Track 6: Public Health I (Demographic & Surveillance)	Venue: Training Center (Room 2)

4.101   Home Based Counseling and Testing in Health Demographic Surveillance System areas in western Kenya.

Amolloh M[1], Laserson K[3], Soo L[3], Mutsotso W[3], Kapere L[1], Aluodo F[1], Dalal W[2], Kwaro D[1]

[1]*Kenya Medical Research Institute, Nairobi*
[2]*U.S. Centers for Disease Control and Prevention, Atlanta, GA, USA*
[3]*U.S. Centers for Disease Control and Prevention-Kenya, Nairobi*

Introduction: Home Based Counseling and Testing (HBCT) is a strategy which has proved effective in increasing uptake of voluntary HIV counselling and testing (KAIS, 2007). HBCT rapidly increases access and utilization of counseling and testing services for the entire household and provides an excellent opportunities for referral and disclosure.

Objective: To determine coverage, access and utilization of counseling and testing services to entire family members.

Methods: After consenting, eligible persons (adults and adolescents $\geq$ 13 years and children $\leq$ 12 years whose biological mothers were HIV-infected or deceased) were tested for HIV in their own homes by trained HBCT counselors using rapid test strips in parallel. Standardized data collection tools which assessed previous HIV testing, sexual and health seeking behaviors were completed for all individuals.

Findings: 52,629 individuals who were offered the test accepted HBCT services. 65% percent of all participants had never had a previous HIV test, while 57% of HIV-infected participants did not know they had HIV until HBCT. Among those tested, overall HIV prevalence rates were 13.2% while Prevalence among first time testers was 8.9%. HIV-discordance among those tested as a couple was 10.5%. HIV rates were high among those who were widowed and remarried at 38% and separated at 32%. Low perception of risk is major barrier to HIV testing while planning for future is the main motivation to test.

Conclusions: HBTC was well-received by the community and increased knowledge of HIV status, low perception of HIV risk is major reason for not testing, HIV rate was higher among widowed and inherited compared to other adults and HBCT present an opportunity for prevention effort through skill building and safe sex negotiation for couples.

4.102

Perception on benefits and barriers toward testing for sexually transmitted infections at Maseno University- Kisumu, Kenya.

Biscah Syombua Munyaka[1] , Anselimo Makokha[2], Elizabeth Bukusi[1]; Purnima Madhivanan[3].

1.   Kenya Medical Research Institute (KEMRI), Nairobi, Kenya.
2.   Jomo Kenyatta University of Agriculture and Technology (JKUAT), Nairobi, Kenya.
3.   University of California San Francisco (UCSF), California, USA.

ABSTRACT

Background: Sexually transmitted infections (STIs) are responsible for an enormous burden of morbidity and mortality in many developing countries because of their effect on reproduction and child health and their role in facilitating transmission and acquisition of HIV. The Kenya National AIDS strategy identifies youth as a "most at-risk population". Young people aged 15-24 years account for more than half of the new HIV infections worldwide each year. Comprising 30% of the population in the developing world, young people present a set of urgent economic, social and political challenges that are crucial to long-term progress and stability. Youth present a window of opportunity for reversing the trend of HIV and other sexually transmitted infections, especially when effective prevention program reach them before they engage in sexual risky behavior. Globally, more than half of the new HIV cases

occur among young men and women aged 15 to 24 years. Young people are at the centre of the global AIDS epidemic. Of the 1.7 billion young people worldwide, 5.4 million are estimated to be living with HIV. This age group also has the highest prevalence (over 500,000 infections daily) of sexually transmitted infections excluding HIV.

Objective: This study sought to determine the perception on benefits and barriers toward testing for sexually transmitted infections among students at Maseno University.

Methodology: It was an institutional based cross-sectional study. The study subjects comprised undergraduate students enrolled at Maseno University. A sample of 328 students participated in the study. A questionnaire was used assess the attitudes, barriers and benefits of testing for sexually transmitted infections through convenient sampling.

Results: The reported prevalence of STIs was 11.9% and over half (59.1%) of the total respondents sampled in this study had undertaken an STI test. The main high risky sexual behaviors practiced by students were: having sex without condom (70.8%), having a one night stand (36.5%) and having sex while intoxicated with alcohol (25.6%). The four top risky sexual attitudes reported by students were: not necessary to use a condom if the partner or self is using a contraceptive (39.1%), not necessary for all sexually active individuals to be tested for STIs (36%), willingness to have heterosexual intercourse with a person on the first day/night of meeting (34.7%) and more concerned about preventing unwanted pregnancy than preventing STI infection (30.2%). The main barriers to STI testing included: fear of testing positive (83.5%), embarrassment (73.2%), lack of knowledge about STI testing (72.0%) and location of testing service (63.4%). The key benefits to STI testing were: to receive treatment if the test is positive (81.7%), helps to reduce feelings of worry and anxiety about not knowing one's STI status (76.8%) and allowing a person to feel safe in beginning a new relationship (74.7%). The age of the respondents was associated with STI testing (P<0.04) in that respondents who were aged 20 years and below and 24 years and above were more likely to take up an STI test. Cues that encouraged STI testing included: billboards with messages on testing (P=0.02) and messages related to STI testing being displayed more on television (P=0.05).

Conclusion: This study found a significant proportion of students had not tested for STIs and of much concern were the risky sexual attitudes and behavior to STI testing identified among the study respondents including sex without condoms.

Recommendations: Proactive sexual health education should be strengthened and awareness education should begin at young ages when principles, value orientations, and behavior models are formed.

4.103

Molecular epidemiology and surveillance of avian influenza virus in selected risk sites in Kenya

Ojigo D.O[1]*. Watuimbi J.,[2]Kiptoo M.,[1]Kikuvi G.[1]

1Institute of Tropical Medicine and Infectious Diseases, Jo mo Kenyatta University of Agriculture and Technology
2Walter Reed Project, Kisumu

Introduction: Human influenza [flu] seasons recur at regular time periods, characteristically during the cold half of the year in each hemisphere. The exact mechanism behind the seasonal nature of influenza outbreaks is unclear though cold stress is often associated as a precursor to an outbreak. Each flu season is normally associated with a major influenza virus subtype. The associated subtype changes each year by re-assortment and genetic drift. Avian influenza is caused by bird adapted viruses. All known viruses that cause influenza in birds belong to the species influenza a virus. All subtypes (but not all strains of all subtypes) of influenza A virus are adapted to birds. Other strains of influenza viruses are adapted to multiple species, though they may display a preference towards a particular host, hence the terms "swine flu," "dog flu," and "horse flu." Being adapted towards a particular species does not preclude adaptations, or partial adaptations, towards infecting other species. The concern is highly pathogenic avian influenza (HPAI) which can lead to pandemic flu. Pandemic flu viruses may contain both avian and human flu

virus genes. The cost of a Human flu season in lives lost, medical expenses and economic impact, as measured in Disability Adjusted Life Years [DALYs], can be severe. Certain conditions such as diabetes, asthma and HIV/AIDS increase the mortality rate of the disease. Following the Avian influenza (H5N1) outbreaks reported in 2003 in Asia, the virus has continued to evolve and spread to Europe and Africa. Human mortalities are relatively still low, but can be high in case of occurrence of pandemic flu. Where the disease has been reported in chicken, economic losses have been reported due to control measures such as culling and disposal, loss of livelihoods, trade restrictions, outbreak investigation and vaccinations.

Methods: Molecular epidemiology techniques detect disease causing virus early and are sensitive to minute changes that can occur at molecular level. Molecular changes can be related to factors such as global warming, production system and changing land use. Determining the prevalence rates and factors associated with presence of avian influenza viruses' different poultry production systems in addition the ability of the current surveillance system to detect events in the poultry sector will be determined with a view of improving it. Poultry sector in Kenya is categorized guided by the production systems into 3 categories: Sector 2, 3 and 4. Sector 2 is represented by commercialized and partly mechanized. Sector 3 is represented by other local hatcheries around the country. The rest of chicken raised in Kenya is found in sector 4. Multispecies rearing is a forth category in production systems.Avian influenza prevalence rates in the different sectors are different: will be the hypothesis being tested.Guided by set inclusion criteria, trachea and cloacae samples will be collected from purposively selected sites typically representing the different production systems. This will be accompanied by administration of a questionnaire. The sample size for each sector will be calculated using the formula from Martin et al., 1987. Analysis will be done by molecular methods (PCR) to detect presence of antigens and exposure will be detecting using ELISA methods.

A review of the current Department of Veterinary Service disease surveillance and reporting in the poultry sector will be undertaken. Indicators of an effective surveillance system be used making the assessment. Piloting of use of mobile technologies in surveillance will be carried out.

An analysis of epidemiological attributes will be fed to the laboratory results. Analysis of indicators of an effective surveillance will be used to rate the effectives of mobile technology in disease surveillance.

Conclusion: The findings from this study will generate molecular epidemiology knowledge on avian influenza, contribute to development of effective preventive measures and improve surveillance of disease in the poultry sector.

4.104

KEMRI/CDC Health and Demographic Surveillance System (HDSS) in Research and Program Implementation

Frank Odhiambo[1], Hellen Muttai[1], Emmanuel Onyango[1], David Obor[1], Kayla Laserson[1]

[1] Kenya Medical Research Institute/Centers for Disease Control and Prevention, Centre for Global Health Research, Kisumu.

Background: In 2001 to 2002, the HDSS was started in Asembo and Gem in Nyanza Province, western Kenya. In 2007 we expanded to include Karemo and Siaya District Hospital. The HDSS currently follows over 220,000 people.

Objectives: To investigate whether childhood mortality could be associated with the geospatial distribution of determinants. To use the HDSS to track internally displaced persons (IDP) entry and exit from the surveillance area and associated morbidity or mortality. To describe the penetration of HIV care and ART services in the HDSS area.

Methods: We carry out Demographic surveys every 4 months, collect data on Socio-economic and educational status every 2 years and collect information on immunization status. We carry out Verbal autopsies and collect specimens for malaria, influenza and rotavirus surveillance. We do home based HIV counselling and testing, and use personal digital assistants (PDAs) to collect data.

Results: High mortality villages occurred in clusters. Higher mortality was associated with living further away from a public road, living closer to streams at lower elevations and lower population densities. 16,000 IDPs came into the HDSS area. This resulted in a high burden of outpatient and inpatient pediatric sick visits, and we observed an increase in the rate of malaria admissions. By the end 2008, 29% of the approximately 17,000 HIV+ adults in the HDSS had enrolled into care services.

Conclusions: Studies that link population demographic information with health facility and GPS data provide rich and useful information that can guide policy making decisions, and HDSS sites can readily be used to evaluate the roll-out of new vaccines like the pneumococcal conjugate vaccine and the rotavirus vaccine.

4.105
Organisational barriers to promoting the social value of health research in Kenya
Lairumbi GM[1], Mike Parker[2], Ray Fitzpatrick[3] and Mike English[1]

1 Kemri-wellcome Trust Research Programme, Centre for Geographic Medicine, Nairobi Unit, P.O Box 43640, 00100, Nairobi, Kenya;
2 Ethox Centre, University of Oxford, Oxford, United Kingdom;
3Department of Public Health, University of Oxford, Oxford, United Kingdom

Background: The conduct of health related research in resource poor settings such as Kenya face several challenges key among them funding. Despite these, the number of research studies conducted in these settings, mainly through international collaborations, has increased in the last decade. This has been accompanied by demands that such research be socially valuable. Importantly, the contribution of global health research and indeed all research, to evidence based policy and practice have become an ethical imperative and various efforts to link health research to policy and promotion of population health have been recommended locally. Despite these efforts, the contribution of research into policy and practice in Kenya remain sub optimal.

Objective: The work reported here was part of a broader study aimed at examining the practical application of ethical strategies aimed at promoting the capture of benefits of global health research conducted in Kenya.

Methodology: The findings are based on a qualitative study involving 52 in depth interviews with key stakeholders drawn from the research system in Kenya

Results: The potential of health research to inform policy and practice in Kenya is substantively limited by several barriers at the organisational level. Key among them are; incompatibility of stakeholder interests and the challenges of harmonising them, insufficient and weak mechanisms for coordinating and linking research, policy making and health care provision and power asymmetry among stakeholders.

Conclusion: We conclude that for the benefits of health research to be realised in Kenya, a combination of social, technical and ethical fixes are required within the national research system to promote linkages between knowledge production and improved population health.

4.106
Rift Valley Fever in Trans Nzoia District: A Threat to Animal and Human Health
Vincent Okoth* 1, 2, Samoel Khamadi1, 3, Rebecca Waihenya2, Janusz Paweska4, Kouichi Morita5, Toru Kubo5 and Matilu Mwau1

1Kenya Medical Research Institute
2Jomo Kenyatta University of Agriculture and Technology
3Walter Reed Project, Kenya Medical Research Institute
4Special Pathogens Unit, NICD, National Public Health Laboratory Services South Africa
5Nagasaki University Institute of Tropical Medicine

Introduction: Tropical Africa is the likely site of origin for many of the *Arenaviridae*, *Flaviviridae* and *Bunyaviridae* arboviruses of modern medical importance and remains one of the most affected regions. Rift Valley fever, is a Phlebovirus of the *Bunyaviridae* family that has caused large explosive epidemics of animal and human illness throughout Africa. RVF outbreaks have been reported in the western region of Kenya since 1950's. Despite the threat posed by this virus to humans and livestock, there have been very few attempts to evaluate its impact in the region.

Objective: The objective of this study was to determine Rift Valley Fever seroprevalence among febrile patients presenting at selected health facilities in Trans Nzoia District, Kenya.

Materials and Methods: Patients presenting with febrile illness at Kitale District Hospital, Andersen Medical Clinic and Endebess Sub-District Hospital between January and July 2009 were recruited. Seroprevalence of RVF was determined by RVF IgG sandwich ELISA and RVF IgM capture ELISA. Samples selected on the basis of ELISA reactivity were subjected to Plaque Reduction Neutralisation Test (PRNT) and Real Time PCR.

Results: A total of 323 (123 male and 186 female) patients were recruited for the study. Gender was not given for 14 patients. Seven (2.2%) of those recruited tested positive for RVF IgG antibodies while another six (1.9%) tested positive for RVF IgM antibodies. Two samples tested positive for both RVF IgG and IgM. Six samples were subjected to PRNT; with 3 sera neutralised RVF virus. RVF virus RNA was not recovered from the six samples that were IgM positive.

Conclusion and Recommendation: RVF is re-emerging in Trans Nzoia District. The seroprevalence is low, and the risk of a future outbreak must be considered. The transmission cycles and characteristics of RVF in the region should be determined.

4.107

Rotavirus Surveillance in a Health and Demographic Surveillance System (HDSS) – Siaya, Kenya

Khagayi Sammy[1], Ogwang S[1], Onkoba R[1], Ochieng B[1], Ismail A[2], Mutonga D[2], Mwenda J[3], Muthoni J[1], Feikin D[4], Breiman R[5], Odhiambo F[1], Burton D[1], Laserson K[1].

[1] *KEMRI/CDC Research and Public Health Collaboration*
[2] *Division of Disease Surveillance and Response – Ministry of Public Health and Sanitation*
[3] *WHO/AFRO*
[4] *Johns Hopkins Bloomberg School of Public Health and Centers for Disease Control and Prevention*
[5] *Centers for Disease Control and Prevention – Kenya*

Background: The KEMRI/CDC Health and Demographic Surveillance System (HDSS) has been conducting hospital surveillance in selected health facilities in Asembo, Gem and Karemo areas in Siaya County since 2001. Diarrhea is one of the leading causes of morbidity and mortality in this area. Previous studies have shown high levels of diarrhea are attributable to rotavirus among children. Rotavirus vaccine studies have demonstrated high efficacy in the first year of life with majority of the western countries adopting it for routine immunization. Due to the imminent introduction of the vaccine in Kenya, there is need for continued surveillance of rotavirus so as to measure the impact of vaccine or other intervention introductions and thus inform national and international policy.

Objectives: The study was aimed at; establishing baseline population-based data on rotavirus disease to facilitate evaluation of rotavirus vaccine impact; use rotavirus surveillance data in combination with population denominators from the HDSS to estimate the hospitalization and mortality rates of rotavirus gastroenteritis in children under 5 years; evaluate shifts in rotavirus genotype distribution over time; share rotavirus surveillance data with the Kenyan Ministries of Health and WHO/AFRO.

Methodology: The HDSS undertakes active hospital surveillance at Siaya District Hospital and Ting'wang'i Health Centre (both in Karemo) and Njejra Health Centre (in Gem). The current population is approximately 225,000 (Gem, Karemo and Asembo). For the period January 2010 to August 2010, structured questionnaires encompassing demographic, treatment history, diagnosis and laboratory investigations to be undertaken were administered to all enrolled patients under the age of 12 coming to these health

facilities. Data was collected electronically by trained personnel during the routine patient management. Patients aged below five years who meet the criteria for acute gastroenteritis provide a stool sample for rotavirus testing at our labs using ELISA methods.

Results: Based on the 8 months of surveillance, we noted that among admissions for children under 5 years, 21% to 32% were due to acute gastroenteritis. Out of the samples collected and tested, we had a rotavirus positivity of between 19% and 37% per month. In the outpatient, one tenth of all under 5 sick visits were due to acute gastroenteritis with a rotavirus positivity of up to 30%. The most common virus strains were the G8/G3 P(4).

Preliminary rate calculations showed that rotavirus accounts for 94 deaths per 100,000 children under 5 years in this area, and 358 hospitalizations per 100,000 children under 5 years

Discussion/Conclusion: Rotavirus is a major health burden in our population. There is need for continued surveillance and genotyping so as to establish the strains circulating in this population and the actual rotavirus burden. The HDSS will help to monitor rotavirus vaccine introduction and other related interventions, by measuring impact on both morbidity and mortality in the population. We will in future link rotavirus data collected to the routine HDSS data to enable analysis of risk factors, household transmission, spatial distribution and modeling of infection in the community.

4.108

Acute infection of rubella in Kenya: a three-year case-based surveillance study

FM Mbugua[1], P. Muchai[1], F Okoth[1],.P. Borus[1], J Kombich[1], A Langat[1], M. Njuguna[1], J Ngugi[1], E Komen[1], C Muitherero[2], D Mohamed[2], T Kamau[3], D Mutie[3]

1   Kenya Medical Research Institute (KEMRI)
2   World Health Organization (WHO)
3. Division of Vaccines and Immunization (DVI)

Background: Case-based surveillance study on measles was conducted in Kenya between January 2008 and December 2010.Clinical signs and symptoms of both rubella and measles are almost similar. Laboratory confirmation of acute infection revealed more cases of rubella virus infection rather than measles. Rubella virus is a major cause of congenial rubella syndrome (CRS) that leads to mental retardation, blindness, deafness and defective hearts among other congenitally acquired malformations. Transmission of rubella virus is through infected airborne droplets or close contact. The virus passes through the placental barrier to the foetus particularly during the first trimester of pregnancy.

Materials and Methods: Blood specimens were collected from the cases that met clinical definition of measles and shipped to KEMRI Measles Laboratory in reverse cold chain (+2 to 8^OC). The specimens were aliquoted in an appropriately labelled 1.8ml cryovials (external threading) and stored at $+2\text{-}4^0$ C awaiting accumulation of enough samples to fill 1 strip of ELISA plate. Acute infection of measles was confirmed by detection of its IgM antibody by enzyme immunoassay (EIA)

using DadeBerhring (from Germany) and Siemens test kits. Measles IgM negative samples were re-tested for specific rubella IgM antibody. The results were entered in EPI Info program for data analysis.

Results: A total number of 3891 blood samples were collected and received in the Measles Laboratory. Acute infection of measles virus was confirmed in 82 (2.1%) cases. Acute infection of rubella virus infection was confirmed in 1,377 (35%). Rubella was confirmed 663 females (48.1%).Rubella infection was laboratory confirmed in 714 (51.9%) males.

Conclusion and Recommendation: Rubella virus outbreaks are common compared with measles. Routine immunization against rubella virus is almost non- existent in the country. The high incidence and prevalence of rubella disease in Kenya poses a threat of CRS.Routine immunization against rubella virus should be incorporated in the National Immunization Schedule. All women of child bearing age should be targeted for mass immunization against rubella so as to protect foetal development.

4.019
One-Health and One-Stop-Border Post (OSBP) experiences from the East Africa Community (EAC) Region: A Case Study of the Kagera River Basin Ecosystem, Rwanda.
Sonoiya Stanley[1]., Kariuki James[2]

1 East African Community (EAC) – Arusha, Tanzania;
2 Kenya Medical Research Institute (KEMRI).

Background: Cross border movement leads to disease transmission in human and animals. Currently, there are no such mechanisms of trans-boundary animal disease (TAD) control within the five EAC Partner States. Objective to document field experiences aimed at operationalizing cross-border zoonosis surveillance teams.

Method: A case study where a field simulation was carried out. Human and animal health experts were drawn from the five EAC Partner States. Local setting: Kagera River Basin Ecosystem in Rwanda which shares a common border with Burundi, Tanzania and Uganda Activities included conducting joint meetings of animal and health officers drawn from the border towns. As well as observation of movement of animals and people across the common border. Review of human health facility and veterinary laboratory records.

Results: There was lack of disease surveillance information sharing between neighboring towns. Mobile phones were also used in some instances of emergency and referral, but connectivity was very expensive. Several documents on trans-boundary animal diseases (TAD) were available and priority diseases were identified by the veterinary officers. There were few human health and veterinary personnel in the border town. Community knowledge and participation in TAD surveillance was minimal.

Conclusions & Recommedation: There is need to tease out TAD surveillance (especially zoonosis) activities for each border region to ensure harmonised disease control. An integrated disease surveillance system for human, animal and plants was necessary towards achieving ONE-HEATH. Involvement of traders and the community is critical. Activities for border-crossing regions should be holistic at all levels through formation of cultural-economic networks, one platform of actions and harmonised data collection through use of ICT platform. Mass media is an important tool for mobilizing public and promoting advocacy. Livestock identification and traceability be undertaken.

Track 7: Public Health II	Venue: Training Center (Room 2)

4.201
Nasopharyngeal carriage of potential respiratory pathogens within Kilifi district in Kenya
Donald Akech[1], Lazarus Mramba[1], Susan Morpeth[1], Norbert Kihuha[1], J. Anthony Scott[1], Laura L. Hammitt[1]

[1]KEMRI-Wellcome Trust Research Programme, CGMR-Coast, Kilifi, Kenya

Background: Nasopharyngeal (NP) carriage of potential respiratory pathogens (eg, *S. aureus, S. pneumoniae,* or *H. influenzae),* usually precedes invasive disease. Introduction of 10-valent pneumococcal conjugate vaccine (PCV10) into the Kenya EPI programme is expected to reduce carriage of vaccine-serotype pneumococci and to reduce invasive pneumococcal disease. Changes in pneumococcal carriage may affect carriage of other bacteria.

Objective: We aimed to describe the patterns of nasopharyngeal colonization in residents of the Kilifi Demographic Surveillance System (DSS).

Methods: A community based cross-sectional study of NP carriage among residents of all ages randomly selected from the Kilifi DSS was

performed during August-October 2010. Following consent, a questionnaire was administered and a NP swab was collected. Swabs were transported in cool boxes to the KEMRI/Wellcome Trust microbiology laboratory. Bacteria were identified by standard methods. Pneumococcal serotyping was performed by the Quellung reaction. Data were analysed using STATA 11.1. Multivariate logistic regression was used to assess factors associated with carriage.

Results: Among the 512 participants, 53.9% were females; 39.5% carried *S. pneumoniae*, 32.6% carried *H. influenzae,* and 6.6% carried *S. aureus*. Among participants aged <5 years (n=157), 70.1% carried *S. pneumoniae.* Vaccine serotypes represented 45.5% of pneumococcal carriage in children aged <5 years. Risk factors for *S.*

pneumoniae were age<1 year (OR 3.57; 95% confidence interval[CI]:1.72-7.41), respiratory infection (OR 2.20; 95%CI:1.38-3.49) the presence of children in the household (OR 3.01; 95%CI:1.67-5.43) and co-carriage of *H. influenzae* (OR 4.56; 95%CI:3.00-6.95). Expanded testing of a subset of swabs from children aged <10 years (n=111) revealed carriage of coliforms in 52.3%, *M.catarrhalis* in 73.9%, and no carriage of *Neisseria* species, *Salmonella* species or group D *Streptococcus*.

Conclusions: Vaccine serotypes represent a sizable proportion of pneumococcal carriage. These data will serve as a baseline for evaluating the effect of PCV10 on carriage of pneumococcus and other potential respiratory pathogens.

4.202

Seroprevalence and estimated incidence of maternal Herpes Simplex Virus Type 2 infection in semi-urban women in Kilifi, Kenya

Nyiro JU[1]**,** Sanders EJ[1], Ngetsa C[1], Wale S[1], Awuondo K[1], Bukusi E[2], Price M[4], Amornkul A[4], and Nokes DJ[1,3]

Kenya Medical Research Institute / Wellcome Trust Research Laboratories, Kilifi[1], Kenya Medical Research Institute / Center for Microbiology Research, Nairobi[2], Department of Biological Sciences, University of Warwick, Coventry UK[3], International AIDS Vaccine Initiative, San Francisco, California, USA[4].

Background: Herpes Simplex Virus type 2 (HSV-2) has public health importance as a leading cause of genital ulcers, a co-factor in HIV-1 acquisition and transmission and as a cause of neonatal herpes infections. Little is known of its epidemiology and burden in Coastal Kenya.

Methods: We screened plasma samples for HSV-2 infection from 826 women aged 15-34 years from Kilifi. Predictors for HSV-2 seropositivity were determined using multivariate logistic regression. The incidence of HSV-2 infection and risk of neonatal herpes were estimated by a simple catalytic model fitted to age-seroprevalence data.

Results: HSV-2 prevalence was 36% (296/826), rising steadily from 8% (11/135) in women <20 years to over 52% in women aged >30 years (P<0.001) and differed between DSS and VCT recruits (32% vs. 44%, P<0.001). HIV-1 prevalence was 8% and 12% (P = 0.12) among the DSS and VCT recruits, respectively. Independent

predictors for HSV-2 infection were: older age (30-34 years; odds ratio (OR) 10.5, 95% confidence interval (CI): 5.2 - 21.0), recruitment from VCT (OR 1.5, 95% CI: 1.1 - 2.1), history of genital ulcers (OR 1.7, 95% CI: 1.2 - 2.3) and HIV infection (OR 2.7, 95% CI: 1.6-4.6). Education beyond primary (OR 0.7, 95% CI: 0.5 - 0.9) was inversely associated with HSV-2 infection. HSV-2 incidence was estimated at 4 cases (95% CI: 3 - 4) per 100 women per year, 17 cases (95% CI: 16-18) per 1,000 pregnancies per year and 33 neonatal cases (95% CI: 31-36) per 100,000 births per year.

Conclusion: HSV-2 transmission is rapid following the onset of sexual activity and likely to result in a significant burden of genital ulcer disease. Nevertheless, the burden of neonatal HSV-2 can be predicted to be low. Educating young women about HSV-2 infection may help in reducing its burden in this semi-urban population.

4.203
Hepatitis B Virus Basal Core Promoter and Pre-core Region Mutations among Liver Disease Patients at Kenyatta National Kenyatta

Missiani Ochwoto 1, 4   , Fredrick Okoth 1, Henry Kioko3, James Kimotho1, Zipporah Ng'ang'a4 , Deepark K2, Ranjit Chauhan2, and Anna Kramvis2

1Kenya Medical Research Institute (KEMRI)
2Hepatitis Virus Diversity Research program (HVDRP), Department of Internal Medicine, University of the Witwatersrand, Johannesburg, South Africa.
3Kenyatta National Hospital (KNH), Nairobi Kenya
4Jomo Kenyatta University of Agriculture and Technology (JKUAT)

Background: Hepatitis B Virus (HBV) remains a major health problem globally and recently Kenya reported an increase in prevalence among blood donors. Efforts to reduce transmission have been fostered in the country, however, data on chronic HBV and viral mutations are limited. HBV mutations occur in all its genes but they cluster into mutational patterns in Pre-core (Pc) and Basal Core Promoter (BCP) regions, which are responsible for expression of Hepatitis B envelop Antigen (HBeAg). These mutations and patterns influence the disease progression, development and severity.
Objectives: This study investigated the prevalence and patterns of BCP/Pc mutations and their association with HBeAg expression and genotypes among liver disease patients of Kenyatta National Hospital (KNH).
Methodology: This cross-sectional study sampled 88 liver disease patients at KNH, liver clinic from 2009 to 2010. Hepatitis B surface Antigen (HBsAg), HBeAg, anti-HIV, and anti-HCV were detected using commercially available kits. BCP, Pre-core and full surface (S) regions of the viral genome were amplified, purified and sequenced. 2 Results: The mean age of the patients was 36.4+1.4 years with 72% males. Forty-six (52.3%) of 88 samples were HBsAg positive of which 8 (17.4%) were co-infected with HIV, none was co-infected with HCV. Of the 46, 22 (47.8%) had elevated ALT and 36 were HBeAg negative. S-gene sequences indicated genotype A (89.1%) and D (10.9%) to be in circulation in Kenya. Forty-four (95.7%) of 46 BCP/Pc sequences had mutation; double A1762T/G1764A were 11(24.0%), 1809-1812nt TCAT mutation were 34(74.0%), C1858T were 10(21.7%), G1862T were 16(34.8%), T1888A were 20(63.1%) and G1896A 1(2.2%). Two patterns were observed, those co-existing with double mutation A1762T/G1764A and those co-existing with C1858T. **Conclusion and Discussion:** BCP/Pc region Mutations affect HBeAg phenotype expression leading to serology HBeAg negative. Overdependence of this HBV marker as indicator for HBV replication among HBeAg negative patients may be misleading. A1762T/G1764A, 1809-1812nt TCAT, G1862T and G1896A mutations are associated with chronic HBV and Hepatocellular carcinoma (HCC), such high prevalence could indicate increase of HCC in Kenya. Key words: Hepatitis B Virus, HBV Basal Core promoter mutations, HBV pre-core mutations, Chronic HBV

4.301
Adherence to user fee charges at primary care facilities and implications for quality of care

Mitsuru Toda, Sassy Molyneux, Antony Opwora, Evelyn Waweru, Tansy Edwards, Greg Fegan, Abdisalan Noor, Catherine Goodman. Kenya Medical Research Institute - Wellcome Trust Research Programme, Nairobi, Kenya

Background: The Kenyan government, in its Vision 2030, aims to provide high quality and equitable health services through, among other strategies, reducing the financial burden on patients. In 2004, high and variable user fees for primary health facilities were removed, replacing them with flat rate fees of KES 10 at dispensaries, and KES 20 at health centres. Studies conducted in 2005 and 2007 on the implementation and impact of this policy suggested an initially positive impact, but adherence to user fee reduction has been variable, and generally low.

Objectives: This study aims to present nationally representative data on user fees currently charged in government health centres and dispensaries, and to examine associations between fees charged and structural quality of care, staff motivation and patient satisfaction.

Methods : Data were collected in late 2010 in a random sample of 248 public health centres and dispensaries in 24 districts across all 8 provinces in Kenya. Data collection at each facility included an interview with the facility in-charge, a self-administered questionnaire for the in-charge, record reviews, exit interviews with patients, and interviews with health facility management committee members.

Findings: We shall present data on adherence to the national user fee reduction policy across all facilities, and on the contribution of user fees to total facility income. We will also describe structural quality of care, staff motivation and patient satisfaction with health facilities, and explore associations of these variables with adherence to user fee policy.

Conclusions: We will discuss the implications of the findings for future financing policy in the country and elsewhere in the region. In particular we will highlight the implications for the roll out of the Health Sector Services Fund in Kenya which is intended to improve quality of care and facility utilisation, partly through improved adherence to user fee reduction.

4.302

A Multifaceted Intervention to Implement Guidelines and Improve Admission Paediatric Care in Kenyan District Hospitals: A Cluster Randomized Trial

Philip Ayieko[1*], Stephen Ntoburi[1], John Wagai[1], Charles Opondo[1], Newton Opiyo[1], Santau Migiro[2], Annah Wamae[2], Wycliffe Mogoa[3], Fred Were[4], Aggrey Wassuna[4], Greg Fegan[1,5], Grace Irimu[1,4], Mike English[1,6*]

1 KEMRI-Wellcome Trust Research Programme, Nairobi, Kenya
2 Division of Child Health, Ministry of Public Health and Sanitation, Nairobi, Kenya
3 Ministry of Medical Services, Nairobi, Kenya.
4 Department of Paediatrics and Child Health, University of Nairobi, Kenyatta National Hospital, Nairobi, Kenya
5 Infectious Disease Epidemiology Unit, Department of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, London, UK.
6 Department of Paediatrics, University of Oxford and John Radcliffe Hospital, Headington, Oxford, UK

Background: In developing countries referral is commonly required for very sick children but hospital care is often of poor quality. However strategies to change multiple practices in rural hospitals have rarely been tested.

Methodology: Eight hospitals were randomly assigned to a full intervention (evidence-based guidelines, training, job aides, local facilitation, supervision and face-to-face feedback; n=4) or a control intervention (guidelines, didactic training, job aides, and written feedback; n=4). Pre-specified structure, process and outcome indicators were measured at baseline and during three and five 6-monthly surveys in control and intervention hospitals respectively. Primary outcomes were processes of care measures, assessed 18 months post-baseline.

Results: In both groups performance improved from baseline. Completion of admission assessment tasks was higher in intervention sites at 18 months (mean=0.94 versus 0.65, adjusted difference 0.49, [95%CI 0.30, 0.69]). Uptake of guideline recommended therapeutic practices was also higher within intervention hospitals: adoption of once daily gentamicin (89.2% versus 74.4%; 17.1%[8.04%, 26.1%]); loading dose quinine (91.9% versus 66.7%, 26.3%[-3.66%, 56.3%]); and adequate prescriptions of intravenous fluids for severe dehydration (67.2% versus 40.6%; 29.9%[10.9%, 48.9%]). The proportion of children receiving inappropriate doses of drugs in intervention hospitals was lower (quinine dose >40mg/kg/day (1.0% versus 7.5%; -6.5%[-12.9% , 0.20%]), and inadequate gentamicin dose (2.2% versus 9.0%; -6.8%[-11.9%, -1.6%]).

Conclusions: Specific efforts are needed to improve hospital care. A full, multifaceted intervention was associated with greater changes in practice spanning multiple, high mortality conditions in rural Kenyan hospitals than a partial

intervention, providing one model for bridging the evidence to practice gap and improving admission

care in similar settings.

4.303

WATER SOURCES, TREATMENT AND STORAGE AT THE HOUSEHOLD LEVEL IN MBITA DISTRICT

Mohamed Karama[1, 3, 4], Sheru Wanyua [1, 6], Ibrahim Kiche[1, 5], James K'Opiyo[1], Satoshi Kaneko[1, 2, 3]

1)   Nagasaki University Institute of Tropical Medicine-Kenya Medical Research Institute (NUITM-KEMRI) project, Kenya
2)   Department of Eco-Epidemiology, Institute of Tropical Medicine, Nagasaki University, Japan
3)   Graduate school of International Health Development, Nagasaki University, Japan
4)   Centre of Public Health Research (CPHR), Kenya Medical Research Institute (KEMRI), Kenya
5)   Spring of Hope (Community-based organization), Kenya
6)   Masters of Science (Public Health) Program at the Institute of Tropical Medicine and Infectious Diseases (ITROMID)

Background: Diarrhoea as a result of unsafe water causes 4% of all deaths and 5% of health loss to disability. It is commonly caused by gastrointestinal infection which kills 2.2 million people globally every year especially children. Cholera and dysentery may cause severe life threatening forms of diarrhoea. Access to safe drinking water, improved sanitation and personal hygiene are paramount intervention approaches.

Objective: The main objective of this study was to determine the sources of water, how it is treated and stored by people living in Mbita district.

Methodology: In this study, 12,806 households were visited as part of the Health and Demographic Surveillance System (HDSS) in January 2009. Data collected included sources, treatment and storage of water. Where possible we also inspected and documented the stored water condition.

Results: Majority of the residents (81.7%) collect their water from Lake Victoria and only 6.1% get their water from the Ministry Of Water taps and 3.8% get water from a river.Most people claimed that they used water guard for treatment but this has not been confirmed and 8.4% boil while 20% admitted not treating water in any way. Rain water harvest was reported in 57% of households. Among those who store water, in 22 (<1%) households there were algae growth, 8 (< 1%) had mosquito breeding and 16% had soil and other deposits.

Conclusion: This area experiences frequent cholera and other diarrhoeal diseases outbreak and it is therefore important to ensure safety of the water at household level which will contribute substantially to the reduction of the incidence of water related diseases.

4.304

Challenges in Implementing Emergency Obstetric and Neonatal Care (EmONC) in Malindi District, Kenya: A Maternity Health Facility Survey

Echoka Elizabeth, Yeri Kombe, Moses Mwangi:

Centre for Public Health Research (CPHR) - KEMRI

Background: In Kenyan, access to and use of quality EmONC services are essential to efforts aimed at reducing maternal and neonatal mortality, which have remained unacceptably high. Although committed to improving maternal and child related MDGs, the question that still remains unanswered is whether health facilities have the capacity to

implement prioritised interventions for improving MDGs 4 and 5. This question formed the basis for this study.

Aim: To examine maternity facilities capacity to implement maternal and newborn health interventions with a focus on Emergency Obstetric

and Neonatal Care (EmONC) in Malindi District, Kenya.

Materials and Methods: A descriptive cross sectional study targeting health facilities that provide maternity services was carried out between Oct–Dec 2010. Information on staffing levels, obstetric procedures performed, availability of equipment and supplies was collected. Assessment of facility EmONC status using the UN guidelines and GIS mapping of facilities was done.

Results: Majority (90%) of facilities were non EmONC. In relation to population size, the UN recommended minimum number of functioning EmONC facilities was not met (75%). There were glaring rural–urban disparities in terms of equity and geographical distribution of EmONC facilities. The least performed EmONC signal functions are administering parenteral antibiotics (12.5%), parenteral anticonvulsants (15%) and neonatal resuscitation (35%). Assisted delivery was not performed. Ampicillin was least (15.8%) available, Ergometrin and Prostaglandin available in none and MgSO4 available in only 26.3%.There was a glaring shortage of nurse-midwives in all the three levels of health facilities assessed, dispensaries being most affected. Majority (73.7%) of the

facilities had partograph forms, however 42.1% did not use them. AMTSL was practised in only 42.1% of facilities. No facility, irrespective of EmONC status had a defined algorithm for managing obstetric emergencies or a register for obstetric complications. Majority (68.4%) of facilities had user fees for normal delivery irrespective of level, ranging Ksh 200-600 (USD 2.5-8).

Conclusion: EmONC services in the district do not meet the UN recommendations. There are glaring gaps in terms of performance of EmONC signal functions occasioned by challenges such as lack of necessary equipments and supplies and inadequate qualified health personnel as deemed necessary by the Kenya national standards. Findings provide a starting point for sensitisation and dialogue with DHMT, health personnel and other stakeholders on how to improve resources for maternal and neonatal health in Malindi district. Specific areas that require attention include, upgrading of lower levels maternity facilities in underserved areas in the district and ensuring that basic equipment, supplies and trained personnel are available in order to provide the critical services.

Key words: *Kenya, Malindi District, EmONC, signal function, maternal and neonatal health, MDG 4 and 5, maternity services,*

4.305

Evaluation of sanitation hygiene and insecticide-treated nets use in Mwaluphamba location, Kwale district, Kenya

Mwobobia IK[1], Ng'ang'a PN[2], Muniu EM[1], Mukoko DA[3] and Njenga SM[1]

1 Kenya Medical Research Institute (KEMRI)
2 Jomo Kenyatta University of Agriculture and Technology (JKUAT)
3. Division of Vector Borne Diseases (DVBD), Ministry of Public Health and Sanitation

Background: Neglected tropical diseases (NTDs) affect the poorest people living in sub-Saharan Africa (SSA) and other poor regions of the world. Schistosomiasis, soil-transmitted helminthiasis, and lymphatic filariasis are the most prevalent neglected tropical diseases (NTDs) in coastal Kenya where malaria is also co-endemic. A recent study done by our group in Mwaluphamba Location, Kwale district, reported the overall prevalence of urinary schistosomiasis and hookworm in school children to be 51% and 42%, respectively.

Objective: To assess the level of sanitation hygiene and insecticide-treated nets (ITNs) use in

rural villages with high prevalence of NTDs in Mwaluphamba location, Kwale district.

Methodology: A cross-sectional survey was conducted in 2009 among 1143 households in five study villages. A structured questionnaire was administered, in each household, to persons aged 15 years and above. MS Access software was used to create and manage the database whereas the SPSS programme was used for statistical analyses of the data.

Results: Of the 1143 households surveyed, 896 (78.4%) had no latrines. Thirty seven (15%) of the latrines were not in use while for those in use, 46 (22.5%) were not clean (had urine and/or faeces on

the floor). Only 9.5% of the respondents reported treating water before use. It was observed that 705 (61.8%) of the respondents were barefooted at the time of interview. Five hundred sixty four (49.3%) households had no mosquito net. Among women of child-bearing age (15-49 years) and under fives, 415 (23.5 %) and 424(28.6%), respectively, reported having slept under a net the night prior to the survey. Majority of the nets, 357 (67.5%), were acquired as donations from the government. Among the latest acquired nets, 431(83.3%) were ITNs. Two hundred thirty eight nets (42.3%) had holes.

Conclusions/recommendations: There is a need to educate the community on sanitation hygiene and use and maintenance of ITNs in efforts to control NTDs and malaria.

Track 6 & 7: Public Health I & II	Venue: Training Center (Foyer)

4.110

Developing a data collection network of traditional birth attendants on birth at home in the Mbita health and demographic surveillance system

Sheru Wanyua [1, 6], Ibrahim Kiche[1, 5], Mohamed Karama[1, 3, 4], James K'Opiyo[1],
Satoshi Kaneko[1, 2, 3]

1)   Nagasaki University Institute of Tropical Medicine-Kenya Medical Research Institute (NUITM-KEMRI) project, Kenya
2)   Department of Eco-Epidemiology, Institute of Tropical Medicine, Nagasaki University, Japan
3)   Graduate school of International Health Development, Nagasaki University, Japan
4)   Centre of Public Health Research (CPHR), Kenya Medical Research Institute (KEMRI), Kenya
5)   Spring of Hope (Community-based organization), Kenya
6)   Masters of Science (Public Health) Program at the Institute of Tropical Medicine and Infectious Diseases (ITROMID)

Background: Monitoring vital events is essential to evaluate mother and child health (MCH) programs especially since neonatal death rate is the most sensitive indicator to monitor MCH. Reduction of neonatal mortality is important in achieving Millennium Development Goal 4 hence it is vital to have accurate data on neonatal deaths in the HDSS.

Objective: Our main objective was to complement and evaluate data on missing pregnancies, births and neonatal deaths through organizing a network of TBAs. This system has been and will be running concurrently with routine data collection in the HDSS by field workers.

Methodology: TBAs were identified and trained on how to record data. TBAs that can neither read nor write are assisted by their relatives and their clients to record data. Data collection is done once within six weeks and the data is linked with HDSS data to identify records that may have been left out during our surveys. This evaluation was done for the period between April 1st 2010 and September 16th 2010.

Results: Among 439 live births and 509 pregnancies obtained by the HDSS during the study period, the TBA data collection system identified 20 births (4.6% of total live births), 72 pregnancies (13.4%), 10 neonatal deaths (none of which had been recorded by the HDSS) missing from the routine HDSS data collection.

Conclusion: Networking of TBAs to collect data is a beneficial complementary system to improve the quality of HDSS data in the area where cultural or religious barriers exist and hinder the capture of pregnancies and neonatal deaths. This network can capture neonatal death events which could otherwise remain hidden if not captured early enough while babies that survive can be captured by the subsequent routine surveys. Pregnancy events captured by this network are also useful since it is possible to follow up the outcome of pregnancies.

Category: Public Health I & II

4.204
Uptake of 2009 Pandemic Influenza A (H1N1) Vaccine among Healthcare Workers in Kenya

P. Oria[1], C. Kelly[1], J. Ahmed[1], P. Muthoka[2], G. Emukule[1], S. Graitcer[3], M-A. Widdowson[4], A. Kosgey[1], R. Wanjala[1], J. Slingluff[1], D. Ombere[1], G. Arunga[1], D. Mutonga[2], J. Omolo[5], E. Muhonja[5], G. Gathecha[5], L. Gathigi[5], L. Makayoto[5], A. Tepo[1], L. W. Waiboci[1], R. Eidex[1], R. Breiman[1], M. Katz[1]

[1] Kenya Medical Research Institute/Centers for Disease Control and Prevention - Kenya, Nairobi, KENYA
[2] Kenya Ministry of Public Health and Sanitation (MoPHS), Division of Disease Surveillance, Nairobi, KENYA
[3] Epidemic Intelligence Service, Atlanta, GA
[4] Centers for Disease Control and Prevention, Influenza Division, Atlanta, GA
[5] Kenya Ministry of Public Health and Sanitation, Field Epidemiology and Laboratory Training Program (FELTP)

Background: In March 2010, Kenya received 730,000 doses of 2009 pandemic influenza A (H1N1) monovalent vaccine from the World Health Organization. From April-June 2010, the Kenya Ministry of Health conducted a 2009 pandemic influenza A (H1N1) (pH1N1) vaccine campaign targeting healthcare workers (HCWs) and other priority groups.

Objective: To assess uptake of pH1N1 vaccine among HCWs.

Methodology: In June and July 2010, we enrolled vaccinated and unvaccinated HCWs at five hospitals in five provinces of Kenya. We used a questionnaire to collect demographic, medical, and vaccine history information, as well as reasons for accepting or declining the pH1N1 vaccine.

Results: Of the 4,397 HCWs approached, 519 (12%) declined to participate in the evaluation. Of the 3,878 HCWs enrolled, 2,179 (56%) were female and the mean age was 33 (range: 18-75). A total of 2,471 (64%) were vaccinated. More females (64%) were vaccinated compared to males (62%) (p=0.05). Only 9 (0.36%) vaccinated HCWs and 2 (0.14%) unvaccinated HCWs also received the 2010 seasonal influenza vaccine (p=0.26). More vaccinated HCWs (8.4%) reported chronic medical conditions compared to unvaccinated (6.2%) HCWs (p=0.04). Less vaccinated HCWs, [39 (2.9%)] were pregnant compared to unvaccinated HCWs [34 (4.7%)] (p=0.03). Among vaccinated participants, 98% reported getting the vaccine in order to protect themselves from pH1N1. Other important reasons included to protect family members (75%), to protect patients (70%) and to prevent the spread of pH1N1 (73%). Reasons for not getting the vaccine included not being present when the vaccine was offered (50%), concern that pH1N1 vaccine may have side effects (24%) and concern about the side effects of vaccines in general (15%).

Conclusion: Nearly two-thirds of enrolled HCWs received the pH1N1 vaccine. Future vaccine initiatives may be more successful if concerns about vaccine side effects are better addressed and extended vaccination times are offered.

4.205
Title: Detection of Avian Influenza Among Wild Birds in Kenya, 2006 -2009.

S. Limbaso[1], D. Schnabel[2], S. Yingst[3], S Muchai[4], J.M. Macharia[5], L. Mwasi[1], M. Junghae[6], P. Ithondeka[5], R.F. Breiman[6], M. Katz[6], De Mattos Carlos[3], M. Kariuki Njenga[6]

1. Kenya Medical Research Institute,Nairobi, Kenya.
2. United States Army Medical Research Unit Kenya, Nairobi ,Kenya,
3. Naval Medical Research Unit 3 Cairo, Egypt,
4. National Museums of Kenya,Nairobi, Kenya,
5. Department of Veterinary Services Kenya,Nairobi,
6. International Emerging Infections Program,Centers for Disease Control and Prevention- Kenya, Nairobi, Kenya

Background: Migratory Birds play an important role in the movement of avian influenza (AI) throughout the world. Kenya, which to date has not reported a case of AI in humans or animals, is part of the bird migratory flyway from Europe and Western Asia.

Objective: To determine what subtypes of avian influenza viruses are harbored by wild birds in Kenya.

Methodology: At 13 flyway sites, birds were captured by ornithologists. Biometric parameters were recorded and each bird banded. Duplicate cloacal swabs were collected, placed in cryovials containing viral transport medium, and screened for influenza A by real-time RT-PCR. All positive Influenza A specimens were further screened for the H5 subtype. Sequencing was done to determine if the strain is highly pathogenic.

Results: Specimens were collected from 3,618 birds representing 150 species. Influenza A virus was detected in 1.7% (61/3618) of the all birds representing 23 different species. Of the 61 Influenza A virus positives 34% were from resident birds, 34% from paleartic migrants and 32% from intra African migrants. No highly pathogenic avian influenza viruses were detected during the study period. However, 1 low pathogenic avian influenza virus (LPAI) H12N2, 1 LPAI H5N8, 2 LPAI H5N2 and 1 H5 subtype whose neuraminidase subtype was not established were detected in 4 bird species.

Conclusions/Recommendations: The implementation of active surveillance has identified influenza A subtypes among wild birds in Kenya. The discovery of influenza virus in both migratory and resident birds reinforces the probability of the potential transmission between migratory and resident birds. This effort has built local capacity for the expert collection and analysis of bird samples for influenza and has given animal and public health experts a baseline of influenza virus activity in birds. This surveillance has the potential to function as an early warning system for HPAI.

4.206

Carriage Rate and Serotypes of *Streptococcus pneumoniae* in children at Thika District Hospital Kenya

Susan Githii[1], Gunturu Revathi[2], Anne Muigai[3], Samuel Kariuki[4]

[1] *Jomo Kenyatta University of Agriculture and Technology, Itromid KEMRI, Kenya,*
[2] *AgaKhan University Hospital Nairobi, Kenya,*
[3] *Jomo Kenyatta University of agriculture and technology (JKUAT), Kenya,*
[4] *Center for Microbiology Research, KEMRI, Kenya*

Background: *Streptococcus pneumoniae* is a major cause of morbidity and mortality worldwide causing diseases that range in severity from meningitis, septicemia, and pneumonia to sinusitis and acute otitis media. Rates of carriage are highest in infants and the elderly.

Objective: To determine the rate of nasopharyngeal colonization by *S. pneumoniae*, distribution of serotypes and antimicrobial susceptibility in children below five years, admitted in Thika District Hospital.

Methodology: Cross sectional study design was used. Nasopharyngeal swabs were collected from 315 children in the month of September and October 2010 and processed to isolate *S. pneumoniae*. The isolates were serotyped by the Quellung reaction and their antibiotic susceptibilities assessed by disk diffusion method.

Results: The overall nasopharyngeal carriage rate for *S. pneumoniae* was 18%. The highest rate of carriage was found in children between one and two years (23 %). There was no significant difference in carriage rates between males and females. Seventeen serotypes were detected among 55 strains analyzed. The isolates belonged to serotypes 6A, 23F, 19F, 13, 6B, 14A, 20, 7C, 1, 15B, 35B, 19A, 11A, 34, 5, 3 and 23A. The three most frequent serotypes were serotype 6A, 23F and 19F. Susceptibility testing revealed that 7% of the isolates were resistant to penicillin and cefotaxime. Resistance to chloramphenicol and erythromycin was 2% and 4%, respectively. High levels of resistance were noted for cotrimoxazole (98%). All isolates were fully sensitive to tetracycline.

Conclusion: There was high level of cotrimoxazole resistance and to other

antimicrobial agents commonly used in Kenya. There will be need to revise antimicrobial policy in the treatment of invasive pneumococcal infections. The most frequently isolated serotypes are included in the seven-valent vaccine and immunization therefore will be important as a prevention tool for pneumococcal infections in the region.

4.207
Evolutionary Pattern of the Hemagglutinin Gene of Influenza B Viruses isolated in Kenya 2005-2009

Gachara, G.[1,2], Bulimo, W.[2], Magana, J.[2], Simwa, J.[2], Symekher, S[2].

1- Dept of Medical Laboratory Sciences, Kenyatta University
2- National Influenza Centre, CVR, KEMRI

Background: In humans, the inability to provide lasting protection against influenza B virus infection is due, in part, to the rapid evolution of the viral surface glycoprotein, haemagglutinin (HA), which leads to a change in its antigenic nature. Therefore, the evolution of the haemagglutinin (HA) an important influenza antigen has and continues to be a subject of intensive research. In this study, we analyzed the evolution occurring in the haemagglutinin of influenza B viruses from Kenya since virological surveillance began in 2005.

Methods: Thirty (30) influenza B haemagglutinin sequences of viruses isolated from different parts of the country between 2005-2009 at the NIC were analyzed. Nucleotide sequences, prediction of amino acid sequences, alignments, and phylogenetic tree construction were completed using BioEdit and MEGA® software

Results: During the five year study period, the two influenza B lineages B/Yamagata and B/Victoria have co-circulated in two years (2005 and 2007) while B/Yamagata viruses exclusively circulated in 2008 and B/Victoria viruses in 2006 and 2009. The nucleotide sequence identity ranged from 92.9% - 97.0% among the B/Yamagata lineage viruses and 90.6% - 98.5% among the B/Victoria lineage viruses. There was generally noted more amino acid substitutions among the B/Yamagata lineage than the B/Victoria lineage. Substitutions were observed in all the epitope regions among B/Yamagata viruses compared to three epitopes in the B/Victoria viruses. Both lineages showed substitutions at position HA1 165.

Conclusions: These results demonstrate that distinct viruses within the two lineages have been co-circulating in the country every year and that there has been a greater evolution of the B/Yamagata viruses. At the same time it is noted that like elsewhere, influenza B viruses in the country have continually been evolving by antigenic drift. In-order to understand whether reassortments have occurred, the study suggests periodic complete genomic sequencing of select.

4.208
Sero Prevalence of Dengue 2 Virus Infections In Patients Presenting with Febrile Illness In Selected Health Facilities In Trans Nzoia Region, Kenya

Muuo Nzou[1], Matilu Mwau[1], Rebecca Waihenya[2]

[1] Centre for Infectious and Parasitic Diseases Research, [2]Jomo Kenyatta University of Agriculture and Technology (JKUAT), Faculty of Science, Department of Zoology, P.O. Box 62000 Nairobi - 00200, Kenya

Dengue Virus and other Arbovirus infections are considered public health threats in Kenya. Although it is evident that these infections are now re-emerging, an accurate estimate of the magnitude of the problem has not been documented. For the health burden to be realized, the study was aimed at determining the sero prevalence of dengue 2 virus in Trans Nzoia, correlating the clinical information and laboratory diagnosis of dengue 2 virus infection and assessing the risk of epidemic transmission for dengue 2 virus in Trans Nzoia region. To

describe and document the exact threat posed by this virus in Kenya, there was need to use the right laboratory tools to conduct regular serological surveys. Optimization of Enzyme Linked Immunosorbent (ELISA) and Plaque Reduction Neutralization (PRNT) assays were used for this purpose. Serological surveillance of Dengue 2 virus using these assays was done in Kitale District Hospital, Andersen Medical Clinic and Endebess District Hospital, all located in Trans Nzoia District. A total of 1121 samples were screened for Dengue – 2 virus infection by ELISA and PRNT and the sero prevalence found to be 0.9% with most of the positive patients from Kitale district hospital.

The clinical information correlated well with the laboratory diagnosis with 16 (32%) and 15 (30%) positive patients presenting with fever and headache respectively. In conclusion, Trans Nzoia District is far from the coastal regions where Dengue 2 virus epidemic was first reported in Kenya, the sero prevalence shows that it might be a re-emerging infection which could now be spread throughout the Nation. The study results are important to the Ministry of Public Health, Kenya, in realizing the impact of Dengue – 2 virus infection in Trans Nzoia, risk of an epidemic transmission and setting up effective surveillance systems.

4.209

Anti fungal drug profile (Triazoles) of dermatophytes isolated from a children's home in Nairobi, Kenya.

Mashedi O.M.M[1]. Bii.C.C[1], Okoth S.[2], Hoog S[3], Gatumwa E.,[1]

1. Kenya Medical Research Institute (Mycology Department) P.O.BOX, 47855-00100-Nairobi, Kenya.
2. University of Nairobi, School of Biological Sciences. P.O.BOX 30197-00100, Chiromo Campus, Nairobi, Kenya.
3.Centraalbureau voor Schimmelcultures (CBS) Fungal Biodiversity Center, Institute of Royal Netherlands Academy of Arts and Sciences P.O. Box 85167, 3508 AD,Utrecht the Netherlands

Background: Dermatophytes are fungi that invade the keratinized tissue (skin, hair and nail) to produce infections referred to as dermatophysis. The severity of dermatophysis may be as a result of the host reactions to the metabolic products of the fungus, the anatomic location of the infection, the virulence of the infecting species, the immune status of the patient and local environmental factors. The HIV/AIDS and other immunocompromised infections and diseases have led to the steady rise in opportunistic fungal infections including dermatophytes It is from this aspect that we decided Total of 36 skin scrapings were examined by direct microscopy and culture methods.
Objective: To find out the anti fungal drug profile (Triazoles) of dermatophytes isolated from children home in Nairobi Kenya.
Methods: The skin scrapings were obtained from HIV positive children in children's home.

In vitro activity against triazoles and azoles antifungals drug profile was determined in accordance to Clinical and Laboratory Standards Institute (CLSI) M 38-A document.
Results: The antifungal assay showed that among the Azoles Fluconazole was resistant to all the dermatophytes tested. Posiconazole and Isaconazole were the most potent drugs against dermatophytes.
Conclusion/Recommendation: The use of Fluconazole as treatment of dermatophytes should be discouraged because it has been documented to show resistant to most filamentous fungi such as dermatophytes. Even though there are no standard methods for conducting *in-vitro* antifungal drugs profiles; more correlation of *in- vivo* and *in-vitro* drug susceptibility profiles studies should be done, using both laboratory and clinical approach to improve treatment.

4.210
Identification of enteric pathogens causing diarrhea in Kenya

J. Ndonye[1], R. Kirera, E. Odundo, and B. E. Swierczewski[1]

USAMRU-K/ WRP-KEMRI, Kericho.

Background: Acute diarrhea remains a major public health problem in developing countries and is responsible for nearly 2.5 million deaths of children under the age of 5. Of the enteric studies conducted in Kenya over the past 20 years, the majority of the findings have been clustered around bacterial outbreaks with a few individual studies reporting on parasitic and viral causes. To date, there is insufficient data on the various enteric pathogens causing acute diarrhea in Kenya.

Objectives: To identify enteric pathogens from acute diarrhea specimens in the general population from different geographic areas of Kenya.

Methodology: Stool samples from age-matched cases and controls were collected from several district hospitals in Kenya. Protozoans were identified using the Triage kit while microscopy was used to identify helminth ova. Isolation and identification of bacterial pathogens was by conventional microbiological methodologies while detection of rotavirus was done using Rotaclone kits.

Results: On microbiological examination, diarrhoegenic agents were detected from 207 (28.3%) of 731 fecal specimens collected (387 cases and 344 controls). The agents were bacterial 23% (*Salmonella spp, Shigella spp, Campylobacter jejuni, Yersinia enterocolitica,* and enterotoxigenic *Eshcerichia coli*), rotavirus 26.5% and parasitic 49.75% (*Giardia liamblia, Entamoeba histolytica, Cryptosporidium parvum, Ascaris lumbricoides, Schistosoma mansoni, Strongyloides stercoralis, and hookworm*) respectively. Of the bacterial pathogens, *Shigella spp* was the most common while *G. lamblia* was the most common parasite.

Conclusions and recommendations: The findings suggest that, parasitic infections were the main cause of diarrhea followed by rotavirus and bacterial pathogens. Additional studies should be done in order to unearth the root cause of contamination with the etiological agents. Ongoing studies include antibiotic susceptibility testing for each bacterial pathogen isolated.

4.211

Superficial fungal infections a major contributing factor in skin infections in outpatients attending a research clinic in alupe Western Kenya

Mokaya.M.T., Adungo.F.O., Makwaga. O⁻, Omao. E., Khamala .K. Andayi .F.O.Adungo N.I. and Mwau.M.

Centre for Infectious & Parasitic Diseases Control Research[1]

Background: Fungi are ubiquitous in nature, and while most usually pose no threat to humans, some can cause serious illnesses. Fungal infections are often associated with HIV/AIDS in sub-Saharan Africa. Fungi may enter the body through a skin puncture. Some are spread between humans or from animals to humans. Mycoses, the infectious diseases caused by fungi, are more common in people with weakened immune systems, such as AIDS patients or those receiving steroid treatment. Superficial fungal infections can be acute short-term problems or chronic illnesses. Some mycoses can be difficult to treat, a number of

antifungal drugs are available, but some are expensive.

Objective: The aim of this study was to determine the prevalence and mycological features of superficial fungal infections in CIPDCR, Alupe, Teso District.

Methods: The patients aged 16 years and above of both sexes with suspected superficial skin infections were sampled. Affected areas were cleaned with 70% ethanol and light scrapings were taken from the active edges of lesions using sterile scalpel blade. The scrapings were suspended in a drop of 30% potassium hydroxide (KOH) solution, and visualized through direct microscopy.

Results: In total, 423 cases of suspected superficial fungal infections were sampled in a period of one year. Off the 223 (52.7%), females, 171 had identifiable fungal elements, while 148 off the 200(47.3%) males had identifiable fungal. The 104 (24.6%) had ominous skin infections clinically indistinct.

Conclusion: Superficial fungal infections are common in Alupe, Teso District. Detection by KOH not so sensitive other methods need to be identified.

4.307

Seasonal Influenza Vaccine Acceptance in Rural and Urban Kenya, 2010

Mwendwa JD[1], Awuor NO[1], Lebo E[1], Muthoka P[2], Bigogo G[1], Laserson K[1], Njuguna H[1], Olack B[1], Ope M[2], Mutonga D[2], Ongalo S[1], Oria P[1], Arunga G[1], Widdowson M[3], Shay D[3], Waiboci LW[1], Sharif SK[4], Breiman RF[1], Katz MA[1]

[1] Kenya Medical Research Institute/Centers for Disease Control and Prevention - Kenya, KENYA
[2] Ministry of Public Health and Sanitation (MoPHS), Division of Disease Surveillance and Response, Nairobi, KENYA
[3] Centers for Disease Control and Prevention, Influenza Division, Atlanta, GA
[4] Ministry of Public Health and Sanitation, Nairobi, KENYA

Background: Influenza vaccine has been shown to reduce influenza-associated acute respiratory infections in developed countries. However, little is known about public perception on influenza and influenza vaccine in Sub-Saharan Africa.

Objective: The objective of this study was to assess attitudes about influenza illness and influenza vaccine among residents of two Kenyan communities prior to and following a seasonal influenza vaccine effectiveness study.

Methods: In March 2010, Kenya Medical Research Institute/Centers for Disease Control and Prevention and Kenya Ministry of Public Health and Sanitation implemented an observational seasonal influenza vaccine campaign, offering free vaccine to study residents 6 months – 10 years old in Lwak and Kibera. We conducted a public awareness campaign about influenza vaccine using posters and household visits. Data were collected to assess community attitudes about influenza and influenza vaccine, and evaluate success of the awareness campaign.

Results: Among the interviewed respondents, 2,859(89.5%) respondents in Kibera and 1,986(95%) in Lwak cited they intended to vaccinate their children because influenza vaccine protects children from influenza [2,219(77.6%) Kibera, 1,780(89.6%) Lwak], and influenza vaccine would protect their family [196(6.9%) Kibera, 365(18.4%) Lwak]. Reasons for not intending to vaccinate children included; need for more information about the vaccine [18(10%) Kibera, 48(73.8%) Lwak], and concerns about adverse effects of influenza vaccine [9(5%) Kibera, 8(12.3%) Lwak]. Among the interviewed respondents following the vaccination campaign, 2,050(64.4%) Kibera and 1,630(63.4%) Lwak respondents said they vaccinated their children. Respondents who did not vaccinate their children cited inconvenient vaccination hours [106(10.6%) Kibera, 71(7.9 %) Lwak], parents too busy [251(25.0%) Kibera, 95(10.7%) Lwak] and children not available [199(19.8%) Kibera, 94(10.6 %) Lwak].

Conclusion: Acceptance of free seasonal influenza vaccination was moderately high in Kibera and Lwak. Extended clinic hours, and a more intensive awareness campaign could improve uptake in future years of the vaccine campaign.

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Knowledge/awareness of association of drug abuse and disease among students in Public Secondary Schools in Nairobi, Kenya.

Lydia W. Mwaura[1]I; Karatu Kiemo[2]; 2 Robinson Ocharo[2]; Benson Agaya[2]

1 – Centre for Public Health Research
2 – University of Nairobi, Kenya

Background: The problem of drug abuse among students in public secondary schools has recently received greater attention from professionals, the public and some leaders particularly following the spate of strikes and riots in more than 300 secondary schools in Kenya in 2008. One of the reasons for concern is that the health of youth is critical in the development and maintenance of human resource capacities within the Kenya Vision 2030 framework.

Objective: To assess the knowledge/awareness of public secondary school students on association of drug abuse and disease.

Methods: A cross-sectional descriptive study was carried out in October 2008. Eight (8) Nairobi public secondary schools with a total of 116 students in Form 1 – Form 4 were randomly selected using probability and non-probability sampling techniques. Semi-structured questionnaire, key informant interview guide, and focus group discussion question guide were used to collect primary data. Quantitative and qualitative methods of data analysis were used to arrive at the findings.

Results: Mean age of the study students was 16.44 (±1.39) years. All the respondents (100%) were aware of, and had seen, heard, or were able to name any of the commonly abused drugs. Majority (87.9%) of the respondents knew and were familiar with bhang, (70.7%) stated that they were familiar with alcohol, while 66.4% and 59.5% had knowledge/awareness of cigarettes and miraa/khat respectively. Nearly one third (30.2%) were aware of cocaine while 19.0% of respondents had knowledge of heroin. Whereas nearly three quarters (72.4%) of students were able to associate drug abuse and HIV/AIDS, 24% responded negatively, while about 3% were not aware of this association. Most respondents (88.8%) were aware that regular use of alcohol can cause disease, while 8.6% were not aware of this association. The respondents associated alcohol abuse with liver cirrhosis and cancers which were mentioned by 64.7% and 26.7% of the respondents, respectively. Most respondents (98.3%) were aware of the relationship between drug abuse and mental illness, while 1.7% mentioned that drug abuse could not lead to mental illness. From the focus group discussion we found out that respondents were aware that when students take commonly abused drugs, they experience hallucinations, screaming, and they are unkempt and unable to groom themselves.

Conclusions: Although most students are aware of the impact of commonly abused drugs on their health and that of others, there is still need to intensify education, guidance and counselling among students in public secondary schools in Kenya.

Key words: *Students, knowledge/awareness, drug abuse, disease, public secondary schools.*

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Birth Spacing In Western Kenya: Effect of Family Composition and Wealth Index on Birth Intervals, 2003 -2008

Sewe M[1], Williamson, John[2], Odhiambo F[1], Laserson KF[1, 3]

[1] KEMRI/CDC Research and Public Health Collaboration
[2] U.S. Centers for Disease Control and Prevention, Atlanta, GA, USA
[3] U.S. Centers for Disease Control and Prevention-Nairobi, Kenya

Background: Short birth intervals may have an adverse effect on child survival. We sought to identify factors associated with birth spacing in the western Kenya KEMRI/CDC Health and Demographic Surveillance System (HDSS).

Methods: The KEMRI/CDC HDSS is a continual monitoring of population changes and characteristics in western Kenya through collection of births, deaths, migration and socio-economic data of 220,000 individuals. All births recorded for the resident population of Asembo, Gem and Karemo for the period 2003-2008 were used for this analysis. A birth interval is the number of months between one birth and the next. All births intervals that were not closed by another birth were censored when the mother died, exited from the study area, was lost to follow-up or at the end of the observation period. Fertility history was reconstructed from previous recorded births. A Cox proportional hazards model using the counting process method was used to model time to next birth.

Results: Overall, 15,171 (44%) of the 34,586 intervals opened by one birth were closed by another birth. The median length of a birth interval was 26 months. Factors that significantly influenced longer time to the birth of the next child included age of mother at birth (HR: 0.81, 95% CI: 0.77, 0.85), (HR: 0.71, 95% CI: 0.67, 0.75) for mothers aged 20-24 and 25+ years respectively compared to ≤20 years, having twins (HR: 0.78, 95% CI: 0.66, 0.90), having secondary education or higher (HR: 0.83, 95% CI: 0.74, 0.93) compared to no education, having higher socio-economic status (HR: 0.85, 95% CI: 0.80, 0.90). Factors that significantly reduced time to birth of next child included: the proportion of children under the age of nine years (HR: 3.98, 95% CI: 3.49, 4.54), having primary education (HR: 1.14, 95% CI: 1.01, 1.27) compared to no education, non survival of previous child (HR: 1.36, 95% CI: 1.29, 1.43). The total number of children a woman had (crude parity), the total number of surviving children a woman had (net parity, proportion of female children and having at least one male child did not influence duration to next birth.

Conclusions: The number of surviving children and sex composition of the children did not have an impact on duration to birth of next child suggesting that in the DSA the speed of parity progression was not controlled by a specific number of off springs in mind. Women with only primary education, a high number of dependent children and who had a previous child who died tended to have shorter birth intervals and should be targeted with awareness campaigns on the hazards of having short intervals on child survival.

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"Whose Priority is it?" Qualitative findings on priority health issues and implications for strengthening Primary Health Care in western Kenya using the community-directed approach

Lorraine Ogange, John Ayisi, Jane Alaii, Vincent Atuncha, Gladys Odhiambo, Ibrahim Shiwalo, Diana Karanja, Pauline Mwinzi.

Center for Global Health Research, Kenya Medical Research Institute, P.O. Box 1578-40100, Kisumu, Kenya; ˙Biomedical Sciences and Technology Department, School of Public Health and Community Development, Maseno University; P.O. Box Private Bag, Maseno-Kenya;Ministry of Public Health and Sanitation, Kisumu.

Background: Much of health policy issues are tackled at the national level without input of the people that it is intended for – the community.

Objective: We conducted a qualitative study to try to identify priority health issues starting from the national level, provincial, district level, frontline level and up to the community level. This formative study was aimed to better understand some of the most common health issues and what they considered as priority health issues to help in designing appropriate strategies for strengthening primary health care in Western Kenya.

Methods: Purposive sampling was used to identify two pairs of districts (a total of 4 districts) for each study site. Two districts in Central Nyanza were identified; Kisumu West and Rarieda. And two districts in Southern Nyanza province where PHC implementation was poorer; Homa Bay and Rachuonyo. The second pair consisted of two districts with a relatively poor level of implementation. The

districts in each pair were comparable in terms of level of PHC implementation, rural population size, implementation of community-based health care programs and major socio-cultural characteristics that were considered relevant for the purpose of the study. The formative research was undertaken in all the 4 selected study districts using qualitative methods like key informant interviews, FGDs and documents review. Data was transcribed and imported into Atlas-ti for analysis.

Results: There was disparity between what the health system considered as health priorities and what was considered priority by community members. Diseases and health conditions related to HIV/AIDS, TB and Malaria were given overall priority rating from health system and community members. However, issues on maternal and child health and water and sanitation were given high priority rating mainly at the community level.

Conclusion: For the communities that are around Lake Victoria, safe water and sanitation as well as maternal and child health are given priority rating. More resource allocation for intervenions should be allocated in these health issues.

4.311
Title: Establishing a national nutraceuticals and phytomedicines development pipeline: Process optimization of a herbal based low sodium table salt.

Keter L.[1], Mwaghadi Z.[2], Karanja R.[1], Wekesa I.[2], Murunga S.[2], Tolo F.[1], Gituku B.[2], Ronoh W.[1], Ngunjiri P.[2] Mwitari P.[1] and Orwa J.[1]

[1]*Kenya Medical Research Institute, P.O. Box 54840-00200, Nairobi, Kenya*
[2]*Kenya Industrial Research and Development Institute, P.O. Box 54840-00200, Nairobi, Kenya*

Background
Development of a natural products innovation system provides the much needed impetus for the successful integration of traditional medicine into the national health system. The World Health Organization (WHO) estimates that 80% of the world's population relies on these "alternative" plant-based medicines as their primary medical intervention. Impediments to the integration of traditional medicine with conventional practice include the unavailability of safety, quality and efficacy data and value added herbal products. Papyrus reed ash has been used traditionally as a salt substitute in Western Kenya. Early studies carried out at KEMRI indicated that Potassium salt substitution derived from local papyrus reed has a favourable K/Na ratio that is suitable for use to regulate high blood pressure in hypertensive patients when used in place of table salt. **Objective**
The general objective was to establish a national development pipeline for the development of a nutraceutical from natural products.

Methodology
The plant material was collected from two study sites in Rift Valley then cleaned, chopped, dried and ashed at KIRDI. Extraction was done using the laboratory scale method at KEMRI and an optimized method for industrial scale at KIRDI. The industrial method was developed and optimized based on the laboratory scale method.

Results
The ash percentage yield for the two samples was between 23 and 29 %. The herbal salt yield for the laboratory scale processing was about 10 % for both samples but 13 and 22 % using the optimized extraction procedure for the Nakuru (KTM-4) and Naivasha (KTM-3) samples, respectively. On further purification of the pilot scale herbal salt, pure herbal salt was obtained. Preliminary results show the K/Na ratios to be 4.48 for KTM-3 and 18.02 for KTM-4. Elemental analysis results indicate the presence of both essential and non-essential elements. Heavy metal contamination was also found to be within the WHO provisional tolerable weekly intake (PTWI) values /Acceptable Daily Intake.

Conclusion
The preliminary data indicate this product will not only be favourable for persons with

mild hypertension but can also be a source of other essential trace elements such as chromium, Zinc and manganese among other.