



In Search of Better Health

11th KASH CONFERENCE

BOOK OF ABSTRACTS

8th- 10th
JUNE
2021

VIRTUAL
VIA
ZOOM



In Search of Better Health

The 11th KEMRI Annual Scientific & Health (KASH) Conference

8th to 10th June, 2021
Virtually Via Zoom

Theme:

Strengthening health systems in Kenya through research, pandemic preparedness, technology and innovations in the post-COVID-19 era.

Organized by:
Kenya Medical Research Institute (KEMRI)

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ACKNOWLEDGEMENTS

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MESSAGE FROM

Prof. Sam Kariuki

Ag. Director General, KEMRI

I take this opportunity to welcome you all to the 11th KEMRI Annual Scientific and Health (KASH) Conference. It is indeed, an exciting moment for KEMRI to host this Conference online for the first time in its decade history.

I want to sincerely, thank my colleagues at the KASH Organization Committee led by Prof. Charles Mbogo and his committee members who have worked tirelessly to overcome all the odds and vagrancies posed by COVID-19 pandemic to make this Conference a reality.

The 11th KASH Conference is a forum for dissemination of research findings and networking not just for the young scientists, but also for our more experienced scientists. The official launching of the Cochrane Review Kenya Chapter a Knowledge Management platform shortly is a testimony of this networking prowess. Cochrane Review is a platform that is geared towards improvement of health where decisions about health and health care are informed by high quality, relevant and up-to-date synthesized research evidence. Let me take this opportunity to welcome all of you to visit our website on www.kemri.org to access this resource.

In addition, if the quality of key plenary speakers and scientific presentations is anything to go by, then our standing as a leading health research institution with a formidable research culture that is robust, responsive and result-oriented cannot be overstated.

This year's Conference theme is "***Strengthening Health Systems in Kenya through Research, Pandemic Preparedness, Technology and Innovations in the post COVID-19 era***" which is not just timely for the country and the rest of Africa, but I dare say globally, thanks to the prevailing COVID-19 global pandemic, which has ravaged the entire globe.

KEMRI strongly takes cognisance of the Presidential declaration on the four pillars of development in particular, the Universal Health Coverage to which deliberate efforts are in place to position as top in KEMRI's flagship strategic direction in reducing its efforts to provide solutions for diagnosis and management of diseases but also to provide solutions on affordability and availability of quality health care, including disease surveillance.

Distinguished Ladies and Gentlemen, It is refreshing to note that out of the 77 abstracts received 74 were accepted for presentation with one keynote speaker during the plenary session while five of them were slotted for the plenary talks on different thematic areas which include COVID -19. The conference is also hosting at least three (3) symposia and 13 scientific sessions.

The KASH Conference is a forum for dissemination of research findings and networking and therefore I look forward to a robust discussion that will come up with resolutions and I believe solutions that are not just timely, but responsive and result-oriented to our current realities in our health systems.

Finally, I take this opportunity to also, sincerely appreciate the KEMRI Board of Directors, led by our Board Chair, Dr. Daniel M. Mbinda. The Board has not only supported this Conference, but as management, we have continued to benefit from their wisdom, guidance and direction.

I wish to also sincerely thank all the participants at this Conference, and especially, those who submitted papers for presentation. Without participants, we cannot have a Conference. Most sincere appreciations to all our partners and collaborators who have supported most of this work being presented here today. Finally, to the Government of Kenya through the Ministry of Health who have given us moral and financial support towards making this conference a success.

I trust and believe that we will have a good and successful conference, and I thank you all for your participation and support.

God bless you all.

Prof. Sam Kariuki
Ag. Director General,
KENYA MEDICAL RESEARCH INSTITUTE



CONFERENCE OVERVIEW

Prof. Charles Mbogo

**Chairperson KEMRI Annual
Scientific and Health (KASH)
Conference**

I am pleased on behalf of the Conference Organizing Committee to welcome you to our 11th, KASH conference. You will of cause, note that the 11th, KASH Conference is unique in two fundamental ways: It is being held online and secondly, away from the traditional Month of February.

Notwithstanding the exceptionality of our conference this year, 11th, KASH maintains its rich scientific program that includes 74 abstracts and symposia titles covering current issues representing at least 300 authors.

In keeping with our tradition, this year's theme "Strengthening Health Systems in Kenya Through Research, Pandemic Preparedness, Technology and Innovations in the post COVID-19 era" plenary and scientific sessions will focus on new scientific knowledge and offer many opportunities for structured discourse on the current major issue, the COVID-19 Pandemic facing healthcare in Kenya and the African region.

With a wide variety of presentations – from oral online presentations in 13 scientific sessions, three symposia, and five panel discussions, theirs is certainly something for everyone. Our full program includes addresses from distinguished research leaders; Prof. Fredrick Chite Asirwa, the CEO of International Cancer Institute, Infectious Disease don, Prof. Kariuki Njenga, the Dean of the Aga Khan university Medical College, East Africa, Prof. Lukoye Atwoli, Programmes Director, Africa-The Global Action Fund for Funal Infections (GAFFI) Emma Orefuwa and Dr. Benjamin Tsofa, the Immediate former Deputy Director of the Centre for Geographic Medicine Research – Coast among others who will both address participants during the three-days conference. A special welcome to all!

In the scientific sessions, a great mix of established and upcoming scientists are presented, with a good number of presentations coming from young scientists whose great efforts we highly commend. We encourage participants to take time beyond the online sessions to continue networking as they learn and mentor each other.

We are confident that this Conference will present us with an opportunity to share excellent experiences from our research, to discuss new ideas and to make new friendships and collaborations. Karibuni

Thank You.

Prof. Charles Mbogo
Chairman, KASH Conference Organizing Committee

PROGRAM AT A GLANCE

TUESDAY 8TH JUNE 2021

| TIME | OFFICIAL OPENING SESSION & KEYNOTE ADDRESS |
|-----------------------|---|
| 0900 - 0915hrs | Conference overview: Chair of KASH Organizing Committee, Prof. Charles Mbogo |
| 0915 - 0925hrs | Welcome remarks: Ag. Director General and CEO, KEMRI Prof. Sam Kariuki |
| 0925 - 0935hrs | Remarks & Welcoming of the Chief Guest: Chair, KEMRI Board of Management, Dr. Daniel M. Mbinda |
| 0935 - 0955hrs | Address and Official opening by Chief Guest: Dr. Mercy Mwangangi, Chief Administrative Secretary Ministry of Health |
| 0955 - 1010hrs | BREAK |
| 1010 - 1035hrs | Opening Key Note Address: Dr. Zulu Eliya “Strengthening Health Systems in Kenya through Research, Pandemic Preparedness, Technology and Innovations in the post COVID-19 era.” |
| 1035 - 1235hrs | Cochrane Kenya Launch |
| Session Chair | Dr. Evans Amukoye |
| Moderator | Dr. Veronica Manduku |
| Monitor | Dr. Damaris Matoke-Muhia |
| 1235 - 0200hrs | BREAK |

TUESDAY 8TH JUNE 2021

SCIENTIFIC SESSION 1 – 4 PARALLEL SESSIONS

| 1400 – 1600hrs | 1400 – 1600hrs | 1400 – 1600hrs | 1400 – 1600hrs |
|--|---|--|---|
| Scientific Session 1: VENUE: Room 1 Pandemic Preparedness, Surveillance Response and Travel Medicine | Scientific Session 2: VENUE: Room 2 Adaptive & Resilient Health Systems I | Scientific Session 3: VENUE: Room 3 Drug & Vaccine Development | Scientific Session 4: VENUE: Room 4 Infectious Diseases 1 |
| Moderator: Dr. Konongoi Limbaso Monitor: Dr. Erastus Mulinge | Moderator: Bridget Kimani Monitor: Kelvin Thiong'o | Moderator: Dr. Joseph Mwangangi Monitor: Carolyne Wandera | Moderator: Prof. Charles Mbogo Monitor: Dr. Cecilia Mbae |
| END OF FIRST DAY | | | |

WEDNESDAY 9TH JUNE 2021

| TIME | PLENARY TALKS |
|-----------------------|---|
| 0830 - 0900hrs | Plenary 1: Prof. Kariuki Njenga, BVM, PhD " Tracking the Middle East Respiratory Syndrome Coronavirus (MERS-COV) among camels and humans in the Horn of Africa " |
| 0900 - 0930hrs | Plenary 2: Prof. Fredrick Chite Asirwa, MD " Strengthening Public Health System for Integrated Cancer (& NCD Control) through Innovative Access & Sustainability Model |
| 0930 - 1000hrs | Plenary 3: Dr. Benjamin Tsofa "Leveraging on Long-Term Research-Decision makers Collaboration to Facilitate Evidence used during the Covid-19 Pandemic Response" |
| Session Chair | Prof. Elijah Maritim Songok |
| Moderator | Dr. Doris Njomo |
| Monitor | Bridget Kimani |
| 1000 - 1015hrs | BREAK |

WEDNESDAY 9TH JUNE 2021

SCIENTIFIC SESSION 5 – 11 PARALLEL SESSIONS AND SYMPOSIUM 1

| 1015 – 1215hrs | 1015 – 1215hrs | 1015 – 1215hrs | 1015 – 1215hrs |
|---|---|--|---|
| Scientific Session 5: VENUE: Room 1 NCDs – Prevention, Diagnosis & Care | Scientific Session 6: VENUE: Room 2 Diagnostics, Genomics & Innovations | Scientific Session 7: VENUE: Room 3 Sexual Reproductive, Adolescent & Child Health (SRACH) | Scientific Session 8: VENUE: Room 4 Public Health 1 |
| Moderator: Dr. Veronica Manduku Monitor: Dr. Linus Ndegwa | Moderator: Dr. Damaris Matoke-Muhia Monitor: Kelvin Thiong'o | Moderator: Dr. Joseph Mwangangi Monitor: Bridget Kimani | Moderator: James Kariuki Monitor: Doris Night |
| 1215- 1400 | BREAK | | |
| 1400 – 1600hrs | 1400 – 1600hrs | 1400 – 1600hrs | 1400 – 1600hrs |
| Scientific Session 9: VENUE: Room 1 Adaptive & Resilient Health Systems 2 | Scientific Session 10: VENUE: Room 2 Infectious Diseases 2 | Scientific Session 11: VENUE: Room 3 COVID-19 Pandemic & Social dynamics | Symposium 1: VENUE: Room 4 Knowledge Management |
| Moderator: Dr. Steve Wandiga Monitor: Jacqueline Mutai | Moderator: Dr. Konongoi Limbaso Monitor: Dr. Erastus Mulinge | Moderator: Dr. Doris Njomo Monitor: Duke Isaboke | Moderator: James Kariuki Monitor: Angie Kide |
| END OF SECOND DAY | | | |

THURSDAY 10TH JUNE 2021

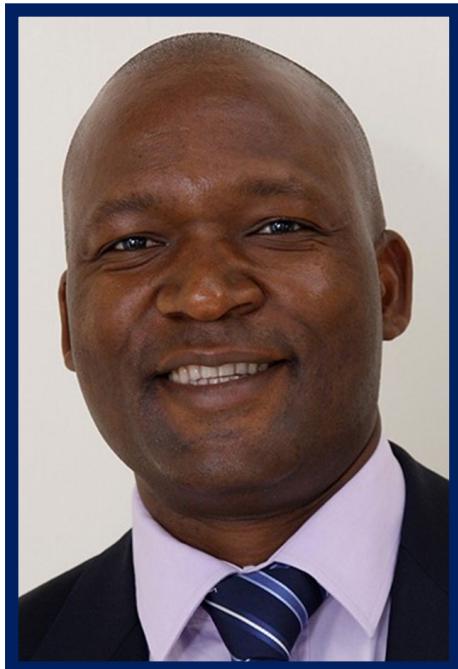
| TIME | PLENARY TALKS |
|-----------------------|---|
| 0830 - 0900hrs | Plenary 1: Prof. Lukoye Awoli MBChB, MMed Psych, PhD “The baseline of mental health of health workers in Kenya during the Covid-19 pandemic” |
| 0900 - 0930hrs | Plenary 2: Ms. Emma Orefuwa “Gaps in Diagnostics and Antifungal Therapies in Africa” |
| Session Chair | Dr. Lubano Kizito |
| Moderator | Dr. Joseph Mwangangi |
| Monitor | Jacqueline K. Mutai |
| 0930 - 1015hrs | BREAK |

THURSDAY 10TH JUNE 2021

SCIENTIFIC SESSION 12 – 13 PARALLEL SESSIONS AND SYMPOSIUM 2 AND 3

| 1015 – 1215hrs | 1015 – 1215hrs | 1015 – 1215hrs | 1015 – 1215hrs |
|--|---|---|---|
| Scientific Session 12: VENUE: Room 1 Infectious Diseases 3 | Scientific Session 13: VENUE: Room 2 Public Health 2 | Symposium 2: VENUE: Room 3 NAPREDA | Symposium 3: VENUE: Room 4 Biotechnology |
| Moderator: Dr. Joseph Mwangangi Monitor: Jacqueline Mutai | Moderator: Dr. Doris Njomo Monitor: Dr. Linus Ndegwa | Moderator: Dr. James Kariuki Monitor: Bridget Kimani | Moderator: Dr. Damaris Matoke-Muhia Monitor: Dr. Erastus Mulinge |
| 1215 – 0100hrs | CLOSING SESSION | | |
| | Conference outcomes & resolutions Chief Rapporteur: Dr. Steve Wandiga Vote of thanks- Dr. Damaris Matoke-Muhia Official Closing remarks – KASH Chair Ag. Director General & CEO, KEMRI | | |
| | END OF THIRD DAY | | |

KEYNOTE SPEAKER



KEYNOTE ADDRESS

Dr. Eliya Zulu

**Executive Director and Founder of
the African Institute for Development
Policy (AFIDEP)**

Dr. Eliya Zulu is the Executive Director and Founder of the African Institute for Development Policy (AFIDEP), whose mission is to transform lives by enabling a culture of evidence-informed policy formulation and implementation in the public sector in Africa. Zulu has extensive experience in research, capacity building, and policy engagement on population change and sustainable development, urban poverty, reproductive, child and maternal health. He is the former President of the Union for African Population studies and has served on many international development panels such as the UK Royal Society Study Group that produced the 2012 report ‘People and Planet’. Zulu has given various keynote addresses, including at the UN General Assembly. He is leading a programme to translate evidence to support African governments determine strategic investments to enable them harness the demographic dividend. A truly international scholar, he earned his Ph.D. in Demography from the University of Pennsylvania, a Masters degree in Population and Development from the Australian National University and a Bachelor of Social Science in Economics and Applied Statistics from the University of Malawi.

Keynote Address Abstract: Strengthening Health Systems in Kenya through Research, Pandemic Preparedness, Technology and Innovations in the post-COVID-19 Era

Over the years, Kenya has made notable efforts in strengthening its health system to improve access and use of health care services by its citizens. Although progress has been recorded in the different health system blocks, many challenges persist, some of which have been made worse by the devolution of health care provision in the country. The COVID-19 pandemic has put the country's weak health care system to the test, demonstrating vividly the central place of research and innovation in not only ensuring that the health system responds to the needs of all Kenyans, but is also "pandemic-ready".

There are laudable efforts in promoting and enabling the generation of the research needed for health sector decision-making and programming in Kenya. Critical institutions such as KEMRI, research funding mechanisms such as the National Research Fund (NRF), research regulatory frameworks, policy commitments to research as outlined in the Kenya Health Policy 2014-2030, and existence of structures such as the National Health Research Committee and the Research and Innovation Division in the MoH, all demonstrate the government's commitment to enabling evidence-informed decision-making (EIDM). But more needs to be done. Top among these is the need to increase investments in research generation, translation and application. Second is the need to strengthen existing systems, structures and processes so that these can play their expected role in enabling timely access to and application of research in decision-making. For example: can KEMRI's Knowledge Management Unit and the MoH's Research Division be adequately capacitated to provide a rapid evidence response service that will ensure real-time research synthesis to respond to urgent or priority health issues in the country? Can the NRF increase and sustain funding for research and innovations needed to respond to persisting or emerging health challenges in the country?

COVID-19 has demonstrated the urgent need for Kenya and other African countries to prioritise health research and innovations. For example, the country is currently dependent on India and other global actors to access COVID-19 vaccines, and yet we know that Kenya has the research capacity to test and produce vaccines. However, due to lack of funding and political leadership, research efforts remain at laboratory stage with limited scale-up. This means that as a country we are not driving innovations needed to radically transform persisting health challenges. Yet this is not just critical for strengthening our weak health system, it is also critical for pandemic preparedness. What technologies and innovations will Kenya need to tackle the next pandemic?

COVID-19 is not the last pandemic. What this pandemic has shown is the importance of preparation and early execution of efforts to prevent, detect, contain, and respond to pandemics. As a country, we need to give utmost priority to pandemic preparedness. Pandemic preparedness should be treated as a national security issue and an economic threat, which should be accorded adequate investments. Political leadership is critical for pandemic preparedness – Kenya needs clear and well-funded structures in place at the Presidency level on pandemic preparedness, linking with the Health Ministry at national and county-levels. Alongside structures, there should also be pandemic preparedness strategies informed by lessons from the ongoing COVID-19 pandemic. These strategies should provide evidence-based guidance on prevention, detection, containment and response, and should put vulnerable groups at the centre of these efforts.

PLENARY SPEAKERS



PROF M. KARIUKI NJENGA, BVM, PHD

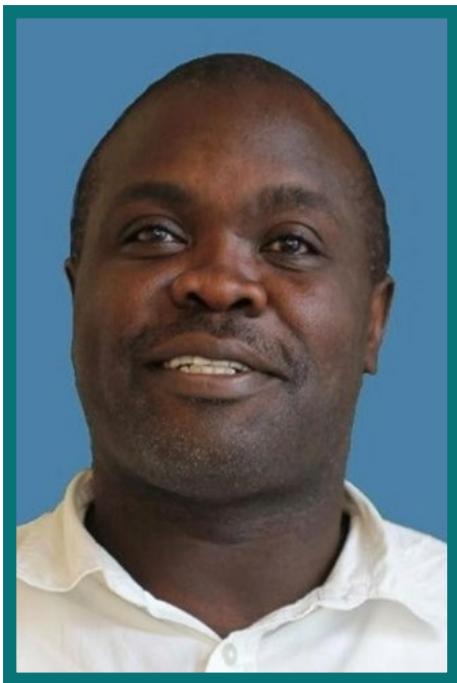
**Chief Research Officer, KEMRI And
Professor of Infectious Diseases,
Washington State University Global
Health Program**

Prof. M. Kariuki Njenga's research focuses on combating emerging infectious diseases (EIDs) in East and Central Africa. During the ongoing COVID-19 pandemic, Dr Njenga has served as an expert by providing advisories through television and newspaper interviews. He also works with the Kenya Ministry of Health to provide diagnostic support and conduct studies to determine the burden of COVID-19 in the population. Dr Njenga was the key person behind the formation of the Government of Kenya's Zoonotic Disease Unit (ZDU), which focuses on detection and control of diseases that are transmitted from animals to cause major outbreaks in humans. He has also worked with the Kenya Directorate of Veterinary Services to establish a mobile-phone animal disease surveillance system, which has greatly improved the country's ability to detect emerging diseases from domestic and wild animals early for the benefit of protecting food animals, and to serve as an early warning of potential human outbreaks. Recently, Dr Njenga was among the 10 internationally renowned scientists awarded funds by the US government to establish strategically placed global Centers for Research in Emerging Infectious Diseases (CREID) to prevent future pandemics. Dr Njenga's CREID is based at KEMRI, Nairobi serving the East and central Africa region. He is a member of the United States National Academy of Medicine.

PROF. M. KARIUKI NJENGA'S ABSTRACT**TRACKING THE MIDDLE EAST RESPIRATORY SYNDROME CORONAVIRUS (MERS-COV) AMONG CAMELS AND HUMANS IN THE HORN OF AFRICA**

Middle East respiratory syndrome coronavirus (MERS-CoV), first detected in 2012 in an ill human in Saudi Arabia has since been confirmed in 2566 humans located in 27 countries and caused 882 deaths (case fatality rate =34.4%). Dromedary camels are the known reservoir of the virus, with >70% prevalence of viral antibodies in adult camel populations globally. While the epidemiologic pattern of MERS-CoV disease suggests that most human cases result from direct or indirect transmission from camels, with limited and non-sustainable human-to-human transmission, there is limited knowledge of the maintenance and transmission of the virus among camel populations and the mechanisms and factors associated with camel-to-human transmission. A review of human outbreaks in the Middle East and Asia shows that given the widespread MERS-CoV infection among camels, zoonotic transmission to humans is relatively uncommon, and the human disease burden is not proportional to exposure to camels. In contrast to the human outbreaks and increased number of documented cases in the Middle East and Asia, there have been no documented cases of human disease in the horn of Africa (Sudan, Somalia, Ethiopia, Djibouti, Eritrea, and Kenya) where >65% of the world's dromedary camels are found. This is despite evidence of prevalent MERS-CoV infection of camels in the region: with IgG antibodies were detected in 80-90% of camels and viral RNA in 11-16% of camels from several African countries, including Ethiopia. Taken together, these studies provided sufficient evidence of continuous transmission of the virus among east African camels, yet a very low seroprevalence (<2%) in pastoralist camel handlers and no reports of human disease.

We recently followed 243 infant camels (day old-2 years old) in 33 herds and their 262 handlers for 2 years (2018-2020) in Marsabit County Northern Kenya. The longitudinal study confirmed widespread outbreak affecting almost 50% (15 of 33) of the herds and occurring shortly after the young camels had lost maternal antibody protection at around 9 months of age. The outbreak started in April 2019 and moved across the herds in 5 months, with up to 67% of camels in a herd being infected. We isolated and genetically compared the local MERS-CoV strains with clades A and B described in the Middle east and Asia and confirmed that the Kenyan strain belonged to Clade C, reported to be less virulent than the other two clades. However, the 2020 Kenya strains were genetically different from other few detected Clade C viruses. More importantly, we detected MERS-CoV infections in three camel handlers (3/262 or 1.1%) during the camel outbreak, and who remained asymptomatic throughout the eight-month follow-up. These findings confirm widespread camel infections in Northern Kenya but suggest infrequent human infections whose clinical disease profile and public health impact should be investigated.



PROF. FREDRICK CHITE ASIRWA M.D.

CEO of International Cancer Institute and Consultant Physician, Chief Medical Oncologist & Hematologist , Eldoret, Kenya

Prof. Fredrick Chite Asirwa M.D. is the CEO of International Cancer Institute, an organization whose main purpose is to expand Education, Clinical Care and Training opportunities in cancer control and research across sub-Saharan Africa (SSA) through multi-sectoral collaborations and partnerships with relevant organizations both governmental and NGOs.

He is a Medical Oncologist & Hematologist, PD/PI of several access to personalized cancer care and research initiatives including Blueprint Program, Shining Tower Program, Clinical Trials Program-all geared towards enhancing early detection, promoting primary HPV screening, providing SOC diagnostics, therapeutics cancer research. He has developed several training programs including SSA Oncology Preceptorship training, Digital Pathology Program, Telemedicine Program, Oncology training for Physician assistants (Clinical Officers), development of Oncology Nursing training program in Kenya, Medical Oncology Fellowship Program and assisted in the development of gynecologic oncology program. . He also conducts Clinical Trials in SSA.

He was previously (2011-2019), the Director of Academic Model Providing Access to Health Care (AMPATH Oncology & Hematology Consortium) in Kenya. In this role he developed infrastructure for telemedicine at AMPATH, created a robust hematology & oncology outreach program in rural Kenya and participated in the development of the Kenya National Cancer Control policies, strategic plans and guidelines by the National MOH. As PI to various clinical and research programs he established Multiple Myeloma program, Lymphoma Program, functional tumor registry, Breast Cancer screening & treatment program, Hemophilia and Sickle cell diagnostics, treatment & research, EMR for Oncology care and screening, a multinational Lung Cancer Control Program, MLCCP (Kenya, South Africa, Lesotho, Tanzania, and Eswatini). He also teaches at various Universities in SSA and participates in Scientific Review Committees (SRC) of various Oncology Clinical Trial Centers in SSA.

He has also been an active ASCO member through ASCO's Multidisciplinary Cancer Management Course (MCMC), International Affairs Committee (IAC), Education Council, ASCO's Academic Global Oncology Task Force and as a Peer reviewer to ASCO Journals. He is also currently a member of ASCO-ESMO Global Oncology Curriculum committee.

He did his Undergraduate training in Kenya and Post-graduate (Internal Medicine residency & Heme/Onc Fellowship) in the United States.

PROF. FREDRICK CHITE ASIRWA'S ABSTRACT**STRENGTHENING PUBLIC HEALTH SYSTEM FOR INTEGRATED CANCER (& NCD CONTROL) THROUGH INNOVATIVE ACCESS & SUSTAINABILITY MODEL****PURPOSE**

To address specific barriers to effective cancer (& integrated NCDs) control in sub-Saharan Africa, potential opportunities across the patient's journey, and discuss an innovative access and sustainability model: International Cancer Institute's (ICI) Experience.

METHODS

International Cancer Institute has partnered with >10 county government leadership in Kenya to enhance breast, cervical and prostate cancer screenings, early detection of cancers, Optimize diagnostics, linkage to care and therapeutics, survivorship care, palliative care and research in participating sites. ICI model involves the entire cancer patient's journey from prevention, health education and advocacy to survivorship care with integration of Other NCDs mainly Hypertension and Diabetes Mellitus Screening. Sickle Cell Disease has also been a focus NCD.

Strengthening of the Public Health system has been achieved through 1) Trainings: more than 50 preceptorship courses, skills trainings, workshops and mentorship programs 2) Hub-and-Spoke Pathology diagnostic support for counties & Digital Pathology Platform 3) Streamlining referral mechanisms through Telemedicine 4) Innovative Oncology Therapeutics programs e.g. RFP and ICI AtM 5) Data collection training, Cancer Registry courses with IARC-AFCRN and electronic POC/ e-ICI 6) Virtual Multidisciplinary TumorBoards (MDTs) to enhance standards of cancer care and practice across the region 7) Strategic partnerships for cancer advocacy and patient support include i) EMPOWER clinics with the County First Ladies Association (CFLA), African Cancer Foundation (ACF), Women 4 Cancer and Roche; ii) Shining Tower Project for capacity building to enhance the skilled workforce of practicing clinicians and accelerate personalized medicine; iii) Blueprint for Innovative Access to Healthcare between ICI and the county government of Meru and other partners- KEMRI, KEHPCA, Amref and NCDAK supported by Takeda and Roche. 8) Increasing access to Oncology Research including Clinical Trials

RESULTS

Over the last 2 years of the programs; 1) More than 2,000 HCPs have been trained across more than 50 courses (www.elearning.intercancer.com), 2) More than 60,000 cancer screenings have been done, 3) Over 4,000 cancer diagnosis made, 4) Essential therapies like Rituximab, Trastuzumab, Capecitabine, Adcetris and more than 60 others have been made available through access programs with both Pharma, Foundations and Governmental Institutions, 5) Over 80% of cancer patients within the system have NHIF coverage and ICI has >95% retention to care due to the ICI Navigation program and e-ICI data management platform. 6) Several studies currently ongoing including Clinical Trials.



DR. BENJAMIN TSOFA

Principal Research Officer, Health Policy & Systems Research, Kenya Medical Research Institute (KEMRI) – Centre for Geographic Medicine Research – Coast,

Dr. Benjamin Tsofa is a Principal Research Officer, Health Policy & Systems Research, Kenya Medical Research Institute KEMRI – Centre for Geographic Medicine Research – Coast. He initially trained and worked as a clinical dentist, before moving into public primary health management and later health policy systems research.

His research interests are in various aspects of health systems including health systems governance, human resources for health, service delivery systems, health financing and health policy analysis. He has a specific interest in health sector resource allocation, priority setting, planning and budgeting.

He currently leads the National Centre for the African Health Observatory Platform for Health Systems and Policies (AHOP) hosted at the KEMRI-Wellcome Trust Research Programme (KWTRP), in addition to leading the health systems governance research group at the KEMRI-Wellcome Trust Research Programme. He is an adjunct health policy and systems lecturer at Pwani University – Kilifi, and Strathmore University and an NDM Teaching Fellow at Oxford University. He also sits in several Technical Advisory Committees, where he provides technical assistance in several health systems strengthening initiatives and general health policy formulation and implementation at both the county and national level in Kenya, at with the WHO AFRO regional office.

DR. BENJAMIN TSOFA'S ABSTRACT**LEVERAGING ON LONG-TERM RESEARCH-DECISIONMAKERS COLLABORATION TO FACILITATE EVIDENCE USE DURING THE COVID-19 PANDEMIC RESPONSE****Background:**

Getting research evidence into policy and practice has become a central concern in health research and is now increasingly being promoted by global research funding agencies. However, the mechanisms proposed for doing so mostly assume a linear pathway from research to policy change, overlooking the power and politics entailed in knowledge generation and use. The political nature and dynamics of research evidence use in everyday decision making is particularly exacerbated during acute health systems shocks like the current CODID19 pandemic.

In 2008, the Alliance for Health Policy and Systems Research, recommended applying qualitative approaches and institutional engagement with policymakers and managers to facilitate the understanding of getting research evidence into policy and practice decision making. In addition, limited attention has been given to the important role that knowledge gained through experience can have in health system decision making, as distinct from research evidence.

Paper focus:

This paper reports on experiences from two long-term collaborative initiatives by researchers and decision makers at hospital and district/county level that have supported real-time learning about ‘everyday decision making by managers and health workers to strengthen health system functioning and enhance health system resilience.

The paper further shares insights on how we leveraged on this long-term collaboration to support COVID19 response at the hospitals and county level; and further drew from these experiences to establish a real-time evidence generation and translation support for national level structures in the ongoing COVID19 response.

Conclusions:

The key lessons we draw from these experiences are that long term collaboration and trust-based relationships help to understand everyday realities of the health system functioning. This in turn facilitates the infusion of (particularly co-produced) health research evidence into everyday decision making. This strengthens health system capacity for responding to everyday challenges and acute health system shocks, thus enhancing health system resilience



PROF. LUKOYE ATWOLI, MBChB, MMed Psych, PhD

Professor and Dean of the Aga Khan University Medical College, East Africa, and Visiting Scientist, Harvard, T. H. Chan School of Public Health, Nairobi, Kenya

Lukoye Atwoli is a Professor of Psychiatry and the Dean of the Aga Khan University Medical College, East Africa. He also practices psychiatry at the Aga Khan University Hospital in Nairobi. Prof Atwoli holds a Visiting Scientist position at the Harvard T. H. Chan School of Public Health, and is an Honorary faculty at the University of Cape Town.

Prof Atwoli trained in medicine (Bachelor of Medicine and Bachelor of Surgery, MBChB) at Moi University before undertaking specialist training in psychiatry (Master of Medicine in Psychiatry, MMed Psych) at the University of Nairobi, where his MMed dissertation explored posttraumatic stress disorder among Mau Mau Concentration Camp survivors in Nairobi. He later earned a Doctor of Philosophy degree from the University of Cape Town in South Africa, focusing on the epidemiology of trauma and posttraumatic stress disorder in South Africa.

Prof Atwoli is widely published, and his current research interests are centered on trauma and posttraumatic stress disorder and the genetics of mental disorders, although he also participates in research on children's and youth mental health, and on HIV and Mental Health.

Prof Atwoli is a social and health rights advocate, and has influenced policy and programmes in the health sector as well as in the political sphere. He has been a strong mental health campaigner and advocate who constantly speaks out for the rights of the disadvantaged in society. He writes a weekly column in the Sunday Nation through which he dissects social issues in Kenya and beyond.

Prof Atwoli is the President-Elect of the African College of Neuropsychopharmacology, and the immediate past Vice-President of the Kenya Medical Association (KMA). He is also currently the Secretary-General of the African Association of Psychiatrists (AAP), and sits on several advisory boards nationally and internationally.

PROF LUKOYE ATWOLI'S ABSTRACT**THE BASELINE OF MENTAL HEALTH OF HEALTH WORKERS IN KENYA DURING THE COVID-19 PANDEMIC**

Introduction: While the risk of contracting COVID-19 is greatest among health workers, societal expectations that the health workers provide workable solutions continue to mount. This has a potentially deleterious effect on their mental health, as confirmed by studies from countries that reported the earliest cases of COVID-19

Methods: We conducted an online survey targeting 1259 health workers between April and July 2020, collecting data on the socio-demographic and professional characteristics of health workers, as well as on COVID-19-related worries, depression, anxiety, hazardous alcohol use, posttraumatic stress disorder, and sleep problems.

Results: Of the 957 participants who responded, the median age was 35 years and 55% were female. About 39% were non-specialist doctors, 19.5% nurses, and 16.3% specialist doctors, with other cadres being 24.7%. Over half of the participants had less than 10 years of experience, and the vast majority (70%) worked in a public health facility. About a quarter of the participants reported working directly with COVID-19 clients at the time of the survey.

Overall, 66% of the participants had significant COVID-19-related worries, and those with more years of experience, were specialist doctors, or worked in private facilities had lower likelihood of reporting worry, while those who had contact with COVID-19 patients had higher likelihood of reporting worry. About 31% of the participants met criteria for depression, with female gender, younger age, unmarried status, and fewer years of experience being associated with depression.

About 44% of the participants reported hazardous alcohol use, associated with being male, unmarried, and having fewer years of experience. Nurses and specialist doctors were less likely to report harmful use compared to other cadres. Up to 36% of participants reported Generalized Anxiety Disorder, and this was associated with younger age, female gender, being unmarried, and having fewer years of experience. Nurses and specialist doctors, as well as health workers in public facilities had lower likelihood of reporting anxiety.

About 65% of the participants had symptoms of PTSD, and married participants had higher rates of PTSD than those that were not married. Up to 24% of the participants had sleeping difficulties, and this was associated with younger age (under 35 years), fewer years of work experience, and being in cadres other than nurses and doctors.

Conclusion: We report a very high rate of worries and mental disorders among health workers at the beginning of the COVID-19 pandemic. The highest risk appears to be among young, unmarried health workers with fewer years of experience. It is therefore important to put in place support structures targeting this demographic of health workers in order to reduce their risk and improve outcomes.



EMMA OREFUWA MS, MPH

**Programmes Director, Africa –
The Global Action Fund for Fungal
Infections (GAFFI), Geneva,
Switzerland**

Emma Orefuwa currently serves as Director of Programmes, Africa for the Global Action Fund for Fungal Infections (GAFFI) with responsibility for leading on programme development, supporting country ambassadors, network building and advocacy.

Emma has a passion for supporting Africans to act as agents of change, and for facilitating African solutions to African problems. She is the co-founder of PAMCA, an African-led network of scientists and Public Health professionals dedicated to identifying unified approaches to fighting vector-borne disease across the African continent. Emma brings 14 years of Public Health experience and has held a number of high-profile project and programme management roles within the UK National health service, International Development, and Global Health

MS. EMMA OREFUWA'S ABSTRACT**GAPS IN DIAGNOSTICS AND ANTIFUNGAL THERAPIES IN AFRICA**

Fungi are silent killers, causing the death of over 2 million people every year - this makes fungal disease one of the top global causes of death ahead of TB and malaria. Vulnerable people from countries in the global south are disproportionately affected and those afflicted with fungal disease live in misery due to morbidity, the inability to work and stigma. Limited diagnosis and poor measurement of disease morbidity means that the true scale of the problem is unknown. GAFFI has been almost the only global voice for fungal diseases in terms of public and global health since 2013. We estimate that with more widely available diagnosis and treatment, the number of deaths could go down to below 750,000. One prime objective is to prevent ~350,000 deaths annually in AIDS due to fungal disease .The average at death of AIDS patients is 35 years, meaning that with GAFFI's proposed interventions this neglected population will receive access to effective healthcare and will live longer, healthier, more productive lives.

As part of these collective efforts to address fungal disease diagnostic gaps in LMIC's GAFFI has initiated the first multi-country assessment of access to fungal disease diagnostics in Africa, with the primary objective of collecting data to evaluate the capacity of health systems to diagnose fungal disease. The preliminary results of this exercise will be presented.

FULL PROGRAM

TUESDAY 8TH JUNE 2021

| TIME | OFFICIAL OPENING SESSION & KEYNOTE ADDRESS |
|-----------------------|---|
| 0900 - 0915hrs | Conference overview: Chair of KASH Organizing Committee, Prof. Charles Mbogo |
| 0915 - 0925hrs | Welcome remarks: Ag. Director General and CEO, KEMRI Prof. Samuel Kariuki |
| 0925 - 0935hrs | Remarks & Welcoming of the Chief Guest: Chair, KEMRI Board of Management, Dr. Daniel M. Mbinda |
| 0935 - 0955hrs | Address and Official opening by Chief Guest: Dr. Mercy Mwangangi, Chief Administrative Secretary Ministry of Health |
| 0955 - 1010hrs | BREAK |
| 1010 - 1035hrs | Opening Key Note Address: Dr. Zulu Eliya “Strengthening Health Systems in Kenya through Research, Pandemic Preparedness, Technology and Innovations in the post COVID-19 era.” |
| 1035 - 1235hrs | Cochrane Kenya Launch |
| Session Chair | Dr. Evans Amukoye |
| Moderator | Dr. Veronica Manduku |
| Monitor | Dr. Damaris Matoke-Muhia |
| 1235 - 1400hrs | BREAK |

AFTERNOON: SCIENTIFIC SESSION 1-4

| | | |
|-----------------------|-------------------------|--|
| Time (EAT) | Abstract No | Scientific Session 1: Pandemic Preparedness, Surveillance Response and Travel Medicine VENUE: Room 1 Moderator: Dr. Konongoi Limbaso Monitor: Dr. Erastus Mulinge |
| 1400 - 1415hrs | 01 | Adaptations and Lessons Learnt from Remote Research Data Collection During the COVID-19 Pandemic in Busia and Mandera Counties in Kenya; Melvine Obuya |
| 1415 - 1430hrs | 02 | Factors that influenced the control of covid-19 in border counties, Schiller Mbuka |
| 1430 - 1445hrs | 03 | Researchers' experience on diary data collection during Covid-19 pandemic; Esther Shiraho |
| 1445 - 1500hrs | 04 | Health-care workers' perspectives on preparedness for outbreak of communicable diseases at Kericho County referral hospital, Kericho County; Abigail Ng'etich |
| 1500 - 1515hrs | 05 | Surveillance of Mosquito Vectors for Febrile illnesses control in Kenya 2009-2019; Fredrick Eyase |
| 1545 - 1600hrs | Panel Discussion | |

| Time (EAT) | Abstract No | Scientific Session 2: Adaptive & Resilient Health Systems I VENUE: Room 2 Moderator: Bridget Kimani Monitor: Kelvin Thiong'o |
|-----------------------|-------------------------|--|
| 1400 - 1415hrs | 06 | Access to Cancer Care in Kenya: Patients, Caregivers and Health Provider's Perspectives, Mercy K. Njeru |
| 1415 - 1430hrs | 07 | Transitioning from the Use of Chlorine-Based Disinfectants to Enzymatic Detergents for Cleaning and Disinfection of Reusable Medical Instruments, A case study of Nyandarua County, Hellen Wambui |
| 1430 - 1445hrs | 08 | Project experiences in development of an online knowledge translation platform that supports evidence use among counties health managers in Kenya, James Kariuki |
| 1445 - 1500hrs | 09 | Health System Response to Covid 19 in Border Counties in Kenya, Doreen Mitaru |
| 1545 - 1600hrs | Panel Discussion | |
| Time (EAT) | Abstract No | Scientific Session 3: Drug & Vaccine Development VENUE: Room 3 Moderator: Dr. Joseph Mwangangi Monitor: Caroline Wandera |
| 1400 - 1415hrs | 10 | Antimycobacterial activities, cytotoxicity and phytochemical screening of extracts for three medicinal plants growing in Kenya, Robi Chacha |
| 1415 - 1430hrs | 11 | Potent antiviral activity of white kidney beans (<i>Phaseolus vulgaris</i>) extract against human influenza A virus, Julian Makau |
| 1430 - 1445hrs | 12 | In silico physicochemical, pharmacokinetic and toxicity analysis of antiplasmodial abietane diterpenoids isolated from <i>Clerodendrum eriophyllum</i> Gurke, Beatrice Irungu |
| 1445 - 1500hrs | 13 | Has commonly used Cold herbal decoction (Dawa) turned to be COVID-19 home made herbal remedy? A review of its use, Sabina Wachira |
| 1500 - 1515hrs | 14 | Synthesis of Silver Nanoparticles Using Dichloromethane- Methanol Flower Extract of <i>Chrysanthemum cinerariaefolium</i> and Its Antibacterial Activity, Caroline Kosgei |
| 1515 - 1530hrs | 15 | Antiplasmodial activities of Extracts of <i>Securidaca Longipedunculata</i> Fresen (Polygalaceae) in Combination with Artemether and Lumefantrine, Douglas Ochora |
| 1530 - 1545hrs | 16 | Toxicity Studies, Sun Protection Factor And Antioxidant Activity Of Selected Plants Used In The Treatment Of Skin Infections In Uganda, Murungi Moses |
| 1545 - 1600hrs | Panel Discussion | |

| Time (EAT) | Abstract No | Scientific Session 4: Infectious Diseases I VENUE: Room 4 Moderator: Prof. Charles Mbogo Monitor: Dr. Cecilia Mbae |
|-----------------------|-------------------------|---|
| 1400 - 1415hrs | 17 | Occurrence in Kenya of Vibrio cholerae O1 El Tor variants carrying both Classical and El Tor type ctxB, Martin Bundi |
| 1415 - 1430hrs | 18 | Distribution and trends of antimicrobial resistance in clinical ESKAPE-E pathogens from Kenyan hospitals (2015 – 2020), Lillian Musila |
| 1430 - 1445hrs | 19 | Determination of Enterococcus faecalis and Enterococcus faecium antimicrobial resistance and virulence factors and their association with clinical and demographic factors in Kenya, Martin Omondi |
| 1445 - 1500hrs | 20 | Durability of Viral Suppression in HIV-1 patients on Combined Antiretroviral Therapy, Edward Maina |
| 1500 - 1515hrs | 21 | Description of Rift Valley Fever in the Kenya Livestock and Wildlife Syndromic Surveillance System, Narok County-Kenya, 2018-2019, Erenius Nakadio |
| 1545 - 1600hrs | Panel Discussion | |

WEDNESDAY 9TH JUNE 2021 PLENARY TALKS

| | |
|-----------------------|--|
| 0830 - 0900hrs | Plenary 1: Prof. Kariuki Njenga, BVM, PhD “ Tracking the Middle East Respiratory Syndrome Coronavirus (MERS-CoV) among camels and humans in the Horn of Africa” |
| 0900 - 0930hrs | Plenary 2: Prof. Fredrick Chite Asirwa, MD “Strengthening Public Health System for Integrated Cancer (& NCD Control) through Innovative Access & Sustainability Model |
| 0930 - 10000hrs | Plenary 3: Dr. Benjamin Tsofa “Leveraging on Long-Term Research-Decision makers Collaboration to Facilitate Evidence used the Covid-19 Pandemic Response |
| Session Chair | Prof. Elijah Maritim Songok |
| Moderator | Dr. Doris Njomo |
| Monitor | Bridget Kimani |
| 1000 - 1015hrs | BREAK |

SCIENTIFIC SESSIONS 5- 8

| Time (EAT) | Abstract No | Scientific Session 5: NCDs – Prevention, Diagnosis & Care VENUE: Room 1 Moderator: Dr. Vera Manduku Monitor: Dr. Linus Ndegwa |
|-----------------------|-------------------------|--|
| 1030 - 1045hrs | 22 | Interpersonal psychotherapy delivered by nonspecialists for depression and posttraumatic stress disorder among Kenyan HIV-positive women affected by gender-based violence, Linnet Ongeri |
| 1045 - 1100hrs | 23 | Cancer Associated Opportunistic Fungal Infections In Patients Attending Selected Oncological Clinics In Kenya, Sally Loronyokie |
| 1100 - 1115hrs | 24 | Spectrum Of Opportunistic Fungal And Bacterial Pathogens In Cancer Patients At Texas Cancer Centre, Nairobi Kenya. Rebeccah Mutembule |
| 1115 - 1130hrs | 25 | Understanding the risk factors of type 2 diabetes and lived experiences of diabetes risk in Nairobi, Kenya, Anthony Manyara |
| 1115 - 1130hrs | 26 | Self-reported symptoms and their influence on help seeking for cancer care in Kenya: A mixed methods study, Sharon Mokua |
| 1130 - 1145hrs | 27 | Treatment outcome among Medically-Assisted Therapy clients, Mombasa-Kenya, Nassoro Mwanyalu |
| 1200 – 1215hrs | Panel Discussion | |
| Time (EAT) | Abstract No | Scientific Session 6: Diagnostics, Genomics & Innovations VENUE: Room 2 Moderator: Dr. Damaris Matoke-Muhia Monitor: Kelvin Thiong'o |
| 1030 - 1045hrs | 28 | Comparison of Quantitative Polymerase Chain Reaction, Kato-Katz and Circulating Cathodic Antigen Rapid Test for the Diagnosis of Schistosoma mansoni Infection: A cross-sectional study in Kirinyaga County, Kenya, Bernard Chieng |
| 1045 - 1100hrs | 29 | Assessment of Plasmodium falciparum Resistance to Piperaquine in Western Kenya using Piperaquine Survival Assay and Molecular Marker Analyses, Duncan Wakoli |
| 1100 - 1115hrs | 30 | Profiling Trends in Susceptibility to Frontline Antimalarials in Kenya between 2008-2021 through Sustained Regional Surveillance, Duncan Wakoli |
| 1115 - 1130hrs | 31 | Molecular signatures of severe acute infections in Hospitalised children, Jacqueline Waeni |
| 1115 - 1130hrs | 32 | Design, Optimize and Compare Loop Mediated Isothermal Amplification (LAMP) and Helicase Dependent Amplification (HDA) Assays, for point-of-care detection of Wuchereria bancrofti DNA in human blood in Tana River Delta, Costal- Kenya, Nancy Kinyatta |
| 1130 - 1145hrs | 33 | Impact of COVID -19 diagnostic services on HIV viral load (VL) and Early Infant Diagnosis (EID) turn-around-time (TAT) in a reference testing laboratory in Kenya, Josephine Wambani |
| 1200 – 1215hrs | Panel Discussion | |

| | | |
|-----------------------|-------------------------|---|
| 1030 - 1045hrs | Abstract No | Scientific Session 7: Sexual Reproductive, Adolescent & Child Health (SRACH) VENUE: Room 3 Moderator: Dr. Joseph Mwangangi Monitor: Bridget Kimani |
| 1045 - 1100hrs | 34 | Systemic inflammation is negatively associated with early post discharge growth following acute illness among severely malnourished children - a pilot study, James Njunge |
| 1100 - 1115hrs | 35 | School re-entry for adolescent mothers in Sub-Saharan Africa (SSA): Policy-practice-need gaps, Caroline Jones |
| 1115 - 1130hrs | 36 | Biomarkers of late post-discharge mortality among children treated for complicated severe malnutrition, Cecilia Wechessa |
| 1115 - 1130hrs | 37 | Contribution of Health Workers and Patient Factors to Adherence to Appointments in Antenatal Clinics In Homa Bay and Kisumu County Referral Hospitals, Kenya, Shadrack Opon |
| 1130 - 1145hrs | 38 | Clinical Outcomes among Adolescents With Perinatal Acquired HIV Infection in Western Kenya, Valarie Opollo |
| 1145 - 1200hrs | 39 | HIV risk behaviors among retail pharmacy clients seeking sexual and reproductive health services in Kenya, Magdaline Asewe |
| 1200 – 1215hrs | Panel Discussion | |
| Time (EAT) | Abstract No | Scientific Session 8: Public Health I VENUE: Room 4 Moderator: James Kariuki Monitor: Doris Night |
| 1030 - 1045hrs | 40 | Participation in methadone program improves antiretroviral uptake and HIV suppression among people who inject drugs in Kenya, Loice Mbogo |
| 1045 - 1100hrs | 41 | Regional differences in HIV and hepatitis C prevalence among sexual and injecting partners of persons who inject drugs in Kenya, Betsy Sambai |
| 1100 - 1115hrs | 42 | Affordable House Floors to Control Tungiasis, Lynne Elson |
| 1115 - 1130hrs | 43 | Swollen Limbs Among Communities Of Keumbu Area, Nyaribari Chache Sub-County, Kisii County: Is The Area Endemic for Lymphatic Filariasis and Podoconiosis?, Mariam Macharia |
| 1115 - 1130hrs | 44 | Barriers of uptake of Trachoma Trichiasis (TT) surgeries among women with Trachoma Trichiasis (TT) in North Pokot Sub County, West Pokot County, Kenya, Victoria Ochwal |
| 1130 - 1145hrs | 45 | A STORY OF SIGNIFICANT CHANGE: Caesarean Sections Service Improvements – Case of Kitui County Referral Hospital, James Kariuki |
| 1145 - 1200hrs | Panel Discussion | |
| 1215 - 1400hrs | BREAK | |

AFTERNOON: SCIENTIFIC SESSION 9 -11 &SYMPOSIUM 1

| Time (EAT) | Abstract No | Scientific Session 9: Adaptive & Resilient Health Systems II VENUE: Room 1 Moderator: Dr. Steve Wandiga Monitor: Jacqueline Mutai |
|-----------------------|--------------------------|---|
| 1400 - 1415hrs | 46 | Pilot implementation of Short Message Service for randomisation in a multisite pragmatic factorial clinical trial in Kenya, Mercy Terer |
| 1415 - 1430hrs | 47 | Implementation of an Online Training Portal for Training of Research Staff: Experiences from a Multi-site Pragmatic Randomised Controlled Trial, Lynda Isaaka |
| 1430 - 1445hrs | 48 | Characteristics and factors associated with transmission of HIV from mother to child and evaluation of surveillance system, Murang'a county, Robert Kuria |
| 1445 - 1500hrs | 49 | Examining the implementation of HIV prevention policies in private retail pharmacies in Kenya, Audrey Mumbi |
| 1500 - 1515hrs | 50 | Increase of Skilled Delivery as a Result of Holding Monthly Maternity Open Days in Bungoma County, James Kariuki |
| 1545 - 1600hrs | Panel Discussions | |
| Time (EAT) | Abstract No | Scientific Session 10: Infectious Diseases II VENUE: Room 2 Moderator: Dr. Konongoi Limbaso Monitor: Dr. Erastus Mulinge |
| 1400 - 1415hrs | 51 | Understanding the role of health workers in the Lymphatic Filariasis elimination program in Kenya: Challenges faced and suggestions for improved program performance, Bridget Kimani |
| 1415 - 1430hrs | 52 | Bioefficacy and durability of Olyset Plus, a piperonyl butoxide and permethrin-treated insecticidal net, in a 3-year long trial in Kenya, Paul Gichuki |
| 1430 - 1445hrs | 53 | Factors leading to slow decline of worm burden among primary school children in endemic counties of Kenya: a cross-sectional study of prevalence and intensity, Janet Masaku |
| 1445 - 1500hrs | 54 | Modeling the Interruption of the Transmission of Soil Transmitted Helminths Infections in Kenya: Modeling Deworming, Water and Sanitation Impacts, Collins Okoyo |
| 1500 - 1515hrs | 55 | Aedes aegypti control intervention: Barriers to community-based trash collection, disposal and recycling in Ukunda, Kwale County, Kenya, Lydia Kibe |
| 1515 - 1530hrs | Panel Discussions | |

| Time (EAT) | Abstract No | Scientific Session 11: COVID-19 Pandemic & Social dynamics VENUE: Room 3 Moderator: Dr. Doris Njomo Monitor: Duke Isaboke |
|-----------------------|---|--|
| 1400 - 1415hrs | 56 | Socio-economic status and knowledge on Covid-19 prevention measures in the border Counties of Busia and Mandera, Kenya, Ismail Ahmed |
| 1415 - 1430hrs | 57 | Effect of covid-19 pandemic response measures on social life in two border counties of Kenya, Priscilla Maiga |
| 1430 - 1445hrs | 58 | Temporal trends of SARS-CoV-2 seroprevalence in transfusion blood donors during the first wave of the COVID-19 epidemic in Kenya, Sophie Uyoga |
| 1445 - 1500hrs | 59 | COVID-19 Outbreak Investigation and Response in Nyeri County Kenya, 2020, Tabitha Waweru |
| 1500 - 1515hrs | 60 | Understanding how COVID-19 pandemic influenced pharmaceutical care services: a qualitative study of retail pharmacy providers' and clients' experiences in Thika, Kenya, Peter Mogere |
| 1515 - 1530hrs | 61 | A Description of Covid-19 Cases in Nyeri County, Kenya, January 2021, Julius Debe |
| 1530 - 1545hrs | 62 | COVID-19 investigation and response in Uasin Gishu County, Kenya, Elias Lentilai |
| 1545 - 1600hrs | Panel Discussions | |
| 1400-1600hrs | Symposium 1: Knowledge Management VENUE: Room 4 Moderator: James Kariuki Monitor: Angie Kide | |

BREAK**THURSDAY 10TH JUNE 2021 PLENARY TALKS**

| | | |
|-----------------------|---|--|
| 0830 - 0900hrs | Plenary 1 | Prof. Lukoye Awoli MBChB, MMed Psych, PhD "The baseline of mental health of health workers in Kenya during the Covid-19 pandemic" |
| 0900 - 0930hrs | Plenary 2 | Dr. Emma Orefuwa " Gaps in Diagnostics and Antifungal Therapies in Africa |
| Session Chair | Dr. Lubano Kizito | |
| Moderator | Dr. Joseph Mwangangi | |
| Monitor | Jacqueline K. Mutai | |
| 0930 - 1015hrs | BREAK | |
| | SCIENTIFIC SESSION 12 - 13 and Symposium 2 & 3 | |

| Time (EAT) | Abstract No | Scientific Session 12: Infectious Diseases III VENUE: Room 1 Moderator: Dr. Joseph Mwangangi Monitor: Jacqueline Mutai |
|-----------------------|---|---|
| 1030 - 1045hrs | 63 | A Systematic Review of Health and Wellbeing in older adults living with HIV in sub-Saharan Africa, Patrick Mwangala |
| 1045 - 1100hrs | 64 | Evaluation of Tuberculosis treatment outcomes between clinically and bacteriologically diagnosed patients: a cohort study, Moses Ngari |
| 1100 - 1115hrs | 65 | Serological evidence of chronic pulmonary aspergillosis in tuberculosis patients in Kenya, Abdi Mohamed |
| 1115 - 1130hrs | 66 | Mycological food safety: Aflatoxins and Mycotoxins contamination and distribution in the Kenyan Cereals, Richard Korir |
| 1115 - 1130hrs | 67 | Physico-Chemical and Microbial Quality of Bottled Drinking Water sold in Embakasi Central, Nairobi, Kenya, Gloria Magut |
| 1130 – 1145hrs | Panel Discussions | |
| Time (EAT) | Abstract No | Scientific Session 13: Public Health II VENUE: Room 2 Moderator: Dr. Doris Njomo Monitor: Dr. Linus Ndegwa |
| 1030 - 1045hrs | 68 | HEALTH STORIES-OF-SIGNIFICANT CHANGE: a novel approaches towards eradication of open defecation in Kibwezi East Sub-County, Makueni County, Marygorret Musau |
| 1045 - 1100hrs | 69 | Sickle cell disease - the patient's perspective, Sophie Uyoga |
| 1100 - 1115hrs | 70 | Salt Iodization and Urinary Iodine Concentration Levels among Primary School Children in Mt. Elgon Sub-County, Kenya, Stephen Oteri |
| 1115 - 1130hrs | 71 | Cancer and social pain in Kenya: Perspectives of patients, survivors and care-givers, Lilian Nyandieka |
| 1115 - 1130hrs | 72 | High Iodine Deficiency In Pregnant Women In Mt. Elgon, Bungoma County, Kenya, Philip Ndemwa |
| 1130 - 1145hrs | 73 | A STORY OF SIGNIFICANT CHANGE - Stigma in EMTCT clients in Taveta Sub-County Hospital, Constance Lezen |
| Time (EAT) | Symposium 2: NAPREDA | |
| | VENUE: Room 3 | |
| 1030 - 1215hrs | Moderator: James Kariuki Monitor: Bridget Kimani | |
| Time (EAT) | Symposium 3: Biotechnology | |
| | Moderator: Dr. Damaris Matoke-Muhia | |
| 1030 - 1215hrs | Monitor: Dr. Erastus Mulinge | |
| | Closing Ceremony | |

SCIENTIFIC SESSIONS

SCIENTIFIC SESSION I: PANDEMIC PREPAREDNESS, SURVEILLANCE RESPONSE AND TRAVEL MEDICINE

Venue: Room I

Abstract 01

Title: Adaptations and Lessons Learnt from Remote Research Data Collection During the COVID-19 Pandemic in Busia and Mandera Counties in Kenya

Melvine Obuya¹, Doreen Mitaru¹, Schiller Mbuka¹, Rodgers Ochieng¹, Miriam Bosire¹, Esther Andia¹, Priscilla Maiga¹, Ismail

Ahmed¹, Lydia Kaduka¹, Joseph Mutai¹, Erastus Muniu¹, Joanna Olale², Seeromanie Harding³

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2Kenya Medical Research Institute, Centre for Clinical Research

3Kings College London

Background: The COVID-19 pandemic, while creating demand for data to inform response efforts, has had an impact on the conduct of biomedical and public health research. The research community has had to adapt its approaches to research in compliance with COVID-19 prevention measures. We highlight the adaptations made and lessons learnt in collecting research data remotely during the pandemic period from two rural communities in Kenya.

Methodology: The study was conducted in Busia and Mandera Counties, and employed a mixed method design. Consenting was done electronically via REDCap. Quantitative data was collected via e-survey on REDCap and qualitative data using telephone in-depth interviews. Study tools were piloted in Kajiado County to simulate implementation conditions. Community sensitization and mobilization was done primarily remotely, with the assistance of Research Assistants locally resident in the implementation counties. Local community health workers, trained virtually, were engaged to assist in the sampling and participant recruitment procedures in compliance to COVID-19 safety measures.

Findings: Piloting proved crucial to informing adjustments of tools, minimizing time needed to complete study procedures remotely and anticipate potential technological challenges. Leveraging on local networks, personnel and partnerships facilitated buy-in from the community. Engaging community health workers through training and active involvement as trusted local resource aided successful sampling and data collection, and enabled participation of e-survey participants who lacked smartphones. Additionally, employing a data collection tool that could support online and offline data capture enabled navigation of internet connectivity issues. Coordination of study activities was done via dedicated WhatsApp groups, phone calls and supported by robust technical support. The team employed a number of modalities to ensure participation in qualitative procedures, including flexible working hours and holding targeted in-person interviews.

Conclusion: It is possible to carry out remote data collection in communities that are challenging to access, as currently occasioned by the COVID-19 pandemic, or in situations where resource constraints preclude traditional methods. This ultimately increases representativeness of research addressing the needs of communities that would otherwise be marginalized. However, successful implementation requires plans that incorporate contingency measures, a high measure of flexibility and adaptability of the research team and customization of various online resources.

Abstract 02

Title: Factors That Influenced the Control of COVID-19 IN Border Counties.

Mbuka Schiller¹, Obuya Melvine¹, Mitaru Doreen¹, Bosire Miriam¹, Andia Esther¹, Ochieng Rodgers¹, Maiga Priscilla¹, Ahmed Ismail¹, Mutai Joseph¹, Kaduka Lydia¹, Olale Joanna², Muniu Erastus¹, Harding Seeromanie³

1KEMRI-CPHR

2KEMRI-CCR

3KINGS COLLEGE LONDON

Introduction: Kenya's porous land borders remain a cause for concern among policymakers and public health experts who fear unchecked movement may contribute to the spread of COVID-19. Kenya's cross-border communities have strong trade, linguistic and cultural ties, which create a conducive environment for unchecked movement and interaction. We sought to understand the factors that may have influenced the control of the pandemic in border counties.

Methods: This was a qualitative study conducted in Busia and Mandera counties, seeking to understand factors that influenced the control of COVID-19 in border counties. Busia County shares a border with Uganda while Mandera County borders Ethiopia and Somalia. Purposive and snowball sampling methods were used to identify informant-rich respondents (n=73) for telephone interviews done using a tailored guide that addressed issues specific to the different study populations. They included policy makers, religious leaders, commercial sex workers, health care workers, truckers, businesspersons and Covid-19 survivors and cares. Data was managed using the framework method and analyzed thematically.

Findings: A number of cross-border and health system factors that influenced the control of Covid-19 in the two border counties were noted. Cross-border facilitators of control of covid-19 included closure of manned border crossing, mandatory use of personal protective equipment, establishment of handwashing stations, screening and sample collection, harmonized testing, case management at point of detection, reporting across border points and pre-existing cross-border health committees (Mandera), while barriers included long testing turnaround time, crowding of truckers (Busia), stock outs of test kits and sample collection kits, existence and use of informal border crossings and slight differences in response strategies across the borders that fueled stigma. Health system factors that facilitated control of covid-19 included designated quarantine and isolation facilities, evacuation and testing services, community sensitization on covid-19, contact tracing, and a robust disease surveillance network (Mandera), while barriers were the proximity of testing labs, resource (infrastructure and PPEs) constraints, as well as shared culture and language among border communities that complicated contact tracing.

Conclusion: Facilitating factors and county-specific innovations can be replicated in other border counties to strengthen control of COVID -19. Border counties bear disproportionate exposure to and burden of COVID-19. There is need for multi-sectoral efforts in resourcing, enhancing health education and enforcing COVID-19 control measures.

Abstract 03

Title: Researchers' Experience on Diary Data Collection During COVID-19 Pandemic

Esther A Shiraho (Kenya Medical Research Institute)*; Priscilla Ms Maiga (KEMRI); MIRIAM BOSIRE (KEMRI); Melvin Ochieng (KEMRI); Schiller Mbuka (KEMRI); Doreen Mitaru (KEMRI); Rodgers Ochieng (KEMRI); Ismail Adow (KEMRI); Erastus Muniu (KEMRI); Joanna Olale (KEMRI); Joseph Mutai (KEMRI); Lydia Kaduka (KEMRI); Seeromanie Harding (Kings College London)

Background: Diaries are gaining ground in qualitative research as a tool for collecting first-hand information on participants' experiences. While there exists information on participants' experience of diary keeping process, limited documentation is available on researchers' experience in implementation of the same. We highlight researchers' experiences while engaging study participants in remote diary data collection during the covid-19 pandemic.

Methods: Researchers' experiences are based on qualitative diary data collection by participants in Busia and Mandera counties of Kenya. Fourteen researchers were virtually engaged - 6 actively engaged participants, 4 were supervisors, 2 liaison (researchers-communities), and 2 collaborators. Online training was conducted via Zoom platform. Community Health Extension Workers (CHEWs) in the respective counties identified prospective participants for training and enrolment. 29 participants consented electronically, and were paired with 6 researchers who offered further training and advice on diary keeping methods. Researchers who were paired with a maximum of 5 participants shared prompts on daily basis to guide on diary entries (DEs), conducted preliminary analysis of shared DEs, compiled individual DEs and archived the same upon approval by the participant. Researchers documented their experiences during this process. Prompts shared with participants served as a template guide for capturing researchers' experiences.

Findings: Training was generally successful as most participants had smart phones and conversant with the Zoom application. However, the few who lacked smart phones or experienced poor network connection opted to share devices with their counterparts, a common scenario in Mandera County. Repeated training helped reinforce study requirements and expectations. Majority (n=11) of the participants opted to keep handwritten diaries, 8 opted to share their DEs directly as WhatsApp message; 2 kept audio diaries; 1 typed in MS Word and 4 used both handwritten and WhatsApp text messages, all of which were shared through WhatsApp. Regular interactive online meetings among researchers enhanced understanding and mitigation of challenges encountered during this process. The pairing between the researchers and participants fostered trust, bonding, understanding and ease in communication. There was high retention of enrolled participants who remitted 14 DEs within 14 days. Others remitted fewer DEs and took 31 days maximum. When asked how they felt about dairying, all participants gave positive feedback.

Conclusion: Key lessons learnt were that the blended research team provided a strong support system amongst researchers and researcher-participant pairing was a novel approach that kept participants engaged and minimized fatigue associated with the diary keeping process. Constant tailored support and flexibility are key for successful diary data collection, especially where personal contact is limited.

Abstract 04**Title: Health-Care Workers' Perspectives on Preparedness for Outbreak of Communicable Diseases At Kericho County Referral Hospital, Kericho County.**

Abigail C Ng'etich (Moi University)*

Background: Kenya is currently experiencing an increase in the emergence of infectious agents leading to several disease outbreaks and pandemics. Health-care facilities play a critical role in response to outbreaks. Multiple frameworks and legislations call for a collaborative and holistic approach in outbreak preparedness and response. Kericho County Referral Hospital, is a level V Hospital and a current COVID-19 Centre in Kenya. This study draws its relevance from the above concerns; to investigate the health-care workers' perspectives on the preparedness of Kericho County Referral Hospital for communicable diseases' outbreak.

Methods: The study was based on a descriptive cross sectional study design. It comprised 31 participants from multiple departments. Convenience and Purposive sampling techniques were used. An online based questionnaire and an observation list were used to collect data. Qualitative data was analyzed through thematic analysis while quantitative data was analyzed through descriptive statistics and summarized based on a scoring scale unique to the study where; 81-120= averagely prepared; 121-160= well prepared.

Results:***Quantitative data results.***

The health-care workers' perceived the hospital to have succeeded in waste management (150) and sustaining routine health services (139). They perceived the following sectors as averagely prepared; human resource (102), non-pharmaceutical resources (118), training (116), emergency committee (114), communication (98) and monitoring and evaluation (103).

Qualitative data results.

Perceived barriers to multi-sectoral preparedness were inadequate resources, inadequate training, inadequate infrastructure and inadequate staff.

Kericho County Referral Hospital has implemented a multi-sectoral approach in preparedness for outbreak of communicable diseases. The hospital should address the shortcomings in averagely prepared departments promptly. Further similar studies to be carried out with a larger sample size and equal distribution across departments.

Pandemics Preparedness, Surveillance Response, and Travel Medicine

Abstract 05

Title: Surveillance of Mosquito Vectors for Febrile illnesses control in Kenya 2009-2019.

Fredrick L Eyase (USAMRD-A)*; Santos Yalwala (USAMRD-A); David Oullo (USAMRD-A); Gladys Kerich (USAMRD-A); Francis Ngere (USAMRD-A); Nicholas Odemba (USAMRD-A); David Abuom (USAMRD-A); John Kamanza (USAMRD-A); Erick Oyugi (USAMRD-A); Eunice Achieng (USAMRD-A); James Mutunga (USAMRD-A); Jaree Johnson (USAMRD-A)

Febrile vector borne infections control strategies are largely based upon biological knowledge of vectors including abundance and species distribution. In Kenya, there has been a re-emergence of arboviruses such as dengue and chikungunya. Recent reports from Kenya shows that the chikungunya virus is evolving to more efficient transmission by the *Aedes aegypti* mosquito. Additionally, recent reports from an outbreak of chikungunya in Mombasa, potentially describes *Culex quinquefasciatus* mosquitoes in its transmission. Malaria also continues to be a major public health burden in Kenya, with children younger than 5 years of age being the most affected. As such, continued surveillance efforts to determine mosquito distribution will fill knowledge gaps and improve disease control effort recommendations.

Between 2009 and 2019, the USAMRD-A/KEMRI entomology program conducted vector surveillance for mosquitoes in different ecological zones of Kenya. The collections were done using BG sentinel traps, CDC light traps, and battery powered aspirators. Collected mosquito vectors were brought back to the Kisumu central laboratory and taxonomically identified using dichotomous keys. Specimens were then stored in freezers for future use. Identified mosquito data was managed in Microsoft Excel and analyzed by genera in GraphPad Prism version 5.02 and SigmaPlot 12.0.

There was significant differences ($p=0.0003$) amongst the genera of mosquitoes collected between 2009 and 2019. *Mansonia* (median 10269; interquartile range; 2624-17158) and *Culex* (median, 8226; interquartile range, 2565-20572) were the most abundant followed by *Aedes* (median, 3706; interquartile range, 1039-7332), and *Anopheles* mosquitoes being the least collected (median, 900; Interquartile range 415-1758) over the study period. Additionally, there were significant differences among the sampled regions. *Mansonia* and *Culex* were equally distributed in four of the eight areas sampled (Baringo, Budalangi, Kwale and Kisumu). *Culex* was more abundantly distributed in 3 regions (Busia, Turkana and Pokot). *Aedes* genera was most abundantly seen in Malindi, followed by *Culex* and *Mansonia* within Kwale.

Culex and *Mansonia* mosquito genera have been associated with arbovirus transmission. Their abundant distribution in most of the sampled regions calls for increased surveillance for arboviruses in those regions. This, more so in light of many cases of undifferentiated febrile illnesses that continue to be reported in different parts of Kenya. The presence of large numbers of *Aedes* mosquitoes in coastal Kenya may continue to support the establishment of chikungunya and dengue in that region. The present study thus adds to mosquito data that is important for vector control and informs knowledge gaps in neglected tropical diseases.

SCIENTIFIC SESSION 2: ADAPTIVE & RESILIENT HEALTH SYSTEMS I

Venue: Room 2

Abstract 06

Title: Access To Cancer Care in Kenya: Patients, Caregivers and Health Provider's' Perspectives

Mercy Njeru (kemri)*; Charlotte Cross (Open University); Lilian N Nyandieka (KEMRI); Sharon Mokua (KEMRI); Richard Mutisya (KEMRI); Vera Manduku (KEMRI); Maureen Mackintosh (Open University)

Mercy K. Njeru, , Charlotte Cross, Lilian Nyandieka, Sharon N. Mokua, Richard Mutisya, Veronica Manduku, Maureen Mackintosh

Background: Access to health care remains a complex notion with varying interpretations and no universally accepted definition. A majority people lack access to healthcare or access basic levels of care. The literature identifies “6As” dimensions of Access: Accessibility, Affordability, Availability, Adequate/Appropriate, Acceptability and Approachability. This paper employs these dimensions in documenting factors that influence access to cancer care in Kenya

Methodology: A convergent parallel mixed methods study design was employed in three counties of Meru, Nairobi and Mombasa. 405 patients were interviewed, four focus group discussions with cancer survivors and 22 in-depth interviews with care givers health workers and policy makers held.

Results: Affordability of cancer services was enabled by National Hospital Insurance Fund but largely depended on cash payment. Challenges included high costs of cancer services. Payments for tests, treatment and indirect costs potentially impoverished the patients through care. Facilities were enabled by county funding, partners, and collaborators. Approachability was facilitated by community outreach services, local networks, awareness and knowledge promotion. However, better linkage between the community and health facility was required, especially for screening services. 30% of survey participants indicated that something they needed at the health facility was unavailable. These included: medication, tests, treatment therapies, pain relief and essential commodities. Qualitative findings identified additional requirements including oncology staff and equipment. Patients also considered aspects of unacceptable care and mentioned fear, stigma, cultural influences, religious and alternative beliefs. Nonetheless, having information and support from family, friends and other patients facilitated acceptability of cancer services. Accessibility in terms of distance and time to reach cancer care services located at County or National referral facility was reported as a challenge for many. Communication including lack of clarity, mis-diagnosis and non-disclosure of relevant information, emerged as an appropriateness concern.

Conclusion: Access dimensions interact and cannot be addressed separately. When these aspects of access to cancer care are facilitated, then access can be improved. Hence, a holistic health system approach is more desirable while emphasis should be made at enhancing diagnostic capabilities at lower levels of care in line with universal health coverage. Adequate insurance, staffing, information are also very important. When challenges to any of the access dimensions remain, then access to cancer care is undermined.

Abstract 07

Title: Transitioning from the Use -of Chlorine-Based Disinfectants to Enzymatic Detergents for Cleaning and Disinfection of Reusable Medical Instruments, A case study of Nyandarua County Public Health Facilities

Hellen Wambui (Nyandarua Chmt Office); James N. Kariuki (Kenya Medical Research Institute)*

Previously, county health care workers did not know the formula for calculating the proportions of chlorine required to prepare the right concentration of the solution required for disinfection of instruments/devices. In a number of county health facilities, there were no designated containers to measure the proportions of chlorine and water required. Moreover, exposure time of the instruments in the chlorine solution was not timed and instruments were left in the chlorine for long periods of time leading to corrosion and damage. This prompted us to carry out an infection prevention and control audit in all the Nyandarua County public health facilities . Audit findings revealed several gaps in reprocessing of reusable instruments/devices, mainly the disinfection process. Frequent supportive supervision visits also revealed that health facilities had incomplete surgical sets or very few sets of instruments to perform specific procedures. This led to delayed service delivery, no provision of the service at all and dissatisfied patients/clients who had to wait longer for the few instruments to be reprocessed. A benchmark trip was made to Kenyatta National hospital where enzymatic detergents were used in the entire hospital. More information on the enzymatic detergents was availed and supplier contact information shared. Lobbying for change from the use of chlorine-based disinfectant was done through the county management team. The supplier was invited for a sensitization meeting that was attended by some county health management team members and health facility staff. Later management approved procurement of a small supply of enzymatic detergents (50, 4litre cans) that was distributed to the 3 high-volume facilities. Later a sensitization meeting was carried out for all facility in-charges on action, reconstitution, exposure time, safety and the effectiveness of the enzymatic detergents. From this experience we learnt that enzymatic detergents are easy to use, require no formula to calculate the proportions. a ratio of 4mls of endozyme to 1 litre of water to daily reconstitute the solution, and an exposure time of only 3 minutes is sufficient. They are also safe on instruments such that even if they are overlay exposed to the solution, no damage would be likely to occur. It is cost-effective due to reduction in the cost of disinfectants. Cost of replacing damaged instruments was also reduced .

Abstract 08**Title: Project experiences in development of an online knowledge translation platform that supports evidence use in six pilot counties in Kenya****James N. Kariuki (Kenya Medical Research Institute)***

Researchers have posited that it is not the availability of research documents that matters most for health decision-making but how to apply this new evidence to the process of informing health decisions at a local setting. The objective of this paper is to document the experiences and lessons learnt in the development and deployment of an online knowledge management and knowledge translation (utafitiwafya). Methodology: This study was part of an ongoing implementation science on evidence-informed decision making (EIDM) processes in Kenya. Health managers from 6 pilot counties (Bungoma, Isiolo, Kitui, Makueni, Nyandarua and Taita Taveta) participated in the study. As an intervention, the research team used an innovative approach in an attempt to minimize the “demand-use gap”. The overall architecture of utafitiwafya platform was built based on web technology with three-tier system architecture. The client application was designed to serve many types of client interfaces. The basic application logic tasks were done in the second tier vis-à-vis the application services layer. The functional tasks included packing, synthesis and visualization of research outputs using complex logic coding algorithms. The third layer of the architecture was the database server layer, which helped to organize and manage data and information for later retrieval and updating (remote server space). Findings (experiences): Lack of county specific research repositories and inability by county health managers to use existing research publications to support informed decision making processes led research team to develop and deploy online platform called utafitiwafya (research-for-health) platform. There was general acceptance by county directors of health of the six pilot counties that the utafitiwafya platform could assist solve their immediate need i.e. capturing, sorting, storing and logically (indexing) of past proposals and research outputs emitting from their counties. Disclaimer – it is too early in this stage to determine the effectiveness of the utafitiwafya platform. Lessons drawn from the experience: The use of open-source software tools helped reduce utafitiwafya programming / development costs. It also provided a flexibility, easy maintenance and sustainability of the platform. Conclusion: The demand for research to guide evidence-informed decision-making processes can occur both at managerial and operational / programme level if healthcare workers are engaged in generating the evidence and not imposed-on by researchers. A customized technology to aid county health department’s needs, has the potential to catalyze sustained demand of research evidence by governments through organizing, storing, retrieving, synthesis and visualizing of research publications.

Abstract 09

Title: Health System Response to Covid 19 in Border Counties in Kenya

Doreen Mitaru (KEMRI)*; Lydia Kaduka (KEMRI); MIRIAM BOSIRE (KEMRI); Schiller Mbuka (KEMRI); Erastus Muniu (KEMRI); Joseph Mutai (KEMRI); Melvin Ochieng (KEMRI); Joanna Olale (KEMRI); Esther A Shiraho (Kenya Medical Research Institute); Priscilla Ms Maiga (KEMRI)

Doreen Mitaru^{1*}; Melvine Obuya¹; Schiller Mbuka¹; Miriam Bosire¹; Priscilla Maiga¹; Rodgers Ochieng¹; Esther Andia¹; Ismail Ahmed¹; Joseph Mutai¹; Lydia Kaduka¹; Erastus Muniu¹; Joana Olale²; Seeromanie Harding³.

1Kenya Medical Research Institute – Center for Public Health Research

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Background: The COVID-19 pandemic has tested the capacity of health systems globally. The Kenyan health system faced the dual pressures of responding to the health emergency and maintaining routine services to secure health gains. The border areas were particularly vulnerable due to existing challenges in access to health services and high movement of goods and people to neighbouring countries. This study sought to understand the health system response to Covid 19 in two border counties in Kenya.

Methods: The study was implemented in Busia and Mandera counties using a mixed method approach in compliance with government regulations. Quantitative data was collected using an e-survey among adults (n=582) in households using random sampling from a household sampling frame developed for the study while qualitative data was collected via telephone interviews (n=73) with purposively sampled key informants including policy actors, healthcare workers, COVID survivors, caregivers, truckers and traders. The study sought opinions from health system providers and users. Quantitative data were analyzed using SPSS while qualitative data was managed using the framework method and manual thematic analysis.

Results: The County Governments coordinated all stakeholders in implementing response measures and guidelines. Regarding service delivery, physical distancing and establishment of triage points were done at health facilities, and dedicated quarantine and isolation facilities were designated in each county. 6.5 % of respondents in the household survey reported disrupted access to general medical services. Re-designation of facilities and a drop in hospital attendance caused disruptions, necessitating innovative mitigation measures to maintain uptake of routine services. Most health workers received sensitization information; but, there was a notable gap in training Community Health Workers to support home based care and isolation. Challenges reported included managing higher workload in facility-based quarantine and isolation wards in part to cater for people in transit, funding, contact tracing, covid-19 testing kits, risk communication, human resource, training and provision of PPE, with varying experiences in the two counties.

Conclusion: The pandemic has brought to the fore the importance of a resilient health system, linked intricately to the community, to minimize implementation delays and secure routine health services. Innovativeness demonstrated in the response points to some inherent resilience in the health system. Added health sector investments in human resource, infrastructure, and disease surveillance are key to managing current and future health threats. Border counties face an additional responsibility for people in transit, which should be considered in planning and resource allocation.

SCIENTIFIC SESSION 3: DRUG & VACCINE DEVELOPMENT

Venue: Room 3

Abstract 10

Title: Antimycobacterial activities, cytotoxicity and phytochemical screening of extracts for three medicinal plants growing in Kenya

Robi Meryl Chacha (KEMRI)*

Background: Tuberculosis (TB), an airborne disease, is among the ten leading deadly diseases worldwide. Despite the efforts of WHO and its partners to eradicate it, it is still a public health issue especially with the rise of multi-drug resistant tuberculosis (MDR-TB) and extensively drug-resistant tuberculosis (XDR-TB).

Objective: This study had an aim of exploring the mycobacteriocidal effects of Commiphora plant species (Burseraceae family) known in the Kenyan traditional medicine to treat respiratory diseases including TB.

Methods: In the search of new anti-TB alternative drugs, plant materials from Commiphora mildbraedii Engl. (root bark and stem bark), Commiphora edulis (Klotzsch) Engl. (stem bark and leaves) and C. ellenbeckii Engl. (stem bark and leaves) were tested for antimycobacterial activity, cytotoxicity and phytochemistry. 100 g of the powdered plant materials were macerated using the serial method with solvents of increasing polarity. Aqueous extraction was carried out by decoction. The microbroth dilution method was used to determine the antimycobacterial activity (MIC) against a model *Mycobacterium smegmatis* ATCC607 while the cytotoxicity evaluation (CC50) was carried out using the MTT assay.

Results: The most active extract was fractionated using preparative TLC and fractions were analysed by GC-MS. Thirty extracts were obtained from the 6 different plant materials and eleven of them exhibited the antimycobacterial activity with the methanolic extracts of the stem and root bark of *C. mildbraedii*, and the aqueous extract of the *C. ellenbeckii* leaves exhibiting high activities (MIC= 0.39, 0.78 and 0.78 mg/L respectively). The MTT assay showed no or low cytotoxicity. The GC-MS analysis of the preparative TLC fractions from the methanolic extract of *C. mildbraedii* revealed the presence of 42 compounds belonging to 10 different classes of phytochemicals. Lup-20(29)-en-3-one and o-xylene were the most abundant. Except o-xylene and α-terpineol, all the compounds were detected for the first time in the *Commiphora* genus.

Conclusion: These findings justify the ethnomedicinal uses of *Commiphora* species in TB treatment. Further studies should be conducted to develop new TB treatment from this plant species. Key words: *C. mildbraedii*, *C. ellenbeckii*, *C. edulis*, antimycobacterial activity.

Abstract 11

Title: Potent antiviral activity of white kidney beans (*Phaseolus vulgaris*) extract against human influenza A virus

Juliann N Makau (Kenya Medical Research Institute)*; Ken Watanabe (Yasuda Women's University); Noriyuki Nishida (Nagasaki University)

Background: Seasonal influenza is a global public health problem associated with significant morbidity and mortality every year. Antiviral drugs and vaccines are available, however, the virus mutates quickly often making them ineffective. Overcoming drug resistance and the discovery of cheap and accessible treatment options for influenza is an urgent public health need. Bioactive dietary constituents are important for the discovery of new drugs and novel approaches for disease management. Common beans (*Phaseolus vulgaris*) are produced and consumed in many parts of the world and have profound health benefits linked to their high content of polyphenolic compounds. In this study, we investigated the antiviral effects of white kidney beans and phenolic constituents against the human influenza virus.

Methods: White kidney beans were pulverized into a fine powder and one gram was mixed with 10mL of either aqueous ethanol or alkaline water and shaken at room temperature overnight. The extract was dried and reconstituted to 20mg/mL in respective solvents and used for the determination of toxicity and antiviral activity. Cellular toxicity and antiviral activity were evaluated using the crystal violet assay. MDCK cells in 96-well tissue culture plates were treated with serial dilutions of extracts in a minimum essential medium. Influenza virus solution of 100 TCID₅₀ was added per well for the antiviral activity assay. The solvents and anti-influenza drug, Tamiflu, were analyzed as controls.

Results: The A/WSN/33 virus was used for the initial antiviral activity screening of the extracts. The alkaline extract showed the highest inhibitory activity with an IC₅₀ of 58.7µg/mL while ethanol extract did not exhibit antiviral activity up to a concentration of 500µg/mL. The alkaline extract did not show cytotoxicity up to a concentration of 500µg/mL and inhibited other strains of influenza virus including A/PR/8/34(H1N1), A/Aichi/2/68(H3N2), and a Tamiflu-resistant clinical isolate of A/H1N1/2009 pandemic with an IC₅₀ range of 20-23µg/mL. The phenolic compounds kaempferol, daidzein, and gallic acid had an IC₅₀ of 28, 62, and 11µg/mL, respectively, comparable to Tamiflu IC₅₀ of 3.9µg/mL against A/WSN/33.

Conclusion: Our results demonstrate that alkaline extract of white kidney beans inhibits the growth of various subtypes of human influenza A virus including a drug-resistant clinical isolate of the 2009 H1N1 pandemic. Phenolic compounds are efficiently extracted in alkaline solutions, thus, we checked various phenolic compounds which are found in white kidney beans for antiviral activity. We found that kaempferol, daidzein, and gallic acid inhibit viral growth in varying concentrations. This study demonstrates the potential future application of a cost-effective and widely accessible food for the management of influenza and for combating drug resistance. Studies are ongoing to determine the mode of action and bioactive components.

Abstract 12

Title: In silico physicochemical, pharmacokinetic and toxicity analysis of antiplasmodial abietane diterpenoids isolated from Clerodendrum eriophyllum Gurke

Beatrice Irungu (kemri)*; Peter Githinji (Kenyatta University); Simon Gitau (KEMRI); Sabina Wachira (KEMRI)

Background: Clerodendrum eriophyllum Gurke, is a herb locally known as Muumba in Kamba. Traditionally, pounded leaves extracts are used to treat malaria. Antiplasmodial and antimalarial activity of crude extracts are reported. Three abietane diterpenoids with antiplasmodial activity ($IC_{50} < 5\mu\text{g/ml}$) are reported. To further investigate drug-likeness potential of the reported antiplasmodial compounds we investigated their in silico physicochemical, pharmacokinetic and toxicity properties.

Methods: To profile in silico properties data of the selected compounds, this study employed freely accessible swissADME and pkCSM servers that have been validated with experimental data and are able to estimate global appraisal of pharmacokinetics and toxicity of small molecules. Structures were drawn using ChemAxon's Marvin JS and converted into smiles format as per requirement of the server followed by processing.

Results: The three compounds taxodione (1) 6-hydroxysalvinolone (2) and 6, 16-dihydroxysalvinolone (3) adhered to Lipinski's rule of five, a predictor of potential good oral absorption and bioavailability. The parameter ranged as follows; Molecular weight 314.42 -346.42; Hydrogen bond donors 1-4 and Hydrogen bond acceptors 3-5. Consensus LogP was picked as a predictor of lipophilicity and it ranged between 3.04-3.65. They were all classified as moderately soluble. Pharmacokinetics analyses predicted that compounds 1-3 have high gastrointestinal absorption and none inhibits CYP1A2 and CYP2C9 isoforms of CYP450. Additionally, Compounds 1 and 2 were predicted as not being inhibitors of P-glycoprotein while 2 and 3 were not blood brain barrier permeants (BBB). There was a PAINS alert for compounds 2 and 3 due to the presence of catechol-A (dihydrobenzene) a substructure that is classified as a frequent hitter. Compound 2 was predicted as having the easiest synthetic accessibility with a score of 3.96. Toxicity predictions indicated that none of the three compounds inhibited hERG 1 and were likely to have no hepatotoxicity while 2 inhibited hERG II and 3 had a positive remark for Ames toxicity.

Conclusion: Pharmacokinetics and toxicity parameters predicted in this work indicate that the analyzed compounds are likely to have some liabilities such as compound 1 and 2 that were predicted as a BBB permeant and hERG II inhibitor respectively. Further studies on these compounds would require a chemistry plan that tackles predicted liabilities.

Abstract 13

Title: Has commonly used Cold herbal decoction (Dawa) turned to be COVID-19 home made herbal remedy? A review of its use

Sabina W. Wachira (KEMRI)*; Lucia Keter (KEMRI); Beatrice Irungu (Kemri)

Background: COVID-19 a pandemic that have destabilized the world is caused by Severe Acute Respiratory Syndrome Coronavirus2. Though huge efforts have gone in research to produce potential therapies for COVID-19, no anti-SARS-CoV-2 therapeutic agents have been discovered so far. Since COVID-19 is a newly emerged viral disease and there is no therapeutic agents, many individuals all over the world came up with a way of preventing and self-treating themselves using herbal remedies. Most of these remedies have been part of their culture before Covid-19 and now aid in the prevention and treatment of COVID-19. For centuries, especially in Africa where medications, prescriptions and hospital visits are inaccessible and/or expensive, people have been creating their own herbal remedies. These has been passed on, from generation to generation contributing to more than 70% of Africa population reliant to traditional medicine for therapy according to WHO. The desire by Kenyans to keep COVID-19 at bay has compelled them to explore home-based remedies. The most commonly known remedy is dawa which has become increasingly very popular and as part of a herbal drink for most households in Kenya after Covid-19 pandemic. Dawa which is a Kiswahili word meaning drug/medicine in English, is a herbal decoction consisting of several food herbs, commonly used for self-treatment when one has cold. The decoction contains but not limited to, ginger, garlic, lemon and turmeric. Our focus is on the contents of this dawa that has become very popular in Kenya.

Methods: Selection of the food herbs was based on combination of spices commonly used in Kenya to self-treat cold. The review was done by searching databases like PubMed, and Google Scholar for articles related to ginger, garlic, turmeric and lemon, specifically focusing on Covid-19, the articles were collected and reviewed.

Results: The search focused on use of ginger, garlic, turmeric and lemon in Covid-19, 351 and 2 papers were retrieved from google scholar and pubmed, respectively. Papers published since January year 2020 to April 2021 were 228. Their titles and abstracts were screened for eligibility. Finally, 103 records were included for the full-text monitoring, and 60 qualified articles, including manual search papers remained for the final data extraction. A remarkable increase use of ginger, garlic, turmeric and lemon in response to COVID-19 was noted.

Conclusion: Dawa is believed to boost immune system which strengthen the body immunity to fight disease and this may contribute to alleviating symptoms, reducing the severity of the virus and improving recovery rates which could finally reduce the mortality rate. This could only be attributed to the fact that the food herbs that combine to make dawa have a lot of health benefit individually and collectively. It is important to carry out clinical trial to inform whether indeed the component of this dawa prevent or improve recovery rate of Covid-19 patients.

Abstract 14**Title: Synthesis of Silver Nanoparticles Using Dichloromethane- Methanol Flower Extract of Chrysanthemum cinerariaefolium and Its Antibacterial Activity**

CAROLINE J Kosgei (Egerton University)*

Nanotechnology is an emerging field that has opened new horizons in nanomedicine. The use of silver nanoparticles is attracting much interest because of their antibacterial activity. This study involved synthesis of silver nanoparticles using Chrysanthemum cinerariaefolium flowers dichloromethane-methanol crude extract. The synthesized silver nanoparticles (Ag NPs) were characterized using UV-Vis spectroscopy, SEM, EDX, TEM and FTIR. The antibacterial potential of the nanoparticles was ascertained against methicillin-resistant Staphylococcus aureus (MRSA), Pseudomonas aeruginosa, Staphylococcus aureus and Shigella sonnei. This was followed by phytochemical analyses of the crude extracts.

The Ag NPs were generally spherical as observed in the SEM and TEM micrographs with an average size of 26.98 nm. The UV- absorption spectrum revealed prominent peak at 430 nm while EDX analysis showed the percentage abundance of silver nanoparticle at (81.33%). The FTIR spectroscopy confirmed absorption bands of various functional groups on the surface of Ag NPs. The absorption bands were at 3472.88 cm⁻¹, 3190.67 cm⁻¹, 1646.61 cm⁻¹, 1405.08 cm⁻¹, 1109.32 cm⁻¹ and 518.64 cm⁻¹.

Antibacterial potential of the synthesized Ag NPs showed that they were more active on S. aureus with an MIC of 31.25 µg/ml. The phytochemicals observed in the crude extracts that could have been responsible for reducing silver ions into silver nanoparticles were flavonoids, phenols, tannins and glycosides.

Abstract 15

Title: Antiplasmodial Activities of Extracts of *Securidaca Longipedunculata* Fresen (Polygalaceae) in Combination With Artemether and Lumefantrine

Douglas O. Ochora (KEMRI)*; Jane Namukobe (Makerere University); Esezah Kakudid (Makerere University); Hosea Akala (USAMRD-K/KEMRI); Bernhards Ongutu (Kenya Medical Research Institute); Abiy Yenesew (University of Nairobi)

Background: Malaria caused 229 million clinical cases and 409,000 deaths in 2019, with most of these cases occurring in Sub-Saharan Africa. The continued increase of resistance of malaria parasites to the available drugs is the greatest cause of high malaria incidences. The growing number of reports on spread of artemisinin resistant strains require reciprocal innovation of new drugs with different mechanism of action to overcome resistance. One strategy to combat drug resistance is the use of combinations of two drugs with different modes of action. In this study, the activities of extracts of *Securidaca longipedunculata* that is traditionally used for fever relief have shown in vivo and in vitro antiplasmodial activities in fixed combinations with standard antimalarial drugs was conducted.

Methodology: Artemether and lumefantrine were each combined with methanol root, stem and leaf extracts of *S. longipedunculata* at fixed extract drug ratios of: 4:1, 3:1, 1:1, 1:2, 1:3 and 1:4. These combinations were tested for ex vivo antiplasmodial activity using clinical isolates and in vitro antiplasmodial activity against three strains of *Plasmodium falciparum* (W2, D6 and DD2) using SYBR Green I method. The mean sum of fifty-percent fractional inhibition concentration (FIC50) are grouped into synergism ($FIC50 < 1$), additivity ($FIC50 = 1$) and antagonism ($FIC50 > 1$).

Results: The roots extract of *S. longipedunculata* was the most potent part when combined with Artemether, the highest synergism in this combination was observed at a fixed ratio of 1:4 with FIC50 value of 0.284 µg/mL against D6 clone of *P. falciparum*. High synergism by Artemether/Root extract against field isolates at a fixed ratio of 3:1 with FIC50 value of 0.505 µg/mL was also observed. Artemether/Stem extract combinations at a fixed ratio of 3:1 showed highest synergism of all ratios with FIC50 value of 0.219 µg/mL against DD2 clone. Good activity was also shown for the same combination (Artemether/Stem extract) against the D6 clone at a fixed ratio of 1:3 with FIC50 value of 0.534 µg/mL and against field isolates at a fixed ratio of 1:1 with FIC50 value of 0.574 µg/mL. Similarly high activity against W2 clone was also shown at fixed ratio of 1:2 of Lumefantrine/Leaves combination with FIC50 value of 0.262 µg/mL. The highest synergism for ex vivo tests was shown at fixed ratio of 1:3 of Artemether/Leaves combination with FIC50 value of 0.289 µg/mL against field isolates. Most of the combinations showed synergism, with a few showing additivity and antagonism.

Conclusion: Combination of extracts of this plant with the two standard antimalarial drugs showed potential antiplasmodial activity as drug combinations reversing the occurrence of resistance.

Key words: Combination, Malaria, *Plasmodium falciparum*, *Securidaca longipedunculata*

Abstract 16**Title: Toxicity Studies, Sun Protection Factor and Antioxidant Activity of Selected Plants Used in The Treatment of Skin Infections in Uganda**

Murungi Moses (Makerere University); Jane Namukobe (Makerere University)*; Peter Sekandi (Makerere University)

Rural populations in Uganda rely heavily on traditional herbal medicine for treatment of various diseases including bacterial infections of the skin. This study was carried out to evaluate the oral and dermal toxicities, sun protection factor and antioxidant activities of the selected plants used in treating antibacterial skin infections. The plant parts used in treatment of the skin infections were cold macerated in distilled water and DCM:MeOH 1:1 to make aqueous extract(A) and organic extract(O) respectively. These samples include Psoropermum febrifugum (PF) stem bark, Plectranthus caespitosus (PC) leaves, Spermacoce princeace (SP) leaves and Erlongea tormentosa (ET) leaves. Acute and sub-acute toxicities were analyzed using OECD guideline tests no. 423, 407, 402 & 410. UV-VIS spectrophotometry was used to determine the sun protection factor and DPPH radical scavenging assay was used to determine the antioxidant activity.

Preliminary observations showed no significant acute oral or dermal toxicities of extracts against mice. Biochemistry tests in conjunction with histopathology results also showed no significant 28-days repeated dose toxicity against major organs in mice. 4-aminoparabenoic acid, (PABA, 42.056 ± 6.809) was used as the standard reagent in SPF determinations. PCA (37.840 ± 0.428) showed the highest whereas ETA (3.075 ± 1.365) showed the least sunscreen activity. In contrast, ascorbic acid ($50.1 \pm 2.99 \mu\text{g/mL}$) was used as the standard for the determination of DPPH radical scavenging activity of the extracts. PCO ($127.4 \pm 1.32 \mu\text{g/mL}$) showed a lowest IC50 whereas PFO ($400 \pm 18.98 \mu\text{g/mL}$) showed the highest IC50 for DPPH radical scavenging.

SCIENTIFIC SESSION 4: INFECTIOUS DISEASES I

Venue: Room 4

Abstract 17

Title: Occurrence in Kenya of *Vibrio cholerae* O1 El Tor variants carrying both Classical and El Tor type ctxB

Martin Bundi (KEMRI)*

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Background: Kenya is endemic for cholera with different waves of outbreaks having been documented since 1971. Recently, new pathogenic variants of *Vibrio cholerae* O1 with traits of both classical and El Tor biotype have emerged and spread throughout many Asian and African countries where cholera is endemic. The aim of this study was to describe the phenotypic and genotypic properties of 146 *V. cholerae* O1 strains isolated from Kenya cholera outbreaks between 1975 and 2017.

Methods: Phenotypic tests (chicken cell agglutination, Polymyxin B, Sheep erythrocyte haemolysis, Voges-Proskauer and Susceptibility to phage IV) and genotypic tests (ctxB genotyping, hlyA typing, rstR typing, rtxC typing and tcpA typing) using PCR were used to determine the biotypes. Pulsed field gel electrophoresis (PFGE) genotyping was used to determine the strains relatedness.

Results: The study findings indicate that the 1975–1984 strains had typical El Tor biotype traits. New variants of *V. cholerae* O1 having traits of both classical and El Tor biotypes were observed from 2007 with all strains isolated between 2015 and 2017 being variant strains sensitive to polymyxin B and carrying both classical and El Tor type ctxB. All strains were resistant to Phage IV and harbored rstR, rtxC, hlyA, rtxA and tcpA genes specific for El Tor biotype indicating that the strains had an El Tor backbone. Pulsed field gel electrophoresis (PFGE) genotyping differentiated the isolates into 14 pulsotypes. The clustering also corresponded with the year of isolation signifying that the cholera outbreaks occurred as separate waves of different genetic fingerprints exhibiting different genotypic and phenotypic characteristics.

Conclusion: We report the emergence and prevalence of *V. cholerae* O1 strains carrying El Tor type and classical type ctxB in Kenya. hlyA typing, rtxA typing, and susceptibility to phage IV were the most reliable tests for determining the El Tor biotype, whereas ctxB genotyping was the most reliable test to determine variant strains. The occurrence of variant strains of *V. cholerae* is a significant event in cholera epidemics in Kenya as few countries have reported the circulation of virulent *V. cholerae* O1 strains harboring both classical and El Tor type ctxB and sensitive to polymyxin B. There is need for further investigation to determine their clinical and epidemiological significance.

Abstract 18

Title: Distribution and trends of antimicrobial resistance in clinical ESKAPE-E pathogens from Kenyan hospitals (2015 – 2020).

Lillian Musila (USAMRD-A, Kenya/KEMRI)*; Fredrick Tiria (USAMRD-A, Kenya/KEMRI); Samuel Wahome (Independent Researcher); Martin MG Omondi (walter reed); Daniel Matano (USAMRD-A, Kenya/KEMRI); Cecilia Kyany'a (USAMRD_A, Kenya/KEMRI); Erick Odoyo (USAMRD-A, Kenya/ KEMRI); Willie Sang (KEMRI)

Background: ESKAPE-E pathogens: Enterobacter spp. (ES), S. aureus (SA), K. pneumoniae (KP), A. baumannii (AB), P. aeruginosa (PA), E. faecium and faecalis (EF), and E. coli (EC) are a prioritized group of clinically important healthcare-associated organisms due to their high multi-drug resistance potential. This surveillance study describes the distribution of these pathogens, the levels of and trends in antibiotic resistance in patients at five hospitals in Kenya from 2015 to 2020.

Methods: The proportions of ESKAPE-E pathogens obtained from patients in each hospital and the antibiotic non-susceptibility (NS) profiles of the isolates were determined using standard culture techniques and a Vitek2 platform. Trends in NS and proportions of multi-drug resistant isolates were determined between two three-year periods. Microsoft Excel 2013 was used to plot NS trends and Stata 13 used for simple linear regression analysis to determine statistical significance.

Results: 1244 non-duplicated ESKAPE-E isolates: 432 SA (34.7%), 374 EC (30.0%), 138 PA (11.1%), 96 KP (7.7%), 82 AB (6.6%), 66 ES (5.3%), and 56 EF (4.5%) were obtained from the various infections. The least effective antibiotics (>60% NS) for each pathogen was: SA: trimethoprim-sulfamethoxazole (76.7%) and benzylpenicillin (94.4%), tetracycline (76.9%), ES: cefixime (98.4%) and cefuroxime (96.9%), EC: trimethoprim (80.5%), ticarcillin/clavulanic acid (63.2%), tetracycline (67.5%), and piperacillin (80.9%), KP: trimethoprim (63.2%), and piperacillin (100%), AB: ceftriaxone (100%), cefepime (81.7%), piperacillin (82.3%), ticarcillin/clavulanic acid (79%). The bacteria were most susceptible (<20% NS) to meropenem (EC, ES, KP), tigecycline (EB, KP, AB), and colistin (EB, AB, PA), ES to vancomycin (7.7%), nitrofurantoin (8.2%), teicoplanin (1.9%) and linezolid (3.9%) and SA to all except tetracycline, benzyl penicillin and trimethoprim-sulfamethoxazole. For the two surveillance periods, a ≥10% increase in NS was observed for PA:meropenem (7.9 to 30.9%), colistin (2.9 to 18.1%), levofloxacin (18.2 to 30.9%); AB: ticarcillin-clavulanic acid (50 to 83.3%), cefepime and piperacillin (68.8 to 84.9%), and meropenem (43.8 to 59.1%); KP: minocycline (35.0 to 47.9%);SA: trimethoprim-sulfamethoxazole (68.1 to 80.1%); and ES: nitrofurantoin (0 to 11.1%) and vancomycin (0 to 10.3%). In contrast, a noteable decline in NS (≥10%) was observed for ES to most drugs, for KP and AB to tigecycline, for KP to fluoroquinolones and a significant decline for SA to rifampicin [(32.8 to 1.9%) p-value= 0.04]. The overall trend in proportion of MDR ESKAPE-E was 46.2% to 44.9% with an increase observed only for KP (36 to 49.3%), PA (25 to 39.4%) and EF (0 to 5.1%).

Conclusions: This study emphasizes the variation in antimicrobial resistance levels and trends among the species and the importance of implementing measures to slow resistance and preserve the remaining efficacious and last-line drugs.

Abstract 19

Title: Determination of Enterococcus faecalis and Enterococcus faecium antimicrobial resistance and virulence factors and their association with clinical and demographic factors in Kenya

Martin MG Omondi (walter reed)*; Lillian Musila (USAMRD-A); Fredrick Tiria (USAMRD-A); Erick Odoyo (USAMRD-A); Daniel Matano (USAMRD-A); Cecilia Kyanya (USAMRD-A); Winnie Mutai (UON); Daniel Mbwika (Kenyatta University)

Background: Enterococci are clinically significant because of their increasing antibiotic resistance and their ability to cause severe infections due to a range of virulence genes. There are few studies examining virulence factors in developing countries. This study describes the antimicrobial resistance profiles and prevalence of key Enterococcal virulence genes gelE, asa1, cylA, esp, and hyl and their association with demographic and clinical characteristics of *E. faecalis* and *E. faecium* patients in Kenya. **Method:** Antimicrobial susceptibility tests and PCR screening for the virulence genes were performed for 37 *E. faecalis* and 7 *E. faecium* isolates previously obtained between 2013 and 2019 from patients in Kisumu, Nairobi, Malindi, Kombewa and Kericho with Urinary tract Infections and Skin and soft tissue infections. The associations between the bacterial species, virulence genes, clinical and demographic factors, and resistance phenotypes were assessed using Fisher's exact test with a p-value of ≤ 0.05 considered significant.

Results: *E. faecium* was associated with inpatient males with hospital-acquired SSTIs, whereas *E. faecalis* was associated with community-acquired UTIs (P-value = 0.0367). There was little difference in the antibiotic resistance profiles between *E. faecalis* and *E. faecium*. There was 100% resistant to erythromycin for all isolates, whereas 25.0 %, 90.9%, and 2.27 % of all isolates were susceptible to tetracycline, nitrofurantoin, and teicoplanin, respectively. All isolates were susceptible to tigecycline, vancomycin, and linezolid. The prevalence of the virulence genes among the 44 isolates were 61.4% for gelE, 59.1 % for asa1, 36.3% for Esp, 25.0 % for cylA, and 2.27 % for hyl. 72.9% of *E. faecalis* isolates had multiple virulence genes, while 57% of *E. faecium* isolates had no virulence genes. Hyl was only detected in *E. faecium*, while cylA and asa1 were only detected in *E. faecalis*. There was significant correlation between the presence of asa1 and esp virulence gene with tetracycline resistance (P-value=0.0305, P-value=0.0363) and between gelE and asa1 with nitrofurantoin drug resistance (P-value=0.0175, P-value=0.0225).

Conclusion: The study highlights the high level of erythromycin resistance in *Enterococcus faecalis* and *faecium* and the accumulation of multiple virulence genes in *E. faecalis*. The significant association of gel E, asa1, and esp virulence genes with drug resistance could explain the clinical success of *E. faecalis* and provides avenues for future studies.

Abstract 20**Title: Durability of Viral Suppression in HIV-1 patients on Combined Antiretroviral Therapy****Edward Maina (KEMRI)***E.K. Maina¹, H. Mureithi¹, A.A. Adan¹, J. Muriuki², R.M. Lwembe², E.A. Bukusi¹

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Introduction: Relatively little is known about the long-term durability of viral suppression in individuals on combined antiretroviral therapy (cART) and the factors associated with viral rebound. Having such data could enable track the goal of cART in achieving and maintaining continuous maximal virological suppression to allow immune reconstitution, minimising the risk of resistance emergence, preventing HIV-related morbidity and mortality, and preventing transmission.

Aim: We aimed to investigate the rate of viral suppression/rebound in people on cART, to determine factors associated with viral suppression/rebound, and to use these estimates to predict long-term durability of viral suppression.

Methods: Medical and demographic data were retrospectively abstracted from 549 HIV-1 patient medical records in three counties of Meru, Kilifi and Nakuru. Participant laboratory data including HIV viral loads, types and history of cART, and treatment history of any opportunistic infections were abstracted. Participants were grouped as those who achieved HIV viral suppression, with viral loads lower than the detection limit (LDL) (viral suppression), and those who experienced one or more detectable viral load measurements >40 copies/ml following the initial LDL (viral rebound). Durable viral suppression was defined as all viral load values at LDL over the 2-year period. Regression analysis was performed to assess the rates of viral rebound as well as investigate factors associated with viral suppression.

Results: There was an overall viral suppression rate of 59%, with site specific rates of 82%, 12% and 81% in Meru, Nakuru and Kilifi respectively. Overall viral rebound rate was 41%, with site-specific viral rebound of 18%, 88.2% and 18.6% in Meru, Nakuru and Kilifi. The durability of viral suppression for most patients, was 24 months in Meru, 12 months in Nakuru, and 30 months in Kilifi. cART adherence and WHO stage I were associated with viral suppression, while cART non-adherence, WHO stage II and duration on ART of more than 36 months were associated with viral rebound.

Conclusions: Overall viral suppression rate in the three studies sites was lower than the WHO target of 95%. However, viral suppression for more than 2 years in patients on cART found in this study is a good sign that progress is being made in these counties towards the achievement of the United Nation's 2030 objective of controlling the risk of HIV transmission.

Acknowledgements: This study is part of the EDCTP2 program supported by the European Union (grant numberTMA2017-CDF-1852– Latent HIV-1, Viral Suppress and Hope for HIV Cure).

Abstract 21

Title: Description of Rift Valley Fever in the Kenya Livestock and Wildlife Syndromic Surveillance System, Narok County-Kenya, 2018-2019

Erenius L Nakadio (Masters Resident)*; Maurice O Owiny (Kenya FELTP); Samuel Kahariri (National Directorate of Veterinary Services)

Background: Rift Valley Fever (RVF) outbreaks in livestock have had detrimental impacts on livestock trade, animal breeding and productivity. Routine evaluation and data analysis of surveillance systems ensures that health events are efficiently and effectively monitored. The KLWSS was adopted in march 2018 to address a lack of real time reporting tool for zoonotic diseases. This study evaluated the Kenya Livestock and Wildlife Surveillance System (KLWSS) and characterized RVF cases reported for Narok County.

Methods: We evaluated KLWSS from January 2018 to December 2019 using CDC guidelines for evaluating surveillance systems. Attributes of simplicity, flexibility, data quality, acceptability, representativeness, timeliness, stability, sensitivity and predictive values positive were examined. Retrospective review of RVF surveillance data for Narok County was performed. Demographic and clinical variables were assessed. Data were cleaned in Ms. Excel and descriptive analysis done using Epi Info 7TM . Categorical variables were summarized using frequencies and proportions while continuous variables summarized using measures of central tendency and dispersion. Study authorization was granted by the Directorate of Veterinary Services.

Results: System was simple in structure and operation, accommodated upgrading of its application, data quality performance was 69.8%, stakeholder's participation rate was 80% with 842 reports coming from six sub counties and 30 wards. The median time between event occurrence and event reporting was two days (range one to six days). The system had been operational since 2018 with no reports of any unscheduled outages and down times. Suspected cases of RVF reported were 11% (95/842) of the reported cases. The livestock species affected were cattle 56% (53/95) and Sheep 44% (42/95). About 96% (91/95) of the suspected cases were in mixed livestock production systems. The common syndrome was abortions 74% (95/129) with Loita ward recording 97% (92/95) of the suspected RVF cases. All suspected cases were reported in March 2018.

Conclusions: The KLWSS system was found to be stable but with below par performance in data quality. There was a 69.8% of unknown or blank responses to items on the surveillance forms. Enhanced surveillance and preventive measures should focus more in the wards, where most cases were reported.

SCIENTIFIC SESSION 5: NCDs – PREVENTION, DIAGNOSIS & CARE

Venue: Room I

Abstract 22

Title: Interpersonal psychotherapy delivered by nonspecialists for depression and posttraumatic stress disorder among Kenyan HIV-positive women affected by gender-based violence

Linnet Ongeri (Kenya Medical Research Institute)*; Susan Meffert (UCSF); Thomas Neylan (University of California, San Francisco); Charles McCulloch (University of California, San Francisco); Elizabeth Bukusi (Kenya Medical Research Institute); Helen Verdeli (Columbia University); John Markowitz (Columbia University); David Bukusi (Kenyatta National Hospital); Harsha Thirumurthy (Penn University); Grace Rota (University of Nairobi); Raymond Rota (University of Nairobi); Grace Oketch (Kisumu County Hospital); Elizabeth Opiyo (University of Nairobi); James Khan (Philip R. Lee Institute for Health Policy Studies); Kelly Blum (University of California San Francisco)

Background: Approximately 75% of HIV+ women live in sub-Saharan Africa and the region has an extremely high GBV prevalence, ranging from 56-71%. The Western Kenya region has the highest HIV prevalence (15%) and the highest prevalence of physical violence against women (57% of women aged 15-49). HIV-positive women suffer a high burden of mental disorders due in part to gender-based violence (GBV). Comorbid depression and posttraumatic stress disorder (PTSD) are typical psychiatric consequences of GBV. Despite attention to the HIV-GBV syndemic, few HIV clinics offer formal mental healthcare. This problem is acute in sub-Saharan Africa, where the world's majority of HIV-positive women live and prevalence of GBV is high. Our study sought to create an adapted IPT (Interpersonal Psychotherapy) manual for treatment of depression and PTSD among HIV positive, GBV positive women and test the feasibility, acceptability and efficacy trends of adapted IPT for depression and PTSD among HIV+GBV+ women.

Methods: We conducted a randomized controlled trial at an HIV clinic in Kisumu, Kenya. GBV-affected HIV-positive women with both major depressive disorder (MDD) and PTSD were randomized to 12 sessions of IPT plus treatment as usual (TAU) or Wait List+TAU. Nonspecialists were trained to deliver IPT inside the clinic. After 3 months, participants were reassessed, and those assigned to Wait List+TAU were given IPT. The primary outcomes were diagnosis of MDD and PTSD (Mini International Neuropsychiatric Interview) at 3 months. Secondary outcomes included symptom measures of depression and PTSD, intimate partner violence (IPV), and disability.

Results: A total of 256 participants enrolled between May 2015 and July 2016. At baseline, the mean age of the women in this study was 37 years; 61% reported physical IPV in the past week; 91% reported 2 or more lifetime traumatic events and monthly income was 18USD. Multilevel mixed-effects logistic regression showed that participants randomized to IPT+TAU had lower odds of MDD (odds ratio [OR] 0.26, 95% CI [0.11 to 0.60], p = 0.002) and lower odds of PTSD (OR 0.35, [0.14 to 0.86], p = 0.02) than controls. IPT+TAU participants had lower odds of MDD-PTSD comorbidity than controls (OR 0.36, 95% CI [0.15 to 0.90], p = 0.03). Linear mixed models were used to assess secondary outcomes: IPT+TAU participants had reduced disability (-6.9 [-12.2, -1.5], p = 0.01), and nonsignificantly reduced work absenteeism (-3.35 [-6.83, 0.14], p = 0.06); partnered IPT+TAU participants had a reduction of IPV (-2.79 [-5.42, -0.16], p = 0.04). Gains were maintained across 6-month follow-up. Treatment group differences were observed only at month 3, the time point at which the groups differed in IPT status (before cross over). Study limitations included 35% attrition inclusive of follow-up assessments, generalizability to populations not in HIV care, and data not collected on TAU resources accessed.

Conclusions: IPT for MDD and PTSD delivered by nonspecialists in the context of HIV care yielded significant improvements in HIV-positive women's mental health, functioning, and GBV (IPV) exposure, compared to controls. Trial registration Clinical Trials Identifier NCT02320799.

23 Cancer Associated Opportunistic Fungal Infections in Patients Attending Selected Oncological Clinics in Kenya

Sally N. Loronyokie (KEMRI)*; Benear Obanda (KEMRI); Hannah Kariuki (KEMRI); Abdi Mohamed (KEMRI); Richard R.K Korir (KEMRI); Christine Bii (KEMRI)

Background: Cancer is an emerging non-communicable disease (NCD) and a significant cause of morbidity and mortality in Kenya. The immune suppressive managements options of chemotherapy and radiotherapy in cancer is a significant predisposition to opportunistic fungal infections (OFI). The study seeks to determine the spectrum of opportunistic fungal infections among cancer patients attending JOOTRH and CPGH.

Methods: A total of 127 cancer patients were recruited from JOOTRH-KISUMU and CPGH-Mombasa. Clinical evaluation was done by the resident oncologist and infections flagged samples collected for fungal investigations. Social-demographic data was captured using a structured questionnaire. Samples were subjected to direct Microscopy, Potassium hydroxide (KOH), lactophenol cotton blue staining and fungal culture. The isolated fungi were subjected to macro and micro morphological identifications according to standard procedures.

Results: A total of 127 samples were collected from the study participants consisting of swabs (throat, rectal, pus, urethral and higher vaginal), skin scrapping, blood, urine and stool. Fungal culture yielded a total of 53 fungal isolates. The filamentous fungi and yeasts were 52.83% and 47.17% respectively. The filamentous fungi were; Penicillium spp. (35.71 %), Aspergillus spp. (25.0 %), Fusarium spp. (12.29 %) Scedosporium spp and Cladosporium spp (10.71 %), Trichophyton spp. (7.12 %), Phialaphora spp., Scapulariosis spp, Rhinocladiella spp., Acremonium spp, Alternaria spp, Rhizopus spp. each accounted for 3.57%. Candida spp. accounted for 47.17%.

Conclusion: Fungi are significant opportunistic infection in cancer patients and diagnosis is key in averting morbidity and mortality in this group of susceptible patients. This data highlights the significance of OFI in cancer.

Abstract 24

Title: Spectrum of Opportunistic Fungal and Bacterial Pathogens in Cancer Patients at Texas Cancer Centre, Nairobi Kenya

Rebeccaah Lwoyelo Mutembule (MOSD)*; Samson Chebon (JKUAT); Hannah Kariuki (KEMRI); Sally N Loronyokie (KEMRI); Abdi Mohamed (KEMRI); Benear Obanda (KEMRI); Catherine Nyongesa (Texas Cancer Centre); Christine Bii (KEMRI)

Background: According to IARC (2018), approximated 18.1 million new cancer cases and 9.1 million deaths are reported worldwide each year. The high morbidity and mortality associated with cancer is attributed to chemotherapy complications and opportunistic infections. The epidemiology of infections in cancer patients is constantly changing with oncological dynamics and the emergence of resistant pathogens. This creates the need for constant surveillance to establish therapeutic modalities based on infection epidemiology and local resistance profiles.

Methodology: A cross sectional hospital based study was conducted at Texas Cancer Center, Nairobi. Clinical samples were obtained from both in and out-patients with clinical symptoms. Ethical clearance was obtained from the Ethical Review Committee of Jomo Kenyatta University of Agriculture and Technology.

A total of 75 samples (urine, stool, blood, pus swabs and skin scrapping) were collected and investigated for bacterial by culture and microscopy:gram stain , fungal pathogens were investigated using KOH(Potassium hydroxide),lacto phenol cotton blue and culture ,parasitic pathogens probed by microspopy at KEMRI/CMR/Mycology Labs using standard procedures.

Results: Escherichia coli accounted for 21/75(28.0%), followed by Candida spp. 14/75(18.0%), Klebsiella spp. 9/75(12.0%), Staphylococcus spp.7/75(9.3%) and Pseudomonas spp.5/75(6.7). Among the yeasts, Candida albicans accounted for >90% of the yeasts isolated with only 1/14(7.1) being C. glabrata. as summerised in the table below

The main pathogens isolated from the 75 samples were as follows; E. coli accounted for 4 from rectal swab, 4 from wound swab, 6 from stool, 4 from urine, 2 from urethral swab and 1 from blood. Yeast accounted for 5 C.albicans from urine,2 from urethral swabs, 2 from throat swabs and 1 C.glabrata on skin scrapping .Klebsiella spp accounted for 4 from stool,2 from urine ,2 from urethral swabs and 1from skin scrapping. Staphylococcus spp accounted for 2 from blood ,4 from wound swabs and 1 from skin scrappings. Pseudonomas spp 1 from urine ,2 from urethral swabs and 2 from wound swabs. Streptococcus spp1 from blood, 2 from urine and 1 from urethral swabs ,4 from throat swabs and 1 from wound swabs. Citrobacter spp 1from urine and 1 from wound swabs. Proteus spp 1 from urine and 1 from rectal swabs. Enterococcus spp 1from stool and 1 from rectal swabs. Peptostreptococcus spp 1from blood . Salmonella spp 1from stool and 1from rectal swabs and Enterobacter spp1 from stool sample respectively.

Cysts of E.coli, E.histolytica and Giardia lamblia were also detected in stool of some patients.

Conclusion: The preliminary study highlights the significance of bacterial and fungal infections in cancer related morbidities and recommend more studies in this group of patients for management purposes. Molecular studies could shade light on whether the organisms are nosocomially acquired.

Abstract 25

Title: Understanding the risk factors of type 2 diabetes and lived experiences of diabetes risk in Nairobi, Kenya

Anthony Muchai Manyara (University of Glasgow)*; Elizabeth Mwaniki (Technical University of Kenya); Cindy Gray (University of Glasgow); Jason Gill (University of Glasgow)

Background: Type 2 diabetes (T2D) is on the rise in Kenya and prevention measures are needed. Understanding T2D risk factors and lived experiences of diabetes risk in Kenya are important for development of appropriate prevention interventions. This study aimed to identify T2D risk factors and the barriers of uptake of diabetes prevention measures in Nairobi, Kenya.

Methods: The study used mixed methods approach – a case control and a qualitative case study. The case-control study comprised of 70 (53% women) recently diagnosed T2D cases who were age-, sex and socioeconomic status-matched to normoglycemic controls (1:1). Data was collected on lifestyle factors, anthropometrics, body composition and handgrip strength. For the qualitative study, in-depth interviews in two contrasting communities in Nairobi, one low-income ($n=15$, 7 female) and one middle-income ($n=14$, 6 female), were conducted. Quantitative data was analysed using logistic regression models, adjusted for covariates, while qualitative data was thematically analysed.

Results: A standard deviation (SD) increase in fat-free mass was associated with lower T2D odds (adjusted odds ratio (AOR)=0.42 (95% confidence intervals [CIs] 0.24, 0.75, $p=0.0032$). Grip strength was inversely associated with T2D (AOR=0.20 (95% CI 0.08, 0.45), $p<0.001$) per SD increase. BMI was not associated with T2D and the mean BMI was a normal weight in men. However, each SD increase in waist-to-hip ratio was associated with over two times higher odds of T2D (AOR=2.28 (95% CI 1.38, 3.79), $p=0.0014$). The qualitative study identified a number of barriers to uptake of diabetes prevention measures (e.g., lifestyle modification, diabetes screening) such as: low disclosure by people with diabetes in both communities; and (mainly in the low-income community) knowledge gaps on diabetes risk factors; low perceived threat and susceptibility; and limited access to diabetes screening and fear of a positive diabetes diagnosis (due to high costs of diabetes management).

Conclusion: These findings imply that central obesity measures, rather than BMI, should be used for risk stratification and there is an urgent need to intervene to reduce central obesity, even when people have a normal weight. Secondly, interventions that increase muscle mass and strength may be useful in reducing T2D risk. Thirdly, there is need for interventions that educate people on diabetes risk factors and persuade them on their susceptibility, especially in the low-income community. Fourthly and in both communities, intervening to enable people with diabetes to disclose their condition would increase knowledge on diabetes preventive measures in the community. Finally, there is need to increase access to diabetes screening services and work towards achievement of universal health coverage, which may lead to affordable diabetes management and consequently reduce fear associated with positive diagnosis, hence contribute to increased uptake of diabetes screening.

Abstract 26

Title: Self reported symptoms and their influence on help seeking for cancer care in Kenya:A mixed methods study.

Sharon Mokua (KEMRI)*; Mercy Njeru (kemri); Charlotte Cross (Open University); Lilian N Nyandieka (KEMRI); Richard Mutisya (KEMRI); Vera Manduku (KEMRI); Maureen Mackintosh (Open University)

Background: Cancer is more curable when detected early. Although some cancers develop completely without symptoms, the disease can be particularly devastating if one ignores symptoms when they occur especially if they do not think that these symptoms might represent cancer. Knowledge about symptoms and whether or not they trigger alarm, influences patient behavior because understanding these potential cancer symptoms then choosing to seek medical care promptly can help to detect cancer before it has spread. Therefore this paper aims to document the self reported symptoms, proportions and patients' help seeking behavior.

Methodology: A convergent parallel mixed methods design was used in the collection, analysis and interpretation of quantitative and qualitative data. A sample of 405 patients took part in a facility survey in Meru, Nairobi and Mombasa counties in Kenya. Four focus group discussions with cancer survivors and 22 in depth interviews with health workers, caregivers and policy makers were also carried out in the selected study sites

Results: About 68% women and 32% men gave a self report of the first symptoms experienced. Around 109 different symptoms covering a significant area of alarm symptoms were reported. The most common symptoms being breast lump, vaginal bleeding, general pain and abdominal discomfort at 17.2%, 7.9%, 6.9% and 6.6% for the different cancer types. About 122 participants reported having experienced more than one symptom at this event. These symptoms prompted various actions by patients where a majority went to a health facility (62.2%), 14.7% of the participants did nothing and 8.5% stayed at home. Some patients self medicated or sought alternative-care among others. For those who presented to a health facility, the median time to diagnosis was shorter compared to those who did not go to a health facility for the major cancer types. The qualitative findings provided further insights into the reasons for help seeking including perception of health screening, cultural influences on disclosing symptoms and recognition of symptom severity

Conclusion: The study findings provide an understanding of how people respond to potential cancer symptoms, and some reasons as to what guides the help seeking behavior considering that symptoms are what pushed a majority of patients to seek healthcare. The health system needs to work very hard to increase awareness among the population to enhance screening and prompt presentation to primary health care with possible cancer symptoms. An increased understanding of the health seeking and help seeking decision making process by patients especially in the Sub-saharan African context is much needed. It will contribute to the development of interventions targeting individuals' swift seeking of medical care in symptomatic cases as we push the health system towards developing and investing in rigorous wellness checks, screening and early detection efforts for better cancer outcomes.

Abstract 27

Title: Treatment outcome among Medically-Assisted Therapy clients, Mombasa-Kenya.

Nassoro J. Mwanyalu (Mombasa County Government, Department of Health)*; Maria Nunga (Kenya Field and Epidemiology Laboratory Training Program); Raphael Mwanyamawi (Mombasa County Government, Department of Health); Maurice O Owiny (Kenya FELTP)

Background: To prevent the spread of HIV and other morbidities among heroin users, Kenya adapted Medically Assisted Therapy (MAT) program in 2014. MAT is one of the essential evidence based comprehensive harm reduction strategies for People Who Inject Drugs(PWIDs). MAT program is regarded by WHO as the most effective therapy for opioids use disorder. We sought to describe poor treatment outcome among the MAT clients in Kisauni MAT clinic.

Methods: This was a cross-sectional study design. We reviewed all the records for patients enrolled at Kisauni MAT clinic from 2017 to 2019. Data sources were; MAT register, laboratory register, Patients MAT card, tuberculosis registers, family planning register and psychosocial register. Poor treatment outcome was defined as any patient Lost to Follow Up (LTFU), seroconverted to HIV, Hepatitis B or Hepatitis C, or a defaulter to antiretroviral therapy. Variables collected were socio-demographic characteristics, clinical and risk factors. Data were analyzed using Epi Info 7. We calculated Prevalence Odds Ratios (POR) and their 95% Confidence Intervals (CI) to identify factors associated with poor treatment outcome.

Results: Of the records reviewed, 443 were eligible. The mean age was 37 years ($SD \pm 8.2$) and 46.9% (208/443) were aged 31–40 years. Proportion of HIV positive patients was 13.1% (58/443), of Hepatitis B was 7.2% (32/443%) and of Hepatitis C was 8.8% (39/443). Prevalence of poor treatment outcome was 27.5% (122/443). Lost to follow up from MAT were 22.8% (101/443), seroconverts were 4.3% (19/443), antiretroviral therapy defaulters were 0.05% (2/443). HIV clients linked to comprehensive care center (CCC) at the clinic were 13.7% (8/58) and 75% (6/8) had undetectable viral Load level. Not being educated (POR 3.4, CI: 1.6–7.2), unemployment (POR: 2.7, CI: 1.6–4.48) and opioid use ≥ 5 years (POR: 2.8, CI: 1.77–4.5) were associated with poor treatment outcome. Conclusion: Opioid use for more than 5 years, unemployment and being uneducated could be factors contributing to poor treatment outcome among MAT patients. We recommend close monitoring of MAT clients with these characteristics and integration of CCC to MAT services.

Key Words: Medically Assisted Therapy, HIV, Hepatitis, Opioid use, Lost to follow up

SCIENTIFIC SESSION 6: DIAGNOSTICS, GENOMICS & INNOVATIONS

Venue: Room 2

Abstract 28

Title: Comparison of Quantitative Polymerase Chain Reaction, Kato-Katz and Circulating Cathodic Antigen Rapid Test for the Diagnosis of Schistosoma mansoni Infection: A cross-sectional study in Kirinyaga County, Kenya.

Benard Chieng (KEMRI)*; Stella Kepha (KEMRI); Collins Okoyo (KEMRI); Cassian Mwatele (KEMRI); Paul PMG Gichuki (KEMRI); Sammy Njenga (KEMRI); David Mburu (Kenyatta Universtiy); Elses Simiyu (KEMRI)

Background: The current standard diagnostic tests of Schistosoma mansoni are Kato Katz and circulating cathodic antigen (CCA) techniques. However, these techniques have been documented to have several limitations that have a direct impact on schistosomiasis control programs. Therefore, there is need for a more sensitive and specific diagnostic tests for diagnosing schistosomiasis. This study compared the performance of quantitative Polymerase Chain Reaction (qPCR), Kato-Katz, and point of care circulating cathodic antigen (POC-CCA) techniques in the diagnosis of S. mansoni infection in the Mwea irrigation scheme, Kirinyaga County in Central Kenya.

Methods: We carried out a cross sectional study on 357 individuals residing in four villages in Mwea irrigation scheme. The participants provided urine and stool samples which were screened for S. mansoni infections using qPCR, Kato-Katz and POC-CCA techniques. The prevalence of S. mansoni by each technique was calculated and 95% confidence intervals estimated using binomial regression model. Sensitivity and specificity were determined using 2x2 contingency tables and compared using the McNemar's chi-square test. Positive and negative predictive values were also determined using the weighted generalized score chi-square test for paired data.

Results: The study found that the prevalence of S. mansoni was 32.8%, 62.5% and 72.8% using Kato-Katz, POC-CCA and qPCR techniques respectively. Further, when using Kato-Katz as a gold standard, POC-CCA sensitivity was 78.6% and specificity was 45.4%, while qPCR sensitivity was 97.4% and specificity was 39.2%. When using qPCR as the gold standard, Kato-Katz sensitivity was 43.8% and specificity was 96.9%, while POC-CCA sensitivity was 78.1% and specificity was 79.4%. Finally, when using a combined gold standard, the sensitivity was 41.6%, 79.4% and 92.5% for Kato-Katz, POC-CCA and qPCR respectively with a specificity of 100.0% for all the techniques.

Conclusion: The study showed that Kato-Katz had low sensitivity compared to the POC-CCA and qPCR despite it being the most commonly preferred method of choice to diagnose S. mansoni infections. The study also showed that qPCR had superior sensitivity followed by POC-CCA, hence it can be used as alternative to Kato-Katz or to confirm the results obtained by Kato-Katz.

Abstract 29**Title: Assessment of Plasmodium falciparum Resistance to Piperaquine in Western Kenya using Piperaquine Survival Assay and Molecular Marker Analyses**

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Background: Malaria is a significant public health burden, especially in sub-Saharan Africa (sSA). Chemotherapy is central in the control of malaria. Piperaquine (PPQ) in combination with dihydroartemisinin (DHA) is the recommended second-line antimalarial for prolonged prophylaxis in Kenya. The shift to this regimen was driven by increased reports of quinine resistance and declining artemether-lumefantrine (Coartem®) efficacy, a first line drug. However, the widespread use of DHA-PPQ in Kenya may be a short lived solution if PPQ resistance, such as that observed in South Eastern Asia (SEA), spread to Kenya. It is therefore important to establish PPQ susceptibility in Kenya using piperaquine survival assay (PSA) and molecular marker analyses.

Methodology: 2-3 ml of clinical isolates collected from *P. falciparum* naturally infected individuals presenting with uncomplicated malaria at Kombewa sub county hospital and Kisumu county hospital were tested for piperaquine susceptibility using immediate ex-vivo and in-vitro PSA. A subset of the isolates was analyzed for in vitro susceptibility using SYBR Green 1-based method. Further, each isolate was genotyped for piperaquine resistance markers in targeted codons of *Pfcrt*, *Pfmdr1*, *Pfpm2*, *Pfpm3*, *Pfexo* and *Pfk13* genes using qPCR and the MassARRAY platform.

Results: A total of 40 clinical isolates showed PSA median (interquartile range) of 0% (0-11.02%), n=40, at 95% CI. of these, 34/40 (85%) clinical isolates had PSA <10% depicting sensitivity to PPQ. Six isolates (15%) had PSA of >10% consistent with PPQ resistance, Data on treatment and clinical outcome for these subjects were not available. PPQ median IC50 (interquartile range) for the subset of clinical isolates in vitro was 20.81 nM (17.33-42.26), n=20. A statistically significant positive association was observed between PPQ IC50 and Pfcrt K76T ($p=0.0007$), Pfhdps A437G ($p=0.0167$) and A613S ($p=0.0043$) respectively. Re-culture for in vitro testing and analyses of polymorphisms in Pfcrt, Pfmdr1, Pfpm2, Pfpm3, Pfexo and Pfk13 genes for these samples are underway.

Conclusion: These finding show that circulating malarial parasites isolated from Kenyan subjects are sensitive to PPQ. The findings on the putative markers of PPQ resistance provide baseline status for continued monitoring of PPQ susceptibility as DHA-PPQ continues to be widely embraced as a second-line treatment in the country. Our previous studies showing extensive genotype changes in this region herald the need for genetic studies focusing on samples with PSA survival rate >10% for timely detection of changes.

Abstract 30

Title: Profiling Trends in Susceptibility to Frontline Antimalarials in Kenya between 2008-2021 through Sustained Regional Surveillance

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Background: Antimalarial drug resistance has been a hindrance to achieving a malaria free world since the first case of chloroquine resistance was recorded in South Eastern Asia (SEA) in 1950s. Consequently, evaluating the efficacy of the scarce frontline antimalarials against the Kenyan *P. falciparum* field isolates is a top priority for efficient monitoring of drug failure and guiding treatment policy in the country.

Methodology: A total of 255 clinical *P. falciparum* isolates collected from patients presenting with uncomplicated malaria at six hospital sites in Kenya between 2008 and 2021 were tested for immediate ex-vivo and in-vitro susceptibility to selected antimalarials using SYBR Green I fluorescence-based assay. Drugs tested include; piperaquine (PPQ), dihydroartemisinin (DHA), lumefantrine (LM), artemether (ART) and chloroquine (CQ). W2 and d6 reference clones were tested in parallel as the assay and test controls.

Results: Lumefantrine median IC50s inclined significantly between 2008; 11.0 nM, n=54 (IQR 2.7 nM to 26.9 nM) and 2021; 30.55 nM, n=51 (IQR 3.2 nM to 47.7 nM) ($p<0.05$). A steady statistically significant decline in median IC50 for CQ was observed between 2008; 7.9 nM, n=36 (IQR 3.9 nM to 15.8 nM) and 2021; 4.6 nM, n=62 (IQR 3.1 nM to 8.2 nM) ($p<0.05$). However, the PPQ susceptibility during the study timeline was stable, median IC50 of 16.8 nM, n=34 (IQR 10.8 nM to 23.1 nM) in 2008 and 14.1 nM, n=42 (IQR 6.4 nM to 21.3 nM) in 2021.

Conclusion: There were varying trends in response of naturally acquired infection clinical isolates between 2008 and 2021 as depicted by increasing sensitivity to CQ and impaired response to LM. These findings underscore the paucity of the drug resistance profile trends and warrant continued surveillance in order to support effective treatment.

Abstract 31

Title; Molecular signatures of severe acute infections in Hospitalised children

Jacqueline M Waeni (KEMRI Wellcome Trust)*; Jacqueline Waeni (KEMRI Wellcome Trust) Jacqueline Waeni (KEMRI-Wellcome Trust Research Programme, CGMRC, Kilifi) *, Daniel O'Connor (University of Oxford), James Nokes (KEMRI-Wellcome Trust Research Programme, CGMRC, Kilifi), Charles Sande (KEMRI-Wellcome Trust Research Programme, CGMRC, Kilifi)

Background: Sepsis is a heterogeneous syndrome characterised by organ dysfunction caused by a dysregulated host response to infection. It is accountable for substantial morbidity and mortality in children globally. Different pathogens such as bacteria, viruses, parasites, or fungi cause infections that manifest with sepsis-like symptoms thus limiting symptomatic clinical diagnosis. In addition, outcomes of hospitalised sepsis patients are difficult to predict. Characterizing the aetiology and risk stratifying sepsis patients remain a challenge globally, but mostly in low- and middle-income countries due to limited diagnostic and prognostic capacity. This complicates care decisions, leading to increased antimicrobial resistance and mortality. Preventing death and long-term morbidity due to infectious diseases requires better diagnostics and new therapeutics to treat serious complications of infections such as sepsis. Understanding the molecular processes that underlie different sepsis aetiologies and outcomes would enable initiation of appropriate and timely treatment. We aimed to characterise the host response in plasma of children under 5 years admitted at the Kilifi County Hospital with severe acute infections.

Methods: Admission levels of plasma proteins were determined using untargeted liquid chromatography tandem mass spectrometry (LC-MS/MS). Protein profiles of children with bacterial infections (N = 63) were compared with those of children who had viral infections (N=75). Healthy children (N=20) were used as controls. Protein profiles of children who had bacterial infections were compared to those who had viral infections. Using linear models, we assessed the relationship between baseline plasma proteins and infection.

Results: Bioinformatic analysis of differentially expressed proteins showed elevation of already characterised acute phase proteins such as C-reactive protein in children with bacterial infections. In addition, angiotensinogen, lipopolysaccharide binding protein, Serpin Family A Member 1, Serpin Family A Member 3 were associated with bacterial infections while Apolipoprotein A-2, and paraoxonase-1 were associated with viral infections. Acute phase responses, toll-like receptor signalling, and neutrophil degranulation were enriched in bacterial infections while platelet degranulation was negatively associated with bacterial infections.

Conclusions: These results show the changes plasma protein levels and biological processes during bacterial and viral sepsis that can be leveraged to design future interventions of sepsis.

Abstract 32

Title: Design, Optimize and Compare Loop Mediated Isothermal Amplification (LAMP) and Helicase Dependent Amplification (HDA) Assays, for point-of-care detection of Wuchereria bancrofti DNA in human blood in Tana River Delta, Costal- Kenya

Nancy M. Kinyatta (Kenya Medical Research Institute)*

Introduction: Diagnosis of Wuchereria bancrofti causing bancroftian filariasis has relied on the detection of microfilariae in blood specimen and mosquitoes. Point-of-care diagnosis of lymphatic filariasis is largely based on microscopic examination and Circulating filarial Antigen testing. PCR, LAMP and HDA have been developed for detection of pathogens.

Methods: Samples for this study were collected from Tana River Delta in Tana River County. Participants were recruited on voluntary basis and 4ML of blood drawn after consenting. The samples were taken to KEMRI Filariasis unit for processing. 200ul of each Samples were subjected to DNA extraction by Alcohol precipitation method. Specific primers for each method were used targeting 18srRNA species specific regions (Ssp1) on *W. bancrofti* complete sequence accession no. AY297458 yielding 188base pairs. Amplifications were done by LAMP, HDA and PCR. Detection was done on intercalating dyes or Gel electrophoresis. Sensitivity, specificity and Kappa statistics were estimated by 2X2 contingency table and compared.

Results: 125 samples obtained were amplified by the 3 methods. The infection rates were 10.4%, 12% and 14.4% by PCR, LAMP and HDA respectively. The sensitivity of LAMP was 92.3% and that of HDA was 76.6%. Specificity for LAMP was 97.3% and that of HDA was 93.7%. Kappa statistics was at 0.84 and 0.67 for LAMP and HDA respectively.

Conclusion: LAMP assay was found to be more comparable to PCR and thus, it can replace PCR in field settings for diagnosis of *W. bancrofti* in Kenya. We recommend more validation studies to be carried out in other endemic regions including a non-endemic region for conclusive recommendation for use of LAMP methods.

Abstract 33

Title: Impact of COVID -19 diagnostic services on HIV viral load (VL) and Early Infant Diagnosis (EID) turn-around-time (TAT) in a reference testing laboratory in Kenya.

Josephine Makokha Wambani (KEMRI)*; Humphrey Kimani (KEMRI); Malone Danda (KEMRI); Lucy Okubi (KEMRI); Matilu Mwau (KEMRI)

Background: In Kenya, the first case of COVID-19 was reported in March, 2020. The testing of SARS-COV-2, which causes COVID-19 was integrated into the molecular diagnostics infrastructure already in place for HIV Viral Load and Early Infant Diagnosis of HIV. It is unknown whether this shift had any impact on VL and EID testing services in the relevant laboratories. Our study assessed the impact of COVID-19 testing on HIV VL and EID testing TAT in laboratories in Kenya.

Methods: HIV VL and EID data on TAT collected between January 2019 to December 2020 was abstracted from the HIV NASCOP database. The mean TAT for the year 2019, January to March 2020 (just before Covid-19 testing commenced) and April to December 2020 were computed to check for an increase or decline in average TAT. Data analysis was conducted using STATA SE 14 for Windows.

Results: The mean TAT for VL in 2019 was 6 days. Between January to March 2020, the mean TAT was 8 days. Between April to December 2020, the mean TAT was 11 days. The mean TAT for EID in 2019 was 5 days, while it was 9 days between January to March 2020. The average TAT was 8 days between April and December 2020.

Conclusion: The increase in VL and EID average TAT observed throughout the study period could be attributed to the fact that the Covid-19 tests as well as HIV had to be tested on the few already overstretched equipment and with the limited human resources available. However, the TAT could have also been affected by other factors that have not been examined in this study, for instance reagent stock outs and machine breakdowns. In the face of another pandemic in future it would be important that the relevant stakeholders increase manpower, mitigate on frequent stock outs and provide prompt action on machine breakdowns.

SCIENTIFIC SESSION 7: SEXUAL REPRODUCTIVE, ADOLESCENT & CHILD HEALTH (SRACH)

Venue: Room 3

Abstract 34

Title: Systemic inflammation is negatively associated with early post discharge growth following acute illness among severely malnourished children - a pilot study

James Njunge (KEMRI - Wellcome Trust Research Programme)*

Background: Rapid growth should occur among children with severe malnutrition (SM) with medical and nutritional management. Systemic inflammation (SI) is associated with death among children with SM and is negatively associated with linear growth. However, the relationship between SI and weight gain during therapeutic feeding following acute illness is unknown. We hypothesised that growth post-hospital discharge is associated with SI among children with SM. The study aimed to determine whether SI is associated with growth post-hospital discharge among children with SM.

Methods: We conducted secondary analysis of data from HIV-uninfected children with SM (n=98) who survived and were not readmitted to hospital during one year of follow-up. We examined the relationship between changes in absolute deficits in weight and mid-upper-arm circumference (MUAC) from enrolment at stabilisation to 60 days and one year later, and untargeted plasma proteome, targeted cytokines/chemokines, leptin, and soluble CD14 using multivariate regularized linear regression.

Results: The mean change in absolute deficit in weight and MUAC was -0.50kg (standard deviation; SD±0.69) and -1.20cm (SD±0.89), respectively, from enrolment to 60 days later. During the same period, mean weight and MUAC gain was 3.3g/kg/day (SD±2.4) and 0.22mm/day (SD±0.2), respectively. Enrolment interleukins; IL17-alpha and IL-2, and serum amyloid P were negatively associated with weight and MUAC gain during 60 days. Lipopolysaccharide binding protein and complement component 2 were negatively associated with weight gain only. Leptin was positively associated with weight gain. Soluble CD14, beta-2 microglobulin, and macrophage inflammatory protein 1 beta were negatively associated with MUAC gain only. Glutathione peroxidase 3 was positively associated with weight and MUAC gain during one year.

Conclusions: Early post-hospital discharge weight and MUAC gain were rapid and comparable to children with uncomplicated SM treated in the community. Higher concentrations of SI markers were associated with less weight and MUAC gain, suggesting inflammation negatively impacts recovery from wasting. This finding warrants further research on reducing inflammation on growth among children with SM.

Abstract 35**Title: School re-entry for adolescent mothers in Sub-Saharan Africa (SSA): Policy-practice-need gaps**

Nancy M. Mwangome (KEMRI Centre for Geographic medicine-Coast)*; Alun Davies (KEMRI-CGMR-C); Caroline Jones (KEMRI-CGMR-C); Amina Abubakar (KEMRI-CGMR-C)

Background: Sustainable Development Goals (SDGs) 4 and 5 promote the access to inclusive and equitable education, especially for women and girls. However, adolescent pregnancy contributes significantly to high school drop-out rates seen among adolescent girls in many sub-Saharan African (SSA) countries. Evidence suggests that sustained access to education by women protects their health and increases their opportunity to negotiate healthy lifestyles and appropriate healthcare for their families. While many adolescent mothers would like to return to school, they face many challenges that hinder their efforts. This study aimed to understand the existing school re-entry strategies for adolescent mothers in SSA. More specifically, it sought to answer: What is the policy context of school re-entry, what are the existing interventions facilitating school re-entry and what is the evidence of challenges and gaps of the policy and intervention implementation.

Methods: The study entailed a narrative review of published and grey literature relating to policies and interventions concerned with the education of adolescent mothers in SSA. The literature was accessed from a range of databases, including Google scholar, African Journals Online (AJOL), Education Resources Information Center (ERIC), Applied Social Sciences Index and Abstracts (ASSIA) and PubMed. The key search terms; adolescent mothers, school re-entry, interventions, barriers and SSA, were combined using the Boolean operator AND. The synonyms of these key terms were combined using the Boolean operator OR. All articles that were published in English language were included. The literature was analysed using content analysis where common themes relevant to the study topic were identified.

Results: Twenty five published articles and thirty one policies and reports from 10 SSA countries were reviewed. There is unwavering international support for the unconditional access to education by all adolescent girls. Additionally, several countries in SSA have school re-entry policies for adolescent mothers including Kenya. However, these policies face several implementation challenges for example, poor policy formulation approaches that exclude valuable input from key stakeholders and the lack of standardised policy implementation guidelines. Two broad categories of interventions to support school-re-entry namely psycho-social and financial, were identified. In most cases, these interventions have been implemented at limited scale with little evidence of the potential for scale up. In addition, the implementation has been without rigorous evaluation and reporting that would provide sound evidence for future implementation.

Conclusion: Despite a conducive school re-entry policy environment and evidence of existing interventions, there appeared to be gaps like the exclusion of key stakeholders' voices in policy formulation processes. More research is needed to provide sound evidence for policy and intervention implementation.

Abstract 36

Title: Biomarkers of late post-discharge mortality among children treated for complicated severe malnutrition

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Background: Despite adherence to the WHO guidelines, children with complicated severe malnutrition (cSM) remain at a high risk of mortality mainly due to infections. Systemic inflammation has been associated with early post-discharge mortality (<60 days) when children are judged to be clinically well. However, it is not known whether systemic inflammation persists and is associated with late post-discharge mortality (> 60 days). This study aimed to investigate whether systemic inflammation and endothelial dysfunction was associated with late post-discharge mortality.

Methodology: This was a case control study nested within a multi-center, randomized controlled trial that investigated the efficacy of daily co-trimoxazole prophylaxis for 6 months among children treated for complicated severe malnutrition and followed up for 12 months. Participants were children aged 2-59 months, HIV uninfected and treated for cSM. Cases (n=64) are children who died between 2 to 6 months following discharge from hospital while controls are children who survived the one-year follow-up period during the trial with no readmission to hospital. Targeted markers of systemic inflammation (cytokines, chemokines n=29) and endothelial dysfunction (thrombomodulin, D-dimer, angiopoietin and ADAMTS13) approaches are used to determine associations with late post-discharge mortality.

Results: Cases had lower median mid-upper arm circumference than controls ($p <0.01$). Inflammatory cytokines; interleukin 1b (IL1b), IL6, tumor necrosis factor (TNFa) and all endothelial markers were associated with late post discharge mortality in univariate analysis ($p<0.05$). After adjusting for confounders in multivariate analysis, markers of endothelial dysfunction; thrombomodulin and D-dimer were associated with late post discharge mortality ($p<0.05$).

Conclusions: Late post-discharge mortality is associated with endothelial dysfunction driven by persisting systemic inflammation. Further planned work will use untargeted liquid chromatography tandem mass spectrometry proteomics to investigate further mechanisms underlying late post-discharge mortality.

Key words: severe malnutrition, complicated severe malnutrition, post-discharge mortality

Abbreviations: WAZ (weight-for-age Z score), WLZ (weight-for-length Z score), LAZ (length-for-age Z score), IFN α -2 (Interferon-alpha 2), ADAMTS13 (a disintegrin and metalloproteinase with a trombospondin type 1 motif, member 13).

Abstract 37**Title: Contribution of Health Workers and Patient Factors to Adherence to Appointments in Antenatal Clinics In Homa Bay and Kisumu County Referral Hospitals, Kenya**

Shadrack Opon (Kenya Methodist University)*; Wanja Tenambergen (Kenya Methodist University); Kezia Njoroge (Kenya Methodist University)

The world wastes up to 40% of health resources, and 56% is due to missed appointments according to the 2018 World Health Report. African medical setting has about 42% missed appointment rate. With about 44% missed appointment rate in antenatal and postnatal clinics, Kenya wastes up to 22% of health resources due to both facility and patient factors. According to UNICEF 2017 report, 502,860 children were not immunized in 2017, and 1.7 million children born between 2013 and 2017 did not receive all prescribed vaccines because of missed postnatal appointments. Homabay and Kisumu Counties with 91/1000 and 149/1000 under-five mortality rates, recorded 42% and 32% missed appointment rates in antenatal and postnatal clinics respectively in 2018 as per their Did Not Attend Reports. This study assessed the effect of health system factors on adherence to appointments in antenatal and postnatal clinics in public hospitals in Kenya. Specifically, it assessed: the contribution of health workers; and influence of patient characteristics on adherence to appointments in antenatal and postnatal clinics. The study adopted a cross-sectional research design across two hospitals which were purposively sampled for inclusion (Homabay County Hospital and Kisumu County Hospital) because of the high under-five mortality and high HIV prevalence rates. These facilities are also ranked on the same level by the ministry of health and are located within the municipality. Stratified sampling and proportionate sampling were used to sample patients, and purposive sampling for hospital managers. Yamane Formula was used to determine sample size. The study comprised 133 antenatal and postnatal patients (Homabay County Hospital 70, Kisumu County Hospital 63) and 2 hospital managers per hospital. Self-administered structured questionnaire and key informant interview guide were used to collect data. Findings revealed, in Homabay and Kisumu County hospitals respectively, as follows: 50 (71.4%) and 20 (40%) due to inadequate responsiveness towards their needs; and 50 (71.4%) and 28 (56%) due to staff attitude. Single and separated ANC clients miss more appointments compared to their married and cohabiting counterparts. The regression models also revealed negative coefficients indicating that a positive change in the independent variables result into a decrease in dependent variable. Also, the independent variables had a t value with a magnitude of at least 2.001 and a significance level of up to 0.007, indicating a strong relationship with and high significance to dependent variable. Conclusively, there was a high missed appointment rate in ANC clinics in Homabay and Kisumu County hospitals because of poor staff attitude and inadequate staff responsiveness. The study recommends that the two counties train staff on public relations; and community health workers to educate mothers on the significance of ANC services to improve adherence to appointments in ANC clinics.

Abstract 38

Title: Clinical outcomes among adolescents with perinatal acquired HIV infection in Western Kenya

Valarie S. Opollo (KEMRI)*

Background: The dynamics regarding the survival of children with perinatally acquired HIV has changed with the increased availability of antiretroviral treatment in Kenya. The first generation of adolescents born with HIV infection has reached young adulthood due to advances in treatment. It is important to continue follow-up of these individuals to assess their long-term medical health and ability to successfully transition to adulthood while coping with a chronic, potentially stigmatizing condition.

Objective: We assessed the long-term clinical effects of HAART among perinatally infected adolescents

Methodology: Adolescents with perinatally HIV acquired infection; ages 11-19 years were recruited from facilities in Kisumu and Homabay counties. We abstracted clinical data such as viral load and CD4 from the participants files. We collected 2ml blood sample for complete blood count and liver function tests.

Findings: From April 2019 to July 2019, 132 adolescents were enrolled. The mean age at diagnosis was 13 months. Median age at time of study was 14 years. The adolescents have been on ART for an average of 8 years and majority were female 68 (52.3%). Only 67 participants had CD4 data at diagnosis available with a mean absolute CD4 count of 864 cells/mm³ and 58 had a mean CD4 of 1636 cells/mm³ at the time of the study. Mean VL at diagnosis was 23205 copies/ml whereas the mean VL at the time of the study was 8946 copies/ml with 80% suppression rate. Most of them (71%) were still on first line HAART regimen, and the few who were on second line had to switch due virologic failure. Samples were collected from 114 adolescents; majority of them (90%) had elevated alkaline phosphatase (ALP) levels a laboratory marker of bone function, with one having a critical elevated ALP >612 U/L. One of them had a critical ALT >75 U/L. the white blood cells and hemoglobin were all within range.

Conclusion: HAART uptake was good among the adolescents, however the impact of HAART should be investigated further to assess the elevated ALP levels. Regular clinical and laboratory monitoring of liver function will be necessary to prevent severe liver injury.

Abstract 39

Tiotle: HIV risk behaviors among retail pharmacy clients seeking sexual and reproductive health services in Kenya

Magdaline A Asewe (Kenya Medical Research Centre)*; Victor Omollo (Kenya Medical Research Centre); Peter Mogere (Kenya Medical Research Centre); Kevin Oware (Kenya Medical Research Centre); Josephine Odoyo (Kenya Medical Research Centre); Zachary Kwena (Kenya Medical Research Centre); Jared Baeten (University of Washington); Kenneth Ngure (Jomo Kenyatta University of Agriculture and Technology); Elizabeth Bukusi (Kenya Medical Research Centre); Katrina Ortblad (University of Washington)

Introduction: The delivery of pre-exposure prophylaxis (PrEP) for HIV prevention at retail pharmacies in Kenya may help overcome barriers (e.g., long wait times, stigma) to clinic-delivered PrEP and reach individuals that do not regularly seek clinic-based services. To understand the potential for this novel model of PrEP delivery, we evaluated HIV risk behavior among pharmacy clients seeking sexual and reproductive health (SRH) services in Kenya.

Methods: At four retail pharmacies in Kisumu and Thika, Kenya, willing clients seeking SRH services (e.g., family planning) were screened for PrEP eligibility as part of a pharmacy-based PrEP delivery pilot. To help determine eligibility, we used Kenya's PrEP Rapid Assessment Screening Tool (RAST) routinely used in public HIV comprehensive care clinics. In the RAST, clients report their HIV status and that of their sexual partner(s) as well as a number of behaviors associated with HIV risk, including condom use, engagement in transactional sex, and post-exposure prophylaxis (PEP) use. We reported findings using descriptive statistics.

Results: From November 2020 to February 2021, 227 pharmacy clients completed the RAST to determine PrEP eligibility. Many clients sought contraceptive services (e.g., oral or emergency contraception) (29%) or PrEP (22%). Other services sought included pregnancy testing (8%), sexual performance enhancing drugs (8%), or HIV self-testing (5%). The majority (80%) of clients reported some behavior associated with HIV acquisition risk. Over half of clients (55%) reported inconsistent condom use, half (51%) reported not knowing the HIV status of their sexual partner(s), and almost a third (28%) reported multiple sex partners. Less commonly reported HIV associated risk behaviors included: sex under the influence of alcohol (11%), recurrent PEP use (4%), an STI in the past 6 months (4%), transactional sex (4%), and sex with partner(s) living with HIV (4%).

Conclusion: The prevalence of behaviors associated with HIV risk was high among clients accessing SRH services at retail pharmacies in Kenya. These findings suggest that the delivery of PrEP at retail pharmacies has great potential to expand the reach of PrEP to population 1s at HIV risk in Kenya and similar settings.

SCIENTIFIC SESSION 8: PUBLIC HEALTH I

Venue: Room 4

Abstract 40

Title: Participation in methadone program improves antiretroviral uptake and HIV suppression among people who inject drugs in Kenya

Loice W. Mbogo (University of Washington -GAP Kenya)*; Betsy C Sambai (University of Washington); Aliza Monroe-Wise (University of Washington); Natasha Ludwig (University of Washington); Brandon Guthrie (University of Washington); David Bukusi (Kenyatta National Hospital); Bhavna Chohan (KEMRI); Paul Macharia (NASCOP); Mathew Dunbar (University of Washington); Emily Juma (University of Washington-GAP Kenya); William Sinkele (SAPTA); Esther Gitau (SAPTA); Ashley Tseng (University of Washington); Rose Bosire (kemri); Sarah Masyuko (NASCOP); Tecla Temu (University of Washington); Joshua Herbeck (University of Washington)

Background: HIV prevalence among people who inject drugs (PWID) in Kenya is estimated to be 18% compared to 4.5% in the general population. Studies from high-income countries have demonstrated that methadone use is associated with increased uptake of antiretroviral therapy (ART) and higher rates of viral suppression among PWID with HIV. However, it is unclear whether methadone use has the same effect among African PWID living with HIV.

Methods: We performed a cross-sectional study to evaluate associations between methadone program participation and ART uptake and viral suppression (HIV RNA viral load <1000 copies/ml) among PWID with HIV in Kenya. Participants were recruited from needle and syringe programs and methadone clinics, interviewed on site, and samples were obtained and assayed for HIV viral loads. Univariate and multivariate logistic regression were used to determine associations.

Results: Among 679 participants, median age was 37 years, 48% were female, and 24% were in a methadone program. We observed higher proportions of ART use (96% vs. 87%, p=0.001) and HIV viral suppression (78% vs. 65%, p=0.012) among PWID on methadone compared to those not on methadone treatment. PWID who were not participating in a methadone program were 4-fold more likely to be off ART and approximately twice as likely to be viremic compared to those in methadone programs (adjusted odds ratio [aOR]=4.36, 95% confidence interval [CI]:1.79-10.61 and aOR=1.95, 95% CI:1.10-3.48, respectively).

Conclusions: In this study, Kenyan PWID living with HIV participating in a methadone treatment program are more likely to be on ART and have viral suppression. Scale-up of methadone programs may have a positive impact on HIV epidemic control for this key population.

Abstract 41**Title: Regional differences in HIV and hepatitis C prevalence among sexual and injecting partners of persons who inject drugs in Kenya**

Betsy C. Sambai (University of Washington)*; Hanley Kingston (University of Washington); Loice W Mbogo (University of Washington -GAP Kenya); David Bukusi (Kenyatta National Hospital); Brandon Guthrie (University of Washington); Bhavna Chohan (University of Washington); Natasha Ludwig-Barron (University of Washington); Rose Bosire (kemri); William Sinkele (Support for Addiction Prevention and Treatment in Africa); Paul Macharia (University of Washington); Sarah Masyuko (University of Washington); Eduan Wilkinson (KwaZulu-Natal Research and Innovation Sequencing Platform); Matthew Dunbar (University of Washington); Ashley Tseng (University of Washington); Helgar Musyoki (Kenya's ministry of Health); Joshua Herbeck (University of Washington); Carey Farquhar (University of Washington)

Background: Injection drug use is a risk factor for HIV and hepatitis C virus (HCV) infections globally, and persons who inject drugs (PWID) in Kenya have >4-fold higher HIV and >10-fold higher HCV prevalence than the general population. Prevalence of HIV and HCV among PWID has been reported as higher in the Coast vs Nairobi; however, it is not known what drives these regional differences. We identified predictors of higher prevalence to inform tailored interventions in Kenya and other parts of sub-Saharan Africa.

Methods: We analyzed data from sexual and injecting partners of PWID living with HIV recruited from the Coast or Nairobi through assisted partner services during 2018 to 2020 and tested them for HIV and HCV antibodies. We used logistic regression to identify partner characteristics associated with increased HIV and HCV prevalence, both overall and stratified by region.

Results: Among 2,462 partners of index PWID participants, median age was 33 years (IQR: 27, 39), 67.8% were men, and 82.5% and 17.5% were identified as injecting partners and non-injecting sexual partners, respectively. Coast partners were older (Coast=35.2; Nairobi=31.8, p<0.001), primarily male (Coast=76.1%; Nairobi=61.3%, p<0.001), and more likely to have paid/received money for sex (p<0.001) or to have had sex with someone they knew to be HIV positive (p<0.001).

Partners from the Coast vs Nairobi had higher odds of living with HIV (Coast=23.7%; Nairobi=17.1%; OR=1.50, p<0.001) and being HCV antibody positive (Coast=16.9%; Nairobi=8.6%; OR=2.16, p<0.001). Ten additional years injecting was associated with 62% higher risk of HIV on the Coast (p<0.01) and more than twice the risk of HCV (p<0.001) in both regions. In Nairobi only, being on methadone was associated with lower odds of both HIV and HCV (p<0.001 and p<0.005, respectively) and older age was a stronger risk factor for living with HIV in Nairobi vs the Coast (interaction p<0.001).

Conclusions: HIV prevalence among sexual and injecting partners of PWID was more than 3-fold the national prevalence in Nairobi and more than 4-fold on the Coast. HCV prevalence was at least 10-fold higher in both regions. Number of years injecting was a significant driver of risk, particularly on the Coast.

Abstract 42**Title: Affordable House Floors to Control Tungiasis**

Lynne H Elson (KEMRI-Wellcome Trust)*; Sharack Nyawa (Dabaso Tujengane); Anthony Bandary (Dabaso Tujengane); Larry Mukofu (KIRDI); Gitobu Mwitari (KIRDI); Abneel Matharu (ICIPE); Paul Odera (ICIPE); Ibrahim Kiiche (ICIPE); Ulrike Fillinger (ICIPE)

Background: Tungiasis is a neglected tropical skin disease endemic in resource-poor rural communities in sub-Saharan Africa, central and South America. It is widespread in Kenya although no systematic national surveys have been conducted. It is caused by the penetration of the female sand flea, *Tunga penetrans*, into the skin, and primarily affects children and elderly people. Infection is associated with unsealed earthen floors in houses. Sand flea larvae, pupae and adults develop in loose dry soil. Improving the house floor could prevent the disease. However, in Kenya solid concrete floors can cost around KShs1,000/m² and are well beyond the reach of affected families who survive on less than KShs100 a day. The aim of this study was to develop a low-cost, locally available, hard floor for prevention of tungiasis for resource-poor households.

Methods: Our approach was to identify traditional techniques used in the past and experiment with combining these with modern soil stabilization technologies to develop a low-cost floor. We then implemented a small, three-armed Randomized Controlled Trial to investigate the impact of a solid floor (concrete or the new floor) versus an unsealed earthen floor on re-infestation with tungiasis. A total of 36 households were selected at having at least 2 tungiasis cases (each with more than 5 fleas), a house with an earthen floor, willing to consent and vacate the house while floor was laid. Households were randomly assigned to one of the 3 study arms, 12 in each. The primary outcome measure was infection prevalence and intensity. Secondary outcome measures were (1) acute pathology scores, (2) the presence of *Tunga penetrans* off-host stages in houses, (3) the experience, perceptions and acceptability and (4) costs of the new floor type compared to a basic concrete floor or no hard floor at all. The study was conducted in Kilifi North sub-county of Kenya.

Results: Focus Group Discussions revealed endemic communities do not consider hard, sealed floors as a priority, roofs and walls are improved first when funds allow. Laboratory studies and small field slab trials found the soil in the study area has a very high sand content with almost no clay, and the most suitable and affordable material to use under the circumstances was a 1: 9 mix of cement in the local soil. In the RCT, the households who received this new floor and those with a concrete floor had significantly lower infection rates than the households who remained with the earthen floor until the end of the study, 10 months. The family members also had less acute pathology. All families were very happy with the new floor, particularly the reduced dust, sand fleas, respiratory illness and how easy it was to keep clean. The cost of the new floor was KShs300/m² compared to KShs1,000/m² for the concrete floors.

Conclusion: It is possible to install a hard, sealed floor in houses that is affordable and locally available and reduces tungiasis infection.

Abstract 43

Title: Swollen limbs among communities of Keumbu area, Nyaribari Chache sub-County, Kisii County: Is the area endemic for lymphatic filariasis and podoconiosis

Mariam Macharia (KENYA MEDICAL RESEARCH INSTITUTE)*; Sammy Njenga (KEMRI); Henry Kanyi (KEMRI); Benson Oisebe (KEMRI); Wyckliff Omondi (Ministry of Health); Robert Masese (Kisii County Department of Health Services); Sultani Matendechero (Ministry of Health); Isaac Ngere (University of Washington); Doris Njomo (KEMRI)

Background: Lymphedema refers to accumulation of lymph fluid causing persistent swelling of the body. It can occur in legs, arms, breast and genitalia. In tropical Africa, the reported leading causes of lymphedema are lymphatic filariasis (LF) and podoconiosis. In Kenya LF, is endemic in the coastal region while podoconiosis has been observed in the western and central highlands. In July 2020, the media reported the swelling of limbs among members of a family living in Keumbu area, Kisii

County. Consequently, an integrated epidemiological assessment was conducted in September 2020 to investigate the reported swellings.

Methods: This was a mixed methods cross-sectional survey conducted in three purposively selected villages in Keumbu: Getacho, Nyansakia and Gucha II. One hundred and five (105) households were selected through systematic random sampling and their households' heads interviewed using a structured questionnaire. A further 306 participants were drawn from the sampled households for the testing of LF infection using the Filarial Test Strips (FTS) and clinical assessment for podoconiosis. In-depth interviews (IDIs) were conducted with 20 participants who were purposively selected because of having swollen legs. Quantitative and qualitative data were analysed using STATA version 14.1 and NVIVO version 10, respectively.

Results: From the 306 samples tested for LF infection, none was positive while only two participants were diagnosed with podoconiosis. In the family whose plight was highlighted by the media, the father and seven children were chronically disfigured; however none of them was diagnosed with podoconiosis or LF. Of the 20 participants who took part in the IDIs, 19 reported that they had sought healthcare from several health facilities with 5 of them indicating that they had been diagnosed with arthritis or diabetes or hypertension. Almost half of the respondents from both quantitative arm [54 (51.4%)] and qualitative arm (n=14/20) had no knowledge on the causes of lymphedema. About half [52 (49.5%)] of the quantitative arm study participants did not perceive themselves to be at risk of lymphedema. More than half [61(58.1%)] of the quantitative arm study participants and three-fifths (n=12/20) of those in the qualitative arm reported that they washed their feet at the end of each day. Three-quarter (n=15/20) of the participants in the IDIs reported feelings of hopelessness, sadness and anger with nine participants reporting community stigmatisation.

Conclusion: There are few cases of podoconiosis and no presence of LF in Keumbu area, Kisii County. The highlighted family with disfigured legs did not suffer from either LF or podoconiosis and thus the need further comprehensive medical investigations and consideration for psychosocial support.

Keywords: Lymphedema, lymphatic filariasis, podoconiosis

Abstract 44**Title: Barriers of Uptake of Trachoma Trichiasis Surgery among Women of North Pokot Sub County, Kenya**

Victoria Ochwal (St. Paul's University Limuru)*; Hillary Rono (Kitale Eye Unit)

Background: Trachoma is the leading infectious cause of blindness in the world, commonly among cultural groups with poor hygiene. West Pokot County had been conducting the World Health Organization recommended surgical sessions at fixed sites and periodic outreach stations at the North Pokot. While some of the men and women having trachoma accepted trachoma surgery, among those who declined were 72.5% women. A cross-sectional study was conducted to assess the perceptions of Trachoma among women with Trachoma Trichiasis (TT) and to explore the social and Institutional based barriers associated with TT Surgery uptake among women with TT in North Pokot Sub County.

Methods: Qualitative methods were used for data collection. Using purposive sampling, 27 women who declined TT surgery were engaged in In-depth-interviews. The study also conducted key informants interviews among National and County Health Workers (4), Local administrators (3) and Development actors (2). Separate FGDs were conducted among women who had undergone TT surgeries (1), their spouses (1), the spouses of the women who declined to have surgery (1) and the Trachoma case finders (1). Data was audio recorded, transcribed, coded and analyzed using NVivo 12 by study themes; perceptions of trachoma, Individual, social and institutional based barriers.

Results: Majority of the participants had knowledge of trachoma and its transmission and reported the importance of facial cleanliness and proper sanitation practices to prevent trachoma. Perception of treatment options ranged from the majority who preferred epilation, and other traditional alternatives. The severity of TT would later prompt seeking of biomedical options like eye ointment (tetracycline) application and inform uptake of surgery.

Individual based barriers included attitudes like procrastination and not perceiving any benefit from the surgery due to fear of recurrence. Furthermore, limited knowledge of what happens during the surgical process was compounded by misconceptions. The Social based barriers included unequal gender relations sustaining the power dynamics at the household and community informing access and uptake of the surgery. Psychosocial barriers emerged as fear of the ‘unsightly post operative look’ with stigma reported as enacted and felt by limiting marriageability of the young women with trachoma. The institutional barriers were related to accessibility and prior health service experience including long waiting times and queues. In addition, a majority of the women reported fear of poor surgical outcomes including complications and general recurrence.

Conclusion: The findings call for targeted Social Behaviour Change Communication within a multi-sectoral approach and further robust surgical audits to ensure quality of surgical outcomes to sustain gains from trachoma elimination approaches and contribute to the contextual and targeted adoption of the Breaking Transmission Strategy (BTS) 2019-2023.

Abstract 45

Title: A Story of Significant Change: Caesarean Sections Service Improvements – Case of Kitui County Referral Hospital

James N. Kariuki (Kenya Medical Research Institute); Joseph K Mulwa (Kitui County Government)*

Introduction: Kitui County Referral Hospital for a long time experienced delays in performing emergency caesarean sections. Some of the key issues contributing to this problem included delays in having a nurse-midwife in theatre to receive the newborn; delays in having the medical officer review the patient and arriving at decisions on whether to perform emergency C-sections; and delays in having the theatre team assembled for emergency C-section, especially outside official working hours.

Processes: Concerned by this trend, the nursing teams raised the issue during a departmental meeting at the maternity wing and proceeded to meet and interview all the concerned stakeholders. Having taken note of the key issues, the team deliberated on the matter with the theatre in-charge and the medical officer in-charge, who acknowledged existence of the problem. The medical officer in-charge together with the nursing officer in-charge agreed to call for an interdepartmental meeting in which all those involved in caesarean. The meeting drew up several conclusions which included the need for teamwork; to have at least one nurse midwife remaining in the theatre at critical times; and to adjust the staff rota so as to have enough nurse-midwives per shift in theatre.

Outcome: Resolutions from these discussions included an understanding that the first on-call medical officer spend the night in maternity to avoid delay in decision making. In this regard, the management was tasked with the duty of ensuring that the rooms for first on-call officers were well kept. Additionally, majority of the nurse-midwives were able to work fast and reduce the waiting time to perform emergency caesarian section.

Lessons learnt: This process was achievable because all the stakeholders came together after the management were involved and understood the changes that were necessary to mitigate the problem. It also called for process ownership by all by encouraging to note that staff in institutions can identify a problem in the institution or department, discuss it with key stake holders and a local solution is arrived at.

Next steps: Going forward, the teams will have to ensure they hold periodic review meetings for all stakeholders take note of new developments.

SCIENTIFIC SESSION 9: ADAPTIVE & RESILIENT HEALTH SYSTEMS II

Venue: Room I

Abstract 46

Title: Pilot implementation of Short Message Service for randomisation in a multisite pragmatic factorial clinical trial in Kenya

Mercy C. Terer (KEMRI-WELLCOME TRUST)*; Dennis Kimego (KEMRI-Wellcome Trust Research Programme); Ambrose Agweyu (KEMRI-Wellcome Trust Research Programme); Charles Oundo (Department of Medical Statistics, London School of Hygiene and Tropical Medicine, UK)

Background: Failure to achieve appropriate randomisation and allocation concealment may result in biased estimates of treatment effects and potential loss of objectivity in clinical trials. The traditional use of sealed envelopes for randomisation is vulnerable to manipulation and the risk of damage to envelopes during shipping and at storage. Additionally, the filling and sealing envelopes is a tedious time-consuming error-prone process. Other randomisation alternatives such as web-based methods are preferred. However, they are expensive and not suitable in low resource settings with poor internet infrastructure. Mobile-based text messaging potentially offers a low-cost and reliable alternative.

Methods: We developed an SMS method that allows one to select an allocation treatment without using envelopes on any mobile device. This method takes participant unique identifiers, trial site, stratum and the trial name as input to process the treatment allocation in a multi-site clinical trial. The system verifies the input parameters before returning a response to the sender. The response is in form of a text which contains the specific details of the allocation treatment. The administrative dashboard summarizes randomization transactions, allows users to monitor SMS activities, manage users and upload the randomization sequence. Dummy randomization lists were used to test the randomization process with dummy trial sites. We evaluated the SMS latency rate in seconds and accuracy against the master randomization list for each randomization message delivered.

Results: We performed dummy test scenarios of 100 runs between the January 2021 and February 2021. Average SMS latency was 00:38 seconds with the fastest delivery in 00:13 seconds with an allocation accuracy of 100%.

Conclusion: The test results indicate an effective methodology that can be adapted in low-income countries to improve randomization. We hope to pilot this method in the upcoming clinical trials and report further outcome of random sequence accuracy, to document user experience, to measure response time and cost. A user framework will be developed to guide implementation at scale in future studies and to provide a reliable and low-cost alternative platform to support the increasing number of large and complex clinical trials in low-resource settings.

Abstract 47**Title: Implementation of an Online Training Portal for Training of Research Staff: Experiences from a Multi-site Pragmatic Randomised Controlled Trial**

Lynda Isaaka¹, Mercy Chepkirui Terer¹, Ambrose Agweyu¹

Affiliations: Epidemiology and Demography Department, KEMRI Wellcome Trust Research Programme, Nairobi, Kenya

Background: Training of research staff on the protocol and study-related procedures is prerequisite for commencing recruitment and trial-specific activities. Face to face training is the most common method used. This can pose logistical challenges especially for multi-site pragmatic trials. Challenges include sub-optimal attendance by hospital staff due to shift-based nature of their work and potential interruption of clinical services as well as logistical challenges associated with travel and face-to-face training set up between multiple sites. The COVID-19 pandemic caused a significant disruption in the conduct of clinical research activities. COVID-19 mitigation measures put in place such as lockdowns and social distancing have led to reduced face-to-face interactions with research staff. An online training portal provides a flexible, easily accessible and low cost means of delivering protocol and study related training.

Methods: We utilized open source tools to develop a web portal that allowed remote management of clinical trial staff centrally using word press content management platform integrated with LifterLMS plugin. Users were required to submit an email address, through which a link to the training portal was provided. The training content was stratified into modules. Each module covered trial-specific topics and study procedures. At the end of each module, we provided an evaluation test and users were required to achieve the set pass mark before proceeding to the next module. The training content was optimized to fit in a mobile device interface. Users were therefore not required to have a laptop and a desktop computer. The system automated the generation of site-specific training logs which were reviewed prior initiating all sites.

Results: The online training portal was successfully launched in August 2019. 482 staff from across 10 hospital sites registered for the training. Of these, 351 (72.8%) successfully completed the online training modules. The course recorded an average performance rate of 97.78% across all the sites. All the sites met the training threshold required for site-initiation and commencement of trial activities.

Conclusion: The online training portal provided an innovative means of delivering training content to research staff. This method of training can be easily adopted by trial teams to conduct trial-specific training to research and hospital staff during the pandemic especially in areas where there are movement restrictions. The tools used to develop the web-portal are open-source and thus minimize costs to study management teams.

Abstract 48

Title: Characteristics and factors associated with transmission of HIV from mother to child and evaluation of surveillance system, Murang'a county

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1Field epidemiology and Laboratory Training Program, Kenya. 2National AIDS STI control program, Kenya, 3VIDHA, 4Department of Health, Murang'a County Government

Introduction: Mother to child transmission (MTCT) of HIV can be reduced to less than 1% by use of Anti-retroviral treatment in HIV positive pregnant and breastfeeding women. Kenya has a HIV prevalence rate of 4.9% and a Prevention of MTCT (PMTCT) need of 69,497 with a MTCT rate of 11.5%. Murang'a recorded a transmission rate of 20.4% four times higher than elimination target. We aimed to characterise and determine factors associated with MTCT and evaluate surveillance system attributes.

Methods: We reviewed mothers and babies pair records for 2016-2018. Data was downloaded from PMTCT electronic register into excel workbook. Variables extracted were demographic, clinical and Laboratory information. Patients with Viral load (VL) count less than 1000 copies/ML were considered suppressed. Frequencies and proportions were calculated for qualitative data using Epi- Info 7. Measures of central tendency analysed for quantitative data using MS- Excel 2003 and Map using Quantum Global Information System. Surveillance system attributes were assed using the updated CDC surveillance evaluation guidelines.

Results: A total of 628 records were reviewed. Mean age was 30.6 (SD 6.5). Age groups between 25-39 years were (70%) (439/628. A majority, 473/628 (75%) received health services at level 3 and 2 facilities. Women aged 20-29 and those between 35-39 had achieved Viral Suppression. Only 262/628 (42%) HIV-Exposed-Infants were followed for 18 months while 355/628(57%) were lost to follow up. The Surveillance system was simple in reporting facility-sub-county, was useful as it generated trends, data Completeness was 50% and its acceptability was 50% mainly by Government officers.

Conclusion: Younger mothers were more than older mothers. A majority of cases sought services from level 2 and 3 health facilities. A majority of the younger women had achieved viral suppression while majority of the babies were lost to follow up. The surveillance system was found to be useful.

Keywords: HIV, Mother To Child Transmission, surveillance, Evaluation

Abstract 49

Title: Examining the implementation of HIV prevention policies in private retail pharmacies in Kenya

Audrey Mumbi (Kemri-Wellcome Trust Research Programme)*

Background: HIV remains a global challenge despite availability of effective interventions. Sub-optimal implementation has been identified as a key barrier to impact. Private retail pharmacies have been identified as unique delivery channels for two HIV prevention interventions launched in 2017: HIV self-testing (HST) and Pre-Exposure Prophylaxis (PrEP).

Objective: To examine the implementation of HST and PrEP policies in private retail pharmacies in Kenya.

Methods: A cross-sectional quantitative survey was conducted at 195 pharmacies in three urban counties (Nairobi, Mombasa and Kisumu) using an interviewer-administered questionnaire. The pharmacies were randomly selected from a complete list of registered pharmacies in the three counties. Data was analyzed using R studio where descriptive statistics were calculated, and logistic regression conducted to explore variables associated with adoption of the two policies.

Results: Of the 195 pharmacies sampled, 107 (55%) had adopted the HST policy, while only 6 (3%) had adopted the PrEP policy. The structures and resources available in the pharmacies for the delivery of the two policies included trained staff with the majority having a diploma in pharmacy, consultation rooms and the presence of clinics and laboratories in some of the pharmacies. The main motivation for providing HST was to help clients to know their status, while the main barrier was the pricing of the test kits. Having a computerized stock management system, a clinic within the pharmacy or more than two staff with a diploma were significantly associated with adoption.

Conclusion: The HST policy has been significantly adopted in private retail pharmacies across the three counties. Implementation of the PrEP policy is lagging behind, mainly due to the lack of proper programs to get the drugs and lack of knowledge on the PrEP guidelines. We recommend that pharmacy service providers should be adequately trained on PrEP guidelines and proper programs to acquire PrEP should be established.

Abstract 50**Title: Increase of Skilled Delivery as a Result of Holding Monthly Maternity Open Days in Bungoma County**

James N. Kariuki (Kenya Medical Research Institute)*; Pamela Barasa (Bungoma District Hospital)

Introduction: Expectant mothers were not seeking reproductive health services from a number of public hospitals in Bungoma County. Arising from this phenomena, Bumala Sub-County Hospital management team decided to investigate reasons why low level of delivery and explore solutions to address the problems. The objective of this paper is to describe reasons and lessons learnt from local public health interventions that lead to increased skilled delivery at Bumala Sub-County Hospital.

Methodology: This was a descriptive case study. The community members were identified and invited well ahead of time through their respective community health extension workers (CHEWs). The healthcare workers started with holding an one-day meeting every month targeted stakeholders e.g. the provincial administration, religious leaders, politicians, retired government officers, community health extension workers (CHEWs), birth companions, county health committees (CHC) members, community health volunteers (CHVs), community members and any other interested persons. They were taken hospital tour of all service departments. The women would be taken round in small groups and meet the staff working in the department. More time would be spent at the maternity / labour ward i.e. 1st stage room for labour, delivery room, where the babies are kept after delivery: and finally, the resting room.

Findings: The sub-county public health officers and nurses were charged with execution and coordination of the strategy. These ‘open days’ attracted more expectant mothers who come and delivered in the sub-county hospital because their doubts were cleared and were convinced that they will be safer if they deliver in hospital as compared to delivery at home. Even though it has become a continuous exercise, increased hospital deliveries was realized after 6 months. As a result of this activity, there has been increased skilled delivery in most of the hospitals from 50% to 76% (based on hospital summaries) and the facility health care workers have learnt that they need to improve on the issues raised by the community after interacting with them- the issues raised by the community were such as lack of privacy at labor ward due to the small maternity unit, lack of night staff to attend to mothers who come to deliver, lack of water supply in some hospitals and long distances to the facility. Moreover, the politicians present urged community members to cooperate and pay the facility improvement fund (FIF) fees levied in public hospitals so as to able to run and also be expanded services.

Lessons Learnt: Community involvement in decision making is key in improving health care service delivery. Health facilities should conduct continuous social-marketing of their services so as to encourage the community utilize the services. This joint action would lead to improved service delivery.

Conclusion: The hospital intends to address the raised by the community in order to better the services.

SCIENTIFIC SESSION 10: INFECTIOUS DISEASES II

Venue: Room 2

Abstract 51

Title: Understanding the role of health workers in the Lymphatic Filariasis elimination program in Kenya: Challenges faced and suggestions for improved program performance

Bridget Kimani (KEMRI)*; Lydia Kibe (Kenya Medical Research Institute); Wyckliff Omondi (Ministry of Health); Hadely Sultani (Ministry of Health); Doris Njomo (KEMRI)

Background: The Kenyan Ministry of Health and its partners through the Division of Vector Borne and Neglected Tropical Diseases, is in charge of the Lymphatic Filariasis Mass Drug Administration (LF MDA) programme. This is implemented through the national, county and sub-county neglected tropical diseases coordinators. Community health extension workers (CHEWs) are charged with training and supervision of community drug distributors (CDDs) who deliver drugs to households. The current study sought to understand the role of the health workers, the challenges they face and their suggestions of how program performance can be improved.

Methods: Two wards, Kaloleni and Kayafungo in Kilifi County were purposively selected for achieving treatment coverage of 58% and 54% respectively in 2015 and of 62% and 39% respectively in 2016, which is below the recommended minimum of 65%. As part of a larger quasi-experimental study, qualitative data was collected through sixteen in-depth interviews with community health extension workers and two semi-structured interviews with the county and sub-county neglected tropical diseases coordinators. Data were analysed by QSR NVIVO version 10 according to identified themes.

Results: The study results showed that the roles of the health workers in planning and implementation of the program include: supply chain management; information education and communication (IEC); records management; health workforce training and management; leadership and governance and service delivery. The major challenge was lack of involvement of the Sub-County Health Management Team (SCHMT) and the local administration during the actual implementation activities. Other challenges faced included inadequacy of drugs supplied for distribution by CDDs, insufficiency of IEC materials for awareness creation, inadequate number of CDDs selected and trained for MDA, poor facilitation for training and supervision of CDDs and limited MDA duration with delayed reporting due to poor network coverage. Suggestions on improving LF MDA were; involving the SCHMT and the local authorities during implementation to create ownership of the program and production of information and education materials to ensure their adequacy; increasing the number of: training days for the CDDs to ensure full coverage of the curriculum; number of CHEWs to ensure adequate supervision; number of CDDs to ensure comprehensive coverage and number of days for drug distribution.

Conclusions: The study results show the need to involve all the relevant stakeholders in the lymphatic filariasis elimination program not only during planning but also in the implementation phase. This will create ownership and improve the program performance.

Key words; Lymphatic filariasis, mass drug administration, challenges, suggestions Health Workers, Neglected Tropical Diseases Coordinators

Abstract 52

Title: Bioefficacy and durability of Olyset Plus, a piperonyl butoxide and permethrin-treated insecticidal net, in a 3-year long trial in Kenya

Paul PMG Gichuki (KEMRI)*; Kiambio Njagi (National Malaria Control Programme (MOH)); Solomon Karoki (National Malaria Programme (MOH)); Luna Kamau (KEMRI); Nabie Bayoh (KEMRI); Yadav Rajpal (WHO); Evan Mathenge (KEMRI)

Background: Long-lasting insecticidal nets (LLINs) are a core intervention for malaria. However, due to emerging evidence of mosquito resistance to pyrethroids, there has been a need for products that can overcome the resistance. Piperonyl butoxide (PBO) treated LLINs were developed for this purpose. An evaluation was carried out on the efficacy and durability of Olyset Plus, a PBO and permethrin treated insecticidal net, versus a permethrin treated, Olyset Net, in a 3-year long trial in a malaria endemic rice cultivation area of Kirinyaga County, Kenya.

Methods: This was a prospective, household randomized controlled trial in four villages. Cone bioassays and were carried out on the two nets at baseline, and every 6 months up to the 36th month against malaria vector, *Anopheles gambiae* Kisumu strain. Nets that failed bioassay tests were subjected to tunnel tests. Additionally, chemical content, fabric integrity and survivorship of the nets were monitored over three years.

Results: The bioassay results showed that Olyset Plus was efficacious up to 18 months, with the efficacy reducing to 42% at the 36th month while Olyset net was efficacious up to 12 months with the efficacy reducing to 36% at the 36th month. The permethrin content in Olyset Plus reduced by 37%, 40% and 52% in 12, 24 and 36 months respectively while its PBO content reduced by 84%, 91% and 94% in the same period. For Olyset net, the permethrin content reduced by 16%, 19% and 20% over the same period. Net survivorship rate was slightly higher in Olyset Plus at 91.2% than in Olyset net at 86.4%. More Olyset net were reported to have at least a hole at 36th month of use (72%) than Olyset Plus at 63%. At 36th month, Olyset Plus recorded proportionate hole index (pHI) classification of good, serviceable and replacement at 49.6%, 27.1% and 23.2% respectively with Olyset net recording 44.9%, 32.8% and 22.2% for the same categories respectively.

Conclusion: The results suggest that addition of PBO to permethrin nets has additional value to the nets. Olyset Plus which had both permethrin and PBO was more efficacious as compared with Olyset net which had only permethrin. Olyset Plus had slightly higher survival rate and fabric integrity as compared to Olyset Net.

Keywords: Bioefficacy, durability, long-lasting insecticidal nets, Olyset Plus, Olyset Net, permethrin, piperonyl butoxide.

Abstract 53**Title: Factors leading to slow decline of worm burden among primary school children in endemic counties of Kenya: a cross-sectional study of prevalence and intensity**

Janet M. Masaku (Kemri)*; Charles Mwandawiro (KEMRI); collins Okoyo (Kemri); Sylvie Araka (Kemri); Elses Simiyu (Kemri); Doris Njomo (KEMRI); Sammy Njenga (Kemri)

Introduction: Soil-transmitted helminthiases (STH) belong to a group of 20 neglected tropical diseases (NTDs) earmarked for control and/or elimination by the World Health Organization (WHO). To ensure that STH infection transmission levels are reduced, and the associated morbidity is mitigated, repeated mass drug administration (MDA) at regular intervals depending on the population prevalence has been recommended by WHO. In Kenya, treatment of over five million school age children (SAC) both in pre-schools and primary schools has been conducted in 28 endemic counties. However, monitoring and evaluation indicate a slow decline of prevalence and intensity of STH in some counties after several rounds of annual MDA. Therefore, there is need to assess the risk factors that might be associated with transmission exposure to maximise on the control programmes.

Methods: A quantitative cross-sectional study was conducted in three endemic counties of Narok, Kisii and Vihiga in Kenya. Simple random sampling was used to select 1886 study participants from nine primary schools purposively selected based on results of previous studies. Participating SAC were interviewed on school and household risk factors of STH infection and stool samples collected and analysed using Kato-Katz technique. Statistical analysis was performed using STATA version 14 (STATA Corporation, College Station, TX, USA). Differences in proportions of infection were assessed using chi-square (χ^2) test and differences in means using Student t-test and Mann-Whitney test. Univariable and multivariable logistic regression was also used to test the associations between the variables.

Results: The overall prevalence of STH was 30.43% (n = 574). Ascaris lumbricoides was the predominant helminth species. Hookworms had the lowest prevalence of 0.21% (95%CI=0.00-0.01) and 0.32% (95% CI=0.00-0.01) in male and female SAC respectively. Prevalence of Trichuris trichiura was observed to be similar in both male and female SAC, at 9.55% (95%CI=0.08-0.11) and 10.65% (95%CI=0.88-0.13) respectively. Unavailability of latrines at home was found to be one of the factors associated with STH infections (OR=0.44, p<0.001). Multivariate analysis revealed that informal job (OR=0.28, P=0.001), subsistence farming (OR=0.19, P<0.001) and other jobs (OR=0.29, P<0.001), were likely to hinder the decline of STH.

Conclusion: The study results shows that there was slow decline of worm burden despite repeated annual MDA for the last six years among the SAC. In addition, some of the factors associated with STH infection were subsistence farming, unavailability of latrines among others. This study suggests bi-annual MDAs in these counties in future and if possible consider including health education on the risks of getting STH infection.

Abstract 54**Title: Modeling the Interruption of the Transmission of Soil Transmitted Helminths Infections in Kenya: Modeling Deworming, Water and Sanitation Impacts**

Collins Okoyo (Kenya Medical Research Institute)*; Graham Medley (London School of Hygiene and Tropical Medicine); Charles Mwandawiro (KEMRI); Nelson Onyango (University of Nairobi)

Background: Kenya, just like other countries with endemic soil-transmitted helminths (STH), has conducted regular mass drug administration (MDA) program for the last 5 years among school aged children as a way to reduce STH infections burden in the country. However, the point of interruption of transmission of these infections still remains unclear. In this study, we developed and analyzed an age-structured mathematical model to predict the elimination period (i.e., time taken to interrupt STH transmission) of these infections in Kenya.

Methods: The study utilized a deterministic age-structured model of the STH population dynamics under a regular treatment program. The model was applied to three main age groups: pre-school age children (2–4 years), school age children (5–14 years), and adult populations (≥ 15 years) and compared the impact of two interventions on worm burden and elimination period. The model-simulated results were compared with the 5 year field data from the Kenyan deworming program for all the three types of STH (*Ascaris lumbricoides*, *Trichuris trichiura*, and hookworm).

Results: The model demonstrated that the reduction of worm burden and elimination period depended heavily on four parameter groups; drug efficacy, number of treatment rounds, MDA and water, sanitation and hygiene (WASH) coverage. Additionally, the model indicated that the benefit derived from the regular treatment increases non-linearly with the treatment rounds and coverage.

Conclusion: The analysis showed that for STH infections to be eliminated using MDA alone in a short time period (less than 5 years), 3-monthly MDA plan is desired. However, complementation of MDA with WASH at an optimal (95%) coverage level was most effective. These results are important to the Kenyan STH control program as they will guide the recently launched Breaking Transmission Strategy.

Abstract 55

Title: Aedes aegypti control intervention: Barriers to community-based trash collection, disposal and recycling in Ukunda, Kwale County, Kenya

Lydia Kibe (Kenya Medical Research Institute)*; Francis Mutuku (Technical University of Mombasa, Environment and Health Sciences Department, Mombasa, Kenya); Amy Krystosik (Stanford University, School of Medicine, Department of Pediatrics, Division of Infectious Disease, Stanford, CA, USA); Mumini Dzoga (Technical University of Mombasa, Environment and Health Sciences Department, Mombasa, Kenya); Scholastica Ratanya (Technical University of Mombasa, Department of Business Administration, Mombasa); Gathenji Njoroge (University of California Berkeley, School of Public Health, Berkeley, CA, USA); Jenna Forsyth (Stanford University, School of Earth Sciences, Stanford, CA, USA); A. Desiree LaBeaud (Stanford University, School of Medicine, Department of Pediatrics, Division of Infectious Disease, Stanford, CA, USA)

Introduction: Dengue virus (DENV), Chikungunya virus (CHIKV), and Zika virus (ZIKV) are three important arboviruses with wide geographic spread and increasing impact on vulnerable human populations that are spread by the same mosquito vector, *Aedes aegypti*. *Ae. aegypti* preferentially breed in containers, often trash or unused containers, within human settlements. Studies have demonstrated that poor waste management leads to accumulated solid waste, especially plastics, and is associated with both transmission and risk of dengue and chikungunya.

Objective: To assess barriers to community-based trash collection, disposal and recycling as an *Ae. aegypti* control intervention in Ukunda, Kwale County, Kenya.

Methods: The study was conducted in Ukunda town, Kwale County at the Kenyan Coast. Qualitative methods involving three semi structured interviews with policy makers & yard operators and two semi structured interviews with factory owners were conducted. Additionally, one focus group discussion with primary collectors and 12 focus group discussions with community members categorized in age and gender were used to collect data. Discussions focused on perceptions toward trash, stakeholders in trash collection, barriers to management of trash in the community and associated vector-borne disease risks.

Results: Several players in waste recycling process were identified: household owners, primary collectors, yard operators, mid-level yard operators and factory owners. Low public environmental awareness, insufficient waste management infrastructure, multiple licensing processes, weak enforcement and ineffective policy implementation were identified as key barriers to efficient collection, disposal and recycling of waste at all levels in Ukunda. The community perceived garbage as an important problem but reported a low knowledge regarding vector borne disease risk. There was also low environmental awareness which was associated with lack of desire to engage in trash management resulting in low community participation.

Discussion and conclusion: The results suggest an urgent need for local authorities to collaborate with the relevant players to improve access and availability of both primary and secondary trash facilities. Importantly, continuous environmental education is recommended as a key strategy for effective trash collection, disposal and recycling.

Keywords: Kenya, *Aedes aegypti*, recycling, trash, mosquito breeding, mosquito, arboviruses

SCIENTIFIC SESSION II: COVID-19 PANDEMIC & SOCIAL DYNAMICS

Venue: Room 3

Abstract 56**Title: Socio-economic status and knowledge of COVID-19 prevention measures in border counties of Busia and Mandera, Kenya**

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Background: Kenya has implemented several mitigating health and economic measures for prevention COVID-19 infection. Socioeconomic status plays a role in the overall well-being and is a major determinant of health. This study sought to determine the association between socio-economic status and knowledge on COVID-19 prevention measures.

Methodology: A cross sectional household e-survey study done in Busia and Mandera Counties of Kenya targeting 600 randomly selected households, where one adult respondent was sampled per household using the KISH grid technique. A questionnaire was used to collect data. The association measures of interest was explored using Poisson regression.

Result: A total of 582 adults (m:43% f:57%) aged between 18-90 years participated in the study. 14% had no formal education while 86% were educated to primary school level. The knowledge of hand washing as a prevention measure did not vary by education. However, those classified in bottom 20% of the wealth index (Measured as amount spent on food per day) were less likely to know of this behavior compared to top 20% (RR 0.77, 95% CI 0.66, 0.89). Participants with no educational qualifications were 0.65 (95% 0.48, 0.89) times as likely to know that covering their mouth when sneezing or coughing can prevent COVID-19 compared to survey participants with secondary education. 20% of the wealth index were 50% less likely to know of this behavior compared with those in top 20% (RR 0.50, 95% CI 0.36, 0.70– S). Those with no educational qualifications were 0.81 (95% 0.66, 0.98) times and those with upper primary education were 0.85 (95% CI 0.75, 0.95) as likely to know use hand sanitizer with those secondary education and above. No differences were observed in using a hand sanitizer as a prevention behavior by the wealth index quintiles. Those classified in bottom 20% of the wealth index were less likely to know about social distance of 2 meter apart compared with those in top 20% (RR 0.37, 95% CI 0.23, 0.60-S). Those with no educational qualifications were 0.72 (95% CI 0.56, 0.92) times and those with lower primary education or religious education were 0.71 (95% CI 0.56, 0.91) as likely to know that wearing a face mask can prevent COVID-19.

Conclusion: Socioeconomic disparities impact adherence to COVID-19 prevention measures, with those in lower wealth quantile and low formal education at greatest risk. Initiatives aimed at addressing the observed inequalities are needed for effective prevention of COVID-19 with tailored communication strategies to influence social behavior change.

Abstract 57

Title: Effect of covid-19 pandemic response measures on social life in two border counties of Kenya.

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Background: The Kenyan government in its effort to control the spread of SARS-CoV-2 instituted mitigation measures that included curfews, restrictions in movement, trade, and religious & social gatherings. These measures had adverse effects on social life, health and wellbeing of Kenyans. This study sought to understand the effect of the pandemic on social life in Busia and Mandera border counties in Kenya to inform covid-19 response.

Methods: The study adopted a mixed methods research approach conducted in Busia and Mandera counties. Quantitative data was collected through a household e-survey (n=582 adults). Changes in daily life due to the covid-19 crisis was assessed as well as available social structures and a general sense of distress in respondents. For qualitative study arm, purposive sampling method was used to identify key informants (n=73) who participated in telephone interviews. They included policy actors, healthcare workers, Covid survivors & carers, truckers, traders and religious leaders. A guide was used to unearth the effects of the pandemic on social life. Quantitative data was analyzed using SPSS version 22 while qualitative data was coded & categorized using the Framework method, and manual thematic analysis done. Ethical considerations were met.

Results: Out of 582 adult participants (M: 43%; F: 57%), 81.4 % reported food insecurity, major changes in social interaction (23.5%), change in quality of relationships with friends and family for worse (59.4%), lack of access to schooling (87.5%) and difficulties in maintaining social distance (82.1%). Respondents reported disruption to religious support (65.5 %), peer support group (21.8%), merry-go-round/chamas (33.2%) and 19.9% sporting activities. 84.7% reported a sense of distress. 82.8% of 101 participants in informal sector reported loss of income. Majority of social networks/links (peer groups, religious networks, families) were disrupted by movement restrictions, curfews and closure of educational institutions. The changes in quality of social relationships reported were largely negative with a number of potential long-term consequences on educational attainment (teen pregnancies likely to affect educational attainment for girls) and family structure and stability (marriages were affected by loss of income and financial strain, divorce, separation). Cases of gender-based violence and suicide were reported. There was convergence of the quantitative and qualitative findings, both of which indicated the pandemic had a generally adverse effect on social life. The qualitative findings provided insights into the lived realities underlying the quantitative findings of the study and aided in identifying recommendations to inform the pandemic response.

Abstract 58**Title: Temporal trends of SARS-CoV-2 seroprevalence in transfusion blood donors during the first wave of the COVID-19 epidemic in Kenya**

Authors: Ifedayo M.O. Adetifa^{1,2*§}, Sophie Uyoga^{1*§}, John N. Gitonga^{1§}, Daisy Mugo^{1§}, Mark Otiende¹, James Nyagwange¹, Henry K. Karanja¹, James Tuju¹, Perpetual Wanjiku¹, Rashid Aman³, Mercy Mwangangi³, Patrick Amoth³, Kadondi Kasera³, Wangari Ng'ang'a⁴, Charles Rombo⁵, Christine Yegon⁵, Khamisi Kithi⁵, Elizabeth Odhiambo⁵, Thomas Rotich⁵, Irene Orgut⁵, Sammy Kihara⁵, Christian Bottomley², Eunice W. Kagucia¹, Katherine E. Gallagher^{1,2}, Anthony Etyang¹, Shirine Voller^{1,2}, Teresa Lambe⁶, Daniel Wright⁶, Edwine Barasa¹, Benjamin Tsofa¹, Philip Bejon^{1,6}, Lynette I. Ochola-Oyier¹, Ambrose Agweyu¹, J. Anthony G. Scott^{1,2,6}, George M. Warimwe^{1,6}

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Introduction: Observed SARS-CoV-2 infections and deaths are low in tropical Africa raising questions about the extent of transmission. In this further study, we examine the dynamics of SARS-CoV-2 seroprevalence among Kenyan blood donors throughout the course of the first epidemic wave.

Methods: From 30th April to 30th September 2020, samples from blood donors aged 16-64 years were collected at six Kenya National Blood Transfusion Service (KNBTS) regional blood transfusion centres across Kenya. We measured SARS-CoV-2 IgG by ELISA in 9,922 blood donors and adjusted for sampling bias and test performance.

Results: By 1st September 2020, 577 COVID-19 deaths were observed nationwide and seroprevalence was 9.1% (95%CI 7.6-10.8%). Seroprevalence in Nairobi was 22.7% (18.0-27.7%).

Conclusion: Although most people remained susceptible, SARS-CoV-2 had spread widely in Kenya with apparently low associated mortality.

Abstract 59**Title: COVID-19 Outbreak Investigation and Response in Nyeri County Kenya, 2020**

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Introduction: The novel COVID-19 pandemic, caused by severe acute respiratory syndrome coronavirus 2, remains a global challenge. Following community transmission, increase in number of positive cases, mortality and untraced contacts in Nyeri, we described the epidemiology of cases, conducted contact tracing and instituted control measures.

Methodology: Using a standard data abstraction tool we reviewed Nyeri county and national line list, contact list and follow up records. We conducted contact tracing for all active cases by use of a phone calls, contact was defined as any person who got exposed to a probable or confirmed case during the 2 days before and the 14 days after the onset of symptoms of the case. We conducted sensitization to county health managers on data management and surveillance and key informant interviews to assess COVID-19 preparedness and response. We performed descriptive statistics and case series for cases at Nyeri main prison

Results: As at 22rd October 2020 Nyeri county had listed 313 COVID-19 cases with 13 deaths (CFR= 4.2%). Index case was on recorded on May 22, 2020. Of the 313 cases 195 (63%) were male, the median age was 36 years (IQR=24), asymptomatic cases were 260 (83%), Nyeri main prison contributed 10% (30) while health workers accounted for 12% (39) of the cases. We listed and traced 69 contacts, however no contact was listed for the prison cases. We capacity built 19 health managers on data management. For preparedness there was an incident command system with one arm chaired by the governor and the technical arm by county director health. There was a rapid response team with surveillance, logistics, laboratory and case and data management functions at the county and sub county levels. There were 6 public isolation centers with a bed capacity of 339.

Conclusion: After sharing of findings Nyeri county-initiated line listing of the cases using the updated tools and continued tracing of contact(s) of all confirmed cases, and reports sent to the national team on a regular basis. We recommended enhanced contact tracing among the resident of the prisons.

Key words: COVID-19, Outbreak, Investigation, contact tracing, Preparedness and Response

Abstract 60

Title: Understanding how COVID-19 pandemic influenced pharmaceutical care services: a qualitative study of retail pharmacy providers' and clients' experiences in Thika, Kenya.

Peter Atandi Mogere (KEMRI - CCR PHRD (THIKA) PROJECT)*; Njeri Wairimu (KEMRI - CCR PHRD (THIKA) PROJECT); Stephanie Roche (University of Washington); Scholastica Wanjiku (KEMRI - CCR PHRD (THIKA) PROJECT); Casmir Edinah (KEMRI); Nelly R. Mugo (KEMRI); Jared Baeten (Gilead Sciences); Elizabeth Bukusi (KEMRI); Katrina Ortblad (University of Washington); Kenneth Ngure (Jomo Kenyatta University of Agriculture and Technology)

Background: In Kenya, retail pharmacies bridge an important gap in the provision of essential healthcare services, with prior research suggesting that many Kenyans first resort to retail pharmacies for both preventative and urgent care needs, as well as minor ailments. We conducted a qualitative study with pharmacy clients and providers to understand whether and how the COVID-19 pandemic has influenced their care-seeking and service provision at retail pharmacies.

Methods: From October to December 2020, we conducted 30 in-depth interviews with pharmacy clients (N=20) and providers (N=10) in Thika, Kenya. Eligible individuals were ≥ 18 years and seeking or providing care at a retail (non-hospital) pharmacy. Interviews were conducted using a semi-structured guide, audio recorded, and transcribed verbatim. Two trained researchers analyzed transcripts using content analysis.

Results: Providers' median age was 28 years (IQR: 24-41) and half (N=5) were male; clients median age was 25 years (IQR: 21-46) and half (N=10) were female. Most clients reported reducing the frequency of their visits to the pharmacy during the pandemic due to fear of contracting the virus, noting that some pharmacies were crowded and not adhering to COVID-19 precaution guidelines. A few clients additionally described stocking up on products they needed from the pharmacy or resorting to using home remedies during the pandemic. By contrast, some clients reported visiting the pharmacy more frequently during the pandemic to seek COVID-19 information and prevention products (e.g., sanitizers, gloves). Most providers noted lowered profit margins during the pandemic due to decreased client volume and reduced opening hours. Some providers also reported selling products at a loss or at no profit to avoid losing clients and increased operational costs to implement COVID-19 precautions (e.g., handwashing stations).

Conclusion: Despite increased operational costs and dwindling profit margins, the retail pharmacies in this study continued to provide health services during the pandemic and served as a primary source of COVID-19 information and prevention products for clients. These findings highlight a potential opportunity for collaboration between retail pharmacies and COVID-19 prevention efforts.

Abstract 61**Title: A Description of Covid-19 Cases in Nyeri County, Kenya, January 2021**

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Introduction: Nyeri county had confirmed 1245 cases as of 15th January 2021 cumulatively with an associated 45 deaths (CFR=3.6%). The county has a high burden of non-communicable diseases hence likely to worsen the outcome. There were reports of rapid transmission of COVID-19 among inmates at Nyeri main prison and in the general population. The team sought to characterize COVID-19 cases admitted at the three isolation centers in Nyeri county and Nyeri main prison, describe medication patterns in private chemists and describe home remedies used by patients under home-based care.

Methods: The investigation was carried out from January 11–17, 2021. Data were abstracted from the health facilities registers of the three isolation centers; Outspan, KNH annex, & Mt. Kenya hospital. Nyeri prison &County and national line lists were also reviewed using a standard template and aggregated into an MS Excel spreadsheet. Semi-structured questionnaires were used to interview COVID-19 patients under home-based care and the drug dispensers. Twelve chemists were purposively sampled. Data were analyzed using Epi Info 7. We calculated measures of central tendency and dispersion for continuous variables and proportions and frequencies for categorical variables.

Results: We reviewed 1245 COVID-19 records from the line list; 172 (13.8%) were admitted at the three isolation centers for COVID-19, while all the 152 (12.2%) cases isolated at Nyeri main prison were all male. The median length of stay at the prison isolation was 3 weeks with a range of 3 to 6 weeks. There were 45 deaths (CFR =3.6 %), Of the 45 COVID -19 patients who died, 29, (64) percent presented to the hospitals with difficulty in breathing and were not aware of their COVID 19 status, 26, (58%) had known comorbidities with diabetes contributing the highest proportion 22, (49%), Nine (75%) of the 12-private chemists were visited; the in-charges reported to know now know about the drugs used to manage COVID-19 patients. About 73.97% (921/1245) of the patients were under home-based care. As regards home remedies; of the 30 patients interviewed, all 30, (100%) used hot water, 27 (90%) reported using lemon juice and only 9 (30%) used other fruits and garlic.

Conclusion and Recommendation: All deaths were from severe cases who presented with difficulty in breathing, we capacity-built the prison health records team on filling of the line list. We recommended continued health education on the use of home remedies for COVID-19 prevention and control.

Keywords: Cases, COVID-19, Isolation, Home based care

Abstract 62**Title: COVID-19 Investigation and Response in Uasin Gishu County, Kenya**

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Introduction: COVID-19 has affected the economy, the health sector and caused social disruption of the livelihood of millions of people globally. By March 30, 2021, Kenya had reported 131,115 cases and 2,135 deaths. Uasin Gishu County experienced a marked increase in number of cases in March 2021. The county acts as the main commercial center in Northern Rift Valley and some Western Counties. We described the magnitude of COVID-19 and assessed COVID-19 preparedness and response in the County.

Methods: We described the line listed COVID-19 confirmed cases as of April 14, 2021, in six sub-counties in Uasin Gishu County. The cases were characterized according to demographics, clinical presentation and admission status. We assessed the preparedness and response of isolation centers on case management, infection prevention control, waste management, cases follow-up. Analysis of continuous variables generated mean and range, while categorical variables generated measures of central tendency and dispersions.

Results: Of 4,300 COVID-19 records analyzed, 2,566 (59%) were for males. The mean age was 37.8 years (± 8.4), most affected age category was 30-39 years at 27.3%. Most affected occupation were business persons at 438 (10.2%). Only 351 (5.9%) had symptoms with 140 (40%) exhibiting cough and 135(3.1%) had died. A total of 2,573 (59.8%) had been put under Home Based Isolation and Care (HBIC) and 537(12.5%) had been admitted in health facilities since the first case was reported. Ainabkoi sub-county had the highest infections 2,292 (53.3%). The county had a total of 144 isolation beds with 55 beds in public facilities and 89 beds in private facilities. The total number of beds in Intensive Care Units/High Dependency Units were 13. Of the 2,642 health workers in 11 health facilities, 856 (32.4%) were trained on PPEs use and 6 (54.5%) of the facilities contract private firms for waste management. Three of the eleven health facilities had Home Base Care (HBC).

Conclusion: The impact of the Covid-19 pandemic has disproportionately affected different occupations with highest infections noted on the businesspersons; while 30 - 39 age group had the highest infection rates. With increase in cases within the county, there is need for increase in number of isolation beds to cater for increase rate of hospitalization. The county government should also make use public isolation centers to ease congestion from private facilities.

Keywords: COVID-19, Infections, Health, Preparedness and response, Kenya

SCIENTIFIC SESSION 12: INFECTIOUS DISEASES III

Venue: Room I

Abstract 63**Title: A Systematic Review of Health and Wellbeing in older adults living with HIV in sub-Saharan Africa**

Patrick Nzivo Mwangala (Kemri-Wellcome Trust Research Programme, Kilifi)*; Amina Abubakar (Kemri-Wellcome Trust Research Programme, Kilifi); Charles Newton (KEMRI - Wellcome Trust Research Programme); Adam Mabrouk (Kemri-Wellcome Trust Research Programme, Kilifi); Ryan Wagner (University of the Witwatersrand, Johannesburg)

Background: People infected with human immunodeficiency virus (HIV) aged ≥ 50 years (PLWH50+), universally recognized as older adults, are increasing rapidly across the world, subsequently creating a subgroup demanding specifically targeted research, policy and practice. Accumulating evidence from high-income countries suggests that these adults experience greater impairments in common mental disorders (CMDs), cognitive impairment, and frailty, significantly reducing their quality of life compared to their uninfected peers. The extent of this problem is unknown in sub-Saharan Africa (SSA), the region most affected by HIV globally. This review summarizes the empirical evidence on CMDs, cognitive impairment, frailty and health-related quality of life (HRQoL) among PLWH50+ in SSA.

Methods: A systematic search for publications was conducted in PubMed, CINAHL, PsycINFO, Embase, and Scopus databases. We reviewed articles on CMDs, cognitive impairment, frailty and HRQoL among PLWH50+ living in SSA, published until Jan 2021.

Results: A total of 50 studies from fifteen SSA countries met the inclusion criteria. About two-thirds of these studies emanated from Ethiopia, Uganda, and South Africa. Studies regarding depression predominated ($n=26$), followed by cognitive impairment ($n=13$), HRQoL ($n=8$), frailty/handgrip strength ($n=8$), and anxiety ($n=2$). Overall, PLWH50+ exhibited varied rates of depression (ranging from 6% to 59%) and cognitive impairments (4% to 61%). The prevalence of frailty among PLWH50+ ranged from 3% to 15%. The correlates of CMDs, cognitive impairment, frailty and HRQoL were rarely investigated, but those reported were sociodemographic variables, many of which were not consistently associated with the reported outcomes. In particular female was consistently associated with poorer mental health, cognitive function, HRQoL and frailty status.

Conclusions: This review documented an increasing number of published studies on HIV and ageing, highlighting the greater interest in this emerging public health issue in the region. However, research on these outcomes in SSA is still scanty. Overall, we find the current evidence inadequate to characterize the real public health dimension of these impairments in the region, partly because of heterogeneous findings, a limited number of well-designed studies on the subject and substantial methodological limitations in many of the available studies. Future work should have sufficiently large samples of PLWH50+, engage appropriate comparison groups, harmonize the measurement of these outcomes using a standardized methodology to generate more robust prevalence estimates and confirm predictors.

Keywords: Ageing, HIV, Common mental disorders, Cognition, Frailty, Grip strength, Health-related quality of life, sub-Saharan Africa

Abstract 64

Title: Evaluation of Tuberculosis treatment outcomes between clinically and bacteriologically diagnosed patients: a cohort study.

Moses M. Ngari (KEMRI Wellcome Trust Research Programme)*; Osman Abdullahi (Department of Public Health, Pwani university, P.O Box 195-80108 Kilifi, Kenya.); Deche Sanga (Kilifi County TB Control Program, Kilifi County, Kenya PO Box 9, Kilifi, Kenya); Willetts Annie (Department of Public Health, Pwani university, P.O Box 195-80108 Kilifi, Kenya.)

Background: World Health Organization (WHO) recommended Tuberculosis (TB) diagnosis includes clinical signs and symptoms, therefore not requiring bacteriological confirmation. Although this empirical TB treatment is routine practice in low-and-middle income countries including Kenya, little is known about their TB treatment outcomes. The objective of this study is to compare TB treatment outcomes among clinically and bacteriologically diagnosed TB, six months after initiating TB treatment in Kilifi county.

Methods: In this retrospective cohort analysis, we included all adults starting TB treatment and followed up for six months, within the Kilifi County TB surveillance database from 2012 to 2018. The TB treatment outcomes assessed included treatment success, failure, death, defaulted and transfer out. We assessed the effect of type of diagnosis on TB treatment outcome using survival regression models from date of initiating treatment to experiencing one of the treatment outcomes or completing six-months of treatment.

Results: We included 12,856 patients; median age 37 [IQR 28–50] years. 5217 (41%) were female while 11,339 (88%) were pulmonary TB cases. Overall, 11,633 (90%) were given first-line TB treatment and 3791 (29%) were HIV infected. 6472 (50%) of the patients were clinically diagnosed of whom 4521/6472 (70%) had a negative sputum/GeneXpert test. During the study 5,565 person-years (PYs) observed, treatment success was 82% and 83% amongst clinically and bacteriologically diagnosed patients ($P=0.05$). There were no significant differences in defaulting ($P=0.70$) or transfer out ($P=0.19$) between clinically and bacteriologically diagnosed patients. Mortality was significantly higher among clinically diagnosed patients: 639 (9.9%) compared to 285 (4.5%) amongst the bacteriologically diagnosed patients; aHR 5.16 (95%CI 2.17–12.3) $P<0.001$.

Conclusions: Our findings suggest empirically treated patients had significantly higher risk of death, irrespective of HIV status or age. To improve survival amongst clinically diagnosed patients, we recommend systematic screening for comorbidities, prompt diagnosis and management of other infections.

Abstract 65**Title: Serological evidence of chronic pulmonary aspergillosis in tuberculosis patients in Kenya**

Abdi Mohamed (KEMRI)*; Richard R.K Korir (KEMRI); Sally N Loronyokie (KEMRI); Benear Obanda (KEMRI); Hannah Kariuki (KEMRI); Evangeline Gatumwa (KEMRI); Christine Bii (KEMRI)

Background: Pulmonary tuberculosis is a significant risk factor to fungal colonization and infection of the lungs. Further, the severe immunosuppression associated with HIV and TB co-infection is a predisposition for fungal infections. The cavitary lesion post TB infection serves as a good reservoir for fungal colonization and subsequent infection. Failure to investigate and manage fungal infection in tuberculosis (TB) patients increases patient morbidity and mortality. The study aimed to provide serological evidence of chronic pulmonary aspergillosis (CPA) among TB patients in Kenya. Towards this we analysed 234 serum samples from patients presenting with persistent clinical features of TB infections despite TB treatment. The patients were recruited from TB clinics in four referral hospitals in Nairobi, Mombasa, Kisumu and Eldoret in Western Kenya.

Methods: This was a cross sectional laboratory based study. Patients were recruited following an informed consent. Serological detection of Aspergillus fumigatus IgG was done using enzyme-linked immunosorbent assay (Bordier Affinity Products SA). Sputum samples were subjected to microscopy and standard fungal culture. The isolated fungi were subjected to macro and micro morphological identifications and confirmed by sequence analysis of calmodulin, betatubulin and ITS genes.

Results: Serological evidence of CPA or fungal sensitization was 46/234(19.7%) and equivocal or borderline was 14/234(6.0%). Western Kenya (Kisumu and Eldoret) had a lower mean IgG level of 0.83 compared to Nairobi 1.35 and Mombasa 1.11. Mycological investigations of sputum resulted in 49/234(20.9%) positive for fungi with Aspergillus spp. being the majority 25 (51.0%). Aspergillus fumigatus was the most common 13 (52.0%), followed by A. niger (32.0%), A. terreus, A. flavus, A. candidus and A. clavatus with 4.0% each. This was followed by Penicillium spp. 10 (20.4%), Scedosporium spp. 5 (10.2%) and Rhizopus spp. 3(6.1%). Among the yeast Candida albicans accounted for the majority 18(34.6%) followed by C. glabrata 5(9.6%). Cryptococcus spp. was isolated from 3 (5.8%) of the samples while 13(25.0%) of the yeast could not be identified with the available tests.

Conclusion: Chronic pulmonary aspergillosis (CPA) is a significant co-morbidity in TB patients in Kenya that could be mistaken for relapse or TB treatment failures in the absence of reliable testing and drug resistance information. It could be the cause of persistent clinical symptoms despite TB treatment often misdiagnosed as TB smear negative or relapse. This unwarranted TB retreatment could be avoided if technical and infrastructural capabilities for fungal diagnosis are put in place. Our recommendation is that all patients with persistent clinical symptoms despite TB treatment should be subjected to fungal investigations before retreatment.

Abstract 66**Title: Mycological food safety: Aflatoxins and Mycotoxins contamination and distribution in the Kenyan Cereals**

Richard Korir¹, Tom Ouko¹, Evageline Mathiu¹, Hanna Njeri¹, Apollo Obanda¹, Olga Mashedi¹, Abdi Mohamed¹, Tetsuhiro Matsuzawa², Tohru Gono², Takashi Yaguchi², Christine Bii¹.

Institutional affiliations: 1. Kenya Medical Research Institute Centre for Microbiology Research, Nairobi, Kenya. 2. Medical Mycology Research Center, Chiba University, Japan

Background: Mycotoxins such as aflatoxin and fumonisins are known carcinogens. In Kenya, cancer especially of the gastrointestinal track is an emerging non communicable disease currently. Chronic exposure to mycotoxin is not only a risk factor for cancer but it affects immunity, kidney and protein-nutrient metabolism which negatively impact on human health. The study aimed at determining mycotoxin contamination and their distribution in Kenyan cereals.

Methods: A cross-sectional study design was carried out in Eastern, Coastal, Western and Nairobi regions. We sampled a total of 678 samples comprising of maize (68.1%), beans (5.5%), wheat (3.3%), rice (4.0%), mixed cereals (3.8%) and nuts (11.0%). Non-random samples [21(3.1%)] were analyzed in a suspected outbreaks in Loitokitok. Mycotoxins were analyzed using Envirologix Quick ToxTM Kits and QC by HPLC fluorescence detection.

Results: We sampled the cereals and nuts from different region in Kenya; coastal strip [203(30.0%)], eastern region [198(29.2%)], western [128(18.9%)] and Nairobi [128(18.9%)] and non-random samples [21(3.1%)] from suspected aflatoxin outbreak in Loitoktok Kajiado. Among the five regions sampled, coastal [32(15.8%)] had the highest aflatoxins contaminated samples considered to be unfit for human consumption. We sampled; maize (68.1%), beans (5.5%), wheat (3.3%), rice (4.0%), breakfast cereal products such as corns and Weetabix (3.8%) and nuts (11.0%) that were present in the market. The overall rate of aflatoxin contamination was 38.5% with 27.1% considered unfit for human consumption (Aflatoxin >20ppb). The study revealed that, 30.4% were contaminated with fumonisin and 1.4% of the samples considered unfit for human consumption (>4ppm). The Eastern part of Kenya had the highest (70.4%, mean 0.84ppm) contamination rate of fumonisins. Loitoktok in Kajiado County was suspected to have an outbreak of aflatoxin, however, fumonisin contamination was 85.7% with a mean 2.582 ppm hence the outbreak was fumonisin but not aflatoxins. Other mycotoxins of interest detected were deoxynevalenol (16.4%), zearalenone (6.3%) and ochratoxin (1.4%). Multiple toxins detection (Aflatoxin and fumonisin) were found in 12.2% of the samples while 1.6% were contaminated with triple toxins (Aflatoxins, fumonisin and deoxynevalenone).

Conclusion: There is significant mycotoxin exposure through contaminated stable food in Kenya that could be responsible for the upsurge of non-communicable diseases such as; cancer, nutrient deficiency, kidney and liver diseases. The widespread mycotoxin contamination calls for measures to protect the public from the health hazards associated with chronic mycotoxin exposure. Regulatory measures and surveillance for mycotoxins is recommended

Abstract 67**Title: Physico-Chemical and Microbial Quality of Bottled Drinking Water sold in Embakasi Central, Nairobi, Kenya**

Gloria C. Magut (Jomo Kenyatta University of Agriculture and Technology (JKUAT)- KEMRI Graduate School)*; Zipporah Bukania (Kenya Medical Research Institute (KEMRI)); Gideon Kikuvi (Jomo Kenyatta University of Agriculture and Technology (JKUAT)); Phillip Ndemwa (Kenya Medical Research Institute (KEMRI)); Sara Marks (EAWAG- Swiss Federal Institute of Aquatic Science and Technology)

Introduction: The consumption of packed water (bottled and sachet) drinking water is on the rise globally, including in low- and middle-income countries where a growing number of households rely on packaged water to meet their daily drinking needs. Still, uncertainties persist regarding the safety of packaged drinking water, especially in urban Africa. In 2019, there were about 65 diarrheal cases per 1,000 people in the Embakasi Central sub-county, the highest rate of diarrheal cases recorded in Nairobi. The media has attributed the diarrheal cases to the pervasive contamination of bottled drinking water. Our study foci were the assessment of physicochemical and microbial quality of bottled drinking water sold in retail outlet (minimarts, kiosks, street vendors) in Embakasi Central, Nairobi.

Methods: A cross-sectional study design was used to assess the quality of bottled drinking water for 8 brands sold at 38 minimarts, 85 kiosks, and 35 street vendors in Embakasi Central Sub-county. First, a scoping visit was conducted to gather information on commonly consumed brands. The Lot Quality Assurance Sampling (LQAS) method was used to enable an estimate of quality of water per brand of the most consumed brands. In total, 158 water samples from eight brands were collected in duplicate bottles from across the study area. The water samples were transported to the Kenya Medical Research Institute (KEMRI)- Centre for Public Health Research Laboratory and the Government Chemist; Water & Environment laboratory and immediately analyzed for physicochemical and microbial parameters, respectively, as per the methods described in APHA (American Public Health Association). Data were organized in an Excel database and trends within and between brands were investigated.

Results: Our findings indicate that 13% and 12% of all samples exceeded safety thresholds for fluoride and E. coli respectively, with one in five samples reporting at least one exceedance (Table 1). Brand 5 was particularly contaminated, with 100% and 25% containing unsafe levels of fluoride and E. coli, respectively (Table 1). According to KEBS (Kenya Bureau of Standards), the recommended packaged drinking water specifications for pH range is 6.5 – 8.5). In our sample of 158 bottled, 59 were outside of this range, indicating operational ineffectiveness in the treatment process

Conclusion and Recommendations: This study provides empirical evidence regarding alarming inconsistencies among bottled water quality in Embakasi Central, Nairobi, as well as the potential public health consequences of drinking bottled water in the study area. The results of this research will be communicated to policy makers and stakeholders in the Kenyan water sector and the public. There is urgent need for stringent operational monitoring and control of packaged drinking water. There is also need for active periodic surveillance and quality control of bottled drinking water.

SCIENTIFIC SESSION 13: PUBLIC HEALTH II

Venue: Room 2

Abstract 68**Title: Health Stories-Of-Significant Change: A Novel Approaches Towards Eradication Of Open Defecation In Kibwezi East Sub-County, Makueni County**

Marygorret Musau (Makueni Chmt); James N. Kariuki (Kenya Medical Research Institute)*

Introduction: There was increase in diarrheal diseases in Nthongoni sub-location of Kibwezi East Sub-County, Makueni County. Many children were brought to the health facility with diarrhea episodes. Open defecation was common practice in the villages. This was probably why diarrheal diseases were in the increase. Thus, there was need to sensitize the community on usage of pit latrines and hand washing with running water and soap. An approach called Community-Led Total Sanitation (CLTS) was implemented. It calls for community members to take charge of their own health as far as sanitation and hygiene are concerned.

What we did?: The process started with community triggering where they were shown how Fecal-Oral infection occurs when they do not use latrines. This included taking a transect walk with the community members and local leaders through the sub location where open defecation sites were noted. Some fresh human feaces were drawn and carried to the meeting point where some of it was mixed with clean water and shaken well until no one could notice the water contained feaces. Follow-up sessions in the community carried-out to make sure no more open defecation sites were observed and that all the households constructed used pit latrines well. Other practices were also initiated to improve hygiene at household level such as installation of hand washing facilities with soap , dish racks and refuse pits.

Key outcome: It lead to a reduction of diarrhea diseases in the sub-county. This was evident after reviewing out- patient records at Nthongoni Health Centre on disease trends by comparing pre and post CLTS processes. Verification process and certification was carried. The community members could also give testimonies on how their children used to fall sick due to poor sanitation and hygiene before implementation of CLTS and how the infections reduced after the process.

Lessons learned: Community participation and ownership of the program is critical and that villagers were very ready to learn. Its important to involve them from the start of the programme till the end. Their participation was also very key in the success of the process. After the triggering process, the community members took it upon themselves to ensure that everyone in that sub location owned and used a pit latrine. If anyone did not cooperate he/she would be reported to the local administrative leaders and action would be taken upon them.

Next steps: Continuous monitoring and evaluation of the programme to ensure that no open defecation is done in the community and that all the sanitation and hygiene practices are followed.

Abstract 69**Title: Sickle cell disease - the patient's perspective**

Sophie Uyoga (KEMRI CGMRC)*; George Mochamah (KEMRI CGMRC); Emmanuel Mabibo (KEMRI CGMRC); Metrine Tendwa (KEMRI CGMRC); Johnstone O Makale (Kemri/Wellcome Trust); Solomon Mutuku (KEMRI CGMRC)

Introduction: Sickle cell disease (SCD) is an inherited red blood cell disorder that results in the formation of abnormal haemoglobin. There are over 300,000 children born with SCD every year with most births occurring in sub-Saharan Africa. There is currently a lot of scientific research on the disease, and it is important that the researchers have a better understanding of what the patients experience in this community, and their views on the on-going research in order to develop a better working relationship with the research participants.

Methods: We conducted 4 focus group discussions (FGDs) and 2 in-depth interviews (IDIs) with the patients (N=18) attending the sickle cell clinic at Kilifi County Hospital and their caregivers (N=26) to share experiences. The emerging themes were presented to the illustrator who developed 4 stories in the context of the local setting. We used the school's engagement programme to distribute the comic book at two local schools.

Results: The discussions highlighted the challenges and successes that the affected families experience. The content for the 28-page comic book that we have developed has been drawn from their experiences and will be targeted for children aged 7-14 years attending the sickle cell clinic to aid their understanding of the disease at an early age. The science club visit at the two schools where some of the patients come from were successful as a way of creating awareness about the disease.

Conclusion: The 32-page comic book highlights facts about sickle cell disease and the challenges the patients and their families face. It will educate the community about the disease and help reduce stigmatization of the affected families. It also gives the patients a source of hope and inspiration.

Abstract 70

Title: Salt Iodization and Urinary Iodine Concentration Levels among Primary School Children in Mt. Elgon Sub-County, Kenya

Stephen N. Oteri (Kenya Medical Research Institute)*; Philip M Ndemwa (Kenya Medical Research institute)

Introduction: Iodine plays a key role in thyroid hormone production and functioning. Inadequate iodine intake results in iodine deficiency (ID) which impairs the normal functioning of the thyroid. Deficiency is associated with damage to brain development, growth retardation, cretinism, and thyroid dysfunction. Millions of people have been condemned to a life of few prospects and continued underdevelopment due to ID.

Objectives: To determine iodine status among primary school children aged 6-12 years.

Study Design: Cross-sectional descriptive study.

Sample size: 385 samples Calculated using Cochran formula and 32 schools used in the study.

Study Area: Mount Elgon Bungoma County, Kenya.

Justification: SAC used as they are vulnerable to iodine deficiency. Mt. Elgon region because it is a high altitude susceptible to soil erosion and leaching which causes ID besides KNMS (2011) showed the area to be ID.

Methodology: Schools selected purposively preference being given to public mixed schools. Spot urine samples were collected from SAC, who came with approximately 5 grams of salt sample they use at home. Water samples were collected from different water sources purposively. Salt was bought from local distribution outlets. The Sandell Kolthoff reaction was used to analyze urine and water samples while salt was analyzed using iodometric titration.

Results: The median urinary iodine concentration (UIC) was 200.7 µg/l. Out of which 24.03% were found to deficient, 25.69% had adequate iodine levels. Household and salt samples from different distribution outlets that conformed to set standards of iodization were 49.4% and 63.64%, respectively. Iodine was not detected in all the water samples.

Conclusion: The study population was found to have adequate iodine based on the median UIC of 200.7 µg/l. However, there was a coexistence of both deficiency and excessive UIC and salt iodization within the population. No iodine was detected in the water samples in the region.

Abstract 71**Title: Cancer and social pain in Kenya: Perspectives of patients, survivors and care-givers**

Lilian N. Nyandieka (KEMRI)*; Maureen Mackintosh (Open University); Charlotte Cross (Open University); Sharon Mokua (KEMRI); Cecilia Wanjala (KEMRI); Richard Mutisya (KEMRI); Vera Manduku (KEMRI); Mercy Njeru (kemri)

Background: A cancer diagnosis along with the subsequent management rigor, causes great strain financially, emotionally and socially among the patients, survivors and the caregivers. Social pain is a painful feeling following social conflicts or lack of understanding about illness status which consequently leads to social rejection or loss. It is a multifaceted phenomenon which incorporates various kinds of distressing social experiences including non-acceptance, misunderstanding, disbelief, rejection, stigmatization, and separation. This pain is poorly discerned clinically and may impact patient care and Quality of Life. This paper aims to document the extent of social pain as described by cancer patients, survivors and caregivers from three treatment sites of Nairobi, Meru and Mombasa Counties.

Methodology: The study employed a convergent mixed method design in three counties utilizing data from four focus group discussions with cancer survivors, a survey of 405 patients and 22 in-depth interviews with caregivers, health workers and policy makers. Thematic analysis was applied for the qualitative data while descriptive analysis was conducted using Stata software for the quantitative study.

Results: Majority (91.6%) of the patients revealed that they had received some form of support during their time of illness. Support received was financial (88.1%), emotional (38.1%) while (32.4%) received psychological support. Others received social support (22.7%), spiritual (18.9%) and other support (12.7%) such as accommodation and physical support. Higher proportions of the patients indicated that they got the support from immediate family (97.8%), extended family (65.9%), friends (54.6%) and faith groups (32.2%). Experiences of psychological and emotional pain were described by the study participants. The participants expressed lived fear of impending death as others contemplated ending their lives. The pain of patients watching their families struggle to support them; being stigmatized and others being abandoned by kin was too much to bear for the participants. The caregivers watching their loved ones struggle in pain was too much to bear.

Conclusion: From the study findings, it is evident that more attention was paid to financial support rather than psychological and social support. With most participants found struggling with psychological, emotional and social pain arising from their experiences, the participants would benefit from psychosocial interventions during and after treatment. The health system could do well to introduce such support within the system and increase awareness among health providers to enhance early discussions of early mapping of the patient care team, to understand the vulnerabilities and the potential risk to increased social pain. Communities could also be educated on the need to support the cancer patients and their families in order to have positive treatment outcomes.

Abstract 72

Title: High Iodine Deficiency in Pregnant Women in Mt. Elgon, Bungoma County, Kenya

Philip M. Ndemwa (Kenya Medical Research institute); **Violet Wanjihia** (KEMRI); **Stephen N Onteri** (Kenya Medical Research Institute)*; **Erastus Muniu** (KEMRI)

Introduction: Iodine is required by the body for production of thyroid hormones which are involved in the regulation of many key biochemical functions. Deficiency occurs when intake falls below recommended levels leading to hypothyroidism which is the main cause of damage to the developing brain especially from the second trimester of pregnancy to the third year after birth. Deficiency in pregnancy can cause spontaneous abortions, stillbirths, congenital anomalies and perinatal mortality.

Objectives: To assess the iodine nutrition status of pregnant women, school-age-children and iodine concentrations of drinking water.

Study design: This was a cross sectional descriptive study.

Sample size: The sample size was calculated using the fisher's method and a sample size of 800 obtained.

Spot urine samples were collected from pregnant women and school-age-children. Drinking water was sampled from different water sources. Pregnant women and school-age-children brought household salt samples.

Laboratory analysis: Urine and water samples were analyzed using Sandell- Kolthoff reaction to determine iodine concentration. Salt iodization levels were determined by titration. Data analysis: The WHO International Council for Control of Iodine Deficiency Disorders clasification was used to categorize the study participants into the various groups of deficiency.

Results: A total of 502 pregnant women were sampled out of which 41.8% were found to be iodine deficient. The average level of salt iodization from pregnant women was 64.3 mg KIO₃/Kg. A total of 132 school-age children were sampled out of which 15% were found to be iodine deficient. Their average household salt iodization level was 65.5 mg KIO₃/Kg. No iodine was found in the collected water samples.

Conclusion: There is an unacceptably high level of iodine deficiency in pregnant women in the study population. This requires immediate remedial action such as targeted supplementation considering the negative consequences of the deficiency.

Abstract 73

Title: A STORY OF SIGNIFICANT CHANGE- Stigma among EMTCT clients in Taveta Sub-County Hospital - A Descriptive study

Constance Matighi Lezen (Taita Taveta Department of Health)*; James N. Kariuki (Kenya Medical Research Institute)

At the Taveta Sub-County Hospital, the Elimination of Mother-to-Child Transmission (EMTCT) of HIV Clinic services are offered in the MCH/FP department, along with the other reproductive health services. This is part of service integration to allow ANC, FP and CWC clients have a one-stop shop for all the services offered. This integration led to eMTCT clients feeling uncomfortable especially now that the other clients had started asking questions especially on seeing their “yellow clinic identification cards”. As a result several issues arose such as non-adherence to HAART, stigma, defaulting, among others. This factors prompted the staff to devise strategies that would focus on client centered service. The MCH team initiated separate clinic days for each clinic group. This strategy aimed at increasing contact time between the clients and the MCH nurses. We Separated days for eMTCT clinics and the normal MCH/FP services i.e. the EMTCT clients were booked on a specific day of the week (every Thursday), while the other clients would come for services on other days of the week. All our clients (70 eMTCT clients) received reviews every week. We divided them into smaller groups consisting of 15 members who attended the clinic on alternate Thursdays based on the client's specific needs for example the lactating mothers separated from the pregnant women since they have their specific needs. Being in this smaller groups, the health care workers were able to attend to each client's specific needs. This work was done by a team of MCH nurses who ensured that they attended to all the clients; CCC staff members who offered the necessary support to nurses and the clients; the hospital administration which ensured a conducive working environment and supply of the commodities needed; and the mentor mothers who were always available to support the eMTCT clients. Lessons learnt: Though not quantifiable, we can attribute the positive patient outcomes to team spirit of the MCH nurses and the willingness of volunteers to support the clients who included “mentor mothers”. The client's viral suppression moved from 76% to 91%. Mentor mothers established support groups with consistent attendance from the clients. Adherence improved as less clients reported missing drugs and minimization of arriving late for clinic appointments.

Conclusion: From this activity we were able to have ample time with the clients and got to know the specific issues of our clients especially those affecting their adherence to ART. The plan is to maintain a small pharmacy in the MCH so that the eMTCT clients can get all the services under one roof.

SYMPOSIA

SYMPOSIUM I: **KNOWLEDGE** **MANAGEMENT**

Venue: Room 4

SYMPOSIUM 2: KNOWLEDGE MANAGEMENT

Venue: Room 3



Unlocking the potential of Knowledge

KENYA MEDICAL RESEARCH INSTITUTE (KEMRI) KNOWLEDGE MANAGEMENT DEPARTMENT

1. Introduction and Background

Background to Evidence Strand Symposium 2021

In Kenya, as of ** the economy has suffered the sharpest contraction since independence, as a result of the COVID-19 pandemic. According to government documents, it is postulated that gains that Kenya had made in poverty reduction have been wiped out and reversed by the COVID-19 pandemic. The health sector which is at the forefront in the response against pandemic, has not been spared either. From synthesis of grey literature, information is suggestive that existing public and private health capacities are strained as they respond to the pandemic. Given the foregoing, decision and policy makers are seeking answers to many questions on how to respond, how to rebuild, how to reform, how to revive and how to design resilient health systems after experiencing such a pandemic of unprecedented levels. Regionally and globally, stakeholders are also waiting for quick policy solutions. Unfortunately, some of those answers may not come in quickly and on time. From the mere fact that the pandemic has increased the demand for policy advice, it is opportune for knowledge translation experts to roll-up their sleeves and make a mark in this age.

a. Convening of the Evidence Strand Symposium 2021

The Evidence Strand Symposium 2021 will be held virtually on the 8th June 2021 from 2pm to 4:30pm via ZOOM link. Participants will be required to register for the main conference using the following link: <https://www.kemri.org/kash-11/>

(NB: for conference payment option: choose CASH payment and click.)

b. Theme and focus of the Evidence Strand Symposium 2021

The theme of the symposium will be “*Building Resilient Health Systems: Tapping into Research Evidence to Support National Recovery from COVID-19 Pandemic*”.

2. Organizers

This year’s symposium whose theme is ”*Building Resilient Health Systems: Tapping into Research Evidence to Support National Recovery from COVID-19 Pandemic*” is strategic in nature. It will build on previous similar workshops and webinars in tackling the Covid-19 pandemic challenges by adopting collaborative approach in undertaking rapid research synthesis to influence policy by embracing peer learning and capacity building between evidence champions and decision/ policy makers.

3. Objectives of the Symposium

The objectives of the symposium include: the promotion of conversation between research evidence and decision / policy makers, including state and non-state agencies; enhance knowledge managers and policy makers collaboration, networking and synergies in generating and sharing evidence; and identify the channels through which ideas and knowledge held by research evidence and policy makers can be used in the public policy process..

Specific Objectives of the symposium include:-

- i. Promote conversation between knowledge translation champions and policy makers, including state and non-state agencies to ensure evidence-based decision making.
- ii. Empower research scientists to evolve into more agile formations that respond to current decision / policy makers' information demands.
- iii. Advocate for a scaling-up of evidence synthesis platforms (such as rapid review mechanisms) to support the responses to COVID-19
- iv. Share knowledge, experience practices from knowledge translation champions that are making progress under the new normal

4. Participation

The Evidence Strand Symposium 2021 aims at targeting over 100 stakeholders. Participants will come from both the public and private sector, working in health in the country. They will include program managers, health care providers, and communication professionals as well as policy makers and other professionals who influence, or have the potential to influence national health programs. Knowledge management (KM) champions working on non-health-development focused activities in healthcare stakeholders will also be invited to the symposium to share their experiences on how knowledge translation (KT) can be applied in a health context.

5. Expected Outcomes

The expected outcome of the Evidence Strand 2021 Symposium include:

Proposals to promote the sustainability of rapid research review mechanism that respond to decision / policy makers demand.

Opportunities for peer learning among symposium participants so as to ensure their resilience in the face of the COVID-19 pandemic

An interdisciplinary and multi-sectorial platform to foster exchange and sharing of information among knowledge translation champions

The workshop will generate the following outputs:

Symposium proceedings report

Symposium communique

PROGRAMME

08/06/2021 Cochrane Launch Tentative Program

| Time | Topic | Presenter | |
|-------------|---|--|--|
| 10:35-10:50 | Welcome and introduction of the speakers -Introduction to Cochrane | Prof. Charles Obonyo | Chair: Jael Obiero Co-chair: James Kariuki Rapporteur: Lilian Mayieka |
| 10:50-11:50 | Evidence informed health care. The role of Cochrane collaboration in health decision making | Prof. Charles Wiysonge | |
| 11:50-12:15 | Overview of the current status of the Evidence generation and synthesis platform in Kenya. | Dr. Eleanor Ochodo | |
| 12:15-12:30 | Unveiling of the Cochrane Banner | Prof. Charles Wiysonge Prof. Jennifer Orwa Prof. Charles Obonyo Dr. Evans Amukoye Dr. Charles Nzioka | |

09/06/2021 KASH evidence symposium tentative program

| Time | Topic | Presenter | | |
|-------------|--------------------------------|--|--|--|
| 11:00-11:10 | Opening of the Symposium | Dr. Leyla Abdullahi | | Chair: Rachel Githomi Co-chair: Barbara Miheso Rapporteur: Safari Agure |
| 11:10-11:30 | Introduction of Cochrane Kenya | Dr. Leyla Abdullahi Prof. Jennifer Orwa | | |
| 11:30-12:00 | Keynote Speech | Prof. Taryn Young | Research For Health: Enhance the Value and Reduce Waste, in the context of COVID-19 Pandemic | |
| 12:00-12:50 | Panel discussion | Panel team Dr. Joyce Wamicwe (MOH) Dr. Emanuel Effa (Cochrane Nigeria) Dr. Lubano Kizito (KEMRI) Prof. Julius Oyugi (UON) Dr. Benjamin Tsofa (WELLCOME TRUST) Moderator Dr. Rose Oronje | Advancing evidence informed healthcare in Africa. Opportunities, capacity building and strengthening collaborations | |
| 12:50-13:00 | Closing Session | Dr. Eleanor Ochodo | | |

SYMPOSIUM 3: BIOTECHNOLOGY

Venue: Room 4

GENOMICS AS A KEY DRIVER OF HUMAN HEALTH SOLUTIONS AND DISEASE MANAGEMENT

There is an increase of human health diseases, outbreaks and pandemics in the world today. This urgently calls for robust innovative tools and technologies that can be used for disease management and prevention. The current COVID-19 pandemic demonstrates the importance of genomics in disease diagnosis, treatment, and vaccine development.

Over the years, genomic tools such as gene sequencing and pharmacogenomics have not only been used to identify disease causing microorganisms, but also provided valuable information on antibiotics mechanism of action. The determination of an abnormal genome and transcriptome of a diseased cell has been considered as a major advancement in disease management. Further, stem cell research, nanotechnology and precision medicine are emerging approaches for disease treatment and prevention. Understanding genomics and its role in human health is paramount. Therefore, this symposium will discuss and create awareness on the application of genomics in human disease management and advances made in Kenya, as well as existing bottlenecks and how they can be overcome.

Aim: To show case the importance of genomics in disease diagnosis and treatment and the need to strengthen genomics capacity in Kenya and beyond.

Expected Outcomes:

1. The role of genomics and bioinformatics data in human disease management outlined
2. Information of SARS-CoV-2 variants in Kenya discussed
3. The need for genomics capacity building in Africa highlighted

Symposium Programme

Chair: Dr. Damaris Matoke-Muhia

Co-Chair: Dr. Luna Kamau

Monitor: Dr. Erastus Mulinge

Rapporteur: Kelvin Thiong'o

DATE: 10th June 2021

| Time | Topic | Presenter |
|---------------|--|--------------------------|
| 10:30 -10:45 | Opening remarks and BRP overview | Dr. Damaris Matoke-Muhia |
| 10:45 -11:00 | The role of genomics in diseases diagnosis and treatment | Dr. Cecilia Waruhiu |
| 11:00 -11:15 | Genomics: A tool for understanding virus transmission | Dr. George Githinji |
| 11:15 -11:30 | SARS-CoV-2 genetic variants and case management | Dr. Charles Nyaigoti |
| 11:30 -11:45 | Genomics Capacity building and strengthening: Why does it matter for Africa “Kenya”? | Dr. Lucas Nyabero |
| 11:45 - 12:20 | Panel discussion/question & answer | Dr. Bernhads Ongutu |
| 12:20 -12:30 | Wrap up | Dr. Luna Kamau |

