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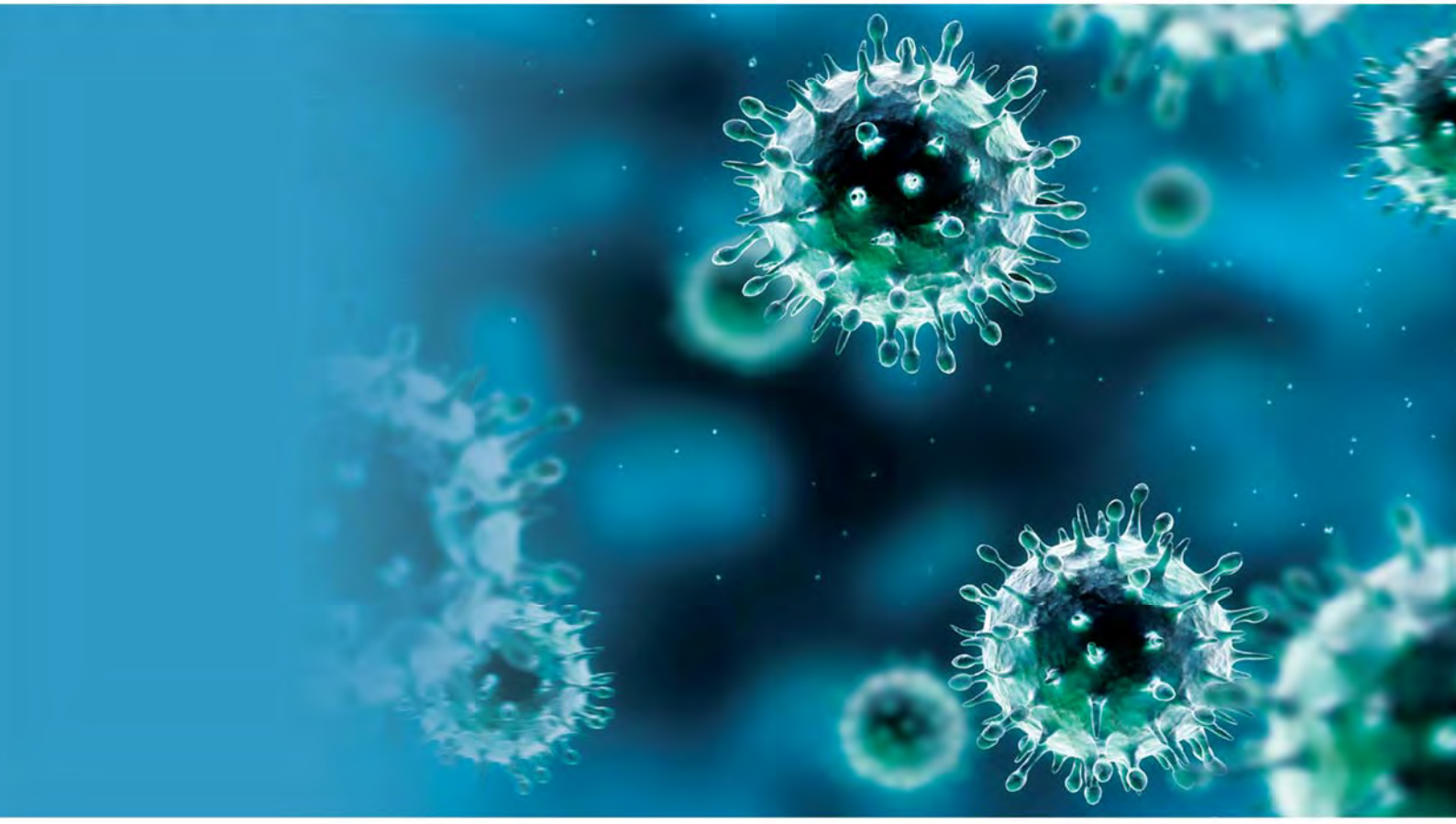

Infectious Disease Symposium 2015

Antimicrobial use and resistance in Eastern Africa

Date: June 18th - 19th 2015

Time: 8.00 am - 5.00 pm

Venue: Laico Regency Hotel, Nairobi

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PARTNERSHIP FOR ADVANCED CLINICAL EDUCATION
A Program of the University of Maryland and the University of Nairobi

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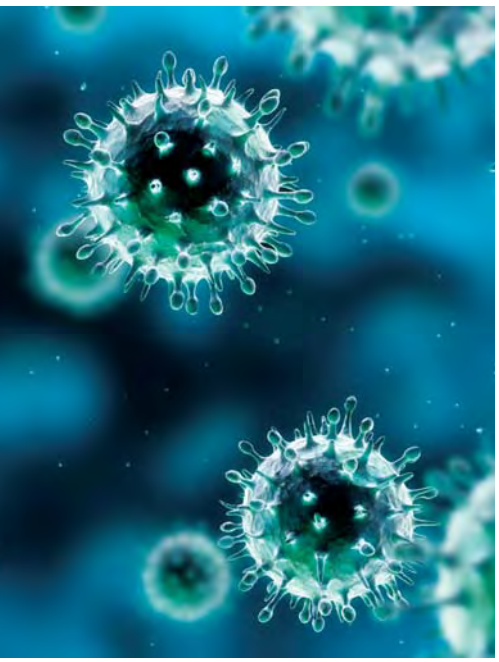

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Table of Contents

Programme & Abstracts Thursday 18 June 2015

Programme
Main event
Plenary

Sub-theme: Antibiotic use and resistance
Venue: Crystal ball room
Chair: Dr Loice Achieng
Co-chair: Professor Godfrey Lule
Rapporteurs: Dr Adam Sheikh & Dr Khalida Bulhan

Time	Activity	Presenter
0800 hrs	Arrival and registration	W Karuoya/MMS/Ushers
0830 hrs	Welcome address	G Lule
0900 hrs	Expert speaker: Surveillance	J Montgomery
0920 hrs	Expert speaker: Global trends in antibiotic use and resistance	B Gilliam
0940 hrs	Expert speaker: Epidemiology and genomics of antibiotic resistance in key zoonotic pathogens in Kenya	S Kariuki
1000 hrs	Tea at exhibition booths	All

Opening ceremony
Venue: Crystal ball room
Chair: Professor Fredrick Were
Rapporteurs: Dr Adam Sheikh & Dr Khalida Bulhan

Time	Activity	Presenter
1025 hrs	Invitation of speaker	Dr Elly Nyaim Opot, Chair, Kenya Medical Association
1030 hrs	Expert speaker: Government position on antimicrobial use	Dr Nicholas Muraguri, Director of Medical Services
1050 hrs	Welcoming remarks	Professor Peter M. F. Mbithi, Vice chancellor University of Nairobi
1100 hrs	Opening remarks	Mr James Macharia, Cabinet Secretary of Health
1120 hrs	Key note lecture	Professor Martinus Willem Borgdorff, CDC
1220 hrs	Lunch	All

Parallel session: Track I

Sub theme: Antibiotic use in animals
Venue: Ball room A
Chair: Dr P Gathura
Co-chair: Mr Zephania Irura
Rapporteurs: Dr Marybeth Maritim & Dr Sanaa S Said

Time	Activity	Presenter
1400 hrs	Expert speaker: Kenyan antibiotic use policy in livestock	K J Ngweiya
1420 hrs	Expert speaker: The role of the veterinarian in prevention of antibiotic resistance in Kenya	J M Mbaria
1440 hrs	Expert speaker: Molecular strategies for profiling of antimicrobial resistance in zoonotic infections	G Aboge
1500 hrs	Abstract presentation: Maasai households in northern Tanzania harbor a higher prevalence of antibiotic resistant E. coli compared with Chagga households	M Subbiah
1510 hrs	Antibiotic use in animals: Q & A session	P Gathura
1530 hrs	Next session begins	All

Parallel session: track II

Sub theme: Methicillin Resistant Staphylococcus aureus and Extended-spectrum Beta-lactamases
Venue: Ball room B
Chair: Dr David Silverstein
Co-chair: Professor Gunturu Revathi
Rapporteurs: Dr Emma Karari & Dr George Otieno

Time	Activity	Presenter
1400 hrs	Expert speaker: Antimicrobial Resistance Surveillance - challenges and future hopes	G Revathi
1420 hrs	Expert speaker: Mechanisms of resistance of extended-spectrum beta- lactamases	R Shah
1435 hrs	Expert speaker: MRSA prevalence in Kenya: Myth or reality?	G Omuse
1450 hrs	Expert speaker: Treatment protocol of multi drug resistant bacteria	E Omonge
1505 hrs	Abstract presentation: Antimicrobial resistance in febrile patients in Mulago Hospital: A call for laboratory guided treatment decisions	R Ssekitoleko
1520 hrs	MRSA and ESBL: Q & A session	D Silverstein
1530 hrs	Next session begins	All

Parallel session: track III

Sub theme: Infection control
Venue: Shaba
Chair: Professor Ruth Nduati
Co-chair: Ms Loyce Kihungi
Rapporteur: Dr Beryl Otieno

Time	Activity	Presenter
1400 hrs	Expert speaker: Hospital acquired Infections	L Ndegwa
1415 hrs	Expert speaker: Situation of IPC in Kenya	B Tsofa
1430 hrs	Expert speaker: Medical Waste Management	F Okuku
1445 hrs	Expert speaker: Strategic Plan for IPC	R Kamau
1500 hrs	Expert speaker: Antiseptics and anti-microbial resistance	T Menge
1515 hrs	Infection control: Q & A session	R Nduati
1530 hrs	Next session begins	

Plenary

Session: Guided poster tour and exhibition booths
Venue: Marsabit and Oldonyo
Chair: Dr Enoch Omonge

Time	Activity	Presenter
1530 hrs	Guided poster tour	Team 1: G Revathi Team 2: P Gathura Team 3: R Nduati
1600 hrs	Exhibition booths and posters	All
1630 hrs	Tea at exhibition booths	All
1700 hrs	Exhibition booths and posters	All
1800 hrs	End of main event	All

Satellite evening symposium

Satellite symposium sponsored by Astra Zeneca

Sub theme: Antimicrobial use and resistance
Venue: Crystal ball room
Chair: Dr J A Aluoch
Co-chair: Dr Loice Achieng
Rapporteurs: Dr Syokau Ilovi & Dr George Otieno

Time	Activity	Presenter
1830 hrs	Welcome address	G Lule
1845 hrs	Expert speaker: Antibiotic use in private hospitals	C Mwachari
1905 hrs	Abstract presentation: A review of 40 years of enteric antimicrobial resistance research in Eastern Africa: What can be done better?	S Omulo
1920 hrs	Panel discussion	Kenya National Antimicrobial Stewardship Advisory Committee
2000 hrs	Gala dinner	
2130 hrs	End of day 1	

Abstracts – Oral presentations (Day 1)

Sub theme: Antibiotic use in animals

MAASAI HOUSEHOLDS IN NORTHERN TANZANIA HARBOR A HIGHER PREVALENCE OF ANTIBIOTIC RESISTANT *E. COLI* COMPARED WITH CHAGGA HOUSEHOLDS

Subbiah M[1], Caudell M[2], Quinlan R[1,2], Quinlan M[1,2], Mshanga D[1,3], Matthews L[4], Keyyu J[5], and Call D[1,6]

[1]Paul G Allen School for Global Animal Health, Washington State University, Pullman, USA; [2]Department of Anthropology, Washington State University, Pullman, USA; [3]Tanzania Veterinary Laboratory Agency, Arusha, Tanzania; [4]Institute of Biodiversity, Animal Health and Comparative Medicine, University of Glasgow, Glasgow, UK; [5]Tanzania Wildlife Research Institute, Arusha, Tanzania; [6]Nelson Mandela African Institute for Science and Technology, Arusha, Tanzania

Background: Antibiotic use is considered a primary reason for the emergence and spread of antibiotic resistance around the world. Our objective is to determine if veterinary antibiotics contribute to the prevalence of resistant enteric bacteria in Tanzania.

Methods: Socio-economic information and faecal samples (livestock, dogs, and human) from Maasai (pastoralists) and Chagga (agriculturalists) households in northern Tanzania were collected. Faecal E. coli isolates (n=32,400) were assessed for susceptibility using breakpoint assays (10 antibiotics). Associations were determined for the prevalence of tetracycline resistant E. coli and socio-economic factors of the ethnic groups.

Results: Maasai households (n=170) owned an average of 153 cattle and 186 sheep and goats and were self-reliant with respect to treating livestock disease. Injectable oxytetracycline was present in 58% of the interviewed households and this was the most commonly used antibiotic. Chagga households (n=100) owned far fewer livestock (avg. 1.4 cattle and 3.9 sheep and goats) and relied on private and government veterinary care. Maasai people harboured the highest prevalence of resistant bacteria. For example, 73.5% of isolates were resistant to tetracycline compared to 25.3% for Chagga. Maasai chickens and dogs also had a high prevalence of resistant E. coli but no known direct antibiotic exposure. In contrast, differences in tetracycline resistance between E. coli from Chagga and Maasai cattle (15.5% and 15.4%) and sheep and goats (12.1% and 23.8%) were less pronounced. A mixed-effects logistic regression demonstrated that consumption of unboiled milk is associated with antibiotic resistance among Maasai, but not Chagga households.

Conclusion: Widespread failure to follow recommended drug withdrawal times and a significant difference in daily milk consumption between Maasai and Chagga households (median 5 L/day vs. 1 L/day) may contribute to this difference. Access to human excreta may contribute to the high prevalence of resistant E. coli found in Maasai dogs and chickens.

Sub-theme: Methicillin Resistant Staphylococcus Aureus and Extended-Spectrum Beta-Lactamases

ANTIMICROBIAL RESISTANCE IN FEBRILE PATIENTS IN MULAGO HOSPITAL: A CALL FOR LABORATORY GUIDED TREATMENT DECISIONS

Ssekitoleko R, Kabugo C, Kajumbula H

College of Health Sciences, Makerere University

Background: Antimicrobial resistance is a commonly encountered problem in Mulago hospital and is propagated by the fact that antibiotic treatment is usually empirical and not guided by laboratory findings.

Methods: We assessed results from 02 studies conducted in Mulago Hospital. The first study involved positive blood culture results from 187 patients with febrile illness who presented to different wards in the period between August 2012 to July 2013. The second study involved positive results from 317 patients with febrile illness in the period between June 2013 through October 2014.

Results: Of the 504 positive isolates 83(16.5%) were Staphylococcus aureus while 68(13.5%) were E.coli.

Resistance was documented to commonly used antibiotics mostly Ampicillin, Cefuroxime, Ceftriaxone and Augmentin. However there was little resistance to Piperacin-Tazobactam, Imipenem/Meropen and Amikacin, although these drugs remain expensive in Uganda. Of the *Staphylococcus aureus* isolates 45% were MSSA and 55% were MRSA.

Conclusion: There is increasing Anti-microbial resistance to the commonly used antibiotics in Mulago national referral hospital. There is need to routinely perform culture and sensitivity tests on patient samples to guide antibiotic treatment regimens in this setting.

Sub-theme: Antimicrobial resistance

A REVIEW OF 40 YEARS OF ENTERIC ANTIMICROBIAL RESISTANCE RESEARCH IN EASTERN AFRICA: WHAT CAN BE DONE BETTER?

Omulo S[1], Thumbi S M[1,2] , Njenga M K[1,3], Call D R [1,4]
[1]Paul G. Allen School for Global Animal Health, Washington State University, Pullman, WA, USA; [2]Kenya Medical Research Institute/Centers for Disease Control (KEMRI/CDC), Kisumu, Kenya; [3]Kenya Medical Research Institute (KEMRI), Nairobi, Kenya; [4]Nelson Mandela African Institute for Science and Technology, Arusha, Tanzania

Background: Antimicrobial resistance is a global problem which, in the face of dwindling production of alternative antimicrobial therapies, threatens to revert us back to the pre-antibiotic era. In sub-Saharan Africa, infectious diseases have stoked the demand for antibiotics for preventive and treatment purposes. However, despite high disease burdens and their resultant health and economic consequences, limited data exist to quantify the contribution of different factors to the prevailing levels of antimicrobial resistance. Consequently, little is known about the effectiveness of existing control strategies or where to direct health resources to achieve maximum benefit.

Methods: We used the PRISMA 2009 guidelines to conduct a systematic review of studies on antibiotic-resistant enteric bacteria in Eastern Africa. We aimed to identify factors that contribute to the emergence, amplification, persistence and dissemination of antimicrobial resistance in humans and animals. We searched PubMed and Google Scholar databases and identified 2,155 probable articles from Kenya, Tanzania, Uganda, Ethiopia, Rwanda and Burundi, published between 1974 and 2013.

Results: 89 studies on humans and 28 on animals reporting resistance in *Salmonella, Shigella, Escherichia coli* and *Vibrio* sp. satisfied the inclusion criteria. Unlike animal studies, human studies were primarily (98%) based on hospital- rather than community-level sampling. Further, although high levels of antimicrobial resistance were reported, variations in documented methodologies and results precluded any conclusions we could reach about the magnitude and trends of antimicrobial resistance.

Conclusion: We, therefore, propose and discuss minimum reporting guidelines for the level of detail that must be provided for resistance studies to permit comparative inferences and inform future meta-analyses. We further advocate for more community-level studies to access populations with limited access to healthcare. These approaches if coupled with establishment of a robust regional surveillance network should, over time, build the pool of data required for evidence-based interventions aimed at controlling antimicrobial resistance.

Programme & Abstracts Friday 19 June 2015

Programme
Main event
Plenary

Venue: Crystal ball room
Chair: Dr Ian Njeru
Co-chair: Dr Marybeth Maritim
Rapporteur: Dr Fareena Ahamed

Time	Activity	Presenter
0800 hrs	Arrival and registration	W Karuoya/MMS/Ushers
0830 hrs	Overview of cholera outbreak in Kenya	Z Irura
0845 hrs	Abstract presentation: Risk Factors for the Current Cholera Outbreak: Case Control Study	A Wandeba

Parallel session: Track I

Sub theme: Disease surveillance
Venue: Ball room A
Chair: Dr Ian Njeru
Co-chair: Dr Marybeth Maritim
Rapporteur: Dr Fareena Ahamed

Time	Activity	Presenter
0900 hrs	Expert speaker: Polio Surveillance in Kenya	E Wafula
0920 hrs	Expert speaker: Measles Surveillance in Kenya	D Njai
0940 hrs	Expert speaker: WHONET AMR surveillance	Z Irura
1000 hrs	Abstract presentation: 2013 Polio Outbreak in Kenya & Somalia – Case of conflict in Polio eradication	K Juma
1010 hrs	Abstract presentation: Close monitoring of respiratory viruses in Kenyan households: Insights into respiratory syncytial virus (RSV) epidemiology and control	P K Munywoki
1020 hrs	Disease surveillance: Q & A session	I Njeru & M Maritim
1030 hrs	Tea at exhibition booths	

Parallel session: Track II

Track sponsored by MSD

Sub theme: Infections in the Immunocompromised host (adults)
Venue: Ball room B
Chair: Dr Enoch Omonge
Co-chair: Dr Michael Chung
Rapporteur: Dr Beryl Otieno

Time	Activity	Presenter
0900 hrs	Expert speaker: Infections in the immunocompromised HIV positive adult patient	S Ojoo
0940 hrs	Expert speaker: Infections in the immunocompromised HIV negative adult patient	B Gilliam
1020 hrs	Infections in the immunocompromised host (adults): Q&A session	E Omonge
1030 hrs	Tea at exhibition booths	

Parallel session: Track III

Sub theme: Sexually transmitted infections
Venue: Shaba
Chair: Professor Walter Jaoko
Co-chair: Professor Omu Anzala
Rapporteur: Dr Bhavna Chohan

Time	Activity	Presenter
0900 hrs	Expert speaker: Emerging STI resistance - Dr Linnet Masese	L Masese
0940 hrs	Expert speaker: Gonococcal Antimicrobial Surveillance Program (GASP) WHO in Kenya - Professor Omu Anzala	O Anzala
1020 hrs	STI: Q & A session	W Jaoko
1030 hrs	Tea at exhibition booths	

Parallel session: Track I

Sub theme: Tuberculosis and other mycobacteria
Venue: Ball room A
Chair: Dr Evans Amukoye
Co-chairs: Dr J Sitenei, Dr C Kabugo
Rapporteur: Dr Eugene Genga & Dr Shabbir Jivanjee

Time	Activity	Presenter
1100 hrs	Expert speaker: Devolving new technologies for diagnosis of tuberculosis and drug resistant tuberculosis within cross-border settings in East Africa: Experience from Kenya	W Githui

1120 hrs	Abstract presentation: Trends in testing for Mycobacterium Tuberculosis using the Xpert MTB/RIF in Nairobi county	C Mwachari
1130 hrs	Abstract presentation: Utility of Microscope Observation-Direct Susceptibility (MODS) Sputum Culture & PCR (Xpert®MTB/RIF) In Detection Of M. Tuberculosis In Kenyan Children	E Obimbo
1140 hrs	Abstract presentation: Determining the capability of sputum collection through induction for the diagnosis of tuberculosis in children in Kenya	J Oliwa
1150hrs	Abstract presentation: A retrospective study on the management of multi-drug resistant tuberculosis in Kenyatta National hospital for the period January to December 2013	M Ngigi
1200 hrs	TB and other mycobacteria: Q & A session	E Amukoye
1215 hrs	Abstract presentation: Prevalence and factors associated with failure in treatment completion or cure in Kenyan children with tuberculosis	D Marangu
1225 hrs	Abstract presentation: Spinal TB in KNH between 2013-2014	R Lucinde
1235 hrs	Abstract presentation: Non tuberculous mycobacterium in HIV infected children	P M Mwangi
1245 hrs	TB and other mycobacteria: Q & A session	E Amukoye
1300 hrs	Lunch	All

Parallel session: Track II

Track sponsored by MSD

Sub theme: Infections in new-borns
Venue: Ball room B
Chair: Professor Aggrey Wasunna
Co-chair: Dr Reson Marima
Rapporteur: Dr Fareena Ahamed & Dr K M Ndirangu

Time	Activity	Presenter
1100 hrs	Expert speaker: Neonatal immunology	A Wasunna
1115 hrs	Expert speaker: Challenges in diagnosing neonatal septicaemia	R Ochieng
1130 hrs	Expert speaker: Dilemnas in treatment of neonatal septicaemia	F Murila
1145 hrs	Abstract presentation: Bacterial spectrum in newborn babies presenting with necrotizing enterocolitis at Kenyatta National Hospital new-born unit	D Mbugua
1155 hrs	Infections in new-borns: Q & A session	A Wasunna & R Marima

Track sponsored by MSD

Sub theme: Infections in the immunocompromised host (paediatrics)
Venue: Ball room B
Chair: Professor D Wamalwa
Co-chair: Dr Joseph Mbuthia
Rapporteur: Dr Fareena Ahamed & Dr K M Ndirangu

Time	Activity	Presenter
1200 hrs	Expert speaker: Infections in the immunocompromised paediatric patient	P Njuguna
1220 hrs	Abstract presentation: Attenuated genotypic signatures during pneumococcal meningitis and HIV co-infection in children	B W Kulohoma
1230 hrs	Abstract presentation: Sustained responses to measles revaccination in HIV-infected children on ART in children	A Njoroge
1240 hrs	Abstract presentation: Comparison of long term Hepatitis B surface antibody levels and presence of Hepatitis B surface antigen in HIF infected and HIV negative Kenyan children following immunization with combined D.P.T.-HiB- Hepatitis B vaccine in infancy	J Mbuthia
1250 hrs	Infections in the immunocompromised host: Q & A session	D Wamalwa
1300 hrs	Lunch	All

Parallel session: Track III

Sub theme: Malaria
Venue: Shaba
Chair: Professor K M Bhatt
Co-chairs: Professor Damalie Nakanjako, Dr Emily Koech
Rapporteur: Sanaa S Said

Time	Activity	Presenter
1100 hrs	Expert speaker: Malaria	Z G Premji
1130 hrs	Expert speaker: Update on Malaria Epidemiology and Policy in Kenya	A Nyandigisi
1155 hrs	Expert speaker: Malaria Diagnostics	R Chunge
1220 hrs	Expert speaker: Malaria Vaccine	B Ogutu
1250 hrs	Malaria: Q & A session	K M Bhatt
1300 hrs	Lunch	All

Parallel session: Track I

Sub theme: Viral infections
Venue: Ball room A
Chairs: Prof Michael Chung
Co-chair: Dr Bhavna Chohan
Rapporteur: Dr Eugene Genga & Dr Shabbir Jivanjee

Time	Activity	Presenter
1400 hrs	Expert speaker: Insights into arbovirus disease emergence in Kenya - A cause for concern and options for control	R Sang
1420 hrs	Expert speaker: Drug resistance patterns amongst influenza viruses circulating in Kenya	W Bulimo
1430 hrs	Abstract presentation: Prevalence and correlates of Nevirapine (NVP) resistance in NVP unexposed HIV-1 infected infants initiating early Antiretroviral therapy	B Chohan
1440 hrs	Abstract presentation: Higher Risk of Pre-Treatment HIV Drug Resistance among Younger ART-Naïve Adults in Kenya	J Munyao
1450 hrs	Viral infections: Q & A session	M Chung
1500 hrs	Next session begins	

Parallel session: Track II

Sub theme: Surgical infections
Venue: Ball room B
Chair: Professor Joseph Oliech
Co-chair: Professor Omondi Ogutu
Rapporteur: Dr Marilynn Omondi-Mwanzia & Dr Susan Karanja-Ngugi

Time	Activity	Presenter
1400 hrs	Abstract presentation: Surgical site infection following emergency laparotomy for bowel surgery at Kenyatta National Hospital	S E Miima
1410 hrs	Abstract presentation: Surgical site infections mitigating tools, our current practice at Kijabe Hospital	J Barasa
1420 hrs	Abstract presentation: Craniotomy surgical site infections at the Kenyatta National Hospital	A H Njiru
1430 hrs	Abstract presentation: Antimicrobial prophylaxis for neurosurgical patients in low income countries: a systematic review	S Opanga
1440 hrs	Surgical infections: Q & A session	J Oliech & O Ogutu
1500 hrs	Next session begins	

Parallel session: Track III

Sub theme: Antimicrobial use and resistance
Venue: Shaba
Chairs: Professor Rodney Adam
Co-chair: Professor Titus Munyao
Rapporteur: Dr Beryl Otieno

Time	Activity	Presenter
1400 hrs	Expert speaker: Fungal infections	R Adam
1430 hrs	Abstract presentation: Candida auris fungemia	N Okinda
1440 hrs	Abstract presentation: Candida endocarditis	H Nabiswa
1450 hrs	Fungal infections: Q & A session	R Adam & T Munyao
1500 hrs	Next session begins	

Plenary

Sub theme: Emerging and re-emerging infections
Venue: Crystal ball room
Chair: Dr Kariuki Njenga
Co-chair: Dr Emily Koech
Rapporteur: Dr Marybeth Maritim & Dr Khalida Bulhan

Time	Activity	Presenter
1500 hrs	Expert speaker: Burden of Emerging Infectious Diseases (EIDs) in sub-Saharan Africa	K Njenga
1515 hrs	Kenya's Preparedness for EIDs	I Njeru
1530 hrs	Polio: How and Why it Re-emerged in Africa	K Sergon
1545 hrs	Recurrent Rift Valley Fever Outbreaks in Kenya: Hii Ni Yetu	P Munyua
1600 hrs	One Health Approach: The Silver Bullet against EIDs?	E Osoro
1615 hrs	Abstract presentation: A Surveillance Study on Tick and Tick-Borne Pathogen diversity in Shimba Hills National Reserve, Kenya	M Mwamuye
1625 hrs	Emerging and re-emerging infections: Q & A session	K Njenga & E Koech

Closing ceremony
Venue: Crystal ball room
Chairs: Professor Godfrey Lule
Rapporteurs: Dr Marybeth Maritim & Dr Beryl Otieno

Time	Activity	Presenter
1630 hrs	Vote of thanks	Professor Titus Munyao
1635 hrs	Closing remarks	Professor Isaac Kibwage, Principal, CHS, UoN
1650 hrs	Submission of evaluation forms	All
1700 hrs	Tea at exhibition booths and posters	All
1800 hrs	End of main event	All

Satellite evening symposium

Sponsored by Roche Limited Kenya.

Sub theme: Viral infections - Hepatitis
Venue: Crystal ball room
Chair: Professor Godfrey Lule & Dr Adam Sheikh
Rapporteurs: Dr Syokau Ilovi and Dr George Otieno

Time	Activity	Presenter
1800 hrs	Welcome address	G Lule
1820 hrs	Hepatitis surveillance data	J Tuei
1830 hrs	Expert speaker: New horizons in the management of hepatitis C	B Gilliam
1900 hrs	Expert speaker: Current advances in management of hepatitis B	E Ogutu
1915 hrs	Expert speaker: Managing Hepatitis B in children	A Laving
1930 hrs	Experience of managing hepatitis in Nigeria	A Akere
1945 hrs	Q & A session	G Lule & A Sheikh
2000 hrs	Gala dinner	All
2130 hrs	End of day 2	All

Abstracts – Oral presentations (Day 2)

Sub theme: Disease surveillance

RISK FACTORS FOR THE CURRENT CHOLERA OUTBREAK: CASE CONTROL STUDY

Oyugi E[1,2], Wandeba A[1,2], Omesa. E[1,2], Mwangi T[1,2], Kigen H[1,2], Muiruri J[1,2], Obonyo M[1,3], Onyango D[2], Boru W[1,2]

[1]Field Epidemiology and Laboratory Training Program, Nairobi, Kenya; [2]Ministry of Health, Kenya; [3]Ministry of Agriculture, Livestock and Fisheries, Kenya

Background: In February 2015, an outbreak of watery diarrhea was reported in two Sub-Counties in Western Kenya. *Vibrio Cholerae* 01; serotype Ogawa was isolated from 26 cases and from water samples collected from a river mainly used by residents of the two sub-counties for domestic purposes. We carried out an investigation to determine factors associated with the outbreak.

Methods: We conducted a community based frequency matched case control study. We defined cases as episodes of watery diarrhoea (at least three motions in 24 hours) in persons ≥ 2 years who were residents of Rongo or Ndhiwa Sub-Counties from January 23 - February 25, 2015. Cases were systematically recruited from a cholera line list and matched to two controls (persons without diarrhoea since January 23, 2015) by age category and residence. A structured questionnaire was administered to evaluate exposures in cases and controls and multivariable logistic regression done to determine independent factors associated with the outbreak. We reported adjusted odds ratios (aOR) and 95% confidence intervals (CI) for variables with p-values ≤ 0.05.

Results: We recruited 52 cases and 104 controls. Females constituted 61% (95/156) of all participants. Overall latrine coverage was 58% (90/156). Latrine coverage was 44% (23/52) for cases and 64% (67/104) for controls. Having no latrine at home (aOR=10.9; 95% CI: 3.02-39.21), practicing communal hand washing in a basin (aOR=6.5; 95% CI: 2.30-18.11) and vending of food as an occupation (aOR=3.4; 95% CI: 1.06-10.74) were independently associated with the outbreak.

Conclusions: Poor latrine coverage and personal hygiene practices were identified as the main drivers of the outbreak. We recommended improved public health education on latrine usage and promotion of hand washing with soap and water in the community.

2013 POLIO OUTBREAK IN KENYA & SOMALIA – CASE OF CONFLICT IN POLIO ERADICATION

Kenneth J

Aga Khan University Hospital, Nairobi/University of Buea, Cameroon

Background: In 1988, a global initiative to eradicate polio by 2000 was adopted by the WHA. More than two decades later, poliovirus type 2 has been eradicated and polio incidence reduced by 99%. Concerns are mounting that ongoing conflicts and insecurity situations are undermining polio eradication efforts. There have been several cases of transfer of the virus from endemic countries to these conflict afflicted initially polio free regions. This study analyzed the latest polio outbreak in the HOA (Somalia/Kenya) and identified possible risk factors to the epidemic and mitigation measures.

Methods: This was a retrospective epidemiological study of the Polio outbreak in Somalia and Kenya in 2013: Secondary data sources from WHO Somalia, IMB Piracy Reporting Centre, UNHCR Somalia and Kenya offices and CDC Reports were used.

Results: A total of 208 cases were recorded from Somalia and Kenya by December, 2013. Genetic sequence analysis indicated close relation with virus circulating in West Africa. South and central Somalia, and Northern parts of Kenya were most affected. The <5 children and males were more

affected in all regions. 55% had zero OPV doses while a few had more than 3 doses of OPV. There was a relationship between age and the number of doses taken. Conflict, insecurity, population displacement and low immunity profile were considered to have influenced the occurrence, magnitude & response to the outbreak.

Conclusions: A key policy imperative has been to develop strategies for optimizing polio prevention and eradication activities within insecure/conflict settings. Surveillance gaps and breakdown of routine EPI framework is a key challenge. Partnerships with parents, systematic negotiations for tranquillity, sufficient funding, coordination, border point vaccinations, monitoring and integration of polio vaccination into existing programs are options for control of the poliovirus and mitigating the effects of insecurity.

Abbreviations: WHA - World Health Assembly; HOA- Horn of Africa; OPV – Oral Poliovirus Vaccine; EPI – Expanded Program on Immunization

CLOSE MONITORING OF RESPIRATORY VIRUSES IN KENYAN HOUSEHOLDS: INSIGHTS INTO RESPIRATORY SYNCYTIAL VIRUS (RSV) EPIDEMIOLOGY AND CONTROL

Munywoki P.K.[1]; Agoti C. N.[1]; Bett A[1]; Cane P.A.[2]; Medley G.F[3]; Nokes D.J.[1, 4]
[1]KEMRI - Wellcome Trust Research Programme, CGMR-C, Kilifi, Kenya; [2]Public Health of England, London, UK; [3]London School of Hygiene and Tropical Medicine, London, UK; [4]School of Life Sciences and WIDER, University of Warwick, Coventry, UK

Background: The major burden of severe respiratory syncytial virus (RSV) disease occurs during the first 6 months of life. Vaccine development for direct protection in this age group faces substantial obstacles. Targeting older individuals, such as household siblings and mothers, might indirectly prevent early infant infection. Assessing the potential of such a strategy requires improved knowledge of the RSV epidemiology.

Methods: We undertook a prospective study in rural Kenya with planned recruitment of 50 households each with a child born after the preceding RSV epidemic and at least one elder sibling. Throughout an RSV epidemic a nasopharyngeal swab (NPS) was collected every 3–4 days irrespective of symptoms, from all household members, and tested for RSV, and other respiratory viruses using multiplex real time PCR. Partial and whole genome sequencing was used to compare virus strains.

Results: From 493 participants in 47 households a total of 16,928 NPS were collected, representing 82.3% of planned. RSV was detected in 40 (85.1%) households and 179 (36.3%) participants. Twenty-eight study infants were infected with 24 (85.7%) being linked with spread of the virus in the household. The study infants acquired infection from within (15, 54%) and from outside (9, 32%) the household. In 4 households the source of infant infection was inconclusive. Older children were primary cases for 11 of the 28 (39%) infant cases, and 10 (91%) of these were attending school. A total of 205 RSV infection episodes were detected in 179 individuals. The infection data were interval censored and assuming a random event time between observations, the average duration of virus shedding was 11.2 (95% CI, 10.1 – 12.3) days.

Conclusions: We demonstrate that older children, particularly school going, are frequent introducers of RSV into households that lead to infant infection. The shedding durations were higher than previously reports based on immunofluorescence antigen detection or viral culture (3.9- 7.4 days), were shown to be strongly associated with age, severity of infection, and revealed potential interaction with other respiratory viruses. These findings are key to our understanding of the spread of this important virus and are relevant in the design of control programmes.

Sub theme: Tuberculosis and other mycobacteria

TRENDS IN TESTING FOR MYCOBACTERIUM TUBERCULOSIS USING THE XPERT MTB/RIF IN NAIROBI COUNTY

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Background: Only 66% incident TB cases were reported in 2011. Xpert MTB Rif was introduced in December 2010 to allow for simultaneous detection of TB and rifampicin resistance in less than two hours. This suboptimal detection of TB was due to challenges in low sensitivity of sputum smear microscopy, inadequate infrastructure, biosafety and human resources to conduct TB culture and drug susceptibility testing.

Objective: To assess the outcome of introducing the Xpert MTB RIF to support diagnosis of TB in a primary care setting

Methods: In January 2013 the two four module Xpert MTB/RIF machines were introduced in Mathari Teaching and Referral Hospital Laboratory (MHL) with support from the University of Maryland's CDC/PEPFAR-funded Partnership for Advanced Care and Treatment program. Five laboratory specialists were trained. Clinicians in 38 primary health facilities in Nairobi County were sensitized on the availability of the equipment and the Ministry of Health's recommendation for the use of MTB/RIF testing for TB diagnosis in patients with TB relapse on retreatment and among HIV-infected patients. Beginning February 2013 sputum samples of patients eligible for Xpert MTB/RIF assay were networked to MHL for testing and results sent back to clinicians by telephone text messages.

Results: Between February 2013 and March 2015, a total of 2219 sputum samples from 38 healthcare facilities were assessed for MTB and rifampicin resistance using the Xpert MTB/RIF with an average turn-around time for results, of seven days. Of these, 780 (35%) were positive for MTB; of which 22 (2.8%) were resistant to rifampicin. Refer to the outcomes in the Table below.

Conclusion: The findings of this study demonstrate successful networking of sputum from peripheral sites, scaling up of detection of TB and rifampicin resistance for screening of TB suspects, improved access to TB diagnosis and identification of potential MDRTB in patients with relapse and smear negative disease. However, there is need to improve medical documentation, time to result to optimize Xpert MTB/RIF system as a point of care test.

UTILITY OF MICROSCOPE OBSERVATION-DIRECT SUSCEPTIBILITY (MODS) SPUTUM CULTURE & PCR (XPERT®MTB/RIF) IN DETECTION OF M. TUBERCULOSIS IN KENYAN CHILDREN

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Background: Timely diagnosis of tuberculosis (TB) in children is challenging due to similarity in clinical presentation to common childhood illnesses, and paucibacillary disease with low sensitivity of sputum microscopy and slow current *Mycobacterium tuberculosis* (MTb) culture methods. Two tests that provide rapid antigenic confirmation as well as drug susceptibility characteristics of MTb have recently been endorsed by the WHO - TB polymerase chain reaction assay (Xpert®MTB/RIF Cepheid SAS) (Xpert) and the Microscope Observation-Direct Susceptibility (MODS) culture assay, however there is minimal experience of these in African children. We piloted the use of Xpert and MODS and compared their diagnostic yield in children with suspected pulmonary TB (PTB) at two public hospitals in Nairobi.

Methods: Children age 2mth to 14yr with suspected PTB whose parents consented were eligible. Children on current or recent anti-TB treatment, or with severe illness (oxygen saturation <90%) unable to tolerate sputum induction were excluded. Children were assessed for contact history, suggestive TB symptoms and signs, tuberculin test, chest radiograph, and 2 sputa specimens were collected ≥4 hrs apart by induction or self-expectoration (older children). Samples were evaluated using MODS Xpert, & acid-fast bacilli (AFB) microscopy.

Results: We enrolled 79 children, 60.8% were female, of median age 2.2 years [IQR 0.9-6.3]), and 13.9% were HIV positive. All 79 children gave a 1st sputum sample, and 57 a 2nd sample. 1st sample results: 2 AFB positive (+), 5 MODS+, and 6 Xpert+; 2nd sputum revealed 2 AFB+, 2 MODS+ and 4 Xpert+. Combining all 136 sample there were 4 (2.9%) AFB+; 7 (5.1%) MODS+, and 10 (7.3%) Xpert+, with overall confirmed TB in 6 (7.5%) children. MTb growth was detected in 5 positive MODs cultures on day 5 (n=3), day 10 (n=1) and day 11 (n=1), giving median time to detection of 5 days, and all were rifampicin & isoniazid susceptible; all Xpert+ samples were rifampicin susceptible. Overall agreement between MODS and Xpert was 96.3% (95% CI 91.6-98.8). Sensitivity and specificity of Xpert was 85.7% (42.1-99.6) and 96.9% (92.3-99.1) respectively using MODS as gold standard (table 1).

Conclusions: Xpert compared favourably to MODS in detection of MTb in child sputum, both provided drug susceptibility profile, and culture time to detection was short. Both assays are a valuable rapid diagnostic option for PTB confirmation in children in the African setting.

DETERMINING THE CAPABILITY OF SPUTUM COLLECTION THROUGH INDUCTION FOR THE DIAGNOSIS OF TUBERCULOSIS IN CHILDREN IN KENYA

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Background: The diagnosis of pulmonary tuberculosis (PTB) in children is challenging. Clinical diagnostic specimens are rarely obtained due to failure to collect good quality sputum. Induced sputum has been recently suggested to aid diagnosis. The procedure is not widely adopted in Kenya due to concerns for infection control and limited experience. Our main aim was to pilot and describe sputum collection by induction among children in our facilities, documenting quality of samples, safety and tolerability of the procedure.

Design/Methods: Children aged 2mths to 14yrs with suspected TB at Kenyatta National Hospital (tertiary level) and Mbagathi District Hospital (secondary level) whose parents consented were enrolled between March to December 2013. Children on current or recent ant-TB treatment were excluded, as well as those with severe respiratory distress unable to tolerate the procedure. Pre-treatment was with nebulised salbutamol followed by hypertonic saline; thereafter sputum was removed by nasopharyngeal catheter aspiration into a mucous trap or coughed out into a sputum container. A second sputum sample was obtained within four hours.

Results: Median age of the 79 children enrolled was 2.2 yrs (IQR 0.9-6.3), 70.9% were ≤ 5 yrs; 48 (60.8%) were female; median Weight-for-Height Z (WHZ) score was -2.1 SD (IQR -2.9 to -0.6 SD). The most common clinical presentation was fever in 58 (73.4%). A first sputum sample was successfully obtained in all 79 children, and a second sputum sample in 57 (total 136 samples), of which 20 (14.7%) were self-expectorated and 95 induced sputum (69.9%) samples. Children who successfully self-expectorated without induction were older than 4.3 yrs. Of the 79 first sputum samples 70 (88.6%) were of good quality and were successfully cultured with an additional four successful cultures obtained after second sample collection yielding an overall success rate in 74 out of 79 (93.8%) children. Reasons for poor quality samples included presence of food particles (n=2); presence of blood (n=3); or insufficient quantity (n=1). No major complications occurred during sputum induction. Minor events reported included slight nasal bleeding and coughing.

Conclusion: Sputum induction was feasible, safe and well tolerated among children in this high volume resource-limited public hospital setting, and provides a valuable approach to sputum collection to enhance confirmation of pulmonary tuberculosis even in young children.

A RETROSPECTIVE STUDY ON THE MANAGEMENT OF MULTI-DRUG RESISTANT TUBERCULOSIS IN KENYATTA NATIONAL HOSPITAL FOR THE PERIOD JANUARY 2013-DECEMBER 2013

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Background: The emergence of Multidrug-resistant Tuberculosis (MDR-TB) in Kenya has implications both on the resources as well as on the overall effort to eradicate tuberculosis. Patients with these strains have a poor prognosis and are likely to retransmit. In resource-limited settings like Kenya, adequate and rigorous management of MDR-TB is imperative. However, data on management patterns and clinical outcomes of MDR-TB remains scarce.

Methodology: A retrospective, descriptive hospital-based cross-sectional study. The study subjects were patients diagnosed and admitted at KNH with MDR-TB from January 2013-December 2013.

Results: Twenty patient files were studied, 12(60%) were males. The mean age of the participants was 29 years. There were 8 (47.1%) and 9 (52.9%) HIV seropositive and HIV seronegative patients respectively. While 84% of patients were resistant to three drugs or less. Upon confirmation of multidrug-resistance, patients were started on a standardized six drug regimen. Out of the 20 cases, four (20%) died, six (30%) were transferred out to other locations, four (20%) were cured, one (5%) completed treatment but had not yet been declared cured while five (25%) of the patients were still on treatment. Three out of the four (75%) patients that died were HIV positive and died within four months of beginning treatment for MDR TB. The cure rate among those who completed treatment was 44 %(4 out of 9).

Conclusions: Management of MDR-TB in KNH was seen to comply with WHO recommendations, national guidelines and international best practice. It is therefore viable to continue the use of the standardized regimen for the management of MDR-TB in KNH. Keen monitoring for adverse drug reactions and their early management is important to improve adherence as well as reduce the risk of progression of these reactions to fatality.

PREVALENCE AND FACTORS ASSOCIATED WITH FAILURE TO ACHIEVE TREATMENT SUCCESS IN KENYAN CHILDREN WITH TUBERCULOSIS IN 2013

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Background and Objective: We sought to determine the prevalence and factors associated with failure to achieve treatment success in Kenyan children with tuberculosis (TB) to allow for prioritization of resources and optimization of paediatric TB care.

Methods: Data records of children with TB were imported from the national web-based surveillance system (TIBU) for the year 2013, de-identified and analyzed in a cross-sectional study. Treatment success was defined as the sum of cured and treatment completed. Failure to achieve treatment success included treatment failure, death, loss to follow-up and not evaluated. Independent factors associated with failure to achieve treatment success were analyzed in a generalized linear model in STATA 13.1.

Results: A total of 9,360 records of pediatric TB patients with a median age 6 years [IQR 2-11] were analyzed. Of these, 979 did not achieve treatment success giving a prevalence of 10.5% (95% CI 9.83-11.08). Age < 5 years (PR= 1.67 [95% CI 1.25-2.25] p=0.001) and a positive HIV status (PR= 2.01 [95% CI 1.59-2.56] p<0.001) were independent factors associated with failure to achieve treatment success when adjusted for patient sex, type of tuberculosis, sputum smear status and type of health sector.

Conclusion: One in 10 children with tuberculosis enrolled into the Kenya TB Program do not achieve treatment success. Targeted care for children under 5 years and those who are HIV-TB co-infected may improve treatment success in the Kenya TB Control Program.

SPINAL TUBERCULOSIS IN KENYATTA NATIONAL HOSPITAL BETWEEN 2013 - 2014 (SEPTEMBER)

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Background: Spinal tuberculosis is destructive and disabling. It accounts for approximately 50% of all cases of musculoskeletal tuberculosis, 15 % of extra pulmonary tuberculosis and 2% of all cases of tuberculosis. This study aimed to assess the disease status in Kenyatta National Hospital orthopaedic wards to patch an existing statistical gap and thus influence management and disease outcome.

Methods: Following identification of diagnosis in the admissions register, patients' files were retrieved and reviewed for sociodemographic, morbidity and mortality patterns. Ethical clearance was granted from the required hospital's authority.

Results: More males presented to hospital in 2013 (23) than in 2014 (10). The fatalities were higher in 2014(10) with an equal sex distribution compared to 2013 (6) of whom the majority were male. The mean age group at presentation was the fourth decade(31-40 years). The common presentations were back pain and progressive lower limb weakness leading to paraplegia. The lower thoracic vertebrae are involved more than the upper lumbar vertebrae. The common complications were: hyper kyphosis(most common), abscess formation, spinal cord compression, spinal canal stenosis and myelomalacia (least common).

Conclusion: Spinal tuberculosis is presenting more commonly in our set up and sensitization is required. As such, we are in the process of carrying out a larger retrospective study of all alive and deceased patients admitted to the hospital from 2000-2014 to acquire more data for facilitation of more evidence.

NONTUBERCULOUS MYCOBACTERIUM IN HIV INFECTED CHILDREN

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Introduction: *Mycobacterium avium* complex was the second most common opportunistic infection in HIV infected children after *pneumocystis jirovecci* pneumonia in the pre- combination antiretroviral therapy era. Incidence has greatly reduced from 1.3 to 1.8 episodes per 100 person years during that time to 0.14 to 0.2 episodes per 100 person years during the combination antiretroviral therapy era.

Purpose: To report the occurrence of mycobacterium avium in HIV infected children, to evaluate its diagnosis and management.

Methods: This is a retrospective case series of two HIV infected children who were diagnosed and managed for mycobacterium avium complex. The patients had CD4 counts below 50. One of the patients was admitted in Kenyatta National Hospital and the other in a private pediatric hospital.

Results: The patients responded well to treatment based on resolution of symptoms. The patients are on follow up in the comprehensive care clinic.

Conclusion: Nontuberculous mycobacterium is a possible diagnosis in severely immunosuppressed children. Diagnosis requires a high index of suspicion and management requires multiple drugs. Secondary prophylaxis may be required in children with a history of disseminated mycobacterium avium complex and continued immunosuppression.

Sub theme: Infections in the new-born

BACTERIAL SPECTRUM IN NEWBORN BABIES PRESENTING WITH NECROTIZING ENTEROCOLITIS AT KENYATTA NATIONAL HOSPITAL NEWBORN UNIT

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Background: Necrotizing enterocolitis (NEC) is the most common life-threatening emergency of the gastrointestinal tract in the new-born period with a mortality rate of 20-50% in developed country settings. In contrast a study done 30 years ago in Kenya showed a prevalence of 13.3% of new-borns and a mortality of 100%. Mainstay of management is systemic broad spectrum antibiotics. Objectives: The main objective was to determine the bacteria associated with NEC and the antibiotic sensitivity patterns among infants admitted into the New-born Unit at the Kenyatta National Hospital and to describe the demographic and clinical profile as well as the short term outcomes.

Methods: The study was conducted in the new-born unit of Kenyatta National Hospital. New-borns with clinical features NEC were enrolled after obtaining informed consent from their mothers. Mothers of the study patients were interviewed and their clinical records reviewed to collect demographic data and clinical history using a standard tool. The babies were examined to ascertain the clinical features as defined by Bell's modified staging Samples of blood, urine, gastric aspirates and cerebrospinal fluid were collected and sent for microbiological cultures and antibiotic sensitivity testing of the positive cultures.

Results: Forty-eight neonates with features suggestive of NEC were studied from June to December 2011. Positive cultures were obtained in all 48 neonates. A total of 87 isolates were obtained, 61% from blood cultures, 33% from gastric aspirates and 6% from urine cultures. Eleven different organisms were isolated, the commonest being *Enterobacter* species (33% of total isolates), followed by Citrobacter (20%) and *Coagulase negative staphylococcus (10%). Candida species* formed 8% of the total isolates. The isolated organisms had significant resistance to penicillins as well as 2nd and 3rd generation cephalosporins. Mortality was high at 75 % of all the new-borns with NEC.

Conclusions: The most frequently isolated bacteria in new-borns with NEC at KNH New born unit are gram negative enteric bacteria, the commonest being *Enterobacter.* There is significant resistance to tradition 1st and 2nd line antibiotics (ampicillin, gentamicin, 2nd and 3rd generation cephalosporin. There is a need to revise antibiotic protocols for babies in the NBU and to consider antifungal coverage in sick babies not responding to the appropriate antibiotics.

Sub theme: Infections in the immunocompromised host (paediatrics)

ATTENUATED GENOTYPIC SIGNATURES DURING PNEUMOCOCCAL MENINGITIS AND HIV CO-INFECTION IN CHILDREN

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Background: Invasive pneumococcal disease (IPD), caused by Streptococcus pneumoniae, is a leading cause of pneumonia, meningitis and septicaemia worldwide. Morbidity and mortality in pneumococcal meningitis are significantly increased among children with underlying HIV infection. We hypothesised that peripheral blood expression profiles from HIV-infected and HIV-uninfected children with pneumococcal meningitis would provide a more detailed perspective of the host inflammatory response in pneumococcal meningitis.

Methods: We used the human genome HGU133A array (Affymetrix, High Wycombe, UK) containing 14500 well-characterised human genes to explore differences in gene expression between HIV-infected and uninfected children with pneumococcal meningitis (n=12) and matched HIV-uninfected control (n=3) samples, and validated gene expression profiles for 26 genes using real time qPCR in an independent set of cases and controls.

Results: Irrespective of underlying HIV infection, cases showed increased expression in genes regulating the innate immune response, leucocyte migration, glucose homeostasis and endothelial cell migration, and regulated expression of apoptotic genes. Pathways required for arginine metabolism, glucocorticoid receptor signalling and leukocyte extravasation were up-regulated in both HIV-infected and HIV-uninfected cases. The following pathways were only activated in HIV-uninfected cases: Toll-like receptor signalling, iNOS signalling, dendritic maturation, granzyme A signalling, pyruvate fermentation to lactate, acetate conversion to acetyl-CoA and glycogen metabolism. Validation of expression for 26 genes by qPCR, confirmed significantly increased relative expression in cases compared to controls.

Conclusion: To our knowledge, this first study of human transcriptome data in pneumococcal meningitis demonstrates a less pronounced host immune response and less activation of IPD response pathways in HIV-infected individuals.

SUSTAINED RESPONSES TO MEASLES REVACCINATION IN HIV-INFECTED CHILDREN ON ART IN KENYA

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Background: Despite recent advances in reducing measles incidence in Africa, a number of measles outbreaks have occurred in countries with high HIV prevalence. This study was conducted to determine the effectiveness of measles revaccination in HIV-infected children on ART.

Methods: In this prospective cohort study, HIV-infected children 15 months to 12 years of age on ART in Nairobi, Kenya received an additional measles vaccine. Questionnaires, physical examinations, and blood draws were completed at enrolment, one, 12, and 24 months after measles revaccination. Measles antibody concentrations were determined by enzyme-linked immunosorbent assay (ELISA) at all time points.

Results: Of 232 enrolled children, 228 (98%) had received at least 1 measles vaccine before 1 year of age. There were 123 (53%) males, median age was 7.5 years (interquartile range (IQR): 5.5–9.5), and median CD4% was 32 [IQR: 27–38]. At enrolment, 52 (23%) of 231 children had an HIV viral

load ≥1,000 copies/mL. Before revaccination, 125 (54%) of 232 study participants had protective levels of measles antibody. Seropositivity was observed in 216/220 (98%) at one month, 158/224 (70%) at 12 months and 128/212(60%) at 24 months post revaccination. Seroconversion among those seronegative at enrolment was 37% at 12 months and 27% at 24 months post revaccination. In this group, children with an HIV viral load ≥1000 copies/mL at enrolment were 91% less likely to seroconvert compared to those with undetectable levels (RR=0.09, 95% CI 0.01 – 0.65, p=0.017). Time on ART, age, gender, CD4%, height-for-age z-score, and vitamin A status at enrolment were not significantly associated with seroconversion at 24 months.

Conclusion: Measles revaccination conferred short-term sustained antibody response in HIV-infected children receiving ART, particularly those who had suppressed levels of HIV virus. Periodic measles revaccination of HIV-infected children on ART may be necessary to confer long-term immunologic memory.

COMPARISON OF LONG TERM HEPATITIS B SURFACE ANTIBODY LEVELS AND PRESENCE OF HEPATITIS B SURFACE ANTIGEN IN HIV INFECTED AND HIV NEGATIVE KENYAN CHILDREN FOLLOWING IMMUNIZATION WITH COMBINED D.P.T.- HiB - HEPATITIS B VACCINE IN INFANCY

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Background: Children with HIV have been reported to show poor response to immunization. Not only do they have poor primary immune response to vaccines but the immunity also wanes more rapidly compared to healthy children. Most HIV infected children have been reported to have levels of anti-hepatitis B surface antigen (anti-HBs) less than 10 mIU/L. Anti-HBs levels above 10mIU/L are considered to be protective against hepatitis B virus infection.

Methods and Results: This cross sectional controlled study found protective anti-HBs in only 35/191 (18%) of HIV positive children aged 4 months to 14 years as opposed to 254/345 (74%) in healthy controls. The difference in the two groups was statistically significant with a p-value <0.0001.

Children without protective anti-HBs in the HIV positive children were more likely to have severe immune suppression. They were also older and likely to have been on ART for a longer duration compared with those who had protective anti-HBs.

Hepatitis B surface antigen (HBsAg) was found in 2.5% of HIV infected children in comparison to 6% of controls.

Conclusion: These results suggest the need for a specific Hepatitis B immunization program for HIV positive children.

Sub theme: Viral infections

PREVALENCE AND CORRELATES OF NEVIRAPINE (NVP) RESISTANCE IN NVP UNEXPOSED HIV-1 INFECTED INFANTS INITIATING EARLY ANTIRETROVIRAL THERAPY

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Background: Nevirapine-based antiretroviral therapy (NVP-ART) is commonly used in resource-limited settings for treatment of NVP unexposed HIV-infected infants. However, the frequency of

resistance and impact of the resistance on viral suppression in this group of infants initiating early ART, have not been well-characterized.

Methods: To address this, we determined serial prevalence of NVP resistance during 12 months of ART among NVP-unexposed HIV-infected infants, enrolled in a clinical trial and initiated on NVP-ART, and determined effect of NVP resistance on viral levels.

Results: Of 99 infants screened, 42 had no reported NVP exposure, and 22 infants with no baseline NVP resistance were initiated on NVP-ART. During follow-up, 7 infants (32%) developed-resistance, 1 infant at 3 months, and 6 at 6 months after ART initiation. HIV-1 RNA levels were similar at baseline among infants who developed resistance and those who did not (P=0.3). There was a trend for reduced viral suppression at 3 months of ART in infants with resistance than in those without (P=0.14) and after 6 and 12 months of ART, viral levels were significantly higher in infants with resistance than those without (P=0.007, P=0.014, respectively).

Conclusion: Among infants without previous exposure to NVP development of NVP resistance was frequent, and presence of resistant mutations in these infants was significantly associated with less viral suppression during the first year of ART. High prevalence of NVP-resistance during ART despite lack of NVP exposure may be due to higher baseline viral levels and longer viremia in infants following ART in contrast to adults. Development of NVP resistance may, in part, explain superiority of Protease inhibitor-based ART in infants

HIGHER RISK OF PRE-TREATMENT HIV DRUG RESISTANCE AMONG YOUNGER ART-NAÏVE ADULTS IN KENYA

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Background: Eligible HIV-positive patients in Kenya are initiated on non-nucleoside reverse transcriptase inhibitors (NNRTI)-based antiretroviral therapy (ART) as first-line treatment. Drug resistance testing prior to ART initiation is not standard of care in this setting and research has shown that the prevalence of NNRTI pre-treatment drug resistance is increasing. This analysis investigates demographic correlates of pre-treatment resistant HIV among ART-naïve patients initiating therapy at three urban and rural clinic sites throughout Kenya.

Methods: From May 2013 through November 2014, 991 HIV-seropositive, ART-eligible adults were enrolled in a randomized clinical trial evaluating pre-treatment HIV resistance testing at three clinic sites in Kenya: two in Nairobi (urban) and one in Maseno (rural). Enrolled subjects completed a survey and had blood collected for resistance testing using an oligonucleotide ligation assay (OLA) that detected mutations at four pol codons conferring high-level resistance to NNRTI (K103N, Y181C, and G190A) and 3TC (M184V). Subjects were excluded from this analysis if they had any previous ART exposure or were less than 18 years old. Pre-treatment drug resistance was defined as a binary outcome (any mutant codon detected ≥2%). Univariable and multivariable Poisson regression with robust variance was used to calculate risk ratios for pre-treatment drug resistance by several potential correlates including gender, age, study site location, partnership, education, employment, and housing.

Results: 838 ART-naïve adults were included in this analysis. 62% were female, the mean age was 40 years old (median, 38 years; range, 18-85 years), and 103 (12.3%) had pre-treatment drug resistance detected at baseline. Resistance was detected in 12%, 15%, and 13% of patients at the Nairobi Ngong Road (n=578), Nairobi Industrial Area (n=79), and Maseno (n=181) study sites, respectively. Of the 103 participants with resistance, 93% had resistance to NNRTIs (69% had mutation detected at K103N, 24% at Y181C, 15% at G190A), and 22% had resistance to 3TC (M184V).

For every 5-year decrease in age, the risk of pre-treatment resistance significantly increased by a factor of 11% [95% Confidence Interval (CI) = 1%, 23%; p=0.037]. This association remained similar in multivariable analysis adjusting for gender and study site location [Relative Risk (RR), 10%; 95% CI, 0%, 21%; p=0.060], though was not statistically significant. Pre-treatment HIV drug resistance among ART-naïve adults was not significantly associated with location, gender, education, employment, or housing. However, when stratifying by gender, for every 5-year decrease in age, the risk of pre-treatment resistance among females significantly increased by a factor of 18% [95% CI= 5%, 33%; p=0.007]. Younger age was not associated with pre-treatment resistance among males (risk ratio=0.97; 95% CI= 0.82, 1.13; p= 0.673).

Conclusion: Younger age was significantly correlated with an increased risk of pre-treatment HIV drug resistance among ART-naïve adults in Kenya. The association was only evident among females, and age was not correlated with pre-treatment drug resistance among males. Younger Kenyan females may be at higher risk of infection by drug resistant HIV compared to older women and males of all ages. This may be due to more recent HIV infection in the younger population of women, and/or their HIV-infected partners are more likely to have drug resistant virus. Older and male Kenyans may have been infected longer ago when HIV resistance was less prevalent. It is also possible that younger women in our study differentially misreported their previous ART exposure and developed acquired resistance. These results may help identify those most at risk for treatment failure at ART initiation due to pre-treatment drug resistance.

Sub theme: Surgical infections

SURGICAL SITE INFECTION FOLLOWING EMERGENCY LAPAROTOMY FOR BOWEL SURGERY AT KENYATTA NATIONAL HOSPITAL

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Background: Emergency laparotomy is commonly performed at Kenyatta National Hospital (KNH) and surgical site infection is a known complication whose incidence is not documented. This study determined incidence of SSI, patient co morbidity and microbial profile.

Methods: A cross sectional study where one hundred and twenty (120) patients were recruited preoperatively, comorbid conditions and American society of anaesthesiologist (ASA) score level were determined. Operative procedure and duration, wound contamination, blood transfusion and duration of antibiotic use were documented. Wounds were assessed and samples in established infection obtained and analysed. Data collected was analysed, p-value of 0.05 was significant.

Results: SSI incidence was 30.8, where mean age was 35.48 years, majority being male (76.7%). Higher incidence of SSI was associated with alcohol and cigarettes use (figure1), dirty wounds (figure 2), prolonged antibiotic therapy (figure 3), perioperative transfusion (figure 4) and ASA score of one (1).

Single bacterial infection was 84.8% with the *Escherichia coli* (48.6%) the commonest isolate figure 5. poly microbial infections with dual isolates were *(Escherichia coli and Klebsiella pneumonia, Escherichia coli and Proteus mirabilis, Streptococcus pyogenes and Candida albicans).*

Conclusion: Public health education on harmful effects of alcohol and cigarette use should be done. Judicial use of blood products and appropriate use of antibiotic therapy based on established guidelines should be emphasised. SSI surveillance and analytical studies examining risk factors could identify predictors of SSI in our set up.

SURGICAL SITE INFECTIONS MITIGATING TOOLS, OUR CURRENT PRACTICE AT KIJABE HOSPITAL

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Background: The aim of this study was to assess the current practices in our institution in relation to surgical site infections (SSI) by observing six practices that are known to reduce SSI rates. These were patient pre-operative bathing, pre-operative shaving, surgical hand preparation, patient skin preparation, antibiotic prophylaxis and theatre discipline.

Methods: A total of 406 patients(138 males and 268 females) undergoing open surgery between February 2014 and August 2014 were prospectively but randomly enrolled and followed-up for thirty days after surgery. The above practices were observed for each patient with the primary end point being presence or absence of SSI within the thirty day follow-up period. Any other complications arising during the same period were also noted.

Results: SSI occurred in 38 patients (9.4%) with the majority being superficial. 99% of the patients had a pre-operative bath while 25% had perioperative hair removal with a razor. About 92% of the patients received prophylactic antibiotics; amongst these, 51% continued to receive postoperative antibiotics. The mean hand washing time for the surgeons was 69 seconds. All the patients had their skin preparation done using an iodine based solution (betadine). The average door opening per theatre case was 52.

Conclusion: The current surgical unit practices to mitigate SSIs are deficient. A subsequent study involving the introduction of evidence based tools to improve our patient outcomes will be carried out by the authors to see their impact within our environment.

CRANIOTOMY SURGICAL SITE INFECTIONS AT THE KENYATTA NATIONAL HOSPITAL

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Background: Surgical site infections (SSI) requiring immediate attention are a major problem for many neurosurgical patients undergoing craniotomies and their presence leads to increased morbidity and mortality.

Methods: This was a prospective observational study carried out on all patients done craniotomies in the neurosurgical ward of Kenyatta National Hospital from June 2014 to March 2015.
SSI were identified according to the Center for Disease Control and Prevention (CDC) criteria, specimens inoculated on culture media, isolates identified and antimicrobial sensitivity patterns determined.

Results: Eighty patients were recruited. Male to female ratio was 4.6:5.8. Six SSI were identified presenting an infection rate of 7.5%. Majority of the infections occurred within the first seven days post operatively. 4 (66.67%) infections were superficial, 1 (16.67%) was deep and 1 (16.67%) involved organ or space.

Significant risk factors for developing SSI during hospital stay were: age, smoking, obesity, long preoperative stay, wound type, operations lasting for more than 4 hours, those done in the afternoon and those with surgical drains.

Cultures were positive in all the specimens. The most common gram positive and gram negative isolates were *Staphylococcus aureus* (33.33%) and *Pseudomonas spp* (33.33%) respectively.
Three SSI (50%) were caused by multiple microbes.

Of the gram positive bacteria *S. aureus* was resistant to multiple antimicrobials but all were sensitive to Vancomycin and Teicoplanin. *Pseudomonas aeruginosa* was resistant to most of antimicrobials but showed low resistance rates to Amikacin (33.33%) and Meropenem (33.33%).

Conclusion: This study has shown that the incidence of craniotomy SSI, risk factors and isolated organisms are similar to studies done in other countries.

ANTIMICROBIAL PROPHYLAXIS FOR NEUROSURGICAL PATIENTS IN LOW INCOME COUNTRIES: A SYSTEMATIC REVIEW

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Background: Neurosurgical procedures are associated with a low incidence of surgical site infections. However, the rates of infections have been shown to increase where there is insertion of shunts and drains. Other potential causes of infection include contamination from the surgical team and the environment. Previously infected patients or patients with known risk factors for infection are also likely to develop surgical site infections. These infections are associated with high morbidity and mortality rates. Antimicrobial prophylaxis using systemic antibiotics and antibiotic impregnated shunts and catheters has been explored to reduce the rate of these infections.

Study Objective: We carried out a systematic review to summarize evidence on the effectiveness of antimicrobial prophylaxis in preventing neurosurgical site infections. The evidence will support the development of an infection control protocol at the Neurosurgical unit of Kenyatta National Hospital.

Methodology: We formulated a research question, which incorporated the Population, Intervention, Comparison and Outcome (PICO). Using developed search terms, we performed a search in MEDLINE and the Cochrane Database of Systematic reviews. Data abstraction was done by the principal investigator, and the co-investigator verified accuracy. The Consolidated Standards of Reporting Trials (CONSORT) 2010 checklist was used to critically appraise the included randomized controlled trials. We used the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system to appraise the quality of the evidence.

Results: We got evidence from one systematic review of 17 studies (n= 2134 patients) and four randomized controlled trials (n=1,949 patients). These studies suggest that systemic antimicrobial prophylaxis and antimicrobial impregnated shunts and catheters are effective in preventing neurosurgical site infections. Evidence from these studies was downgraded to moderate quality due to indirectness.

Conclusion: Antimicrobial prophylaxis can be used to prevent infections in neurosurgical patients. Use of antimicrobial impregnated shunts and catheters is not applicable in our setting due to high cost and impracticability.

Sub theme: Fungal infections

CANDIDA AURIS FUNGEMIA

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Background: *Candida species* have emerged as important health care associated pathogens and is about the fourth most common organism causing bloodstream infection in reported series. *C. albicans* typically comprises about half the *Candida* isolates, while *C. glabrata* is frequently the second most common isolate. However, there is substantial geographic and temporal variability in the most prevalent *Candida* species. *C. auris* (identified as *C. haemulonii* by Vitek II) has rarely been reported as a human pathogen, but in our institution, is the most common species causing candidemia. Therefore, we have undertaken an analysis to determine the pattern and risk factors of *C. auris* fungemia.

Materials and methods: We analyzed all positive blood cultures on patients admitted to a 300 bed referral hospital in sub-Saharan Africa from Sept 2010 to December 2014. Blood cultures were continuously monitored in a Bactec system and a Vitek 2 system was used for speciation and susceptibility determination of positive cultures. A selected number were referred to a reference laboratory for determination of species and susceptibility. A total of 173 episodes of candidemia were identified in 153 patients. Positive blood cultures of the same species were considered to be part of the same episode if there was less than one month between successive positive blood cultures.

Results: The most common organisms were *C. auris* with 74 episodes, followed by *C. albicans* (44), *C. parapsilosis* (19), *C. tropicalis* (18), and *C. glabrata* (10). The *C. auris* isolates were identified by Vitek as *Candida haemulonii*, but 21 were subjected to molecular typing using ITS sequencing and PFG typing, and all were identified as C. auris. Thus, these isolates are referred to herein as *C. auris.*

Susceptibility testing on the Vitek 2 was performed for 43 of the C. auris isolates. They uniformly demonstrated reduced susceptibilities to azoles with fluconazole MICs ranging from 32 to >64 and voriconazole MICs mostly in the 1-2 range (range 0.12-4). Caspofungin susceptibilities were done on 29 isolates (beginning late 2013 and 28 had MICs of 0.5 or less. Susceptibility results from the reference lab on 21 isolates confirmed the reduced azole susceptibilities. The isolates showed uniform in vitro susceptibility to echinocandins and amphotericin B.

The risk factors and outcome of *C. auris* fungemia are being evaluated.

Conclusions: Despite no previous reports of C. auris infection in North America or Europe, this organism is the major etiologic agent of candidemia in a teaching hospital in Kenya.

Sub theme: Emerging and re-emerging infections

A SURVEILLANCE STUDY ON TICK AND TICK-BORNE PATHOGEN DIVERSITY IN SHIMBA HILLS NATIONAL RESERVE, KENYA

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Background: Outbreaks of emerging and re-emerging tick-borne pathogens are becoming more frequent world-wide. Surveillance is critical to improve our understanding of pathogen diversity and their tick vectors. This will elucidate disease transmission dynamics that can inform the development of better disease prevention and control strategies.

Methodology: A total of 4,324 questing ticks (209 adult ticks, 586 nymphs and 3,502 larvae) were collected from six sites in Kenya's Shimba Hills National Reserve (SHNR). Morphologically, adults were identified to species level while nymphs and larvae were identified to the genus level. Three species from two genera of the Ixodidae family were identified; *Amblyomma eburneum, Amblyomma thollonii, and Rhipicephalus maculatus.* Molecular analysis of CO1, ITS2 and 16S rRNA genes was used to further confirm adult species identifications and to assign species identities to the nymphs and larva which were difficult to identify based on morphological characteristics. Ticks were pooled in varying sizes, depending on species and life cycle stages, and analysed for tick-borne pathogens including arboviruses, bacteria as well as protozoa using PCR with high resolution melting (HRM) analysis and sequencing of unique melt profiles.

Results and Conclusion: Detection of *Anaplasma phagocytophilum,* two *Rickettsia*-like and two *Ehrlichia*-like bacterial species in *R. maculatus* ticks, and *Theileria velifera* along with *Rickettsia africae* in *A. eburneum* ticks was recorded for the first time. Molecular evidence in this study suggests that there is a broad diversity of novel *Rickettsia* and *Ehrlichia* species that occur in ticks within the SHNR. Moreover, unique tick diversity and previously unknown associations between *R. maculatus* and *A. eburneum* ticks with bacterial pathogens were identified. As such, the importance of routine systematic efforts to monitor both known and novel pathogens that are likely to emerge in the future is re-emphasised.

Poster Presentations

Sub theme: Malaria

NO	TITLE OF PRESENTATION	PRESENTER
A001	SYNTHESIS AND EVALUATION OF ANALOGUES OF BENZOQUINONE METABOLITE FROM THE ENDOPHYTIC FUNGI SYLARIA FOR ANTIMICROBIAL ACTIVITY	S GACHUHI
A002	MALARIA SURVEY ON ISLANDS IN LAKE VICTORIA	J GITAKA

Sub-theme: Methicillin Resistant Staphylococcus Aureus and Extended-Spectrum Beta-Lactamases

NO	TITLE OF PRESENTATION	PRESENTER
B001	PREVALENCE OF METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) AMONG PAEDIATRIC PATIENTS ADMITTED IN INTENSIVE CARE UNIT AND NEONATAL INTENSIVE CARE UNITS OF THE KENYATTA NATIONAL HOSPITAL-NAIROBI, KENYA	R NDUATI
B002	THE PREVALENCE OF EXTENDED SPECTRUM BETA LACTAMASE PRODUCERS AMONGST GRAM NEGATIVE BACILLI: AN OBSERVATIONAL STUDY FROM ROUTINE LABORATORY DATA	V MAGUTU
B003	SPECTRUM OF MICROBIOLOGY AT A PRIVATE UNIVERSITY HOSPITAL IN NAIROBI: IMPLICATIONS FOR CLINICAL PRACTICE.	D MAINA
B004	CARRIAGE RATE OF METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS AMONG HEALTH CARE WORKERS AT THE KENYATTA NATIONAL REFERRAL HOSPITAL	A W MOGERE

Sub theme: Tuberculosis and other mycobacteria

NO	TITLE OF PRESENTATION	PRESENTER
C001	FIRST LINE ANTI-TUBERCULOSIS DRUG RESISTANCE AMONG NEW AND RE-TREATMENT TUBERCULOSIS HIV INFECTED PATIENTS IN NAIROBI, KENYA	L N OBONYO
C002	SPINAL TUBERCULOSIS IN KENYATTA NATIONAL HOSPITAL BETWEEN 2000 - 2014: RESEARCH PROPOSAL	D OWENDE

Sub theme: Viral infections

NO	TITLE OF PRESENTATION	PRESENTER
D001	HIV-1 DIVERSITY AND RESISTANCE MUTATIONS AMONG ANTI-RETROVIRAL THERAPY NAÏVE ADULT PATIENTS IN KENYA: A SYSTEMATIC REVIEW OF THE LITERATURE	P O YONGA

Abstracts

A001: SYNTHESIS AND EVALUATION OF ANALOGUES OF A BENZOQUINONE METABOLITE FROM THE ENDOPHYTIC FUNGI XYLARIA FOR ANTIMICROBIAL ACTIVITY

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A robust healthcare system that curbs the spread of communicable diseases caused by pathogens is an important cornerstone to sustainable economic development of any country. Although chemotherapy remains the main avenue of treatment in our health facilities, its long term efficacy is severely threatened by the emerging problem of drug resistance to the available antimicrobial agents.

Notable microbes with developed antimicrobial resistance include Staphylococcus aureus, Enterococcus and Gram-negative bacilli. Drug resistance has also been observed in *Plasmodium falciparum,* the parasite responsible for the deadliest form of malaria, against the current antimalarial agent (Artemisinin). Although malaria is a global health challenge, it is estimated to cause over 34,000 infant fatalities annually in Kenya. Consequently, there is an urgent need to develop new therapeutic agents to forestall the looming epidemic that would arise from widespread resistance to the current drugs in our healthcare facilities.

Considering that natural products have served as templates for development of effective drugs, the main objective of this research is to develop antimicrobial derivatives of the benzoquinone metabolite, 2-chloro-5-methoxy-3-methylcyclohexa-2,5-diene-1,4-dione isolated from the endophytic fungi Xylaria sp. It is noteworthy that the metabolite shows an in vitro activity against P. falciparum with an IC50 of 1.84μM. The metabolite is therefore a promising candidate for structure modification to enhance its pharmacological profile.

The goal of this project will be achieved through synthesis of derivatives of the metabolite and their characterization using spectroscopic techniques such as Infrared spectroscopy (IR), Nuclear Magnetic Resonance (NMR) and Mass Spectrometry (MS). The antimicrobial activity will be evaluated based on standard procedures at the School of Pharmacy, University of Nairobi.

This study will not only generate antimicrobial agents to support the health sector in the social pillar of Vision 2030, but also demonstrate the capability of value-addition on our natural resources to spur scientific innovation.

A002: MALARIA SURVEY ON ISLANDS IN LAKE VICTORIA

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Background: Malaria continues to pose a serious public health challenge in the Lake Victoria islands. Mass drug administration (MDA) using artemisinin combination therapy and primaquine is a strategy that may have a role in the elimination phase, nonetheless malaria prevalence in these islands needed to be established before the MDA is carried out.

Methods: Since 2012, five cross-sectional malariometric surveys have been conducted in Mbita and Suba Districts of Homa Bay County in Kenya. Malaria parasites in blood were detected by three diagnostic methods: (1) microscopy, (2) RDT, and (3) PCR.

Results: Prevalence rates were highest in Ungoye, intermediate on Mfangano, and lower in Takawiri, Kibuogi, and Ngodhe. In Ungoye, malaria prevalence was consistently high in children under 10 years and showed substantial decrease in older adolescents and adults, a pattern characteristic of high transmission areas. In contrast, in Takawiri, Kibuogi, and Ngodhe, malaria burden was more equally distributed across all age groups. The data also showed that a substantial proportion of malaria infections were not detected by conventional methods such as microscopy and RDT, indicating that individuals with low parasite density infections represent an important reservoir for the continuous transmission.

Conclusion: Since many malaria infections are sub-microscopic we propose to treat all individuals regardless of parasitemia by mass drug administration (MDA) using combination of Artequick (artemisinin and piperaquine) and small-dose primaquine on Ngodhe, to examine the feasibility of eliminating malaria in tropical Africa.

B001: PREVALENCE OF METHICILLIN RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA) AMONG PAEDIATRIC PATIENTS ADMITTED IN INTENSIVE CARE UNIT AND NEONATAL INTENSIVE CARE UNITS OF THE KENYATTA NATIONAL HOSPITAL-NAIROBI, KENYA.

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Back ground: Methicillin-resistant *Staphylococcus aureus* (MRSA) remains a public health problem in both the developed and developing countries. There is evidence that MRSA infection increases morbidity, the risk of mortality, and increased financial burden. MRSA on average accounts for 57% of S. aureus isolates causing nosocomial infection in intensive care units (ICUs) in USA , and are increasingly reported from many developed countries

Objective: To determine the prevalence of methicillin resistant *staphylococci* among pediatric patients admitted in neonatal intensive care unit (NICU) and adult intensive care unit (ICU) of Kenyatta National Hospital in Nairobi.

Methods: This was a cross sectional, analytical study conducted during five months from mid-June to mid-November 2012. Pediatric patients admitted in ICU and NICU were recruited daily and enrolled after getting a written informed consent from their parents or guardians. Nasal swabs, and tracheal aspirates were collected and then taken to KEMRI-microbiology laboratory for bacterial culture and PCR detection of *mecA* gene for methicillin resistance among staphylococci. Cefoxitin screening test was not performed.

Results: A total of 150 patients were recruited into the study (67 patients in NICU and 83 in ICU). A total of 218 samples (155 nasal swabs and 63 tracheal aspirates) were collected from these patients. *Staphylococcus spp.* was isolated from 71samples (32.6%), 33 of these (46.5%) were positive for mecA by PCR. Overall 66.7% (22/33) were males and 33.3% (11/33) were females. *Staphylococci* showed highest sensitivity to vancomycin and linezolid. These isolates were resistant to most of the commonly used antibiotics at KNH.

Conclusion: *Staphylococci* were isolated from one third of the nasal and tracheal aspirates of patients in the NICU and ICU Kenyatta National Hospital, Nairobi Kenya with a higher frequency in nasal swab cultures than in tracheal aspirate cultures. Methicillin resistance is highly (46.5%) prevalent among these isolates. Detailed bacteriological studies are required to evaluate the current burden of infections due to MRSA

B002: THE PREVALENCE OF EXTENDED SPECTRUM BETA LACTAMASE PRODUCERS AMONGST GRAM NEGATIVE BACILLI: AN OBSERVATIONAL STUDY FROM ROUTINE LABORATORY DATA

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Background: The prevalence of multi-drug resistant bacteria has a significant impact on patient management, antibiotic selection and overall morbidity and mortality.
Antibiotic selection should therefore be based on individual pathogens, emerging trends and local surveillance data.
Surveillance data on antimicrobial susceptibility patterns is therefore vital in the formulation of hospital antibiograms and the selection of empirical antimicrobial therapy.

Methods: Electronic records from 2010 to 2014 of all bacterial isolates from specimen submitted to Pathologists Lancet Kenya laboratories were reviewed. Gram negative bacilli were identified and susceptibility patterns analyzed to identify extended spectrum beta lactamase producers. All specimens were collected and processed using standard bacteriological techniques.

Results and Conclusion: This study showed a high prevalence of extended spectrum beta lactamase producers amongst gram negative bacilli and may be a reflection of the high carriage level of multi-drug resistant organisms in the community. A prospective study with both laboratory and clinical correlation including previous admission history should be done to explore community multi-drug resistant prevalence more thoroughly.

B003: SPECTRUM OF MICROBIOLOGY AT A PRIVATE UNIVERSITY HOSPITAL IN NAIROBI: IMPLICATIONS FOR CLINICAL PRACTICE.

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Aga Khan University Hospital, Nairobi

Background: Prompt empirical antibiotic therapy is essential for reducing mortality in blood stream infections and severe sepsis before targeted therapy can be instituted. Hospital guidelines suggest that the choice of empirical antibiotics should largely depend on the prevailing pathogen composition and antibiotic susceptibility patterns determined by analysing cumulative microbiology lab data. Obtaining a local antibiogram is challenging in developing countries especially in sub-Saharan Africa due to absence of standard microbiology labs capable of generating accurate data. We present the spectrum of microbial agents and antimicrobial susceptibilities seen in our institution.

Methods: Aga Khan University hospital Nairobi is a 300 bed JCIA accredited university hospital with modern pathology / microbiology labs. Cumulative microbiology data for the period 2010- 2014 was extracted from the Lab information system and archived data from automated bacteriology analyser (Vitek Compact 2) which was sorted out based on organisms and clinical samples.

Results: A total of 1941 blood cultures were positive during the study period. After removing the likely contaminants and grouping the *Candida* species together, the relative frequency of the various blood stream pathogens showed Candida species as the most common but followed closely by *Escherichia coli (E. coli).* The antimicrobial resistance of E. coli and Klebsiella spp. obtained from blood cultures was much higher than reported elsewhere for third generation cephalosporins, and quinolones. A rising trend was observed for ESBL positive enteric bacilli.
Carbapenem resistant enteric bacilli (CRE) were exclusively found among Klebsiella pneumonie. E. coli was the leading uropathogen followed by Klebsiella spp., a pattern similar to what is reported all over the world. MRSA were rare and vancomycin resistant Enterococci (VRE) were conspicuous by absence. There were fewer bacterial causes for meningitis than elsewhere.

Conclusion: Candida spp. is an important cause of bloodstream infections (BSI) in our hospital. There is higher resistance to antibiotics among bacterial causes of BSI which mandates choice of broad spectrum empiric therapy. Vancomycin may not be indicated empirically as MRSA are rarely seen.

B004: CARRIAGE RATE OF METHICILLIN RESISTANT *STAPHYLOCOCCUS AUREUS* AMONG HEALTH CARE WORKERS AT THE KENYATTA NATIONAL REFERRAL HOSPITAL

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Background: *Staphylococcus aureus* is associated with many community and hospital acquired infections. Nasal carriage among health care workers is an important source of staphylococci that results in nosocomial infections. Infections caused by Methicillin resistant *staphylococcus aureus* are associated with longer hospital stay, prolonged antibiotic administration, greater costs than infections caused by methicillin susceptible *staphylococcus aureus*. In hospital settings, drug resistant strains especially MRSA have emerged leading to severe and fatal infections. There's currently no data on carriage of MRSA among health care workers in Kenyan public hospitals.

Objectives: This study sought to determine the prevalence and the risk factors associated with MRSA colonization among health care workers(HCW) at Kenyatta National Hospital and also the antibiotic susceptibility profile of the isolates.

Design: A cross sectional study

Methodology: The study was conducted on a total of 180 HCW at Kenyatta National hospital's ICU, renal and Burns units and medical ward from 4th February 2015 to 3rd March 2015. Nasal and hand swabs were collected and cultured on Mannitol Salt Agar. Slide coagulase test was then performed, followed by an oxacillin susceptibility test on Mueller Hinton Agar using Kirby-Bauer disc diffusion method.

Results: *Staphylococcus aureus* was isolated in 72 HCWs. Nasal and hand carriage was 45 and 27 respectively, while 10 had both nasal and hand carriage leaving an overall carriage rate of 62 (34.4%).The *Staphylococcus aureus* isolates showed high sensitivity to linezolid (98.4%),and gentamycin(96.8%).They showed high resistance to vancomycin(53.2%). Penicillin and ampicillin were the most resistant, (80.6% and 66.1%) respectively. Methicillin resistance was seen in 37 of the S.aureus isolates, both by the disc diffusion test and by the Oxacillin Resistance Screen Agar (ORSA) test ,but 3 HCW had both nasal and hand carriage, therefore, giving an overall carriage of 34(54.8%) of the S.aureus isolates. This represented 18.9% of all the HCW. There was a slightly higher preponderance for MRSA in the females(19.1%) .The males had(18.5%).The highest carriage was in the medical ward(29.4%) while the lowest was in the renal unit(8.8%)

Conclusions: There was a high rate of carriage of MRSA carriage among HCW. The medical ward had the highest carriage. The *staphylococcus aureus* were most susceptible to Linezolid

C001: FIRST LINE ANTI-TUBERCULOSIS DRUG RESISTANCE AMONG NEW AND RE-TREATMENT TUBERCULOSIS/ HUMAN IMMUNODEFICIENCY VIRUS INFECTED PATIENTS, NAIROBI KENYA

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Background: Drug resistant tuberculosis is a state when *Mycobacterium tuberculosis* organisms are resistant to antimicrobial agents. Scarce data on prevalence exist in populations with high rates of tuberculosis and human immunodeficiency virus (HIV).

Objective: Drug resistance patterns to TB (tuberculosis) drugs with respect to cluster of differentiation (CD4) count, among HIV infected TB patients, Nairobi, Kenya.

Methods: Sputa from patients with bacteriologically confirmed pulmonary tuberculosis were cultured on Mycobacterium Growth Indicator Tube (MGIT) media. Strains of *mycobacterium tuberculosis* complex from MGIT were subjected to drug susceptibility testing for isoniazid, Rifampicin, Streptomycin, and Ethambutol. The Becton Dickinson Facscount technique was in CD4 count.

Results: The median CD4 count was 286. 51 (37.0%) patients had CD4 count (<200) while 87 (63.0%) had counts ≥200. 42 (82.4%) of patients with CD4 count <200 and 70 (80.5%) with counts ≥200 were sensitive to all anti-tuberculosis drugs. Resistance patterns among patients with CD4 count of<200 was; Isoniazid 6 (11.8%), Rifampicin 5 (9.8%), Ethambutol 4 (7.8%), Streptomycin 3 (5.9%). Among patients with CD4 count ≥200 resistance pattern was Isoniazid 10 (11.5%), Ethambutol 7 (8.0%), Rifampicin 4 (4.6%), and Streptomycin 4 (4.6%). Three (5.9%), and 3 (3.4%) isolates from patients with CD4 count <200, and those with CD4 count ≥200 respectively, were multidrug resistant.

Conclusion: There was no statistical significant difference between CD4 count and TB drug resistance patterns (P=0.670).

C002: SPINAL TUBERCULOSIS IN KENYATTA NATIONAL HOSPITAL BETWEEN 2000 - 2014: RESEARCH PROPOSAL

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Background: Tuberculosis of the spine is a destructive and disabling form of extra pulmonary tuberculosis caused by Mycobacterium Tuberculosis. There were estimated 9million new cases of tuberculosis and 1.5 million deaths in 2013 making this disease one of the biggest infectious killers in the world (WHO 2013). The aim of this study is to assess the status of spinal tuberculosis in our national hospital in attempt to patch the national statistical gap that exists on the same.

Objectives

- To identify total number of admitted cases.
- To identify age and sex distribution.
- To identify common presenting complaints.
- To identify management given.
- To identify disease outcome.

Methods: This will be a descriptive retrospective study. Data will be collected using a data sheet and information retrieved from in-patients' files and records. The files will be retrieved from the records office in KNH after identification by their code (A.18) by the statistics office. Relevant literature review has also been assessed to augment the data.

Expected Results: As a consequence of increased awareness, an increase in the number of cases seen at KNH is expected. Higher morbidity rates are expected in relation to mortality rates. Contrary to popular belief that TB spine mostly affects immunosuppressed patients, it is expected to affect more previously healthy subjects or those without any co-morbidity.

Utilization of Results: The results from the study as of any descriptive study will be used to come up with etiological hypotheses which will pave way for analytical case control studies. The data will be used for planning, policy making and to allow for improvements in preventive, curative and promotive interventions aimed at protection against TB Spine.

D001: HIV-1 DIVERSITY AND RESISTANCE MUTATIONS AMONG ANTI-RETROVIRAL THERAPY NAÏVE ADULT PATIENTS IN KENYA: A SYSTEMATIC REVIEW OF THE LITERATURE

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Background: The advent of anti-retroviral therapy (ART) has led to lesser morbidity and mortality if well optimized. However, the emergence of ART resistance to some medications threatens these gains, thus leading to sub-optimal viral suppression. Various studies however show divergent prevalence figures as far as the resistance mutation profile is concerned.

Objective: To examine the HIV-1 diversity and resistance profile mutations among HIV-1 infected ART naïve patients in Kenya.

Methods: Systematic review of published and unpublished studies between 2000-2014 involving HIV-1 diversity and resistance mutations among ART naïve HIV-1 infected patients in Kenya was done from MEDLINE®, online repositories, article references, and hand-searches.

Results: A total of six papers were studied, with a total of 633 successfully genotyped samples. The highest frequency subtype was A1 which was noted in 62.1% of the samples. 36 samples (5.7%, CI: 3.9-7.5%) were found to have resistance mutations, of which the commonest mutations among nucleoside reverse transcriptase inhibitors (NRTIs) was T215F (1.0%, CI: 0.2-1.8%), the commonest mutations among non-nucleoside reverse transcriptase inhibitors (NNRTIs) was K103N (1.4%, CI: 0.5-2.3%), and the commonest mutations among protease inhibitors (PIs) was M46L (0.5%, CI: -0.05-1.1%).

Conclusion: This pooled review reveals a high drug resistance profile among the Kenyan population, thus with increased access to anti-retroviral therapy, increased vigilance is needed in testing for drug resistance among HIV-1 infected adults eligible for treatment.

Symposium organisers

Committee members

Professor Titus Munyao
Professor Godfrey Lule
Professor K M Bhatt
Professor Omu Anzala
Professor Rodney Adam
Professor Ruth Nduati
Professor Sylvia Ojoo
Professor Walter Jaoko
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