration leads to reduced amplitude and broadened profiles,

temperature ratios (σ/δ) and obliqueness angle θ also significantly modulate the nonlinear and dispersive behavior of the solitary waves.

Conclusion: Our study of IASSs provides critical information on theoretical understanding and practical technologies across various plasma applications in laboratory and astrophysical settings.

Recommendations: We recommend that future research could extend this analysis by considering higher-order nonlinear equations such as the modified KdV (mKdV) or Gardner equations to study large-amplitude solitary waves. Or compare theoretical predictions with in situ satellite observations or laboratory plasma experiments to validate the model results.

Contributions: This study contributes to plasma physics by providing a systematic derivation of the KdV equation for a magnetized super thermal e-p-i plasma. It also offers a framework for interpreting localized electrostatic structures in both laboratory plasmas, such as the well-known and widely used semiconductor plasmas, intense laser fields and astrophysical environments, including the solar wind, auroral zones, and pulsar magnetospheres.

Keywords: Electron-positron-ion (e-p-i) plasmas, ion-acoustic solitary structures (IASS), Korteweg-de Vries (KdV) equation, Kappa distribution, Astrophysical plasmas

Barriers and facilitators to uptake and utilization of the WHO mental health Gap Action Programme- Intervention Guide (mhGAP-IG) for dementia assessment and management in primary healthcare settings in Uganda using the COM-B framework

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Abstract

Background: The WHO mental health Gap Action Programme-Intervention Guide (mhGAP-IG) presents an opportunity for appropriate assessment and management of people with dementia by non-specialist health workers in low- and middle-income settings such as Uganda. Although the mhGAP-IG 2.0 was introduced in Uganda in 2016, there is limited information about its uptake and utilization by non-specialist healthcare providers. This study aimed to identify barriers and facilitators to uptake and utilization of the mhGAP-IG for dementia assessment and management by non-specialist healthcare providers in Kabale District, rural southwestern Uganda

Methods: This exploratory qualitative study used a semi-structured interview guide to conduct in-depth interviews with non-specialist healthcare providers (medical officers, clinical officers, nurses, and midwives). We adopted the Capability, Opportunity, and Motivation (COM-B) theoretical model to understand the behavior of non-specialist healthcare providers. Data analysis was done using a framework analysis guided by a priori themes in line with the COM-B model.

Results: The significant barriers included limited resources, insufficient skills, and a lack of training. The opportunity to integrate the mhGAP-IG for dementia into routine work and health reporting systems is hindered by limited access to the mhGAP guidelines. Additionally, stigma associated with dementia and the lack of prioritization for dementia demotivate healthcare providers. However, awareness campaigns and educational initiatives could challenge the stigma, enhance knowledge, and encourage non-specialist healthcare providers to utilize the mhGAP-IG for dementia. Participants expressed a need for training and access to copies of the guidelines to provide appropriate dementia assessment and management. **Conclusion:** Enhancing the capacity of non-specialist healthcare providers and local contextualization of guidelines may be a viable option for the uptake and utilization of the mhGAP-IG for dementia assessment and management by non-specialist healthcare providers.

Keywords: mental health Gap Action Programme-Intervention Guide (mhGAP-IG), Dementia, healthcare providers, Uganda.

Development and Optimization of a Conventional PCR Assay for Direct Detection of *Streptococcus pneumoniae* from Nasal Swabs

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Introduction: *Streptococcus pneumoniae* remains a leading cause of childhood mortality worldwide despite widespread use of pneumococcal conjugate vaccines (PCVs). Nasopharyngeal carriage is clinically important as it precedes disease and enables transmission. Although PCVs have reduced vaccine-serotype carriage, they offer incomplete protection against non-vaccine serotypes. Understanding current serotype distribution in Ugandan children is essential for guiding vaccine design and public health strategies.

Objective: To develop and validate a conventional polymerase chain reaction (PCR) assay for the detection and serotype assignment of *S. pneumoniae* directly from clinical nasal swabs.

Methods: A CDC-validated assay was modified into a two-tier "MUST Protocol" for local application. DNA from 40 clinical isolates representing distinct pneumococcal serotypes was extracted for use as positive controls. Primers targeting the *CpsA* gene, common to all pneumococci, were utilized to screen isolates for pneumococcal positivity. Serial dilutions determined the lower limit of detection, and BLAST analysis evaluated primer binding across serotypes. PCR products were visualized by gel electrophoresis to verify the expected 160-bp *CpsA* amplicon.

Results: Extending amplification from 35 to 40 cycles improved the detection of low-concentration samples. Reducing the total reaction volume from 20 μ L to 10 μ L maintained equivalent sensitivity while conserving reagents. The assay's detection threshold was approximately 0.05 ng/ μ L DNA. Thirty-nine of forty isolates yielded the predicted *CpsA* band; serotype 38 did not. BLAST analysis revealed poor primer complementarity for serotype 38.

Conclusions: Thirty-nine of 40 serotypes (98%) were successfully amplified. The CpsA primers failed to detect serotype 38, a clinically relevant strain not covered by current vaccines. Improved screening assays are needed to ensure accurate detection of non-vaccine serotypes.

Recommendations: With over 100 pneumococcal serotypes, enhancing assay sensitivity is critical. Incorporating additional LytA or Wzy primers into the assay may reduce false negatives and strengthen pneumococcal surveillance.

Keywords: Streptococcus pneumoniae, PCR, pneumococcal vaccine, serotyping

Self-care among people with heart failure in Uganda: Challenges and Potential Solutions

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Abstract

Heart failure (HF) accounts for up to 43% of all hospital admissions among adults and has a high one-year mortality of up to 8%. Although no African guidelines currently advising on HF self-care management, the European Society of Cardiology recommends that all HF patients receive education and support to facilitate self-care. Self-care among HF has been reported to improve health outcomes, reduce morbidity and mortality. This paper is to evaluate the barriers and perceived solutions associated with self-care among HF patients in Uganda. We undertook an exploratory qualitative study that was grounded in the Theory of Planned Behavior through which we explored barriers and their solutions to self-care for HF patients. We carried out 10 in-depth interviews with physicians who manage HF, patients who have experienced (or have) HF, and one focus group discussion with HF patients. Data was collected, coded, and analyzed using Nvivo 14 and interpretation followed the ISSM COREQ Checklist for qualitative research. Barriers to self-care were categorized into themes according to TPB and entailed; attitudes towards HF self-care which included difficult to initiate and sustain self-care, lack of self-discipline and slow resolution of symptoms. Within the subjective norms barriers were limited health workers support, inadequate social support and negative peer pressure. Under perceived behavioral control, lack of understanding of the importance of self-care and

lack of finances were the identified barriers. Solutions to HF self-care barriers included education about self-care, availability of affordable and sustainable medicines, and improved social support. Self-care among people with HF is challenging and there is need to support them to get better health outcomes.

From Crisis to Care: Delivering Integrated Health Services through the URCS Mobile Clinic

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Introduction: In humanitarian crises, access to essential health care often collapses as infrastructure and health systems become overwhelmed. In response to increasing displacement from conflict and climate-related emergencies, the Uganda Red Cross Society (URCS), with support from the Kuwait Red Crescent, ECHO, and IFRC, launched a fully equipped Disaster Mobile Clinic in 2024. Operating at Health Centre II level and staffed by Emergency Medical Technicians, the clinic delivers integrated health services directly to crisisaffected communities.

Objectives: To restore access to primary and preventive health services among displaced and disaster-affected populations, while strengthening disease surveillance, early referral, and health promotion within a One Health framework.

Approach: The mobile clinic provides outpatient care, maternal health, chronic disease management, health education, and emergency referrals. Services are integrated with district health systems to ensure continuity of care. The model combines human, animal, and environmental health awareness, emphasizing disease prevention, hygiene, and vector control.

Results: In 2024, the URCS mobile clinic:

Reached 8,977 people through direct clinical care and outreach,

Referred 286 patients to higher-level facilities, and

Conducted 144 health outreaches in refugee settlements and disaster-affected areas, including Nakivale, Kasese, and Kiryandongo.

Health education sessions improved awareness of malaria, hygiene, vaccination, and maternal health, while ongoing chronic care restored treatment continuity for patients with diabetes and hypertension.

Conclusion: The URCS Disaster Mobile Clinic demonstrates a scalable model for integrated humanitarian health delivery. Its flexibility bridges service gaps during crises and reinforces community resilience through early detection, health education, and coordination across human and environmental health

sectors.

Keywords: One Health, Mobile Clinic, Epidemic Preparedness, Refugee Health, Resilience,

Uganda Red Cross

THE ROLE OF UGANDA NATIONAL OIL COMPANY (UNOC) IN ENHANCING ENVIRONMENTAL CONSERVATION FOR COMMUNITY-BASED CLIMATE CHANGE MITIGATION AND ADAPTATION IN UGANDA,

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ABSTRACT

Introduction: This paper explains the role of the Uganda National Oil Company (UNOC) in promoting environmental conservation as a strategic response to community-based climate change mitigation and adaptation. As Uganda's energy sector expands, environmental degradation and greenhouse gas emissions pose significant challenges to sustainable development. The research problem focuses on how UNOC integrates environmental stewardship within oil and gas operations to support local communities in addressing climate-related vulnerabilities. The study's importance lies in linking extractive industry governance to climate resilience and sustainable livelihoods in Uganda. **Objective(s):** The main objectives are to assess UNOC's environmental conservation strategies, evaluate their impact on community-based climate adaptation initiatives, and identify best practices for integrating sustainability into oil sector operations.

Methodology / Approach: A systematic literature review, document analysis, best practices and qualitative and case study approach was employed, key informant interviews with UNOC officials and community representatives, and review of environmental impact assessment reports. Data were analyzed thematically to identify trends and gaps in policy implementation and community participation.

Results / Findings: Findings reveal that UNOC has adopted green investment principles, implemented biodiversity protection measures, and promoted reforestation programs in Albertine Graben communities. However, gaps persist in local participation, monitoring, and technology transfer for sustainable adaptation practices.

Conclusion / Implications: UNOC's initiatives contribute positively to climate resilience but require enhanced collaboration with local governments and civil society to sustain environmental gains. Integrating community knowledge systems with corporate sustainability frameworks strengthens long-term climate adaptation.

Recommendations: Strengthen multi-stakeholder partnerships, expand environmental education, and institutionalize community-based monitoring of UNOC's green programs.

Keywords: UNOC, environmental conservation, community-based adaptation, climate change, Uganda.

CONTAMINATION AND SUSCEPTIBILITY PATTERNS OF ENTEROBACTERIACEAE IN UNCOOKED BEEF AND CHICKEN FROM SUPERMARKETS: A CROSS-SECTIONAL STUDY IN KAMPALA CENTRAL DIVISION

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Background: The prevalence and antibiotic susceptibility of Enterobacteriaceae contaminants in raw meats in Kampala's supermarkets remains largely unknown, the knowledge of which is important to public health and policy.

Objectives: The study aimed at determining the prevalence and antibiotic susceptibility of Enterobacteriaceae contaminants in raw beef and chicken in supermarkets of Kampala central.

Methods: A cross-sectional study using 48 samples from Six random

supermarkets. Contamination status reported in Colony forming units per gram was determined and ten antibiotics tested for susceptibility on the isolated contaminants.

Results: The general prevalence of Enterobacteriaceae was 83.33% with *Escherichia coli* at 38%, *Klebsiella* at 32% and *Citrobacter* at 34% being the predominant organisms. Chicken (100%) was more contaminated as compared to beef (66.67%) with a p value of 0.002. There was no significant difference in the contamination of these foods across supermarkets and parishes (p value 0.549 and 0.441 respectively). The antibiotic susceptibility was generally good with all the organisms being susceptible to most antibiotics used except Ampicillin and ceftriaxone. *Escherichia coli* showed a 60% and 57.1% resistance to Ampicillin and ceftriaxone respectively while *Klebsiella* showed a 56.7 % resistance to Ampicillin. No difference was observed in the antibiotic susceptibility of organisms isolated (p value 0.00575).

Conclusion: Prevalence was high particularly in chicken. Resistance to antibiotics was low except for Ampicillin and Ceftriaxone. Major contaminants were *Escherichia coli*, *Citrobacter* and *Klebsiella*.

Keywords: Enterobacteriaceae, Contamination, Susceptibility.

A MACHINE LEARNING PREDICTIVE MODEL FOR EARLY DETECTION OF PRE-ECLAMPSIA AMONG ANTENATAL MOTHERS IN SOUTHWESTERN UGANDA.

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Introduction:

Preeclampsia is a hypertensive disorder unique to pregnancy and remains a leading cause of maternal and perinatal morbidity and mortality, affecting approximately 5–8% of pregnancies globally. In the Ugandan context, it contributes to approximately 20% of maternal deaths.

General Objective: To create awareness of maternal mortality future trends related to preeclampsia and developing and applying a machine learning predictive model for early detection among antenatal mothers in Southwestern Uganda.

Methodology / Approach: The study applied the machine learning model development which followed a structured pipeline called Machine Learning

Model Development Pipeline (ML-MDP). This study explored the application of machine learning techniques to predict the risk of preeclampsia using clinically relevant features such as family history, gestational age, blood pressure, body mass index (BMI) and smoking status. The models were evaluated using accuracy, precision, recall, and ROC-AUC metrics.

Results: A predictive model was developed and evaluated using performance metrics including accuracy, precision, recall, ROC-AUC, and feature importance analysis. The model achieved an overall accuracy of 76.8% and demonstrated strong discriminatory power with an AUC of 0.83, indicating its potential as a supportive tool in early risk stratification.

Conclusion: The study demonstrates that machine learning can provide supportive tools for early risk stratification of preeclampsia, thereby enhancing maternal healthcare in low-resource settings.

Recommendations: Future research includes improving model generalizability through diverse dataset integration, enhancing interpretability via explainable AI techniques, and piloting real-time implementation within electronic health record systems.

Keywords: Preeclampsia, Machine Learning, Maternal Health, Prediction Model, South Western Uganda.

BIOFERTILIZER FOR ENHANCED CROP PRODUCTION ON ONIONS IN MUKONO MUNICIPALITY, MUKONO DISTRICT, UGANDA

Uzamukunda Mackline (Bsc.Ed Hons) 2023/MSC/096/PS

Abstract

Agricultural productivity in Uganda remains hindered by declining soil fertility and limited access to effective fertilizers, necessitating innovative solutions to enhance crop yields sustainably. The study addressed the challenges posed by excessive use of conventional inorganic fertilizers, such as soil degradation and environmental pollution, while meeting the increasing demand for sustainable agricultural inputs in Uganda.

The research objectives were to characterize the physicochemical properties of the coal-derived biofertilizer using FTIR, TGA, and CHNS analyses; assess soil nutrient changes following its application; and evaluate its impact on onion growth parameters including plant height, leaf number, bulb weight, and bulb length. Soil and coal samples were collected from the study area and treated in controlled experiments.

Results demonstrated that the coal biofertilizer contained significant organic carbon, functional groups conducive to nutrient binding and slow nutrient release, and improved key soil quality indicators such as pH, organic matter,

and essential macronutrients (Nitrogen, Potassium, and Phosphorus). The application of the biofertilizer significantly enhanced onion growth metrics compared to untreated controls, indicating improved nutrient uptake and plant vigor. Soil pH 5.4 ± 0.02 , Organic matter (%) 4.3 ± 0.11 , Phosphorus (ppm) 12.2 ± 0.35 , Nitrogen (ppm) 149.0 ± 0.05 , Calcium (ppm) 224.5 ± 0.25 , Magnesium (ppm) 118.0 ± 0.68 , Potassium (ppm) 149.9 ± 0.01 , Sand (%) 51.4 ± 8.9 , Clay (%) 22.6 ± 0.54 and Silt (%) 26.1 ± 0.62 support the potential of coal-derived biofertilizer as a cost-effective, eco-friendly alternative to chemical fertilizers for small and medium-scale farmers, contributing to sustainable crop production, reduced environmental impact, and improved livelihoods.

The study aligns with food security and sustainable development goals by promoting innovative fertilization strategies suitable for Ugandan agriculture. The research advances knowledge on biofertilizers' role in nutrient cycling and soil health, providing a scientific foundation for further studies and agricultural policy development in Uganda and similar agronomic areas.

Smart Biochar-Compost Hubs: Community-Driven Waste Transformation for Climate Resilience

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Ugandan communities face persistent challenges of organic waste mismanagement and declining soil fertility. Waste from households and farms is often burned or dumped, contributing to environmental pollution and greenhouse gas emissions. Simultaneously, smallholder farmers struggle with poor soil health and limited access to affordable soil amendments. This project proposes Smart Biochar-Compost Hubs simple, locally constructed systems designed to convert organic waste into biochar and compost, offering a low-cost, climate-resilient solution for sustainable agriculture. The initiative aims to reduce organic waste, improve soil productivity, create employment opportunities, and demonstrate carbon sequestration through biochar application. Biochar will be produced using modified 200-litre metal drums through controlled pyrolysis, monitored with basic sensors such as Arduino and LED indicators to ensure optimal charring. Composting will involve layering green waste with biochar in simple bins, with regular turning and moisture control to accelerate decomposition. Prototype designs have been developed, and early trials indicate promising results in biochar quality and compost texture. Community interest is strong. To scale the initiative, partnerships with local governments, NGOs, and agricultural extension services are recommended. Integration into school and cooperative programs, linkage with carbon offset schemes, further research on biochar

blends, and development of digital tracking tools will enhance long-term sustainability and impact.

Keywords: Biochar, Composting, Climate Resilience, Waste Management,

ADMISSION REQUIREMENTS FOR ACADEMIC YEAR 2025/2026

POSTGRADUATE PROGRAMMES

MINIMUM ENTRY REQUIREMENTS

The minimum requirements for admission to any Postgraduate degree are:

- a. Uganda Certificate of Education (UCE) or its equivalent with at least 5 passes
- b. Uganda Advanced Certificate of Education (UACE) or its equivalent with at least 2 principal passes.
- c. An Honors degree from an accredited degree awarding institution
- d. Candidates who have a Pass degree should have at least a Postgraduate Diploma with at least a credit from an accredited degree awarding institution.

Additionally, applicants to any **Master of Medicine** programme MUST meet the following minimum entry requirements:

- i. Applicants whose first language or medium of instruction is not English, must provide evidence from a recognized English language training institution that they have sufficient command of English language.
- ii. Have a documentary evidence of Internship Training indicating disciplines and dates.
- iii. International applicants should have their documents verified by NCHE.
- iv. International applicants, should have their degree certificate and transcript translated and converted into an equivalent of Ugandan Universities' CGPA
- v. Be registered or eligible for registration with Uganda Medical and Dental Practitioners Council.
- vi. A current certificate of good standing with the Medical Practitioners' Council of the country of origin.

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- a. Uganda Certificate of Education (UCE) or its equivalent with at least 5 passes
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- c. An Honors degree from an accredited degree awarding institution
- d. A Masters' degree from an accredited and chartered degree awarding institution
- e. A Concept paper
- f. Curriculum Vitae of proposed supervisor(s).

LIST OF POSTGRADUATE PROGRAMMES OFFERED AT MUST

Faculty of Business and Management Science		Duration (Years)
1	Master Of Business Administration	2
2	PhD in Business Administration	3
Faculty of Computing and Informatics		
3	Master in Business Informatics	2
4	Master of Science in Health Information Technology	2
5	Master of Science in Information Systems	2
6	PhD in Computing by Research	3
Faculty of Interdisciplinary Studies		
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8	Master of Arts in Governance and Planning	2
9	Master of Arts in Development Studies	2
10	PhD in Development Studies	3
Faculty of Medicine		
11	Master of Medicine in Anaesthesia	3

12	Master of Medicine in Community Practice/Family Medicine	3
13	Master of Medicine in Dermatology	3
14	Master of Medicine in Ear, Nose and Throat	3
15	Master of Medicine in Emergency Medicine	3
16	Master of Medicine in General Surgery	3
17	Master of Medicine in Internal Medicine	3
18	Master of Medicine in Obstetrics/Gynaecology	3
19	Master of Medicine in Ophthalmology	3
20	Master of Medicine in Paediatrics & Child Health	3
21	Master of Medicine in Pathology	3
22	Master of Medicine in Psychiatry	3
23	Master of Medicine in Radiology	3
24	Master of Public Health	2
25	Master of Public Health with Research Ethics	2
26	Master of Medical Laboratory Science	2
27	Master of Science in Anatomy	2
28	Master of Science in Biochemistry	2
29	Master of Science in Medical Microbiology	2
30	Master of Science in Pharmacology	2
31	Master of Science in Physiology	2
32	Master of Pharmacy (Clinical Pharmacy)	2
33	Master of Science in Pharmacognosy & Natural Medicine Science	2
34	Master of Science in Pharmaceutical Analysis	2
35	Master of Nursing Science in Critical Care	2
36	Master of Nursing Science in Community Midwifery & Reproductive Health	2
37	Master of Nursing Science in Mental Health Nursing	2
38	Master of Nursing Science in Pediatric Clinical Nursing	2
39	PhD in Medicine	3
Faculty of Science		
40	Master of Education in Curriculum, Instruction and Media Studies	2
41	Master of Education in Educational Administration and Planning	2
42	Master of Education in Educational Psychology	2

43	Master of Science in Biology (Natural Resources' Ecology, Management & Conservation)	2
44	Master of Science in Biology (Microbiology and Parasitology)	2
45	Master of Science in Chemistry	2
46	Master of Science in Mathematics	2
47	Master of Science in Physics	2
48	PhD in Biology	3
49	PhD in Chemistry	3
50	PhD in Physics	3
51	PhD in Mathematics	3
52	PhD in Curriculum and Media Studies	3
53	PhD in Educational Administration and Planning	3
54	PhD in Psychology	3
Faculty of Applied Science and Technology		
55	Master of Science in Biomedical Engineering	2
56	PhD in Biomedical Engineering	3

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