

**International Center for Advanced Research and Training  
&  
International Institute for Tropical Agriculture**



**2017 INTERNATIONAL RESEARCH SYMPOSIUM**

17-19 August

Bukavu, Democratic Republic of Congo

ICART Founders



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## WORDS OF WELCOME

It is with great pleasure that I welcome you to the second International Research Symposium co-hosted by ICART and IITA.

With this symposium we have the opportunity to acknowledge and consolidate the great strides that have been made since we held the first Symposium three years ago. Collectively, we have not only enhanced research capacity within Bukavu but we have strengthened our inter-institutional scientific collaborations within Bukavu and the DR Congo as well as across Africa, and with institutions in Europe and the United States of America.

As already stated by the introduction of our first Symposium, many problems confronting the citizens of the Democratic Republic of the Congo and of the African continent may best be addressed by the unique expertise and experience of African researchers. Thus our goals continue to be to support research training, to promote innovative and collaborative research partnerships and to engage African scientists and their partners with the aim of finding solutions to pressing social issues through research. DR Congo, like many other countries that have experienced decades of conflict, has a great need to understand the challenges of a post-conflict society and to develop evidence-based solutions to address poverty, reduce the burdens of hunger, disease and gender based violence, and to promote peace and security.

Special collaboration with institutions such as the Panzi Hospital/Panzi Foundation, the Evangelical University in Africa and the University of Michigan, which are co-founders of ICART, and collaboration with other local institutions, such IITA and the other local universities and hospital serve as powerful instruments to help in the national recovery.

So again, let me welcome you to this opportunity for substantive research dialogs and may many new research teams and projects emerge from this symposium.

Janis M. MILLER, Symposium Chair

## THEMES AND OBJECTIVES

### Objectives

- To build on the synergies begun at the 2014 ICART symposium, which offered its first forum for disseminating exemplary scientific/scholarly communications on research
- To maximize opportunities for face-to-face interactions with highly qualified international researchers and beginning scholars/scientists.
- To deepen collaborative interactions between symposium participants' research institutions.
- To maximize the International Center for Advanced Research and Training and its institutional partners' visibility and potential for highest impact within and outside of the eastern region of Africa.
- To share IITA's contribution to agriculture and nutrition through science and development.

Operationalizing the Objectives: We will emphasize content expertise areas around the interacting themes to operationalize the symposium objectives, using both oral and poster presentation, a writing workshop embedded into the symposium timeframe, and multiple opportunities for networking.

### Themes

- Food Security and Nutrition
- Infectious and Diarrheal Diseases
- Health and its Social Consequences for Women
- Ecological and Environmental Impacts on Health
- Other

## SYMPOSIUM COMMITTEE

### Symposium Chair

Janis M. MILLER, PhD, APRN, FAAN  
Professor, School of Nursing  
Research Professor, Obstetrics & Gynecology, School of Medicine  
University of Michigan, Ann Arbor, USA

### Symposium Co-Chair

Kanigula MUBAGWA, MD PhD,  
Professor, Dept. of Cardiovascular Sciences,  
University of Leuven, Leuven, Belgium  
Director, International Center for Advanced Research and Training (ICART)

### Symposium Co-Chair

Chris OKAFOR, PhD  
Officer-in-charge  
IITA-Kalambo Station  
Bukavu, DR Congo

### Scientific Committee:

Siobán D. HARLOW, PhD, *co-chair*  
Professor, Epidemiology and Global Public Health  
Professor, Obstetrics and Gynecology  
Director, Center for Midlife Science  
University of Michigan, Ann Arbor, Michigan USA

Katcho KARUME, PhD, *co-chair*  
Professor of Physics, Mathematics, Climate Change and GIS and Remote Sensing  
Dean of the Faculty of Agricultural and Environmental Sciences  
Université Evangélique en Afrique, Bukavu, D.R. Congo *and*  
Director General, Goma Volcano Observatory, Goma, D.R. Congo

Parvine BASIMANE BISISMWA, MD, MSc  
Tropical Infectiology  
Research Assistant, Faculty of Medicine  
Université Evangélique en Afrique, Bukavu, D.R. Congo

Paul M. DONT SOP NGUEZET, PhD  
Agricultural Economist  
Impact Economist, International Institute for Tropical Agriculture (IITA), Bukavu, D.R. Congo

Alain MUKWEGE, MD, MSc  
Women's Health  
Visiting Scholar/Research Assistant  
University of Michigan  
Ann Arbor Michigan USA

Jean B. NACHEGA, MD, PhD, MPH, FRCP  
Associate Professor of Epidemiology, Infectious Diseases and Microbiology  
University of Pittsburgh Graduate School of Public Health, Pittsburgh, PA, USA *and*  
Adjunct Associate Professor of Epidemiology and International Health  
Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA *and*  
Professor of Medicine & Director, Center for Infectious Diseases  
Stellenbosch University Faculty of Medicine and Health Sciences, Cape Town, South Africa

## 2017 KEYNOTE SPEAKERS

**Jean NACHEGA, MD, PhD, MPH, FRCP**  
**University of Pittsburgh**  
**Johns Hopkins University**  
**Stellenbosch University**  
[jnacheg1@jhu.edu](mailto:jnacheg1@jhu.edu)



Professor Nachege is tenured Associate Professor of Epidemiology, Infectious Diseases, and Microbiology at University of Pittsburgh; Adjunct Associate Professor of Epidemiology and International Health at Johns Hopkins University; and Professor Extraordinary of Medicine and Director of the Centre for Infectious Diseases, at Stellenbosch University. He is also Visiting Professor at Université Evangélique en Afrique (UEA) and Université Catholique de Bukavu (UCB). He has over 20 year-experience in patient care, teaching, and research on HIV/AIDS & TB in Africa. He has authored over 134 peer-reviewed publications, to include in top-tier journals. He is an ad hoc consultant at WHO, CDC, Bill & Melinda Gates Foundation, and a member of South African Academy of Sciences.

**Nzola-Meso MAHUNGU, PhD.**  
**DRC National Representative**  
**International Institute of Tropical Agriculture**  
[N.Mahungu@cgiar.org](mailto:N.Mahungu@cgiar.org)

Dr. Mahungu is the DRC National Representative of the International Institute of Tropical Agriculture (IITA). He has thirty-five-year experience in crop research for development, mainly in root and tuber crops improvement programs resulting in the release of high yielding cassava (white and bio-fortified) varieties resistant to diseases/pests with good consumers' acceptance (food and industrial uses) and adaptability in different African agro-ecologies (DR Congo, Tanzania, Malawi, Zimbabwe, etc.) His professional experience includes international, regional (networks) and national food crops research for development systems; projects development and formulation; and monitoring and evaluation. He also has professional experience in participatory research and extension/technology transfer in collaboration with NGO's and with the public and private sectors following the commodity value chain approach and linking farmers/producers to markets. He is an effective administrator, trainer and leader accustomed to managing organizations and setting up national, regional and continental (Pan African) research for development programs.



**René-Xavier PERRIN, MD**  
**Université d'Abomey Calavi, Benin**

[PERRINX@yahoo.fr](mailto:PERRINX@yahoo.fr)



Dr Perrin: Professeur titulaire de Gynécologie Obstétrique de l'Université d'Abomey Calavi (Benin), Chef de l'unité de Gynécologie-Obstétrique à la Faculté des Sciences de la Santé de Cotonou, chef du Département Mère-Enfant, coordonnateur du certificat d'études spéciales (CES) de Gynécologie-Obstétrique. Il a dirigé plusieurs travaux sur la fécondité-contraception, dépistage et traitement des cancers gynécologiques, prévention de la prématurité, mortalité maternelle et périnatale, SONU. Membre fondateur de la Société Médicale au Bénin et de la Société Africaine de Gynécologie-Obstétrique (SAGO). Président de la commission chargée du renforcement institutionnel des sociétés nationales. Il a conduit plusieurs missions et consultations en santé de la reproduction (Jhpiego, OMS, Engender Health, Médecins du Monde, UNICEF, UNCFD).

**Benoit NEMERY, MD, PhD.**  
**Department of Public Health and Primary Care**  
**Centre for Environment and Health**  
**KU Leuven, Belgium**  
[ben.nemery@med.kuleuven.be](mailto:ben.nemery@med.kuleuven.be)

Ben Nemery is Professor of Toxicology and Occupational Medicine. His research involves experimental as well as clinical and epidemiological studies in lung (and other) diseases caused by occupational and environmental agents. In his recent research he has concentrated on occupational and environmental health in the South, especially in Katanga, DR Congo. He holds a weekly outpatient clinic for occupational pulmonary disorders in the university hospital of Leuven.



**Shaheen MEHTAR, MBBS, FRCPath, FCPATH, MD**  
**Stellenbosch University & ICAN**  
[smehtar@sun.ac.za](mailto:smehtar@sun.ac.za)



Professor Shaheen Mehtar (retired) trained in the United Kingdom in Medical Microbiology, Infectious Disease and Community Health. She was Head of Microbiology at the North Middlesex Hospital & Senior Lecturer at Royal Free Hospital for 23 years. She moved to South Africa in 2000 serving as Deputy Director Public Health in the Western Cape before moving to Tygerberg Hospital and Stellenbosch University where she established the Unit of Infection Prevention and Control in 2004. It has an exceptional training reputation across Africa ranging from a basic course to a Masters and PhD in IPC. Prof Mehtar is a highly respected world expert in Infection Control and has been involved in setting up IPC programmes in Europe, Far East, India, Asia and Latin America. She served on the executive committees of prestigious organizations such as the Hospital Infection Society, The British society of Antimicrobial Chemotherapy, European Society of Microbiology and Infectious Disease, the International Society of Chemotherapy and International Society of Infectious Diseases. Through ICAN, Prof Mehtar is involved in establishing and promoting training programs and operational research in IPC and antimicrobial stewardship across Africa. She currently serves on several WHO committees including those for global IPC

policies, surgical site infection, WASH and safety injection global network (SIGN)

## SCHEDULE OF EVENTS

### THURSDAY, AUGUST 17<sup>TH</sup>

08:15 – 08:45	REGISTRATION
08:45 – 09:20	WELCOME!
09:20 – 10:00	SYMPOSIUM INTRODUCTION
10:00 – 10:45	PLENARY SESSION A (Keynote: Jean Nachega)
10:45 – 11:10	Coffee Break
11:10 – 12:00	POSTER SESSION
12:00 – 13:20	ORAL PRESENTATIONS
13:20 – 14:10	LUNCH
14:10 – 15:30	ORAL PRESENTATIONS
15:30 – 16:15	PLENARY SESSION B (Keynote: Nzola Mahungu)

### FRIDAY, AUGUST 18<sup>TH</sup>

08:15 – 08:45	REGISTRATION
08:45 – 09:30	PLENARY SESSION C (Keynote: Rene-Xavier Perrin)
09:30 – 10:30	ORAL PRESENTATIONS
10:30 – 10:45	Coffee Break
10:45 – 11:30	POSTER SESSION
11:30 – 12:30	ORAL PRESENTATIONS
12:30 – 12:45	RECOGNITION OF SYMPOSIUM STAFF SUPPORT & PHOTOGRAPHY
12:45 – 13:30	LUNCH
13:30 – 15:30	WRITING WORKSHOP

### SATURDAY, AUGUST 19<sup>TH</sup>

08:15 – 08:45	REGISTRATION
08:45 – 09:30	PLENARY SESSION D (Keynote: Benoit Nemery)
09:30 – 10:30	ORAL PRESENTATIONS
10:30 – 11:00	Coffee Break
11:00 – 12:00	ORAL PRESENTATIONS
12:00 – 12:45	PLENARY SESSION E (Keynote: Shaheen Mehtar)
12:45 – 13:00	CLOSING CEREMONY OF DAY
13:00 –	LUNCH

EVENING

CLOSING COCKTAIL

## DETAILED SCHEDULE OF EVENTS

### THURSDAY 17<sup>TH</sup>

#### **08:00 – 08:45 Registration**

#### **08:45 – 09:20 WELCOME!**

Inaugural ceremony: Governor of South-Kivu, Provincial Ministry of Health, Chancellor of UEA (Gustave MUSHAGALUSA), President of Panzi Foundation (Denis MUKWEGE), 2017 Symposium Chair (Janis MILLER), Co-Chairs (Kanigula MUBAGWA, Chris OKAFOR), Symposium Scientific Review Committee Co-Chairs (Sioban HARLOW, Katcho KARUME)

#### **09:20 – 10:00 SYMPOSIUM INTRODUCTION**

Janis MILLER (Symposium Chair): Objectives/Aims/Structure

Kanigula MUBAGWA (Symposium Co-Chair, ICART Director): Introduction to ICART

Chris OKAFOR (Symposium Co-Chair, IITA Officer in Charge): Introduction to IITA-Kalambo Station

#### **10:00 – 10:45 PLENARY SESSION A (Keynote)**

**Jean NACHEGA** MD, PhD, MPH, FRCP. (Moderator: Janis MILLER, PhD, APRN, FAAN)

HIV/AIDS-Associated Non-Communicable Diseases in Africa: An Emerging Clinical and Public Health Threat ("Maladies Non-Transmissibles Associées au VIH/SIDA en Afrique: Une Menace Clinique et de Santé Publique Emergente")

#### **10:45 – 11:10 Coffee Break** [Poster presenters are expected to leave first so they can get to their posters without missing coffee]

#### **11:10 – 12:00 POSTER SESSION:** [Take your coffee with you as you stroll through the posters and converse with the poster presenters]

Poster Theme: FOOD SECURITY AND NUTRITION

1. Somatic growth from birth to 6 months in low birth weight, in Bukavu, South Kivu, Democratic Republic of the Congo. RM KAMBALE, MM AKONKWA, AM NYAKASANE, FN ISIA, JK BWIJA, BM MASUMBUKO, O BATTISTI
2. Biofortified cassava for improving food and nutrition security in Nigeria. KC AKUWA, EY PARKES, OO AINA, B MOSHOOD, P ILUEBBEY, A BELLO, P ILONA, PA KULAKOW
3. Determinants of food insecurity according to the calorific intake approach: specific case of the localities of Bwegera, Kigwena and Lemera in the Bufuliru chiefdom community, Uvira, South Kivu territory. VN STANY, NG MUSHAGALUSA, BJ BUMVA
4. Factors explaining the entrepreneurial intention of young people in the agricultural sector in DR Congo: Special case of student's finalists in economics and agronomy of the UEA, Bukavu. C MUGISHO KANYAMA
5. Genetic analysis of yellow endosperm maize inbred lines and hybrid performance under contrasting environments. M OLAYIWOLA, A OLUSEYI, S OYEWOLE, O ARIYO, O JOHNSON, D KOLAWOLE
6. Cavy (Guinea pig) neglected animal but valuable in food security for low income household in Sub-Saharan Africa. R AYAGIRWE, B MAASS, F MEUTCHIEYE, M YACOUBA
7. Assessment of genetic diversity and structure of DR Congo cavy population using SSRs markers R AYAGIRWE, M KYALO, Y NASSER, F MEUTCHIEYE, M YACOUBA
8. Resilience strategies developed by stakeholders fighting agricultural crises in the Bushi Land in the Eastern part of Democratic Republic of Congo. GM KAMUJITFE, BR MUIHIGWA, GN

MUSHAGALUSA

9. Non-significant effect of iron-fortified beans on serum iron levels in adults and in malnourished children. TM KASHOSI, Z MUSHAMALIRWA, S MATABARO, P UDOMKUN, N RUKHUNGU, AK LUBOBO, F NIELSEN, C OKAFOR, K MUBAGWA
10. Fe isotopic signature in a sub-Saharan African population. JC CIKOMOLA, MR FLOREZ, K VANDEPOELE, PB KATCHUNGA, AS KISHABONGO, MM SPEECKAERT, F VANHAECKE, JR DELANGHE

Poster Theme: INFECTIOUS AND DIARRHEAL DISEASES

11. Factors associated with mortality in cholera epidemic in Bukavu, D.R. Congo, 2012 - 2014. A BANYWESIZE, ANH BULABULA, AM BULABULA
12. Deliberate exposure of humans to chlorine the aftermath of Ebola in West Africa. ANH BULABULA, S MEHTAR, H NYANDEMOH, S JAMBAWAI
13. Vibrio cholerae during cholera epidemic in South Kivu in 2014 and 2015. DN ZOZO, EN BAHIZIRE, AB NKEMBA, JB MBIRIBINDI, LK WIMBA, PN MITANGALA
14. Malaria in pregnant women in Bukavu, South Kivu, Democratic Republic of Congo. AM BULABULA, ANH BULABULA, AS MYANGA, M MVULA, MP MBO, TC KAYEMBE
15. Epidemiological, clinical and evolutionary of the outbreak of cholera in Kindu health zone. B ABDALA KINGWENGWE, A BULABULA, E SHINDANO MWAMBA
16. Validity and reliability of Widal test and OnSite Typhoid IgG/IgM Combo in the diagnosis of typhoid fever in Bukavu, South-Kivu Province in Democratic Republic of Congo. TM KASHOSI, PB BISIMWA, D LUPANDE, E BAHIZIRE, C KAVIRA, J KIVUKUTO, K MUBAGWA
17. Therapeutic, biological, clinical and epidemiologic profile of congenital malaria disease in an endemic area in the Democratic Republic of Congo. J MBO KASOMBA, A BIRINDWA MUHANDULE, G AGANZE, R KAMBALE MBUSA, M KALIBUZE
18. Validity and reliability of 3rd generation HIV rapid diagnostic tests compared to 4th generation ELISA apDia HIV Ag/Ab in Bukavu, Eastern Democratic Republic of the Congo. TM KASHOSI, W PREISER, KYAMBIKWA, PM MULONGO, K MUBAGWA, JB NACHEGA
19. Aflatoxin contamination of crop products from Burundi and Eastern Democratic Republic of Congo. P UDOMKUN, AN WIREDU, C MUTEGI, J ATEHNKENG, M NAGLE, F NIELSON, J MÜLLER, R BANDYOPADHYAY, B VANLAUWE
20. Awareness and perception about the occurrence, causes and consequences of aflatoxin contamination in Burundi and Eastern Democratic Republic of Congo. P UDOMKUN, AN WIREDU, NL NABAHUNGU, F NIELSEN, CNS ENGOKE, B VANLAUWE, R BANDYOPADHYAY

Poster Theme: OTHER

21. Acute respiratory infection in children at the Provincial General Hospital of Bukavu: Associated risk factors and viruses involved. L KABEGO
22. Determinants of fetal macrosomia in Bukavu, DR Congo. DMA SENGEYI, LS MAKALI, MG MULINGANYA
23. Fiscal decentralization and local revenues: rental income tax in Bukavu city. CT BALYAHAMWABO, AB MUGISHO, O KASELE, J RIZIKI
24. Mortality and morbidity causes in General Pediatric Unit of Bukavu Provincial Hospital. J NTAGERWA, JB LURHANGIRHE, J BWIJA, G MUDUMBI, S BALOL'EBWAMI, Y LUFUNGULO, B MASUMBUKO
25. Causes of morbidity and mortality in severe acute malnourished children admitted in the Pediatrics Department of the General Referral Hospital of Panzi, Bukavu DR Congo. J MBO KASOMBA, BM MASUMBUKO
26. Risk factors and causes of neonatal mortality in the neonatal service of the Panzi Hospital, Bukavu, DR Congo. M MWILO, L KANKU TUDIAKWILE, BM MASUMBUKO

Panzi, DRC. MF NDEKO, BM MASUMBUKO

28. Perception of corruption by the traffic Police and taxi drivers in Bukavu: Analysis of causes and tackling strategies. A BITENGA
29. IDPs are not always IDPs: the relevance of IDP label based on the ground in non-camp settlement in South-Kivu. G NGUYA
30. The aggressivity of Congolese population toward MONUSCO. B NAMEBIGABA

#### **12:00 – 13:20 ORAL PRESENTATIONS**

Moderator: Léon NABAHUNGU, PhD, IITA

Podium Theme: FOOD SECURITY AND NUTRITION

31. Practicality and potentials of genomic selection to improve root yield, dry matter content and cassava mosaic disease resistance in cassava. O ALABI, M WOLFE, S IKPAN, JL JANNINK, C EGESI, I RABBI, P KULAKOW
32. Economical-financial analysis of a project on the oyster mushroom production at Bukavu in eastern DR Congo. G MUGISHO
33. Inventory, characterization and use of edible insects in South Kivu eastern DR Congo. R AYAGIRWE, Z BUHENDWA, K KARUME, G MUSHAGALUSA
34. Effect of heat treatment on the quality of traditional white cheese "Mashanza" produced in South Kivu, Eastern DR Congo. VM BWANA, RB AYAGIRWE, Y MUGUMAARHAHAMA, B GANZA, CB AKSANTI, EB BISIMWA, K KARUME, AZ BALEZI, GN MUSHAGALUSA

**13:20 – 14:10 LUNCH** [Poster presenters will be dismissed first for lunch]

#### **14:10 – 15:30 ORAL PRESENTATIONS**

Moderator: Tina AMISI, MD, Panzi Foundation and ICART

Podium Theme: HEALTH AND ITS SOCIAL CONSEQUENCES FOR WOMEN

35. Knowledge and attitude of mothers toward labor pain and labor pain analgesia at Hôpital Provincial Général de Référence de Bukavu; Cross-sectional study from September to November 2016. E MUGABO, E BWENGE, P KABUYA, Y KUJIRAKWINJA, G MULINGANYA
36. Emergent risk factors of preeclampsia in Kinshasa, DR Congo. MAD SENGEYI, BL KUSEKE, MA MBANGAMA
37. Ritualistic sexual abuse of children in post-conflicts eastern DRC: Factors associated with the phenomenon and implications for social work. AC KASHERWA

Podium Theme: ECOLOGICAL AND ENVIRONMENTAL IMPACTS ON HEALTH

38. Non syndromic cleft lip and/or cleft palate: epidemiology and risk factors in Lubumbashi (DR Congo), a case-control study. S MBUYI-MUSANZAYI, T KAYEMBE, M KASHAL, P LUKUSA, P KALENGA, F TSHILOMBO, K DEVRIENDT, H REYCHLER.

#### **15:30 – 16:15 PLENARY SESSION B (Keynote)**

**Nzola-Meso MAHUNGU**, PhD, (Moderator: Katcho KARUME, PhD)

Food Security and Nutrition: Challenges and Opportunities for the Youth and Vulnerable Women in Africa

## **FRIDAY 18<sup>TH</sup>**

**08:00 – 08:45 REGISTRATION**

**08:45 – 09:30 PLENARY SESSION A (Keynote)**

**Rene-Xavier PERRIN, MD** (Moderator: Denis MUKWEGE, MD, PhD)

**Prise en Charge des Fistules Obstétricales: Expérience du Bénin (“Management of Obstetric Fistula: Experience of Benin)**

**09:30 – 10:30 ORAL PRESENTATIONS**

Moderator: Bruno M MASUMBUKO, MD PhD

Podium Theme: HEALTH AND ITS SOCIAL CONSEQUENCES FOR WOMEN

**39.** The dignity of gender and wellbeing in forcibly displaced women: a call for transformational action. A MSABAH

Podium Theme: INFECTIOUS AND DIARRHEAL DISEASES

**40.** Prevalence and risk factors of dyslipidaemia and cardiovascular disease in HIV-infected adults in Bukavu, Democratic Republic of the Congo. PC KATOTO, AH BULABULA, D BIHEHE, PPM LUNJWIRE, A MURHULA, TM ESTERHUIZEN, K MUBAGWA, JB NACHEGA

**41.** Distribution and diversity of mosquito vectors and their role in arboviruses transmission in selected districts of Tanzania. NP BISIMWA, E RWEYEMAMU, MJ RWEYEMAMU, SO ANG’WENYI, J WEYER, PJ VAN VUREN, JT PAWESKA, LEG MBOERA, CJ KASANGA, MM RWEYEMAMU, G MISINZO

**10:30 – 10:45 COFFEE BREAK** [Poster presenters will be dismissed first so they can get to their posters without missing coffee]

**10:45 – 11:30 POSTER SESSION** [Take your coffee with you as you stroll through the posters and converse with the poster presenters]

Poster Theme: HEALTH AND ITS SOCIAL CONSEQUENCES FOR WOMEN

**42.** Intensity and severity factors of childbirth pain among mothers giving birth at Hôpital Provincial Général de Référence de Bukavu (HPGRB); Cross-sectional study from September to November 2016. E MUGABO, F KAMPARA, P KABUYA, E BWENGE, G MULINGANYA

**43.** Complications related to clandestine abortions as a reason for admission to intensive care: Regarding 38 cases at Panzi General hospital. B CIKWANINE, N MWAMBALI, MD ALUMETI, SH MAPATANO, M RAHA, T MPONYI, O NYAKIO

**44.** A study of the alloimmunization in pregnant women from the Democratic Republic of Congo, Africa. J CIKWANINE, B MUHIGIRWA, I BERGLÖV, L LYXE, C HESSE

**45.** Factors of access to care within 72 hours after sexual abuse. M RAHA

**46.** Education and educational gender in Democratic Republic of Congo. JB MUHIGWA, A BITENGA, JB BALEGAMIRE

**47.** Fistules urétero-vaginales traitées par voie laparoscopique à l’Hôpital de Panzi. DB NANGA, DM MUKWEGE, GB CADIÈRE

**48.** Consequences of domestic violence on women's health in the City of Beni, Democratic Republic of Congo. N KYAKIMWA MUKONO, K KABULULU KAMBALE TRASULI

Poster Theme: OTHER

49. Etiologic and prognostic characteristics of non-traumatic coma cases among adult patients admitted in the Emergency Department, General Provincial Hospital of Bukavu, DR Congo. GQ MATEO, B BAMULEKE, N BAPOLISI, M NGABO, G MAHESHE, K MUBAGWA
50. Glycated nail proteins as a marker of diabetes diagnosis. AS KISHABONGO, P KATCHUNGA, E VAN AKEN, M SPEECKAERT, S LAGNIAU, R COOPMAN, J DELANGHE
51. Prevalence and risk factors of chronic kidney disease (CKD) in South Kivu, Democratic Republic of Congo (DRC): a population-based study. M MASIMANGO IMANI, E SUMAILI KISWAYA, M JADOUL, P WALLEMACQ
52. Relationship between benign prostate hypertrophy and anthropometric parameters in diabetic and non-diabetic patients who underwent TURP in Bukavu, DR Congo. L-E MUBENGA, D CHIMANUKA, L MUHINDO
53. Pathologies and complications revealing diabetes mellitus; About 71 cases in the Internal Medicine Department at the Panzi General Reference Hospital from January 2014 to December 2016. P BAZIBUHE LUNGERE, D MASEMO BIHEHE, J SELEMANI, G BESULANI KIKUNI
54. Epidemiological, clinical and therapeutic aspects of sickle cell anemia in children in Kindu Reference General Hospital (HGRK). B ABDALA KINGWENGWE, BJR MABIALA, E SHINDANO MWAMBA
55. Etiologic factors and prognosis of acute renal failure in the Intensive Care Unit at Panzi hospital. K SELEMANI, B BALEZI, B KIKUNI, B CIKWANINE, M BIHEHE, K WILONDJA

Poster Theme: INFECTIOUS AND DIARRHEAL DISEASE

56. Gut colonization with extended-spectrum beta-lactamase-producing enterobacteriaceae in patients visiting the Provincial General Hospital of Bukavu. L KABEGO, L M IRENGE, JC ZALUKA, R B CHIRIMWAMI
57. Clinical profile and outcomes of HIV-infected severely malnourished children: Case of the Provincial General Referral Hospital of Bukavu. J BWIJA KASENGI, E NKABA, B MASHUKANO, J NTAGERWA, R KAMBALE, Y LUFUNGULO, B MASUMBUKO
58. Management of hepatitis C in limited resources setting in the directly acting antivirals (DAA) era: experience of Bukavu, DR Congo. T SHINDANO AKILIMALI, C TSHONGO MUHINDO, M MASIMANGO IMANI
59. Genetic and phylogenetic characterisation of hepatitis B virus in the Eastern part of the Democratic Republic of Congo. T SHINDANO AKILIMALI, Y HORSMANS, B KABAMBA MUKADI
60. Optimal antiretroviral therapy adherence as evaluated by CASE index score tool is associated with virological suppression in HIV-infected adults in Dakar, Senegal. AK BYABENE, L FORTES-DEGUENONVO, K NIANG, MN MANGA, ANH BULABULA, JB NACHEGA, M SEYDI
61. Kaposi's angiosarcoma: Epidemiological, clinical and pathological studies In the Western and Eastern regions of the Democratic Republic of Congo. P MULUMEODERHWA, R CHIRIMWAMI, B MANWA, F CIKOMOLA, M BAGUMA, S WASSASSIA, E MUNGUAKONKWA, M PAULLO, L MAROT, B KABAMBA, R FIASSE, E MARBAIX
62. Prevalence and possible risk factors associated with delayed HIV diagnosis in children with tuberculosis co-infection in Cape Town, South Africa: A retrospective cohort study. LN BYAMUNGU, K DU PREEZ, E WALTERS, JB NACHEGA, HS SCHAAF
63. Seroprevalence and epidemiological profile of blood donors at the Kisantu Referral Hospital St Luc, Democratic Republic of Congo. DM LUPANDE, GM BUSA, C PULULU, A LUYINDULA, M-F PHOBA, OM LUNGUYA
64. Using local technology and resources to promote infection prevention in the Cameroon Baptist Convention Health Services (CBCHS). JG NKWAN

65. Prevalence of Helicobacter pylori antigens and antibodies in asymptomatic children in Kinshasa, DR Congo. NI ALAMA, S AHUKA–MUNDEKE, J KOKOLOMAMI, SM MAKIALA, NM NGWAKA, FB LUINZIA, L NGENZIE O SABI, DN BOMPANGUE, OM LUNGUYA, J-J MUYEMBE
66. Molecular epidemiology of hepatitis B virus in Central African Republic. P BASIMANE-BISIMWA, P PELEMBI, G KOVOUNGBO, U VICKOS, A BÉRÉ, C BEKONDI, J NACHEGA, NP KOMAS

**11:30 – 12:30 ORAL PRESENTATIONS**

Moderator: Jean NACHEGA, MD, PhD, MPH, FRCP

Podium Theme: ECOLOGICAL AND ENVIRONMENTAL IMPACTS ON HEALTH

67. Eco-epidemiology of malaria in the South-Kivu Province of the Democratic Republic of the Congo. NR BIGIRINAMA, BD BATUMBO, VR KIZUNGU, BG BISIMWA, ND BOMPANGUE Université de Kinshasa

Podium Theme: INFECTIOUS AND DIARRHEAL DISEASES

68. Prevalence, risk factors and outcomes of rifampicin-sensitive & -resistant pulmonary tuberculosis identified by Xpert MTB/RIF assay in a post-conflict region, Eastern DR Congo, 2012-2015. ANH BULABULA, EM MUSAFIRI, LN KITETE, JP CHIRAMBIZA, D KALUMUNA, R NYOTA, G THERON, R WARREN, Z. KASHONGWE, JB NACHEGA
69. Association between respiratory syncytial virus infection in infancy and subsequent asthma: A metaanalysis of observational studies. L KABEGO, C DE BEER

**12:30 – 12:45 RECOGNITION OF SYMPOSIUM STAFF SUPPORT & PHOTOGRAPHY**

**12:45– 13:30 LUNCH**

**13:30 – 15:30 WRITING WORKSHOP**

## **SATURDAY 19<sup>TH</sup>**

**08:00 – 08:45 Registration**

**08:45 – 09:30 PLENARY SESSION D (Keynote)**

**BENOIT NEMERY**, MD, PhD (Moderator: Kanigula MUBAGWA, MD, PhD)  
Health impacts of metal mining and processing in Africa

**09:30 – 10:30 ORAL PRESENTATIONS**

Moderator: Parvine BASIMANE BISISMWA, MD, MSc

Podium Theme: INFECTIOUS AND DIARRHEAL DISEASES

- 70.** Genetic characterization and seroprevalence of peste des petits ruminants virus in South Kivu, Eastern of Democratic Republic of Congo. BA BWHANGANE, CG GEORGE, LC BEBORA, E MACHUKA, N SVITEK
- 71.** High prevalence of anemia but low level of iron deficiency in preschool children during a low transmission period of malaria in rural Kivu, DR Congo. E BAHIZIRE, P BAHWERE, P DONNEN, P LUNDIMU TUGIRIMANA, S BALOL'EBWAMI, M DRAMAIX, C NFUNDIKO, R CHIRIMWAMI, K MUBAGWA
- 72.** Performance of SD Biotin Malaria Ag Pf/Pan rapid test in the diagnosis of malaria in South-Kivu, DR Congo. T MITIMA KASHOSI, J MINANI MUTUGA, DS BYADUNIA, J KIVUKUTO MUTENDELA, B MULENDA, K MUBAGWA

**10:30 – 11:00 COFFEE BREAK**

**11:00 – 12:00 ORAL PRESENTATIONS**

Moderator: Sioban HARLOW, PhD

Podium Theme: ECOLOGICAL AND ENVIRONMENTAL IMPACTS ON HEALTH

- 73.** Economic shocks and healthcare expenditure among farming households in Nigeria. A OYEWALE, A OGUNNIYI, A RUFAL, A BIRINDWA

Podium Theme: FOOD SECURITY AND NUTRITION

- 74.** Assessment of nutritional status of children aged 36-59 months attending nursery schools in Bukavu. J NTAGERWA, A MATUMWABIRI, J BWIJA, B MASHUKANO, A NYAKASANE, R KAMBALE, B MASUMBUKO

Podium Theme: HEALTH AND SOCIAL CONSEQUENCES FOR WOMEN

- 75.** Understanding women's empowerment and transitions into the agricultural sector in Kinshasa, DRC. R BIABA APASA, R BULLOCK, K MUBAGWA

**12:00 – 12:45 PLENARY SESSION E (Keynote)**

Shaheen Mehtar PhD, MD (Moderator: Chris Okafor)  
Ebola Outbreak in West Africa: Lessons Learned

**12:45 – 13:00 Closing Ceremony of day**

**13:00 – Lunch**

**EVENING: COCKTAILS AT HOTEL IN BUKAVU**

## ABSTRACTS

1. Richard Mbusa KAMBALE, Martine Mihigo AKONKWA, Adolphe Muhimuzi NYAKASANE, Francisca Nachi ISIA, Joe Kasengi BWIJA, Bruno Mungo MASUMBUKO, Oreste BATTISTI

Catholic University of Bukavu; [adolphenyak@gmail.com](mailto:adolphenyak@gmail.com);

### ***Somatic growth from birth to 6 months in low birth weight (LBW), in Bukavu, South Kivu, Democratic Republic of the Congo.***

**Introduction:** LBW is one of the leading causes of perinatal and infant morbidity and mortality, impaired growth and neurocognitive development. The aim of this study was to evaluate nutritional status of infants born LBW and to analyse the factors influencing their growth during their first 6 months of life. **Methods:** It was a prospective cohort study for 6 months, including 100 infants born with LBW and 100 infants born at full-term and with normal weight. Z- scores for weight for age, length for age and weight for length were computed with the software Epinut. Poisson regression was used to quantify the association between nutritional status and sociodemographic and nutritional factors in bivariate and multivariable analyses. The significance threshold was fixed at 0.05. **Results:** At 6 months, 15.1% of LBW were underweight, 50.7% were stunted and 4.1% had emaciation. Risk factors for stunting were male sex [OR (95% CI) 1.68 (1.06 - 2.65);  $p = 0.024$ ] and a short interpregnancy interval [OR (95% CI) 2.23 (1.14 - 4.34);  $p = 0.005$ ]. High socioeconomic level was a protector factor for stunting [OR (95% CI) 0.49 (0.25 - 0.98);  $p = 0.028$ ]. Being male was a risk factor for underweight [OR (95% CI) 3.41 (1.98 - 11.85);  $p = 0.003$ ]. **Conclusion:** In the short term, infants born LBW may have growth disturbances. It is necessary to emphasize the importance of growth assessment of LBW children and proper education of their mothers about nutrition of their children for early and timely diagnosis and management of growth retardation and prevention of subsequent problems.

2. KC AKUWA, EY PARKES, OO AINA, B MOSHOOD, P ILUEBBEY, A BELLO, P ILONA, PA KULAKOW  
International Institute of Tropical Agriculture and Harvest Plus; [akuwakingsley@gmail.com](mailto:akuwakingsley@gmail.com)

### ***Biofortified cassava for improving food and nutrition security in Nigeria***

Despite interventions to fight malnutrition by supplementing with vitamin A capsules and food fortification programs, Nigeria records high vitamin A deficiency (VAD) especially with children under the age of five and pregnant women. Over the last decade, HarvestPlus has worked with partners to develop and disseminate biofortified cassava with total carotenoids content of up to 10 $\mu$ g/g on fresh weight. Promising genotypes with sufficient potentials for the final target of 15  $\mu$ g/g have been identified in the germplasm. The delivery strategies combine public-private partnerships to empower the downstream population where malnutrition is severe. This strategy enabled sustainable scale-up production and utilization of vitamin A cassava to mitigate malnutrition and income generation. Four states selected served as model hubs to reach other states in Nigeria. Over 800,000 improved PVAC stems have been disseminated to about one million farming households in Nigeria and more than 2 million farming households will be planting PVAC and at least 17 million people consuming vitamin A gari and fufu in their regular diets in 2018. Food diversification is essential, and over twenty food products comprising traditional meals and confectioneries have been developed using vitamin A cassava to add value. The adoption and utilization of PVAC in food systems promise to improve and ensure food and nutrition security in Nigeria.

3. Vwima N STANY, NG MUSHAGALUSA, BJ BUMVA  
Université Evangélique en Afrique; [svwima@yahoo.fr](mailto:svwima@yahoo.fr)

### ***Determinants of food insecurity according to the calorific intake approach: specific case of the localities of Bwegera, Kigwena and Lemera in the Bufuliru chiefdom community, Uvira, South Kivu Territory.***

Agriculture is the main occupation of the population of the territory of Uvira but, according to An Ansoms and Wim Marivo (2010), it is, along with Kalehe, the poorest territories. The choice of this study is justified by the idea of the authors Sen (1981), Voldés (1981), Eischer (1987), who support the importance of "accessibility to food" in the household food security. According to Sen (1981) "If a person lacks the means to acquire food, the presence of food on the markets is not much consolation." The objective of this study is to measure food insecurity and its correlates according to the calorific supply approach by using the

consumption survey on a stratified sample grouped in sub-localities, considered here as strata. The systematic sampling consisted in the fact that heads of households were taken from the total population of each locality because at a random of 3/100. The survey covered 139 households including 63 households in the locality of Bwegera, 41 households in the locality of Kigwena and 35 households in the locality of Lemera. The results show that, 84.2% of our respondents derive their income from agriculture and the household lives on US \$ 50.09 per month obtained from the optical expense. With an average of 7 people per household, the income spent becomes \$ 7.15 per person per month, or \$ 0.24 per person per day. This income is very low and is even below the poverty line of \$ 1 per person per day. This situation explains a monetary poverty that is still acute in this community. The household allocates more than 50% of this income to food consumption. Household calorific supply based on household size, age, sex and weight is 815kcal on average per day and more than 72% of kcal is supplied by maize flour (17.7%), Cassava flour (28.07%), beans (13.19%) and rice (13.38%). This justifies the importance of growing these crops in these areas. Fish and meat are less and less consumed and provide households with 0.44% and 3.39% Kcal, respectively. This low consumption of animal protein is one of the characteristics of malnutrition in this community. All households that eat three to four times a day are those with positive calorie differences and over 69% of those that eat once or twice a day are households with negative caloric differences. Estimated results of the EVIEWS-based LOGIT model on the possibility of food security have shown that various factors expose households to food insecurity, i.e., the type of habitat, age, number of meals consumed, income, education level, household size, sex and the amount consumed. These factors were significant in explaining food security at the 5% or 10% threshold. The result shows that the probability that a household in food insecurity is very high and is even 78.73% while 21.27% is the probability that a household in our study area is safe. This high probability of food insecurity is due to structural and cyclical phenomena such as the presence of insecurity and tribal conflicts, the increasing presence of plant diseases such as brown manioc streak, degeneration of certain seeds, access to markets, the problem of processing and storing agricultural products, as well as the problem of peasant structuring and access to finance.

#### 4. Christian MUGISHO KANYAMA

[christianmugishokanyama@gmail.com](mailto:christianmugishokanyama@gmail.com)

##### **Factors explaining the entrepreneurial intention of young people in the agricultural sector in DR Congo: Special case of student's finalists in economics and agronomy of the UEA, Bukavu**

The aim of this study was to explain the formation of entrepreneurial intent among the young UEA /Bukavu finalist students in the agricultural sector in the DR Congo. This study relates the attitudes and perceptions of these students towards the achievement of an agricultural activity during their professional career and how each factor influences their agricultural entrepreneurial intent. From a methodological point of view, a model of intention derived from the theory of planned behavior of Ajzen (1991) is developed and tested by the multiple regression method. It is a model based on three factors including attitudes associated with planned behavior, subjective and social norms, and perception of behavioral control. The study results, from a sample of 180 finalist students in economics and agronomy, confirm that only the attitudes associated with planned behavior and the perception of behavioral control explain significantly and positively their agricultural entrepreneurial intent. Subjective and social norms are not significant. The other relevant result from this study is the significant influence that the perception of behavioral control would have on the student's personal attitude. However, there are also several other constraining factors for young people's involvement in the agricultural sector in the DR Congo: lack of professional experience with the agricultural sector, difficult access to land and Microcredit, etc.

#### 5. Muyideen OLAYIWOLA, Ajala OLUSEYI, Sam OYEWOLE, Omolayo ARIYO, Ojo JOHNSON, David KOLAWOLE International Institute of Tropical Agriculture (IITA) & Federal University of Agriculture, Abeokuta (FUNAAB), Nigeria; [M.Olayiwola@cgiar.org](mailto:M.Olayiwola@cgiar.org)

##### ***Genetic analysis of yellow endosperm maize inbred lines and hybrid performance under contrasting environments.***

Identification of maize hybrids with combined resistance/tolerance to stem borer and low soil nitrogen (Low N) could contribute to food security and improve rural livelihood in sub-Saharan Africa (SSA). A total of 105 yellow maize hybrids obtained from a 15x15 diallel cross plus five checks were evaluated in Nigeria under low N (at Mokwa and Zaria), artificial stem borer infestation (at Ibadan, Ikenne and Ife) and non-stress conditions at all locations. Data were recorded for grain yield and other traits, and analyzed across stress

(low N and stem borer infestation), non-stress and all environments. Analysis of variance revealed significant genotype, environment and genotype x environment interaction effects for most measured traits across stress, non-stress and all test environments. The General (GCA) and Specific (SCA) combining ability effects were significant for most of the traits under each and across research conditions. However, there was preponderance of the GCA over the SCA effect, indicating that additive gene action was more important than non-additive in the inheritance of the traits. Five different grouping methods: SCA, HSGCA, HGCAMT, SSR and SNP classified the inbred lines into 3-4 heterotic groups. However, SSR had the highest breeding efficiency (41.2%) and was identified as the most efficient grouping method. Lines 5, 7, 1, 14, 3, and 2 were identified as potential sources of resistance or tolerance to at least one of the stresses. Mean grain yield of the top 25% performing hybrids (selected based on Rank Summation Index) ranged from 4.0 – 5.1 t/ha, with all 21 selected hybrids outperforming the five checks. AMMI analysis identified hybrids 7x11, 3x4, 4x11, 1x11, 4x13, 4x15 and 5x15 as high yielding, amongst which only 1x11 and 5x15 were stable. The two hybrids should be further tested on-farm for release and commercialization in West and Central Africa.

6. Rodrigue AYAGIRWE, Brigitte MAASS, Felix MEUTCHIEYE, Manjeli YACOUBA  
Université Evangélique en Afrique; [rayagirwe@gmail.com](mailto:rayagirwe@gmail.com)

***Cavy (Guinea pig) neglected animal but valuable in food security for low income household in Sub-Saharan Africa***

Cavy (Guinea-pigs) are one of the species used as food security guarantee for low income households in sub-Saharan Africa. This review presents a synthesis of the characteristics of their role at household level, their production systems, their phenotypic and genetic diversity as well as the factors affecting their production performances. Livestock farming is a secondary activity whose farmers' characteristics vary from one region to another. The cavies (Guinea-pigs) are kept mostly by women and children in free range in the kitchen or in cages without breeding equipment. There is no control of their diet dominated by grasses, asteraceae, legumes, kitchen wastes and crop residues. The most frequent diseases are coccidiosis, pneumonia, salmonellosis, helminthiasis and ectoparasitoses. Phenotypic variability and genetic diversity exist within and between populations. Performance is influenced by two groups of factors that are exogenous and endogenous to the raised animal. The main factors are sex, genetic type, physiological state of the animal, inbreeding level, farrowing rank, type of birth, rearing system, type of feed, the physical state of the food, the presence or absence of antinutritional factors, the palatability of the food supplement type and the breeding environment. A synthesis of the phenotypic, genetic and zootechnical performance of guinea pigs is presented.

7. Rodrigue AYAGIRWE, Martina KYALO, Yao NASSER, Felix MEUTCHIEYE, Manjeli YACOUBA  
Université Evangélique en Afrique; [rayagirwe@gmail.com](mailto:rayagirwe@gmail.com)

***Assessment of genetic diversity and structure of DR Congo cavy population using SSRs markers***

Cavies (Guinea-pigs) are commonly used in sub-Saharan Africa as a source of meat consumption, income generation and manure production in mixed crop-livestock systems. In this work we evaluated genetic diversity and population structure of cavies from four regions of Democratic Republic of Congo (DRC). For that purpose, we screened 343 samples with 16 simple Sequence Repeats (SSR). A total of 113 alleles were detected, and the number of alleles ( $N_a$ ) per marker ranged from 4.69 and 7.23 (Kinshasa and South Kivu, respectively) with an average of 5.77 alleles. All loci have been found to be polymorphic with PIC ranging from 0.31 to 0.84, while the general mean across all loci was 0.58. The observed heterozygosity ( $H_O$ ) and expected heterozygosity ( $H_E$ ) ranged from 0.23 to 0.42 and from 0.50 to 0.65, with average values of 0.34 and 0.58, respectively. Heterozygosity and inbreeding coefficient levels indicate a higher level of inbreeding in the studied populations. The analysis of molecular variance (AMOVA) showed a superior genetic diversity within individuals than between populations even from distant regions. These results are in accordance to population structure analysis showing that individuals from the same population can be genetically more similar to individuals from far away population, than from individuals from the same population. Three major gene pools have been identified and shared among the DR Congo cavy population. The dendrogram, genetic distance and STRUCTURE analysis divided the 343 individuals into three distinct groups and generated similar results. The results derived from analysis of genetic diversity could be used for designing effective breeding programs through selecting representative genotypes and manage cavy breeding programs.

8. Guillaume Muta KAMULETE, Berckmans Bahananga MUHIGWA, Gustave Nachigera MUSHAGALUSA; Evangelical University in Africa-UEA Bukavu; [kamuletemutaa@yahoo.fr](mailto:kamuletemutaa@yahoo.fr)

***Resilience strategies developed by stakeholders fighting agricultural crises in the Bushi Land in the Eastern part of Democratic Republic of Congo***

Former studies reveal the regression and/or stagnation of the agricultural production at the level of small and big Enterprises. To avoid agricultural crises, adaptive measures have been tried by different agricultural households. There are complementary sources of income to agriculture such as fishing, teaching, brickmaking and sewing. However, the income obtained from these complementary activities is insufficient and fails to meet food and nonfood needs of households, most of which do not have an attic to store their food. A survey using a sample composed by 240 householders was conducted in Walungu and Kabare Territories. Drawing on Ghiglione and Matalon (1998), we used grape method combined with Kish method noticing questionnaires by letters; each letter representing a member of the household in order to collect the opinion of each member of the household. The study suggests to boost the agricultural sector in the Bushi Land, it seems necessary to promote the emergence of a middle class of producers who can practice intensive agriculture thanks to diverse support, which will ensure a sustainable agriculture exuding a crop surplus and preserving the environment.

9. T Mitima KASHOSI, Z MUSHAMALIRWA, S MATABARO, P UDOMKUN, N RUKHUNGU, AK LUBOBO, F NIELSEN, C OKAFOR, K MUBAGWA

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***Non-significant effect of iron-fortified beans on serum iron levels in adults and in malnourished children***

**Objective:** Micronutrient deficiency is a recognized important component of malnutrition. Bio-fortified foods obtained by selection of crops with higher micronutrient concentrations can be used to supply the needed elements. We investigated the ability of iron (Fe) fortified beans (HarvestPlus; iron content > 70-94 ppm) to increase serum Fe levels in adult women and in malnourished children. **Methods:** Vulnerable women housed at Panzi were fed the fortified beans, which replaced the usual beans of their diet, for 90 days. In twenty-one of them (mean age SEM: 28+/-2.96 years) anthropometric parameters including weight, height, skinfold and brachial circumference, were taken before and after the feeding period to assess the nutritional status. Blood was also collected pre- and post-feeding. Twenty children (37+/-5.37 months old) presenting severe but uncomplicated malnutrition were also given one meal of fortified beans at Panzi and mother were given beans to cook at home for 30 days. Data were compared using paired T-test. **Results:** In the adult women, anthropomorphic parameters (BMI: 22.1+/-0.71 pre vs. 22.0+/-0.76 post feeding) and inflammation/infection status were unchanged. Despite changes in blood cell counts (leucocytes: 5.9+/-0.39 vs 6.8+/-0.43, x10<sup>3</sup>/mm<sup>3</sup>; P=0.004; erythrocytes: 4.5+/-0.11 vs. 5.5+/-0.16, x10<sup>6</sup>/mm<sup>3</sup>, P=0.0001) and protein (albumin: 3.8+/-0.06 vs. 4.4+/-0.12 g/dL, P=0.00006) there was no significant change in total serum iron (52.7+/-2.48 vs. 56.3+/-2.55 µg/dL, P=0.65). Qualitatively similar results were obtained in the malnourished children. **Conclusion:** The outcome of feeding with bio-fortified foods is not certain and may depend on the duration of the feeding as well as on the micronutrient bio-availability in the fortified food.

10. Justin C CIKOMOLA Maria R FLOREZ, Karl VANDEPOELE, Philippe B KATCHUNGA, Antoine S KISHABONGO, Marijn M SPEECKAERT, Frank VANHAECKE, Joris R DELANGHE

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***Fe isotopic signature in a sub-Saharan African population.***

The iron isotopic analysis is an interesting clinical approach for assessing iron status. Both diabetes mellitus and the ferroportin Q248H mutation are very common in Africa and are associated with iron metabolism. We aimed to investigate the iron isotopic composition in diabetics presenting the ferroportin Q248H mutation. Forty-two male subjects living in Bukavu (South Kivu) were enrolled in this study: twenty-seven controls showing no Q248H mutation, eleven Q248H heterozygotes and four homozygotes. The median age of the study population was 53 years (IQR: 48 - 59years). There was no difference of age between groups. None of them had been treated for iron overload by phlebotomy. In the ferroportin Q248H mutation group eight subjects (53 %) were diabetics, while in the wild-type group ten subjects (37 %) were diabetics. The  $\delta^{56}\text{Fe}$  ratio in the whole blood ranges from -3.32‰ to -2.41‰, without any difference between the difference groups (Ferroportin Q248H mutation and wild type) and age. The  $\delta^{56}\text{Fe}$  ratio was significantly higher in diabetic subjects than in non-diabetic subjects ( $n < 0.05$ ). The  $\delta^{56}\text{Fe}$  ratio showed significant correlations with

body mass index (BMI) values ( $Y (\delta^{56}\text{Fe } \text{‰}) = -0.0443\text{BMI (kg/m}^2) - 3.259$  ( $r = 0.504, p < 0.0001$ ); and with ferritin concentration ( $Y (\delta^{56}\text{Fe } \text{‰}) = -0.0003\text{Ferritin}(\mu\text{g/L}) - 2.8$  ( $r = 0.458, p < 0.0001$ ). The correlation between  $\delta^{56}\text{Fe } \text{‰}$  ratio and HbA1c was similar ( $Y (\delta^{56}\text{Fe } \text{‰}) = -0.0029\text{A1c (mmol/mol)} - 3.03$  ( $r = 0.26, p < 0.001$ ). No correlation between  $\delta^{56}\text{Fe } \text{‰}$  ratio and transferrin concentration, transferrin saturation and iron concentration was observed. In a multiple regression analysis only the BMI and the serum ferritin concentration was associated with the iron isotopic composition.

#### 11. A BANYWESIZE, ANH BULABULA, AM BULABULA

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##### ***Factors associated with mortality in cholera epidemic in Bukavu, DR Congo, 2012 - 2014***

**Objective:** To determine the clinical outcomes of cholera epidemics and the associated factors, in Bukavu, DR Congo. **Methods:** A retrospective cohort study of cholera patients was conducted in Bukavu. The follow-up time was defined as the time from admission to discharge and the outcome of interest was mortality. Cholera epidemics of three consecutive years were studied, 2012 – 2014. Socio-demographics and other clinical data were documented. The data capture was performed using a Microsoft Excel spreadsheet and statistical analysis on STATA IC 13.1. Bivariate comparisons were conducted using chi-square tests, a  $p$ -value  $< 0.05$  was considered significant. The current data did not meet the criteria for multivariate analyses. **Results:** Of 1459 patients, 1429 (97.9%, 95% CI 97.1% - 98.6%) were cured vs 30 (2.1%, 95% CI 1.4% – 2.9%) died. Compared with cholera survivors, death was more likely to occur in patients of 36 years old and above (56.7% vs 19.1%,  $p < 0.001$ ), married (43.3% vs 29.5%,  $p < 0.001$ ), widowers (23.3% vs 3.9%,  $p < 0.001$ ), unemployed (26.7% vs 8.6%,  $p < 0.06$ ), year 2013 (63.3% vs 39.2%,  $p < 0.01$ ) and in patients with hospital stays  $< 4$  days (66.7% vs 38.7%,  $p < 0.05$ ). Of 30 patients who died, 29 presented with diarrhea and vomiting, 27 had severe dehydration (WHO stage C) and 16 were male. Overall, 51.7% (754/1459) used “non-boiled” tap water and 35.9% (523/1459) used spring water. **Conclusion:** Mortality is relatively low among cholera patients in Bukavu. Young adults, unemployed, married, widowers and short hospital stays were associated with mortality. There is still an opportunity to improve cholera outcomes in Bukavu, by sensitization campaigns for better personal hygiene and seeking health care at early stage of the disease.

#### 12. Andre NH BULABULA, Shaheen MEHTAR, Haurace NYANDEMOH, Steve JAMBAWAI

Infection Control Africa Network and Stellenbosch University & Infection Control Africa Network and Stellenbosch University, Ministry of Health & Sanitation Sierra Leone; [andybulabula@gmail.com](mailto:andybulabula@gmail.com)

##### ***Deliberate exposure of humans to chlorine the aftermath of Ebola in West Africa***

**Objective:** To describe the adverse clinical effects of deliberate chlorine spraying of human beings during the recent Ebola outbreak in West Africa. **Methods:** A cross sectional survey by interview of 1550 volunteers consisting of 500 healthcare workers (HCW), 550 Ebola survivors (EVD) and 500 quarantined asymptomatic Ebola contacts (NEVD) was conducted. Demographics, frequency of exposure to chlorine, clinical condition after chlorine exposure particularly eye, respiratory and skin conditions were noted. The length of time HCWs worked in Ebola Treatment Units (ETU), and use of personal protective equipment was recorded. Verbal consent was obtained from all participants and all responses remained anonymous. Permission and assistance from the guardian or parent was sought for those below 18 years of age. **Results:** 493/500 HCW, 550/550 EVD and 477/500 NEVD were sprayed at least once with 0.5 % chlorine. Following even a single exposure, an increase in the number of eye (all three groups) and respiratory symptoms (in HCW & EVD) was reported ( $p < 0.001$ ); after multiple exposures, respiratory and skin symptoms increased. In HCW, multiple vs single exposure was associated with an increase in respiratory (OR = 32 (95 % CI 22 –49)  $p < 0.001$ ), eye (OR = 30 (95 % CI 21 –43)  $p < 0.001$ ) and skin conditions (OR = 22 (95 % CI 15–32)  $p < 0.001$ ). Available personal protective equipment neither reduced nor prevented the adverse effects of chlorine. **Conclusions:** Reported exposure to chlorine has usually been accidental. Despite the lack of evidence as a recognized outbreak control measure, deliberate exposure of humans to chlorine spray was wide spread in Africa during the Ebola epidemic resulting in serious detrimental health effects on humans. We strongly recommend that his practice be banned and that alternative safer methods be used. *University of Singapore gave an unconditional educational grant for this study.*

13. Deogratias Nyarukweba ZOZO, Esto Namegabe BAHIZIRE, Aime Bisimwa NKEMBA, Justin Bengehya MBIRIBINDI, Louisette Kayange WIMBA, Prudence Ndeba MITANGALA  
Centre de Recherches en Sciences Naturelles & Université Libre de Bruxelles & Institut Supérieur des Techniques Médicales & Division Provinciale de la Santé & Laboratoire Provincial de Santé Publique Nord Kivu; [dezozo@hotmail.com](mailto:dezozo@hotmail.com)

### ***Vibrio cholerae during cholera epidemic in South Kivu in 2014 and 2015***

**Introduction:** In recent years cholera is endemic in fashion in some of the province's health regions. Outbreaks are reported each year, often without laboratory confirmation. The objective of this work was to confirm the presence of *Vibrio cholerae* in patients with suspected cholera in health coastal areas of the Ruzizi River and lakes Kivu and Tanganyika. **Methods:** During epidemics in 2014 and 2015 stool samples were collected from patients hospitalized in the Cholera Treatment Centers (CTC) of ZS Uvira, Nundu, Fizi, Minova and Bukavu. Samples were collected by syringe and placed in vials containing a transport medium (Cary Blair). In the laboratory these samples were inoculated on TCBS. After incubation at 37 ° C for 16 to 24 hours of suspicious yellow colonies were identified based on biochemical characteristics. They were then clustered by specific serums: versatile and monovalent *Vibrio cholerae* O1. **Results:** Of 62 patients 25.8%, 61.3% and 12.9% respectively were in the age group <5 years, 5 to 45 and > 45 years. Among them 56.4% were female. Altogether 42 strains of *Vibrio cholerae* O1 were isolated and identified which serogroup 37 Inaba and Ogawa 5. *Aeromonas* spp. and *Plesiomonas* were isolated *Shigelloïdes* respectively in 3 and 1 patients. Antimicrobial susceptibility was: bactrim 8%, ciprofloxaxine 48%, chloramphenicol 76%, tetracycline 88%, ampicillin 92%, cefotaxime 100%. **Conclusion:** We have shown the presence of *Vibrio cholerae* O1 in CTCs and also similar germs. A high resistance was observed to Bactrim and ciprofloxacin. These findings underscore the biological confirmation of interest in case of cholera.

### ***Vibrio cholerae lors d'épidémie de choléra au Sud-Kivu en 2014 et 2015.***

#### **Introduction**

Depuis quelques années le choléra sévit en mode endémique dans certaines zones de santé de la province. Des épidémies sont déclarées chaque année, souvent sans confirmation biologique. L'objectif de ce travail était de confirmer la présence de *Vibrio cholerae* chez les patients suspects de choléra dans les zones de santé du littoral de la rivière Ruzizi et des lacs Kivu et Tanganyika.

#### **Matériels et méthodes**

Au cours d'épidémies en 2014 et 2015 des échantillons de selles ont été prélevés chez des malades hospitalisés dans des Centres de Traitement du Choléra (CTC) des ZS d'Uvira, Nundu, Fizi, Minova et de la ville de Bukavu. Les échantillons étaient collectés par seringue et introduits dans des flacons contenant un milieu de transport (Cary-Blair).

Au laboratoire ces échantillons étaient ensemencés sur le milieu TCBS. Après incubation à 37°C pendant 16 à 24 heures, des colonies jaunes suspectes, étaient identifiées sur base des caractères biochimiques. Elles étaient ensuite agglutinées par des sérums spécifiques : polyvalent et monovalent *Vibrio cholerae* O1.

#### **Résultats**

Sur 62 patients 25,8%, 61,3% et 12,9% étaient respectivement dans les tranches d'âge < 5 ans, 5 à 45 ans et > 45 ans. Parmi eux 56,4% étaient de sexe féminin. Au total 42 souches de *Vibrio cholerae* O1 ont été isolées et identifiées dont 37 serogroupe Inaba et 5 Ogawa. *Aeromonas* sp. et *Plesiomonas shigelloïdes* étaient isolés respectivement chez 3 et 1 patients.

La sensibilité aux antimicrobiens était : Bactrim 8%, Ciprofloxaxine 48%, Chloramphenicol 76%, Tétracycline 88% Ampicilline 92%, Cefotaxime 100%.

#### **Conclusion**

Nous avons montré la présence de *Vibrio cholerae* O1 dans les CTC mais aussi des germes similaires. Une grande résistance était observée au Bactrim et à la Ciprofloxacin. Ces résultats soulignent l'intérêt de confirmation biologique en cas d'épidémie de choléra.

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### ***Malaria in pregnant women in Bukavu, South Kivu, Democratic Republic of Congo***

Objective: To determine the plasmodium prevalence and the complications due to malaria in pregnant

women, in Bukavu, situated between 1400 – 1700m above sea level. **Methods:** In a cross-sectional study 320 pregnant women with monofetal pregnancies were selected in maternity wards from three hospitals: the Provincial, Kadutu and Ciriri hospitals. Both thick (stained with 3% Giemsa) and thin (May-Grunwald-Giemsa) blood smears were performed on peripheral blood sample from mothers, newborns, umbilical cord and placenta. Plasmodium's presence on the smears defined malaria. Sociodemographics and clinical data of mother-child pairs, including parity, complications, birthweight and gender, were analysed. Statistical analyses were performed on Epi info 3.5. Proportions and means (standard deviations) were computed). Chi-square or Fisher Exact tests were run to compare proportions where relevant.  $P < 0.05$  was considered statistically significant. **Results:** The mean age (SD) of mothers was 27.3 (6.3) years. The distribution of pregnant women with malaria by parity status, 1, 2 and  $\geq 3$  showed the following proportions: 3.6%, 7.5% and 5.4% ( $p > 0.05$ ), respectively. The prevalence of plasmodium in pregnant women's thick blood smear was 5.3%. The mean (SD) birthweight was 3.163 (477). The overall proportion of low birthweight (LBW) was 8.4%, Pregnant women with malaria had 17.6% LBW vs 8% to those without malaria ( $p < 0.05$ ). No LBW baby was born to a mother with placental malaria; however, 8.8% of LBW births were born to mothers without placental malaria. **Conclusion:** We document unstable malaria transmission in Bukavu. The LBW accounted for malaria complications during pregnancy in this study. The LBW are derived more from malarious pregnant mothers than mothers who were not. The LBW could not be linked to placental malaria in this study. The possible causes of this complication are other than malaria parasites.

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***Epidemiological, clinical and evolution of the outbreak of cholera in Kindu health zone***

Cholera is still present today as one of the most common causes of morbidity and mortality associated with dirty hands disease. This condition still appears in epidemics in our midst. Apart from the various administrative and technical reports produced on the cholera epidemic lived in the city of Kindu in 2015, there is no scientific work that has studied this subject. The objective of our study was to present the demographic, clinical and progressive suspected cases have been affected by the cholera epidemic. Our study is retrospective on all suspected cholera cases admitted to the cholera treatment center of HGRK 27 August to 31 December 2015. There was a total of 2244 cases including 891 children. The data analyzed show that 39.7% of the cases were children. Male sex was predominant with 56% of cases, 47.7% of cases originated from Basoko health area of the 10 health areas that account Kindu health zone, 54.4% of cases were seen within 24 hours of having followed the onset of diarrhea, 68% were in a state of severe dehydration on admission. Mortality was 5, 1% among cases admitted to the CTC HGRK. These results demonstrate the need to raise awareness of Kindu health zone in particular and of the city of Kindu in general on cholera prevention measures and its complications.

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***Validity and reliability of Widal test and OnSite Typhoid IgG/IgM Combo in the diagnosis of typhoid fever in Bukavu, South-Kivu Province in Democratic Republic of Congo.***

**Introduction:** Blood culture, the gold standard for diagnosis of typhoid fever is inaccessible in the majority of low resources countries. Widal test is used in all health care in RDC and Bukavu town even if its validity and reliability was already decried in many publications. The objective of this study was to evaluate an appreciable, more specific, simple and easy test which can be proposed instead of Widal test in province of South-Kivu in DR Congo. **Methods:** We conducted a prospective cross-sectional study since January to May 2016. Blood specimen was collected from Cahi and Nyamugo hospitals. We evaluated two rapid tests: Widal test usually used in all hospitals in South-Kivu Province and OnSite Typhoid IgG/IgM combo, a new typhoid rapid test in Bukavu. Blood specimens were collected from patients who presented three typical signs of typhoid. No patient had history of treatment with antibiotics. For each selected patient samples for blood culture and for serology were collected. Blood culture was collected in a vial Bact Alert manufactured by Biomerieux. Serological analysis (Widal test and Typhoid IgG/IgM Combo) was conducted strictly according to manufacturers' instructions. We considered the blood culture as positive only if we have isolated *Salmonella enterica* serovar Tvphi. To assess the performance for each test. sensitivity. specificity. positive

and negative predictive values and 95% confidence interval were calculated using MedCalc Software. For reliability, Kappa test and Youden index were used. **Results:** 130 patients were selected in the two hospitals. Widal test showed more positive cases than One Site Typhoid IgG/IgM Combo. 16 blood cultures were positive, in only 6 of which *Salmonella enterica* Serovar Typhi was isolated. Sensitivity of Typhoid Combo IgG/IgM was 100% (54.07-100), specificity was 82.26% (74.4-88.5), PPV and NPV was respectively 21.4% (8.3-40.9) and 100% (96.4-100). The Kappa test and Youden index was 0.3 (0.2-0.4) and 0.82 respectively. **Conclusion:** Typhoid Combo IgG/IgM has an excellent specificity and negative predictive value. It has also a very good specificity but a low positive predictive value. This test is better than Widal test in the diagnosis of typhoid fever but the positive values must be associated to clinical signs.

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***Therapeutic, biological, clinical and epidemiologic profile of congenital malaria disease in an endemic area in the Democratic Republic of Congo***

**Introduction:** Malaria remains a major public health problem in sub-Saharan Africa, in general, and in our country, the Democratic Republic of the Congo, in particular. **Objective:** To document the epidemiological, clinical, biological and therapeutic profile of congenital malaria in Uvira city and to arouse the caregivers' curiosity to be able to diagnose and manage malaria congenital disease. **Methods:** This is a retrospective study, spread over two years, from June 2014 to May 2016. It was conducted in the Neonatology Unit of the Uvira Reference General Hospital. It included all newborn babies aged less than one month who were hospitalized in our department. **Result:** Most mothers were under 18 years old and primiparas (51.2%). The frequency of congenital malaria was 33.3%. Congenital malaria affected more neonates whose mother was primiparous and giving birth at home, female with 57.1%. The most affected age was less than 7 days (60.1%). Premature infants were more concerned (40.5%) and hypotrophic (weight less than 2500 g) with 45.2%. Fever was observed in 80%. TDR was positive in 83.3% cases and 13.1% infants were anemic. No major complication in 69.1%. The majority of our patients benefited from quinine by infusion at 65.5%. Most of our patients recovered and deaths occurred in 2.4% for 1-6 days hospital stay with 72.6%. **Conclusion:** The prevalence of congenital malaria is high in the endemic area. In addition to the use of insecticide-treated mosquito nets, environmental sanitation and proper follow-up prenatal consultation should reduce the prevalence of malaria-congenital disease.

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***Validity and reliability of 3rd generation HIV rapid diagnostic tests compared to 4th generation ELISA apDia HIV Ag/Ab in Bukavu, Eastern Democratic Republic of the Congo***

**Objective:** This study aimed to evaluate the accuracy and reliability of Rapid diagnostic tests (RDTs) in Eastern Democratic Republic of the Congo (DRC). **Methods:** Blood bags were collected from consecutive blood donors in Bukavu, Eastern DRC, May 1st to June 30th, 2015. Alere Determine™ HIV-1/2, Trinity Biotech Uni Gold™ HIV, and DoubleCheckGold™ Ultra HIV 1& 2 was evaluated. The laboratory-based 4th generation ELISA apDia HIV Ag/Ab assay was used as comparator. Sensitivity, specificity, positive and negative predictive values, and related 95% confidence intervals were calculated computed using MedCalc statistical software. Reliability was evaluated using Cohen's Kappa Statistic ( $\kappa$ ). **Results:** Among 312 participants who provided blood specimens, 96/312 (30,7%) were female and the mean age (SD) was 31,7 years ( $\pm 8,1$  years). Of the three hundred twelve blood transfusion bags collected, 7 (2.2%) were found to be HIV-positive by the comparator ELISA apDia HIV Ag/Ab assay. While only 5/312 (1.6%), 5/312 (1.6%), and 4/312 (1.3%), blood transfusion bags were tested positive by Alere Determine™ HIV 1/2, Uni-Gold™ HIV, and DoubleCheckGold™ Ultra HIV 1&2, respectively. The sensitivity was 57.1% (95% CI: 18.4-90.1) for all three tests. The specificity was 99.7% (95% CI: 18.4-90.1) for Alere Determine™ HIV 1/2, 100% (95% CI: 98.8-100.0) for Uni-Gold™ HIV, and (100% (95% CI: 98.8-100.0) for DoubleCheckGold™ Ultra HIV 1&2. Cohen's Kappa Statistic showed moderate agreement between the 4th generation ELISA apDia HIV Ag/Ab and RDTs Alere Determine™ HIV 1/2 and Uni-Gold™ HIV ( $\kappa = 0.66$ ; 95% CI: 0.55-0.76) but good agreement for

DoubleCheckGold Ultra HIV1&2 ( $\kappa = 0.72$ ; 95% CI: 0.61 – 0.82). Conclusions: In comparison to the laboratory-based ELISA apDia HIV Ag/Ab assay, the currently used 3rd generation HIV RDTs, assessed in this study, showed unacceptably poor accuracy results. These data raise serious concerns about blood transfusion safety and calling for stringent quality control measures and the need for laboratory-based antigen testing or nucleic acid testing if acute HIV infection is suspected.

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***Aflatoxin contamination of crop products from Burundi and Eastern Democratic Republic of Congo***

Aflatoxins (AFs) are noxious secondary metabolites of certain fungal species found in food and feed. Contamination of a commodity is associated with production and storage losses, and subsequently less food availability. Aflatoxins can also pose human health risks and represent a barrier to the development of trade, in both domestic and international markets. In this study, samples of cassava, maize, groundnuts, beans, soybeans, and sorghum, and their processed products were collected from local markets in Burundi and Eastern DRC. In order to investigate the levels of AF, samples were analysed using a single step lateral flow immunochromatographic assay (Reveal Q+). The results revealed the presence of AFs in all samples from both countries, with levels ranging from 1.5 to 2781  $\mu\text{g}/\text{kg}$ . Samples collected from Burundi contained relatively higher levels of AFs. In 51% of all the crops samples, total AF contamination was above the EU maximum tolerable level of 4  $\mu\text{g}/\text{kg}$ . Processed products, particularly from groundnut, maize and sorghum, had the highest incidence of AF contamination when compared to dried seeds. These results can serve as the basis for strategic and systematic approaches to reduce AF contamination in agricultural commodities in Burundi and Eastern DRC in order to reduce health risk, avoid reduced production in livestock, and open up export markets. To further strengthen national efforts in abating contamination, risk assessments are proposed in order to establish regulatory thresholds that the local consumer population can depend on, and which can be used to monitor safety across the country.

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***Awareness and perception about the occurrence, causes and consequences of aflatoxin contamination in Burundi and Eastern Democratic Republic of Congo***

The results show about 53% aware rate within the sampled, mostly through farmer-to-farmer information flow on aflatoxins. Farmers' perception and awareness of aflatoxin contamination were significantly influenced by household size and education. Annual income was found to have negative and significant association with farmers' perception. Kendal's concordance rank correlation analyses show agreement in the perception of the farmers across the two locations. The farmers ranked high humidity, improper storage practices, and poor soils as a potential causes of aflatoxin contamination, and consequently ranked is crop management practices as most effective ways of controlling aflatoxin contamination. In fact, majority of the farmers apply pre-harvest crop management practices as a means of controlling aflatoxin contamination. They identified changes in taste, smell, and colour of agricultural produce as signs of contamination, and reported stunning and liver infections as health risks associated to aflatoxin. Their inability to sell crop at true market values results in significant financial losses. About 31% of farmers in Burundi and Eastern DRC claimed to be willing to allocate resources to seed intervention, while a lesser proportion agreed to pay for training and information services. In order to intervene successfully the aflatoxin control package needed to be a low-cost differentiation in the market that was also credible with farmers. Development of markets that reward growers of aflatoxin free maize with premium prices for their product will further increase adoption of aflatoxin combating technologies

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***Acute respiratory infection in children at the Provincial General Hospital of Bukavu: Associated risk factors and viruses involved.***

**Introduction:** Acute respiratory infections (ARI) are the leading cause of morbidity and mortality worldwide. In children, viruses are the major cause of ARI. In this paper, we aim to determine risk factors for lower respiratory tract infection (LRTI) as well as the role of viruses in ARI in children younger than 5 years at the PGHB. **Methodology:** In this cross-sectional study, socio-demographic, clinical data and nasopharyngeal swabs of 146 children younger than 5 years who consulted at the PGRB for respiratory tract infection symptoms were collected. Nasopharyngeal swabs were analysed and a multiplex RT-PCR was used to detect viruses involved in ARI. Data were captured on an Excel spreadsheet and analysed using the R software. **Results:** The median age of our population was 14.5 months (IQR: 7–28). The M: F ratio was 1:1.02. 29 patients were hospitalized, 117 were outpatients. 25% of the patients had LRTI and 75% had URTI. 26.7% of the patients had malnutrition, 32% came from poor families, 52% of the children's mothers did not attend university, 32% of the patients received antibiotics prior to hospitalization, 42% of them were exposed to cooking smoke, 13% to cigarette smoke and 21% to alcohol intake during pregnancy while 28% of them had a family history of atopy. In their management, 41% of the patients received antibiotics, 11.6% of them had oxygen, and 8.2% had a gastric tube inserted. Four factors were associated, statistically, with increased risks of LRTI: malnutrition, low socioeconomic level of the family, low level of education of the mother and younger age of the patient. We are screening for the following viruses: RSV A and B, Influenza A and B, Parainfluenza 1, 2, 3, 4, Bocavirus, Coronavirus, Adenovirus, Rhinovirus, Enterovirus and Metapneumovirus. **Conclusion:** This study provides new insight into the epidemiology of ARI in Bukavu City. Infants are more exposed to LRTI as well as the disadvantaged population.

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#### ***Determinants of fetal macrosomia in Bukavu, DR Congo***

**Introduction:** Fetal macrosomia is usually defined when the birthweight is  $\geq 4000$  g or fetal weight  $> 90$ th percentile for gestational age. Its inadequate management may cause many maternal complications (genital tract lacerations, postpartum hemorrhage by uterine atony or rupture and neonatal complications (shoulders dystocia, plexus brachial elongation, fracture of humerus, of clavicle, death). The aim of this study was to identify risk factors for fetal macrosomia to improve management. **Methods:** This is a case-control study conducted in the maternity unit of the Hôpital Provincial Général de Référence de Bukavu (HPGRB) in Democratic Republic of Congo from November 2016 to January 2017. After delivery women were distributed in two groups, according to their newborns weight: 30 mothers in the case group (newborns weight  $\geq 4000$  g) and 30 mothers in the control group (newborns weight 2500 to 3500 g). Maternal sociodemographic characteristics and obstetric environment were studied and compared in the two groups. Data were analyzed with the software Medcalc 12.5.0.0. Differences were considered significant if  $p < 005$ . **Results:** Compared to control mothers, we found that the mothers of macrosomic infants were more multiparous and obese. **Conclusion:** Multiparity and Obesity are high risk factors for macrosomia. The reduction of maternal and perinatal complications passes through a better knowledge of risk factors and their early detection.

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#### ***Fiscal decentralization and local revenues: rental income tax in Bukavu city***

The financial aspect of decentralization has affected the sensitivity of economies since the 1950s. Financial self-sufficiency is evoked when a community is able to secure the financial resources it needs without recourse or dependence on other communities at a higher level of government. Investment in real estate and the rural exodus coupled with population growth in Bukavu city could be a privileged source of revenue for the provincial budget, given the constitution and the Congolese laws on decentralization which give prerogatives to the province to collect the rental income tax. Based on monthly data of the General Direction of Taxes (DGI) and the Provincial Direction of Mobilization and Management of Revenue (DPMER) In South Kivu for ten years, from 2007 to 2016, this paper uses the student statistical test for comparison of means to investigate the impact of fiscal decentralization on public revenues. The results show that decentralization significantly improves the rental income tax (IRL). However, these revenues are still low relative to the province's fiscal potential. It is possible to increase these revenues if the quality of institutions (anti-corruption, security, provision of public goods, rule of law, etc.) were improved and if urbanization standards were applied.

24. Joseph NTAGERWA, Jean Baptiste LURHANGIRHE, Joe BWIJA, Germain MUDUMBI, Serge BALOL'EBWAMI, Yvette LUFUNGULO, Bruno MASUMBUKO

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***Mortality and morbidity causes in General Pediatric Unit of Bukavu Provincial Hospital***

**Objective:** The aim of this study was to identify the main causes of morbidity and mortality in children hospitalized in the general pediatric unit of the Provincial General Referral Hospital of Bukavu. **Methods:** Our retrospective study included 750 cases of children from 1 month to 17 years old and who were hospitalized in the general pediatric unit from August 2013 to January 2015. The data were captured and analyzed by the software EPI Info 3.7. **Results:** Males predominated (57%, odd ratio 1.26). The age range 6-23 months was most common (22%). The majority came from Kadutu commune (37.20%). The most frequent causes of morbidity were: acute gastroenteritis, malaria, urinary infection and the bronchopneumonia. The mortality rate was 10%. The main causes of mortality were septic shock (26.6%), severe malaria (13.3%) and anemia (12%). Children under 5 years represented 80% of the deaths. Children referred from other health facilities had a high risk to die than those not referred [(OR=9.5; IC (5.5-16.5)]. The highest lethality causes were: septic shock (66.66%), anemia (50%), rhabdomyosarcome (50%), IVCD (25%), hypovolemic shock (23%), the ARDS (21.73%). **Conclusion:** The hospitalizations in the general pediatric unit were mainly justified by infectious diseases. These and their complications were responsible for the majority of the deaths. The delay of being referred increased the risk of dying. Reinforcement of the strategies of prevention and the improvement of the management of infectious diseases would allow the control of morbidity and the reduction of mortality.

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***Causes of morbidity and mortality in severe acute malnourished children admitted in the Pediatrics Department of the General Referral Hospital of Panzi, Bukavu DR Congo***

**Objective:** The aim of the study was to identify the causes of morbidity and the factors associated with mortality in severe malnourished children hospitalized in the Pediatric Department of the Panzi General Referral Hospital. **Methods:** It was a retrospective, descriptive and analytic study that covered a two-year period from 1st January 2014 to 31st December 2015. Out of the 963 files consulted, 807 fulfilled the inclusion criteria of study. The collected data were captured and analyzed through the software Stata version 10. **Results:** With a slight male predominance, the majority of our patients came from the Panzi hospital surrounding areas. The most affected age group was 24 to 59 months. The highest admission number of malnourished children was observed in December. Morbidity was dominated by infections and diarrhea. The mortality rate was 13% and the three leading causes of death were: sepsis (57.9%), anemia (8.4%) and hypoglycemia (7.5%). Generalized edema and alteration of other anthropometric parameters exposed malnourished children to risk of death. **Conclusion:** Severe acute malnutrition has a high mortality rate in our environment. The presence of edema was associated with a very high risk of mortality. The alteration of anthropometric indices increasingly contributes to the death occurrence. There may be an interaction between these different indices which could explain the increase of malnourished children deaths.

26. Mambo MWILO, Leonard KANKU TUDIAKWILE, Bruno Mungo MASUMBUKO,

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***Risk factors and causes of neonatal mortality in the neonatal service of the Panzi Hospital, Bukavu, DR Congo***

**Objective:** The objectives of our work were not only to describe the epidemiological profile and causes of neonatal mortality but also to evaluate the effectiveness of CPAP and NHF on the reduction of neonatal mortality in the neonatal unit of the Panzi hospital. **Methods:** This is a retrospective study with an analytical aim. It analyzes all neonatal deaths recorded during the years 2013-2014. For the comparison of the proportions, we used the Chi-square or Fischer's exact test with a threshold of significance lower than 0.05. **Results:** Out of a total of 1,825 newborns admitted in Neonatal service, 216 deaths were registered. The neonatal mortality rate was 11.83%. After multivariate analysis, we found that neonatal mortality was correlated with primiparity, extreme low birth weight, transfer from surrounding health facilities, DIC, and congenital malformations. The leading causes of lethality in the newborns under CPAP and NHF were

extreme prematurity and neonatal asphyxia. Conclusion: The rate of neonatal mortality remains high in the neonatal unit despite efforts to reduce it. Risk factors and causes were identified. Extension of the antenatal care and in utero transfer program and postnatal follow-up of the newborn should be the priority of the Panzi Hospital.

**27. Mapendo Fefe NDEKO, Bruno Mungo MASUMBUKO**

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**Morbidity and mortality in the Pediatric Emergency unit at the General Reference Hospital of Panzi, DRC**

Introduction: Infant and child mortality remains a major problem in developing countries, including the DRC. The objective is to study the factors related to deaths in the pediatric emergency unit of Panzi hospital.

Methods: This is a prospective, descriptive and analytical study of 457 medical records of children aged 1 month to 15 years hospitalized in the Panzi hospital Pediatric Emergency Unit from 1 December 2015 to 31 May 2016. The parameters studied were age, sex, origin, education and activity of parents, time to admission and the main causes of death. The data was entered and analyzed using the Epi-info software. We used the statistical test of p-value and OR. Results: Children under 5 years of age constituted 52.2%. Male patients accounted for 56.7% and came directly from the home (61.3%). Parents had secondary education at 58.4% for fathers and 52.8% for mothers. Mothers had a household occupation (46.2%) and fathers were public servants (33.9%). The overall mortality rate was 14.8% (68/457), the three leading causes of death were malaria (35.2%), acute respiratory infection (20.6%) and malnutrition (19.1%). There was a statistically significant relationship between age and death, origin and death, as well as parental education and death. Conclusion: Infant mortality is high in the Panzi Hospital and is dominated by malaria, ARI and malnutrition especially in young children. Priority actions to reduce this rate should be directed towards the control of infectious and parasitic diseases.

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***Perception of corruption by the traffic Police and taxi drivers in Bukavu: Analysis of causes and tackling strategies***

The aims of this study were to capture how the traffic police and taxi drivers in Bukavu perceive corruption and to assess the effectiveness of strategies put in place by NGOs to tackle corruption in the road sector. The traffic police in the DRC are notorious for bribery. Corruption in the road sector is obvious and is carried out in the open air. Several governmental and non-governmental organizations have emerged to fight against corruption as the main enemy of development in the DRC. However, little is known about how Congolese citizens, especially the traffic police and taxi drivers, perceive corruption. We used a mixed methods approach to capture the perception of corruption by the police and taxi drivers. 12 in depth interviews with the traffic police and 15 with taxi drivers were conducted in Bukavu. 40 police officers and 40 taxi drivers were surveyed. We conducted 3 interviews with two organizations tackling corruption especially Badilika project and SAJECEK FORCE VIVE. As opposed to the perception of NGOs, which consider corruption as a social cancer and very problematic, both the traffic police and taxi drivers perceived corruption as a crucial survival strategy and an important life source without which food, children's education and other basic needs will not be met. Hence, it becomes difficult to fight against corruption in this sector as NGOs, the state, the traffic police and taxi drivers have diametrically opposed views of the phenomenon. The traffic police and taxi drivers have a very positive perception of corruption. Efforts should be made to translate the positive view of corruption into a negative one. Interventions to tackle corruption should address its cultural, political, economic and legal roots to be successful. A single look on corruption will always result into a failure.

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***IDPs are not always IDPs: the relevance of IDP label based on the ground in non-camp settlement in South-Kivu***

For two decades of conflict and complex humanitarian response, Internally Displaced Persons have been the main core of assistance in eastern DRC and have attracted generous findings and attention to their plight. On

the other hand, less is known about the meaning of the word IDP in the field by different actors involved in their assistance. Most important, the consequence of the label is still overlooking to address the future of IDPs in eastern DRC. In a context of non-camp setting and a cluster approach to assist IDPs, South Kivu gives the opportunity to better understand IDP definition on the ground as IDPs population make up the important vulnerable group in regard to the conflict. For the purpose, the paper tends to generate knowledge and to understand the field definition of IDPs based on multiple interviews, observations and focus group with actors and host communities involved in the assistance of "IDP". Second, the paper unveils empirical criteria of the term "IDP" according to the social construct of the term. Third, the paper analyses the empirical definition based on the rationale to assist IDPs. The fourth part reflects on the non-relevance of IDPs concepts. The paper ends by engaging a discussion around the failures to better assist IDPs.

### 30. Bienvenu NAMEBIGABA

Centre Africain PG

#### ***The aggressivity of Congolese population toward MONUSCO.***

**Objective:** What are the factors that explain the aggressivity of Congolese people to MONUSCO. The aim of this study was to display the factors that explain the aggressivity of Congolese people to MONUSCO. **Methods:** I used mixed methods to conduct this study. 400 were surveyed in South and North Kivu. 6 focus groups were conducted with civil society actors, 2 focus groups were conducted with public authorities, one in South-Kivu and another in North-Kivu. Ten MONUSCO staff were interviewed. 80 in depth interviews were conducted with civil society leaders. **Results:** Below are four factors who explain the aggressivity of Congolese people toward MONUSCO. 1. Congolese people are aggressive to MONUSCO because they are not aware of the mission and the mandate of MONUSCO in the DRC, and how the UN system works. 2. Absence or lack of peace plan /architecture in DRC. 3. Little appreciation of MONUSCO's work as compared to the local expectations of peace, security and the means invested for the mission in the DRC. 4. Reverses of MONUSCO as UN mission in the DRC. Five drawbacks were identified and documented, and corrective measures of this reverses.

### 31. Olumide ALABI, Marnin WOLFE, Smith IKPAN, Jean-Luc JANNINK, Chiedozi EGESI, Ismail RABBI, Peter KULAKOW

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#### ***Practicality and potentials of genomic selection to improve root yield, dry matter content and cassava mosaic disease resistance in cassava***

Genomic selection's (GS) potential is in the ability to select individuals of higher breeding value without the requirement of collecting phenotypes pertaining to these individuals. Three consecutive genomic selection cycles have been accomplished in the IITA-NEXTGEN cassava breeding project. A selection gain trial was established from three cycles of genomic selection. From each of the cycles, quartile samples were made from the progenies derived and planted together with the original parents selected by GEBVs in each of the selections cycles, Cycle 0, Cycle 1 and Cycle 2. The trial was set up in an augmented design in two replicates and planted in two locations in Nigeria; Ibadan (7.40° N, 3.90° E, 210m ASL, precipitation: 1305mm) and Mokwa (9.30° N, 5.00° E, 457m ASL, precipitation: ~1100mm). Preliminary findings indicate a significant genetic gain for dry matter content, cassava mosaic disease resistance and root yield. The cross validation accuracy of the genomic estimated breeding values (GEBVs) and the realized estimated breeding values (EBVs) indicates values of 0.49, 0.53 and 0.78 for fresh root weight, dry matter content and cassava mosaic disease severity, respectively. Using the breeder's equation, the expected genetic gains were estimated from the recurrent genomic selection cycles. The results correlate with the prediction accuracies for these traits from cycle to cycle. Rapid genetic improvement of some economic traits in cassava using genomic selection appears to be a promising addition to cassava breeding strategies that will contribute to variety development and farmer's profitability.

### 32. Gilbert MUGISHO

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#### ***Economical- financial analysis of a project on the oyster mushroom production at Bukavu in eastern DR Congo***

The domestication of mushrooms is a means of reducing poverty and food insecurity because of its low cost of production, high profits and nutritional and therapeutic benefits. Eating habits as a basis for analyzing food security and reflecting the livelihoods of a population depend on the purchasing power of individuals on the

one hand and on the availability and accessibility of healthy food on the other hand. Nevertheless, for more than three decades, the Democratic Republic of Congo (DRC), located in the heart of Central Africa, is experiencing a deficit food situation in both rural and urban areas mainly caused by insufficient protein and energy. To solve this problem, besides animal proteins, there are other safe food and protein sources in nature, such as high eatable mushrooms that have long been considered potential substitutes for meat and other animal products. A set of intellectual operations and means enabled us to search, demonstrate, analyze and verify the truths pursued by this study. Three research methods and techniques helped us, including market research, the analytical method and the PERT method. This series of methods was based on the economic and financial analyses of the project which allowed us to evaluate the risk and the profitability of our project. The purpose of this study is to provide an economic-financial analysis of the risk and cost-effectiveness of a project to establish a large-scale oyster production and marketing firm in the city of Bukavu. The results showed that such an initiative is possible to be done being given that there are favorable socio-climatic conditions; An expected level of profitability estimated at 82.14%; A risk level of 44.9% and a recovery of capital within ten years.

**33. Rodrigue AYAGIRWE, Zone BUHENDWA, Kaccho KARUME, Gustave MUSHAGALUSA**

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***Inventory, characterization and use of edible insects in South Kivu eastern DR Congo***

Edible insects are reported to be an alternative way of malnutrition and hunger alleviation in African countries. They are reported to exist in South Kivu and are part of the local diet but no more information is available. A study of the inventory, characterization and use of edible insects in South Kivu was carried out in 360 households from 18 randomly selected groups in three territories (Fizi, Mwenga and Walungu). Consumers of insects surveyed in the territory of FIZI were mainly male (58.3%), with an average age of 25 years. The majority were married (69.8%) and many were not attending school (34.2%). They live mainly from agriculture (54.2%), and are mainly Protestant (67.2%) with an average number of  $6.7 \pm 2.7$  persons per household. Information was collected on the different types of insects consumed and raised, methods of harvesting, methods of preparation, harvesting and harvesting periods. The results indicate that 19 species of insects are consumed in the study area with varying preferences. In FIZI they prefer the larvae of scarabae whereas in Mwenga it is the "Tukumombo" and in Walungu grasshoppers are the one most preferred. Different methods of processing have been reported and varied from one region to others and depend on the type of insect. Despite being utilized for consumption, they are as well used for medication purposes, while some can as well cause intoxication if miss-processed.

**34. Valence Mutwedu BWANA, Rodrigue Basengere AYAGIRWE, Yannick MUGUMAARHAHAMA, Bahindwa GANZA, Chance Barume AKSANTI, Espoir Basengere BISIMWA, Kaccho KARUME, Alphonse Zihalirwa BALEZI, Nachigera Gustave MUSHAGALUSA**

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***Effect of heat treatment on the quality of traditional white cheese "Mashanza" produced in South Kivu, Eastern DR Congo***

The processing of fresh milk into traditional white cheese traditionally known as "Mashanza" remains poorly documented in South Kivu (DR Congo), while this form of milk nutrient preservation is a luxury product and highly appreciated by the population from the area. Four batches of 5 liters of fresh milk each were collected in healthy Frisian cows and subjected to different heat treatment conditions (pasteurization and non-pasteurization), fermentation (24 hours, 48 hours) and post-harvest of the coagulum (draining for 30, 60 and 120 minutes). Thirty-six milk samples (3 per treatment) were subjected to a physicochemical and microbiological analysis. The results of the analyzes showed that the milk pasteurized and fermented for 48 hours and drained for 30 minutes, were generally of better nutritional quality, although the unpasteurized milk gave the best yield in "Mashanza". Irrespective of the type of pathogen, the frequencies of contamination in the white cheese (Mashanza) samples from unpasteurized milk are higher. Although total mesophilic aerobic flora was high than other pathogens in all types of milk, the rate of contamination was generally low compared to the standards. This study allowed a better appreciation of the quality of the Mashanza following the different treatment methods and made recommendations for the processors in order to improve the quality of their product.

35. Eric MUGABO, Espoir BWENGE, Pierre KABUYA, Yvette KUJIRAKWINJA, Guy MULINGANYA  
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***Knowledge and attitude of mothers toward labor pain and labor pain analgesia at Hôpital Provincial Général de Référence de Bukavu; Cross-sectional study from September to November 2016.***

Introduction: In the developed world, non-pharmacological and pharmacological methods are used to relieve pain during most childbirths; whereas in the developing world a gap exists between provider awareness and practice of labor pain relief. This study aims to determine knowledge and attitude of mothers about pain and analgesia during labor at HPGRB. Methods: About 220 mothers were interviewed between September and November 2016. We used a survey questionnaire to determine mother's knowledge and attitude about labor pain and labor pain analgesia. Stata 12 for Windows was used for statistical analysis. Associations between variables were determined by using Chi-square tests. A p-value < 0.05 was considered significant. Results: Half of mothers believed that pain during labor is godly (54%) whereas only 10% knew that it is physiologic. Antenatal consultation did not affect this perception of labor pain. Half of mothers (52%) did not expect to use labor pain analgesia. Belief that labor pain has a positive impact on maternal love to her baby (68%) was the main reason of avoiding labor pain analgesia. No association was established between mother's attitude in the face of labor pain and maternal love to her baby. About labor pain relief, only 24% were informed about pain relief during labor; influenced by education level (p=0.00). The main source of information about labor pain relief was the hospital but outside the antenatal consultation. Epidural analgesia was used by 4,1% and most of mothers who experienced it for the first time desired it for their next childbirth. No association between labor pain analgesia and maternal love to her baby was established. Conclusion: Mothers' knowledge of mothers about labor pain remains dominated by perceptions of the divine origin of pain and few practiced labor pain relief at HPGRB. Obstetricians, midwives and anaesthesiologists have to collaborate to improve knowledge by education during antenatal consultation.

36. MAD SENGEYI, BL KUSEKE, MA MBANGAMA

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***Emergent risk factors of preeclampsia in Kinshasa, DR Congo***

Introduction: Preeclampsia (PE) is an increasingly frequent pathology at the University Clinics of Kinshasa (UCK) with an incidence of 6,6 %. Many drugs used for the treatment are not usually available in Kinshasa. Its impact can be reduced by improving its prevention through the early identification of risk factors during prenatal visits. Objectives: to evaluate the association between risk factors and complications with the occurrence of preeclampsia. Methods: We conducted a case-control study, retrospective, at the UCK. The case group included pregnant women who developed PE during pregnancy and controls included pregnant women who did not develop PE. A total of 336 pregnant women, including 112 cases and 224 controls, matched by age and parity, were selected from January 2004 to December 2015. The study variables included: socio-demographic characteristics, maternal antecedents as well as the characteristics of the pregnancy. Statistical analyses consisted of calculations of averages, standard deviations and proportions; Student t-tests, chi-square tests and the odds ratio(OR) with a 95% CI were calculated using the SPSS 18.0 software. Results: Significantly associated risk factors were single marital status (p=0,000), a pregnancy history of hypertension (OR 14,6; CI: 5,5-39,1), a family history of hypertension (OR 3,9; CI: 2,01-7,7), a personal history of hypertension (OR 4,2; CI: 1,2-14,4), absence of prenatal visits (OR 3; CI: 2,4-3,8) and prenatal visits out of UCK (OR 3,8; CI: 2,6-5,7) as well as malaria or urinary tract infection during pregnancy (OR 4,1; CI: 1,6-10,5 respectively). Abruptio placentae (OR 14,6; CI: 3,2-65,8), fetal distress (OR 44,4; CI: 10,4-189,5), neonatal death (OR 12,6; CI: 1,5-106,2), failure of the APGAR score (OR 9,7; CI: 4,1-21,5), low fetal weight (OR 7,7; IC: 4,5-13,2), prematurity (OR 5,9; CI: 3,4-10,1), stillbirth (OR 4,8; CI: 1,9-12,1) and caesarean section (OR 3,1; CI: 1,9-5,01) were significantly associated with preeclampsia. Conclusion: the occurrence of preeclampsia is significantly associated with a single marital status, a pregnancy history of hypertension, a family history of hypertension, a personal history of hypertension. Absence of prenatal visits and prenatal visits out of UCK seem emergent risk factors.

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***Ritualistic sexual abuse of children in post-conflicts eastern DRC: Factors associated with the phenomenon and implications for social work.***

**Introduction:** Although many studies have investigated sexual assault against women and girls from a generalized point of view, little is still known about ritualistic sexual abuse targeting children in post-conflicts eastern DRC. This study wished to examine the determinants of ritualistic sexual abuse of children in post-conflicts South-Kivu province. **Methods:** An exploratory research design was used and grounded theory was the main tradition behind the study. The unit of analysis for the study was a household where at least a case of ritualistic sexual abuse of a child was reported. In each selected household the head of the family and the child survivor of the assault were interviewed. Thus semi-structured interviews were conducted with a purposely selected sample of 41 participants, among which 22 were primary respondents (household level participants) and 19 were key informants. Besides 3 focus group discussions were conducted in all territories with heterogeneous categories of participants. Data collection was conducted in Kavumu, Kalagane, Mukungwe and Bukavu; in South-Kivu province, eastern DRC. **Results:** Forms of ritualistic sexual abuse included incest, pedophilia, sexual exploitation, child marriage and child abduction associated with extreme sexual brutality. The abuse was basically sexual and targeted children from any age between 6 months and 12 years. Ritualistic sexual assault of children was based on 3 main determinants. Socioeconomic determinants were all about: child poverty, poor parenting, poor housing and unemployment. Political instability-related factors involved IDPs, community militarization, civilian adoption of rape and weak CP mechanisms. The mystical factors involved superstitions such as: healing HIV/AIDS and other STIs, blood addiction, economic power, invulnerability to shooting/being invisible to the enemies on the battles. **Conclusion:** In a context of ample impunity and poor empirical data, speculation persisted and sexual abuse of children was far from being curbed.

**38. Sébastiena MBUYI-MUSANZAYI, Tony KAYEMBE, Marca KASHAL, Prosper LUKUSA, Prosper KALENGA, François TSHILOMBO, Koenraade DEVRIENDT, Hervé REYCHLER.**

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***Non syndromic cleft lip and/or cleft palate: epidemiology and risk factors in Lubumbashi (DR Congo), a case-control study***

**Objective:** To determine the incidence and risk factors of occurrence of non-syndromic cleft lip and/or cleft palate (NSCLP) in Lubumbashi. **Method:** A case-control study was conducted in the health district of Lubumbashi from February 2012 to December 2015. An exhaustive sampling, collecting all newborns with CL±P in maternities was conducted. From a total of 172 cases, 162 non-syndromic cases were recruited. For each case, one clinically normal newborn control was selected. **Results:** NSCLP had an incidence of 1/1258 live births (0.8/1000). We found significant associations with a family history of CLP (Chi-square family history=11.5, p=0.0007), maternal alcohol intake (OR= 19.3, 95% CI: 1.9- 197.1), paternal alcohol during the periconceptional period and the first trimester of pregnancy (OR= 18.7, 95% CI: 3.9- 89.2), maternal educational level lower than high school (OR=9.5, 95% CI: 2.0- 44.7), clay (Pemba) consumption during pregnancy (OR= 38.3, 95% CI: 9.3- 157.0), the use of insecticides in the evening (OR= 130.3, 95% CI: 13.2- 1286.9), indoor cooking with charcoal (Makala) (OR = 6.5, 95% CI: 1.22-34.5), and regular consumption of Kapolowe fish, supposedly contaminated with heavy metals (OR = 29.5, 95% CI: 7.4-116.7). **Conclusion:** Several environmental risk factors highly prevalent in Central Africa for facial clefting were found.

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***The dignity of gender and wellbeing in forcibly displaced women: a call for transformational action***

There is increasing consciousness of the relationship between the gender-wellbeing and transformational development on the African continent. Nonetheless, not many gender policies or welfare programmes explain the reasons for and magnitudes of challenges faced by women from a transformational development perspective in an attempt to bring about sustainable solutions. Moreover, hardly any course of action exists that allows policymakers and/or development practitioners to set up strategic approaches essential for taking care of the health consequences of forcibly displaced women. and to minimise the causal factors of

injurious acts or objectifying behaviours within societies that relegate their dignity to nothingness. This paper addresses the question of gender and wellbeing among displaced women in Africa using South Africa and the Democratic Republic of Congo (DRC) as case studies. The data for this paper was collected empirically through semi-structured interviews and focus groups in the Western Cape Province of South Africa among refugee migrants from various regions of the African continent, and in the eastern part of the DRC among the survivors of sexual and gender-based violence (SGBV). The paper deduces that gender and wellbeing are essential ingredients of human dignity; they require reflection and action from every layer of the social fabric.

**40.** Patrick C KATOTO, Andre H BULABULA, Dieudonné BIHEHE, Pierre-Prince M LUNJWIRE, Aimé MURHULA, Tonya M ESTERHUIZEN, Kanigula MUBAGWA, Jean B NACHEGA, Stellenbosch University & Catholic University of Bukavu (UCB) & University of Leuven, Leuven & Université Evangélique en Afrique & PHARMAKINA & University of Pittsburgh & Johns Hopkins Bloomberg School of Public Health; [katotopatrick@gmail.com](mailto:katotopatrick@gmail.com)

***Prevalence and risk factors of dyslipidaemia and cardiovascular disease in HIV-infected adults in Bukavu, Democratic Republic of the Congo***

**Objectives:** To determine the prevalence of and risk factors for dyslipidaemia and cardiovascular disease in HIV-infected adults. **Methods:** Cross-sectional study. From July to September 2016, a structured questionnaire was administered to HIV-infected adults attending three HIV clinics in Bukavu, Democratic Republic of the Congo. Data on socio-demographic and clinical characteristics were collected. Fasting blood sugar (FBS) and lipids, total cholesterol, triglyceride, high-density lipoprotein cholesterol (HDL-c), low-density lipoprotein cholesterol (LDL-c), were measured; most recent CD4+ T-cell count results were extracted from medical records. Metabolic syndrome (MS) was defined per the International Diabetes Federation (IDF) and National Cholesterol Education Program Adult Treatment Panel III (ATPIII) criteria. Adjusted odds ratio (OR) and confidence limit (CI) were generated through logistic regression. **Results:** Of the 495 study participants, 356 (72%) were women: 474 (95.8%) were receiving antiretroviral therapy (ART). The median age was 43 years [interquartile range (IQR) 36-51]. FBS  $\geq$ 100 mg/dl and LDL-c  $>$ 150mg/dl were more prevalent in participants receiving in ART-arm ( $p=0.05$  and  $p=0.009$ , respectively). The overall prevalence of MS per IDF and ATPIII criteria were 30% [95%CI, 23%-38%] and 27% [95%CI, 20%-35%], respectively. In a multivariable logistic regression, low physical activity (OR 2.47, 95%CI: 1.40-4.36,  $p=0.002$ ), daily exposure to household air pollution from biomass of more than two hours (OR 2.18, 95%CI: 1.01-4.68,  $p=0.05$ ), ART exposure (OR 7.46, 95%CI: 1.21-45.96,  $p=0.03$ ), stavudine-containing ART (OR: 2.57, 95%CI: 1.11-5.93,  $p=0.03$ ) and protease inhibitor containing-ART (OR: 2.96, 95%CI: 1.07-8.18,  $p=0.04$ ) were independently associated with the MS. **Conclusion:** MS is highly prevalent among HIV-infected adults in Bukavu. Beside traditional risk factors and the known contribution of certain ART on MS, daily exposure to household air pollution with cooking fumes is of specific concern. Targeted prevention interventions and avoidance of stavudine-containing ART regimens are critical to decrease the burden of MS in HIV-infected adults.

**41.** N Patrick BISIMWA, Edson RWEYEMAMU, Mariana J RWEYEMAMU, Samuel O ANG'WENYI, Jacqueline WEYER, Petrus Jansen VAN VUREN, Janusz T PAWESKA, Leonard EG MBOERA, Christopher J KASANGA, Mark M RWEYEMAMU, Gerald MISINZO

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***Distribution and diversity of mosquito vectors and their role in arboviruses transmission in selected districts of Tanzania***

**Introduction:** Mosquito-borne viruses primarily infect animals and humans causing significant public and veterinary health threat nearly worldwide. Knowledge of vector diversity is important in understanding the transmission dynamics of vector borne disease. **Methods:** Mosquito surveys were conducted during and after rainy seasons from March 2015 to June 2015 to collect adult mosquitoes from rural and urban setting in six different districts of Tanzania using CO<sub>2</sub>-baited CDC light traps, Biogent sentinel traps, battery-powered aspirators, and the Mosquito Magnet CO<sub>2</sub> trap. Mosquitoes were then identified based on their morphology using morphological identification keys under a stereo light microscope. Reverse Transcription-Polymerase Chain Reaction (RT-PCR) assay was performed on pooled adult *aedes* mosquitoes to detect the presence of Chikungunya virus, Dengue virus, Rift valley fever virus and Yellow fever virus. **Results:** A total of 6102

mosquitoes belonging to 5 genera (*Aedes*, *Anopheles*, *Culex*, *Mansonia*, *Mimomyia*) and 19 species were trapped. Overall, the abundance of mosquito genera varied significantly ( $p < 0.05$ ) with *Culex* having high abundance 56.2% ( $n = 3434$ ) while *Mimomyia* genus recorded the lowest number 6.3% ( $n = 390$ ). The predominant species was *Culex quinquefasciatus* 49.5% ( $n = 2692$ ), followed by *Aedes aegypti* 16.3% ( $n = 793$ ). Overall mosquito abundance varied significantly by geographical zones. Most of the species 30% ( $n = 1830$ ) were collected in Kyela followed by Karagwe 22.4% ( $n = 1367$ ) and Mahenge district giving the least collections 8.3% ( $n = 511$ ). Of 76 adult *Aedes* mosquito pools screened, arboviruses were detected in 61 (80.2%) included *Flavivirus* (33 pools), *Alphavirus* (24 pools) and *Bunyavirus* (1 pool). From the 33 *Aedes* mosquito pools tested positive for *Flavivirus* genus, Dengue fever virus was identified into 11 pools by RT-PCR, giving an infection rate of 33.3%. Moreover, Chikungunya virus was detected into 4 pools out of 24 (16.6%) *Alphavirus* genus positive pools while Rift valley fever virus was detected in 2 pools out of 4 (50%) *Bunyavirus* positive pools. No pool was positive for yellow fever virus. Positive pools were detected in all of the selected districts tested within Tanzania. **Conclusion:** Our findings provide an insight into the abundance and distribution of potential vectors in these wards which may be important in determining areas at risk of emergence and circulation of mosquito-borne diseases. The close proximity of these vectors to humans and the detection of viruses in them pose high risk of virus transmission and emphasize a need for vector control measures in the study area.

**42.** Eric MUGABO, Freddy KAMPARA, Pierre KABUYA, Espoir BWENGE, Guy MULINGANYA  
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***Intensity and severity factors of childbirth pain among mothers giving birth at Hôpital Provincial Général de Référence de Bukavu (HPGRB); Cross-sectional study from September to November 2016***

**Introduction:** The pain experienced during childbirth by women is still acute even in a physiological context. Locally, it remains an issue that women have to face during labor and delivery. For most women it is the most intense pain they have ever felt. This survey aimed to assess childbirth pain intensity and determine factors associated with severe labor pain intensity. **Methods:** In this cross sectional study, 220 mothers giving birth were interviewed from September to November 2016 at HPGRB. It was a convenience sample. Pain was assessed by VAS. The influence of sociocultural, gynaecologic and obstetrics factors was checked. Each participant gave consent before interview. Statistical analyses were performed by Stata 12. Participants who felt mild to moderate childbirth pain were compared to those who felt severe pain using Chi-square tests. A  $p$ -value  $< 0.05$  was considered to be significant. **Results:** At the beginning of labor, most women (92%) reported mild to moderate pain and at the end (expulsion of the new-born) most women (96%) reported severe labor pain. In the two periods neither sociocultural nor obstetrical factors influenced childbirth pain intensity. However, during childbirth, most women (82%) reported severe labor pain. Age ( $p = 0.011$ ), parity ( $p = 0.00$ ) and induction or stimulation of labor ( $P = 0.00$ ) were correlated with severe labor pain intensity. **Conclusion:** This survey suggests that childbirth is associated with severe pain and pain is influenced by some factors (age, parity, induction or stimulation of labor). More studies are recommended in order to improve women's comfort during childbirth by using pharmacological and non-pharmacological analgesia techniques.

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***Complications related to clandestine abortions as a reason for admission to intensive care: Regarding 38 cases at Panzi General Hospital***

**Introduction:** In sub-Saharan countries, resuscitators, physicians and gynecologists are faced with uncommon situations related to clandestine abortions. Complications of clandestine abortions are one of the reasons for hospitalisation in intensive care units. The objective of this study was to describe the picture and profile of these patients. **Methods:** This is a retrospective and descriptive study carried out on 8 patients admitted at Panzi intensive care unit with a diagnosis of clandestine abortion. **Results:** The prevalence of clandestine abortions was 0,38; it was young women of average age of 23.3 years. The time to the consultation after induced abortion was 5,8 days on average. The cause of admission to intensive care was a disorder of consciousness for 55,2% of cases but also haemodynamic repercussions, 31,6% hypotension and 47,4% of anuric patients. Amines were used in 16,6%, a need for blood transfusion for 63,1%. Laparotomy was required for 26.3% of cases. Peritonitis was the most common complication in 55.2%. The mortality rate

was 23,7%. The average hospital stay was 9,3 days. Conclusion: The septic status, the neurological and hemodynamic repercussions of patients with an illegal abortion, required admission in the intensive care. The mortality still is elevated in these cases.

**44. J CIKWANINE, B MUHIGIRWA, I BERGLÖV, L LYXE, C HESSE**

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***A study of the alloimmunization in pregnant women from the Democratic Republic of Congo, Africa***

Introduction: Screening for the presence of maternal antibodies is standard procedure in developed countries and of great importance for the prevention of hemolytic disease of the fetus and newborn (HDFN). The presence of red cell antibodies is estimated to occur in approximately 1% of all pregnancies in Sweden. In the African population the D-antigen is less common and scientific reports regarding the incidence of red cell antibodies during pregnancy are few. The aim of the present study was to screen for antibodies amongst pregnant women at the Panzi Hospital. Methods: Samples were collected from pregnant women at the Panzi Hospital. The ABO and RhD blood group were determined with tube technique. The plasma was frozen and screening for antibodies were performed at the Sahlgrenska University Hospital using BioRad gelcards and indirect antiglobulin technique (IAT). The screening panel consisted of three cells. Positive samples were further investigated using IAT a gel standard panel. Results: Samples were drawn from 473 pregnant women, gestational week 22 to 38 with median week 27. Blood group O RhD positive were the most common blood group (41,2 %) and in total 28 women were RhD negative (5,9 %). When screening for antibodies, 20 samples were found to have weak positive reactions and two samples had strong positive reactions. In the following antibody identification most samples were found to be negative or indeterminate. The two strong positive reactions correlated with two clinical significant antibodies, i.e. anti-D and anti-e. Furthermore, an anti-Lea were identified. Overall the frequency of antibodies was found to be 0,6 %. Conclusions: The frequency of RhD negative individuals in Congo has to our knowledge not previously been reported. This study is a small pilot project with the long term ambition to improve the health care for pregnant women including prenatal screening for red cell antibodies in Congo.

**45. Maroyi RAHA**

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***Factors of access to care within 72 hours after sexual abuse***

The figures of the Panzi Hospital indicate that less than 17% of survivors arrived at the hospital within 72 hours after rape; and yet, survivors who arrive at the hospital before 72 hours receive a special medical support to prevent Sexually Transmitted Diseases, pregnancy, HIV transmission and tetanus. The objective of this study is to determine the factors causing most survivors to come for care after 72 hours following the rape. This work is an explanatory study conducted at the Panzi Hospital, carried out on 543 survivors of sexual violence in 2014. A logistic regression model was helpful to us in determining the factors explaining overall access to care before 72 hours of rape. The correlation matrix and the ROC curve allowed us to appreciate the quality of the model. The odds ratios were derived from the final model coefficients and tested by chi-square Wald. For all the tests, a p-value less than the threshold of 5% was considered significant. The results of the logistic model showed that access to care before 72 hours was significantly influenced by the distance between the residence of the survivor and the Hospital, the presence of a link between the survivor and her aggressor and the trauma level of the survivor.

**46. Julien Bake MUHIGWA, Ali BITENGA, Juvenal Bazilashe BALEGAMIRE**

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***Education and educational gender in Democratic Republic of Congo***

Introduction: Many international and local organizations have been involved in women's education as a key factor for sustainable development for many years. A major focus has been put on primary and secondary school education. However, little is known about the long term impact of higher education of women in the Congolese community. The aim of this study was to find the social, economical, cultural and political impact of women's education after they have graduated from universities in the Congolese community. Methods: This study was conducted in 3 universities and 2 colleges namely the Evangelical University in Africa, the Catholic University of Bukavu, the Official University of Bukavu, the Teachers' Training College of Bukavu and the High Nursing School of Bukavu. Through a retrospective endeavor, we looked at the number of women

and girls who registered in these institutions as students from 2000 to 2016 and how they have been performing academically compared to men's performance. Furthermore, we went to the community and met 200 graduates' women to find what they have become and what they think others have become after their graduation from the universities. **Results:** We found that university education was a key factor for the promotion of women's leadership and political representation. Women who benefited from the university education are involved in decision making in their families, they are the main breadwinners for their households and live in better conditions than those who did not go to University. However, the proportion of women in the state apparatus is still insufficient. **Conclusion:** University education is gender promoting in DR Congo if considered seriously. Decision makers have to ensure that women have access to university education, become effective in leadership and increase their ranking representation.

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#### **Fistules urétéro-vaginales traitées par voie laparoscopique à l'Hôpital de Panzi**

**Objectifs:** Rapporter l'étiologie, le diagnostic et la prise en charge des fistules urétéro-vaginales opérées par voie laparoscopique. **Méthodes:** Etude prospective portant sur 12 opérées pour une fistule urétéro-vaginale par voie laparoscopique du 1er octobre 2015 au 31 Juin 2016, à l'hôpital de Panzi. **Résultats:** Les fistules urétéro vaginales représentaient 22% de l'ensemble des fistules opérées. L'âge moyen des patientes était de 24 ans, avec des extrêmes allant de 16 à 49 ans. La tranche d'âge de 20 à 29 ans représentait 58,3%. La césarienne était la principale cause de la fistule à 91,6%. L'examen au bleu de méthylène et l'UIV étaient les examens de confirmation du diagnostic. La lésion urétérale était à gauche à 91,6%. La réimplantation urétéro-vésicale sur vessie psorique était le traitement réalisé à 83,3%. Les pertes sanguines étaient < 200 ml dans 70%. La durée moyenne de l'intervention était de 205 minutes. Une sonde double J était laissée en place chez tous nos malades. Les suites opératoires étaient simples chez tous les malades, literie sèche à 100%. La durée d'hospitalisation était de 12 jours. **Conclusion:** La chirurgie gynéco-obstétricale est la première cause de fistule urétéro vaginale. L'examen au bleu de méthylène et l'UIV sont important pour le diagnostic. Le traitement par la chirurgie laparoscopique quoique peu rependue est possible et peut être proposée pour les même indications que la voie ouverte.

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#### ***Consequences of domestic violence on women's health In the City of Beni, Democratic Republic of Congo***

**Introduction:** Violence to women is a real public health problem. According to WHO, one in four women is exposed at one time or another in her life to domestic violence and loses between one and four years of healthy life. Domestic violence is the cause of a split of the total expenditure of annual health among women ( [www.sante-educatio.tg](http://www.sante-educatio.tg) ). **Methods:** A survey questionnaire was administered to 200 married women living in the town of Beni, chosen by simple random sample. The study covers 12 months, from January to December, 2016. **Results:** 28% (56 of 200) was the overall prevalence of domestic violence in the city of Beni. It is among women with low education and income without this proportion is higher. 248 was the frequency of consultation by the 200 women surveyed, 51% (128/248) of consultations benefited the women victims of violence, 29% (59/128), 18% (44/128) and 8% (16 / 128) viewed respectively uro-genital infection (STI included), digestive disorders (gastritis included) and cardiovascular disease. **Conclusion:** This study shows that 1) domestic violence affects the health of women who are the victims, 51% of the consultations were in their favor; 2) genital infections are at the top of the list of diseases developed by these victims; and, 3) the rate of violence is 28% in the city of Beni. **Recommendation:** to fight against inequality between men and women.

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#### ***Etiologic and prognostic characteristics of non-traumatic coma cases among adult patients admitted in the Emergency Department, General Provincial Hospital of Bukavu, DR Congo.***

**Introduction.** Knowledge of the main causes of non-traumatic coma and of factors associated with

mortality and morbidity. **Methods.** This study involved fifty-seven adult patients admitted to the Emergency Department with a Glasgow coma score (GCS) of less than 9 between January and September 2016. Demographic, clinical and paraclinical data were collected on admission, at 48 hours after initiation of treatment, on discharge from the Emergency Department (for death or further hospitalization). **Results.** Non-traumatic coma cases represented 3.2% of all ED admissions. The main causes of coma were: acute complications of diabetes (26.3%), stroke (19.3%), cerebral malaria (17.4%) and septic shock (14.0%). Mortality rate in the first 48 hours was 21.1%, and the presence of vomiting and of meningeal irritation as well as a low GCS were associated with this early mortality. Mortality for the whole hospitalization period was 47.3%, and the main causes of death were septic shock (37.0%), intracranial hypertension (25.9%) and HIV ((11.1%). **Conclusion.** Acute complications of diabetes, stroke and cerebral malaria are the main causes of non-traumatic coma in our context. Awareness campaigns for the fight against cardiovascular risk factors and those of free distribution of ITNs to the Congolese people are imperative to prevent such disastrous consequences.

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***Glycated nail proteins as a marker of diabetes diagnosis***

**Introduction:** Diabetes prevalence is rising dramatically in developing countries. This implies a need for affordable and robust diagnostics. Nail clippings contain 85% of proteins (keratins) which are prone to glycation. We have explored the possibilities to assess glycation of nail keratins as a tool for diabetes diagnosis and monitoring. **Methods:** Fructosamine was assessed in clippings from 116 healthy subjects and 112 diabetics using a modified photometric nitro blue tetrazolium-based assay. A group of 51 patients who underwent cataract surgery (34 diabetics and 17 non-diabetics) were also enrolled in this study. Following lens extraction, fructosamine was analyzed in lens and nail fragments. Following cutting the nail plate into superficial and deep layers, differential analysis of fructosamine was performed. **Results:** Glycated nail proteins discriminated well diabetics (median: 4.07  $\mu\text{mol/g}$  nail,  $p < 0.0001$ ) and nondiabetics (1.75  $\mu\text{mol/g}$  nail). ROC analysis yielded an AUC of 0.848 (specificity 93.1%; sensitivity 68.9%). This marker may be useful in the monitoring of diabetic retinopathy and nephropathy. A marked correlation was found between nail and lens glycated proteins ( $R^2 = 0.55$ ,  $p < 0.001$ ). Furthermore, differential analysis of material originating from deep and superficial nail layers yielded a higher fructosamine level in deeper layers (median 3.6  $\mu\text{mol/g}$  nails,  $p < 0.05$ ) than in superficial layers (median 1.12  $\mu\text{mol/g}$  nails). The nails could be stored at elevated temperatures for months without quality loss. **Conclusion:** Assaying glycated nail proteins is an affordable and simple alternative for diagnosing diabetes in remote areas. Glycation of nail proteins occurs in the deep layer of finger nails, which is in close contact with blood vessels and interstitial fluid. Nail protein glycation can be regarded as a marker for diabetic glycation-associated target organ damage. The method requires only a simple photometer and cheap reagents which can be home made, making the method very suitable for developing countries.

**51. Mannix MASIMANGO IMANI, Ernest SUMAILI KISWAYA, Michel JADOUL, Pierre WALLEMACQ** Université Catholique de Bukavu & Cliniques Universitaires Saint Luc & UNIKIN; [masimax2003@yahoo.fr](mailto:masimax2003@yahoo.fr); ***Prevalence and risk factors of chronic kidney disease (CKD) in South Kivu, Democratic Republic of Congo (DRC): a population-based study.***

**Introduction:** The prevalence of CKD in African Americans and Western Africans is high but whether this applies to all populations from Sub Saharan Africa is unclear. We assessed the prevalence and risk factors of CKD in the adult south-Kivu population.

**Methods:** We conducted a cross-sectional study (October 2016 - April 2017) using a multistage cluster sampling in both an urban (Bukavu) and a rural (Katana) area. Body composition (body mass index (BMI), visceral fat mass, relative fat mass and muscle mass) was obtained using an OMRON bioimpedance Monitor. All subjects provided a blood and spot urine sample. Dipstick (Multistix 8 SG®, Siemens) urinalysis was performed on site by the study team. Albumin-creatinine-ratio (ACR) and serum creatinine are currently being measured on frozen samples in the Cliniques Univ. Saint Luc, Belgium. Thus, the prevalence and risk factors of CKD (based on ACR and  $\text{eGFR} < 60 \text{ ml/min/1.73m}^2$ ) will be presented in August. **Results:** We

women. Urban subjects had a higher BMI ( $24.8 \pm 4.9$  kg/m<sup>2</sup> vs  $22.1 \pm 3.4$ ), waist circumference ( $85 \pm 13$  cm vs  $80 \pm 9$ ) and relative fat mass (31% vs 24%) than rural subjects. In contrast, the relative muscle mass was higher in the rural population (33 vs 30%), mainly composed of farmers (71.4%). The prevalence of hypertension (BP  $\geq 140/90$  mmHg or treated) and diabetes (fasting glycemia  $\geq 126$  mg/dl or treated) was 20.7 % and 3.8 % respectively without difference between sites. Prevalence of dipstick urine protein (1+), (2+) and (3+) was 5.9 %, 2.9 % and 0.8 % respectively, without difference between sites. **Conclusion:** Hypertension is highly prevalent in both genders at both sites. Body composition in urban subjects suggests a greater risk of metabolic syndrome. The prevalence of proteinuria by dipstick is not significantly different between sites. Prevalence and risk factors of CKD will be available at the time of presentation.

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***Relationship between benign prostate hypertrophy and anthropometric parameters in diabetic and non-diabetic patients who underwent TURP in Bukavu, DR Congo***

**Introduction:** Benign prostate hypertrophy (BPH) and Type 2 diabetes mellitus (T2DM) are prevalent in older men and represent a challenge in public health. Prior studies report correlation between BPH and T2DM, a component of metabolic syndrome (MetS) which is increasing in Sub-Saharan Africa due to rapid modernization. **Objective:** This study was designed to evaluate the association of prostate volume and anthropometric parameters among diabetic and non-diabetic patients who underwent transurethral resection of the prostate (TURP) for BPH. **Methods:** We retrospectively analyzed data of 159 selected patients who underwent TURP over a three-year period (February 2014–January 2017) for BPH with tissue diagnosis. Data of patients including age, T2DM, BPH assessment, and anthropometric parameters measurement were reviewed and analyzed to determine whether prostate volume correlates with anthropometrics and/or diabetes. **Results:** Mean age in the entire cohort was  $68 \pm 8.5$  years. Of the 159 patients 94 (59, 1%) were not diabetic and 65 (40, 9%) were diabetic.

Fasting blood glucose and prostate volume were significantly higher in diabetic group than in the nondiabetic ( $121.7$  mg/dl  $\pm 45.7$  vs  $85.4$  mg/dl  $\pm 11.7$ , and  $p < 0.001$ ;  $58.5$  cc  $\pm 23.5$  vs  $49.4$  cc  $\pm 20.3$ , and  $p = 0.017$  respectively). Waist circumference and BMI were statistically greater in non-diabetic than in diabetic group ( $94.6$  cm  $\pm 10.2$  vs  $90.6$  cm  $\pm 10.4$ , and  $p = 0.001$ ;  $25.1$  kg/m<sup>2</sup>  $\pm 3.3$  vs  $23.6$  kg/m<sup>2</sup>  $\pm 3.4$  and  $p < 0.001$ ). Prostate size was significantly associated with fasting blood glucose ( $P = 0.007$ ) and PSA ( $P = 0.009$ ). However, prostate size was not related to existence of diabetes, BMI, waist circumference, IPSS, Quality of life score, and onset duration of symptoms. **Conclusion:** Prostate volume is not correlated with anthropometric parameters in diabetic and non-diabetic Congolese patients who underwent TURP in South-Kivu.

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***Pathologies and complications revealing diabetes mellitus; About 71 cases in the Internal Medicine Department at the Panzi General Reference Hospital from January 2014 to December 2016.***

**Introduction:** Diabetes mellitus is a major public health problem worldwide. Its evolution is silent until the appearance of severe complications in terms of morbidity and mortality. The objective of this study was to determine the frequency of diabetic complications as well as the pathologies revealing diabetes mellitus in our environment. **Methods:** It is a descriptive documentary study, covering a period of 3 years (from January 2014 to December 2016). It covers 71 new cases of diabetes mellitus diagnosed and followed up in the internal medicine department of the Panzi hospital. The data was collected and analyzed using Epi Info 3.5.4 version 2012 software. **Results:** We collected 71 new cases of diabetes mellitus among 342 diabetic patients hospitalized during the study period. Type 2 diabetes mellitus (77.5%) was predominant. The sex ratio was 1.0; the mean age was  $53 \pm 17$  years (Extremes: 13-90 years). The most affected age group was between 41-60 years (45.1%). The most common reason for consultation was physical asthenia (35.2%). The main pathologies revealing diabetes mellitus were infections (57.7%), with predominant cases of urinary tract infections (25.4%) followed by respiratory infections (8.5%) and HIV infection (7.0%). The main acute metabolic complications during the discovery of diabetes mellitus were ketoacidosis (40.8%) and hyperosmolar decompensation (9.9%). Chronic complications were: hypertension (22.5%), peripheral neuropathy (15.5%), stroke (11.3%), neuronopathy (2.8%) and heart failure (1.4%). The evolution of our

patients was marked by a mortality of 18.3%. Conclusion: Diabetes mellitus remains a major public health issue more especially in our environment where researchers estimate that more than half of diabetic patients are not diagnosed. The reduction of complications and mortality from diabetes mellitus would involve increased sensitization and early detection.

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***Epidemiological, clinical and therapeutic aspects of sickle cell anemia in children in Kindu Reference General Hospital (HGRK)***

Sickle cell disease is a genetic condition whose estimated prevalence in the DRC (Democratic Republic of Congo) is 2% in the general population and 15 ‰ live births. In Maniema, particularly in Kindu, there are still no studies that can address this condition. The aim of our study is to contribute to the knowledge of the epidemiology of sickle cell disease in the province of Maniema and to determine the clinical and therapeutic aspects. This is a retrospective study that examined 88 affected children admitted to the pediatric ward of the HGRK between 1st January 2015 and 31 December 2016, a two-year period. The results show that no cases were hospitalized before the age of 2 years, the sex ratio was 1.5 for males, 55.7% of cases were admitted during the hot season rainy, 69.3% of cases were hospitalized for vaso-occlusive crises, 71.6% of cases benefited hydration associated with an analgesic as therapy during the crisis, 71.6% of cases stayed two to seven days in hospital, the outcome was favorable in 76.1% of cases and 6.8% of cases had more than three attacks in one year. This data is evidence that the sickle cell must have a research interest in Maniema.

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***Etiologic factors and prognosis of acute renal failure in the Intensive Care Unit at Panzi Hospital.***

Introduction: Acute renal failure (ARF) is a renal function in response to a situation of aggression and is characterized by a deterioration of glomerular filtration rate. The main risk factors are the existence of a previously impaired renal function, the patient's age, concomitant use of nephrotoxic drugs or drugs that may interfere with the physiological mechanisms of renal protection. Our objective was to take stock of the etiological aspects and analyze the main prognostic factors. Methods: Prospective study, yielding a series of 39 cases of ARI, collected in the intensive care unit of Panzi General Hospital between October 2015 and March 2016. We included all patients who presented at their admission or during their ICU stay increased creatinine > 120  $\mu\text{mol/l}$  or oliguria (<0.5 ml/kg.h). Results: The prevalence of ARF in intensive care is 20.63%. The sex ratio is 3/2 male dominated. The average age was  $33.67 \pm 17.2$ , extreme ages (7 and 70 years). The main causative factors: pregnancy complications (23.07%), septic shock (21.62%), diabetes complications (13.5), antibiotics (10.25%), native products (10.3%), severe malaria (5.40); Hemodialysis has been shown in 24 (61.5%), only 7 (29,16%) can access it. The death rate (43.59%). Prognostic factors: Age ( $\leq 40$ ans) influences the mortality ( $p = 0.00835$ ), multiplies 7 times mortality risk (OR = 7.12). fever (OR = 7.00;  $p = 0.0183$ ). Septic shock ( $p = 0.022$ ) which multiplies 5 times mortality risk (OR = 5.06). Conclusion: The prognosis of acute renal failure depends on the speed of the care and multi organ failure associated. However, it remains remarkably severe with a high mortality.

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***Gut colonization with extended-spectrum beta-lactamase-producing enterobacteriaceae in patients visiting the Provincial General Hospital of Bukavu***

Introduction: It is known that gut colonization is one of the major risk factors for ESBL infections. Given previous studies highlighting a high prevalence of ESBL-producing bacteria in urinary tract and bloodstream infections in Bukavu City, we undertook this study that aims to determine the ESBL-producing E coli and Salmonella spp gut colonization prevalence. Methods: This study investigated gut colonization with E coli and Salmonella spp ESBL producers among 194 inpatient and outpatient children younger than 5 years at the Provincial General Hospital of Bukavu (PGRB). Stool culture was performed and biochemical methods were used for bacterial identification. Double disk diffusion method was used to detect the ESBL phenotype. Results: There were more male participants than females (sex ratio: 1.25). The median age was 1 year (IQR: 0.5-2). 164 E. coli were isolated and 30 Salmonella spp. 21.13% of all the isolates exhibited a phenotype of ESBL. We found a higher rate of ESBL isolates among inpatient participants (24.7%) than outpatient ones

(10.4%) (p-value: 0.03). All the isolates were sensitive to imipenem, 89.7% of them to amikacin, 63.2% to ciprofloxacin, 58.2% to ceftriaxone, 56.2% to cefotaxim and 52.8% to ceftazidime. 100% of the isolates were resistant to amoxicillin, 97.2% to ampicillin, 71.79% to amoxicillin-clavulanic acid and 63.41% to gentamicin. **Conclusion:** There is a high rate of gut colonization by ESBL E. coli and Salmonella spp in children younger than 5 years visiting the PGHB. Implication of these findings is that these bacteria may contaminate drinking water and food; Some may have the potential to cause extra-intestinal infections.

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***Clinical profile and outcomes of HIV-infected severely malnourished children: Case of the Provincial General Referral Hospital of Bukavu***

**Objective:** Malnutrition and HIV infection in children are two serious diseases with high morbidity and mortality in sub-Saharan Africa. HIV infection is almost always complicated by malnutrition during its natural evolution and malnutrition is, therefore, one of the circumstances of HIV infection diagnosis. The aim of this study is to determine the association between malnutrition and HIV infection in children at the PRGHB. **Methods:** This study was a retrospective analysis of 965 medical records of severe malnourished children aged between 1 and 168 months. The children were admitted to the Nutrition and Therapeutics Center B during the period from January 1, 2013 to December 31, 2015. They were screened for HIV using Determine and Unigold serological tests after parents' consent. **Results:** Out of 965 severe malnourished children, 37 (3.8%) were HIV-positive. HIV seropositive was not known before the hospitalization in 64.9% of cases. When compared to HIV-negative children, those HIV-positive were more likely to suffer from marasmus than kwashiorkor [OR 1.7 (1.1-2.6, P = 0.008)], and to have more medical complications such as pneumonia, tuberculosis, oral candidiasis and sepsis (P<0,001). Mortality was higher among malnourished HIV-positive children than among HIV-negative ones (35.1% versus 7.7%). The use of the association of highly active antiretroviral therapy with co-trimoxazole prophylaxis improved their survival (92.3% versus 7.3%) and their global weight gain. **Conclusion:** The combination of malnutrition and HIV infection in children is one of the causes of high morbidity and mortality in our environment. Effective prevention of mother-to-child transmission of HIV is urgently needed.

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***Management of hepatitis C in limited resources setting in the directly acting antivirals (DAA) era: experience of Bukavu, DR Congo***

**Introduction:** DAAs had revolutionized the management of hepatitis C with cure rates of more than 95%. Unfortunately, access to these drugs is still difficult in many resource-limited countries. The aim of this study is to present the results of the first patients treated at the HPGRB and to assess main difficulties encountered during the management. **Methods:** Prospective study over an 18-month period (June 2015-December 2016) in patients treated for chronic hepatitis C at the HPGRB. At the same time, an evaluation of the costs incurred as well as difficulties encountered during the management was made. **Results:** Out of a total of 61 diagnosed or referred patients, only 18 (29%) could be treated. The following therapeutic regimens were prescribed: 4 patients with SOFOSBUVIR + LEDIPASVIR + RIBAVIRINE and 14 with SOFOSBUVIR + LEDIPASVIR. There were 2 deaths during treatment (related to comorbidities) and 2 incomplete treatments. Of the 14 patients with completed treatment, 10 were able to carry out the viral load control at the end of the treatment (71%) and, in this group, the cure was effective in 9 patients and 1 showed a therapeutic failure. Genotyping was performed in only 12 patients (67%). The total cost of treatment is estimated at USD 1949, among which 60% cover medicines. Only two patients were able to achieve the overall costs of management (11%). **Conclusion:** management is feasible in Bukavu but is still out of reach for a large part of the population (price, local availability). Governments should establish policies to facilitate the accessibility to treatment.

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***Genetic and phylogenetic characterisation of hepatitis B virus in the Eastern part of the Democratic Republic of Congo***

**Introduction:** Hepatitis B virus (HBV) is characterized by a wide genomic variability that could play a role in

clinical manifestations and response to therapy. There are only limited studies on HBV genotype distribution in Democratic Republic of Congo (DRC), all done in the western part showing a vast majority of genotype E. We thus performed a study to determine the genotype distribution and the molecular characteristics of HBV in South Kivu, an eastern province of the DRC. **Methods:** Blood screening was performed from 2014 to 2015 at the Provincial Hospital of Bukavu in newly detected AgHBs positive subjects. We performed the HBV DNA load by Abbott RealTime HBV assay on m2000 system, the genome sequencing targeting the S and P overlapping region, the phylogenetic analysis with Geneious 4.0 software and an additional mutational analysis focused on the identification of mutations (p region) using the online HBVseq tool (Stanford University). **Results:** The genotype determination was performed in 41 patients: mean age was  $38.3 \pm 13$  years and 28 (68.3%) of them were males. HBV genotype A was detected in 40/41 (97.6%) and HBV genotype E in 1/41 (2.4%). The phylogenetic analysis showed that nearly all South Kivu A genotypes (39/40) are closely related to A1 subgenotype strains found in Rwanda, Haiti and Martinique while only one single strain attached to the A2 cluster was isolated. The only remaining E genotype case was linked to the western African E crescent.

**Conclusions:** The A genotype seems to be the most predominant genotype in eastern DRC with the majority belonging to the Afro-Asian subgenotype (A1). This contrasts with the western part of DRC where E genotype is the most frequently found genotype. These results support the hypothesis of an East-West genotypic demarcation. Moreover, the low genetic variability of HBV is suggestive of a strong local endemicity.

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***Optimal antiretroviral therapy adherence as evaluated by CASE index score tool is associated with virological suppression in HIV-infected adults in Dakar, Senegal***

**Objective:** To determine the prevalence and factors associated with optimal antiretroviral therapy (ART) adherence and virological failure (VLF) among HIV-infected adults enrolled in the national ART programme at the teaching hospital of Fann, Dakar, Senegal. **Methods:** Cross-sectional study from 1 November 2013 to 30 January 2014. **Outcomes:** (1) optimal ART adherence by the Center for Adherence Support Evaluation (CASE) Index Score ( $>10$ ) and (2) VLF (HIV RNA  $> 1000$  copies/ml). Diagnostic accuracy of CASE Index Score assessed using sensitivity (Se), specificity (Sp), positive predictive value (PPV), negative predictive value (NPV) and corresponding 95% confidence intervals (CIs). Multivariate logistic regression analysis was performed to identify independent factors associated with optimal adherence and VLF.

**Results:** Of 98 HIV-infected patients on ART, 68% were female. The median (IQR) age was 42 (20–50) years. A total of 57 of 98 (60%) were on ART more than 3 years, and majority (88%) were on NNRTI-based first-line ART regimen. A total of 79 of 98 (80%) patients reported optimal ART adherence, and only five of 84 (5.9%) had documented VLF. Patients with VLF were significantly more likely to have suboptimal ART adherence (17.7% vs. 2.9%;  $P = 0.02$ ). CASE Index Score showed the best trade-off in Se (78.9%, 95% CI: 54.4–93.9%), Sp (20.0%, 95% CI: 11.1–31.7), PPV (22.4, 95% CI: 13.1–34.2%) and NPV (76.5%, 95% CI: 50.1–93.2), when we used a VLF threshold of HIV RNA  $>50$  copies/ml. Factors independently associated with VLF were CASE Index Score  $<10$  ([aOR] = 13.0, 95% CI: 1.1–147.9;  $P = 0.04$ ) and being a boosted PI-based ART regimen ([aOR] = 27.0, 95% CI: 2.4–309.4;  $P = 0.008$ ). **Conclusions:** Optimal ART adherence is achievable in a high proportion of HIV-infected adults in this study population. CASE Index Score was independently associated with virological outcomes, supporting usefulness of this low-cost ART adherence monitoring tool in this setting.

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***Kaposi's angiosarcoma: Epidemiological, clinical and pathological studies In the Western and Eastern regions of the Democratic Republic of Congo***

**Introduction:** Kaposi's angiosarcoma (KS) is a malignant vascular tumor, previously being an endemic disease in the Democratic Republic of Congo, presently an epidemic disease after the advent of Human Immunodeficiency Virus (HIV) in 1981. The aim of this study was to compare clinical and histological features of HHV-8 of KS in the Western and Eastern regions of the Democratic Republic of Congo. **Methods:**

Retrospective (2000- 2007) and prospective (2008-2015) studies on the clinico-histological features of KS. **Results:** 194 patients were included: 138 men (mean age  $35,6 \pm 14.0$  years), 56 women (mean age  $29.8 \pm 13.2$  years), KS was associated with a status HIV (+) in 94.5% of the patients and a status HIV (-) in 5.5%. Cutaneous localizations of KS were predominant in the majority of the patients (81.9 %). Pathological examination showed the triple classical histological characteristics: vascular and fusocellular proliferation, hemorrhagic suffusion, more or less inflammatory infiltrate in different evolutive stages of the disease: stage I (n=63; 32.5%), stage II (n=50; 25.7%) and stage III (n= 81; 41.7%). Mitosis were found in 23% of cases and atypia were rare. **Conclusions:** Although there are still a few cases of sporadic Kaposi angiosarcoma (KS) in the Eastern region of the Democratic Republic of Congo (DRC) the great majority of cases of KS in the Eastern and Western region of the DRC are associated with the epidemic of AIDS. Most of the patients with KS have skin lesions whose macroscopic and microscopic severities are related to the degree of the AIDS related immunosuppression. Antimitotic are not available in the centers of care for patients with KS especially in the Eastern DRC where recourse is the only HAART.

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***Prevalence and possible risk factors associated with delayed HIV diagnosis in children with tuberculosis co-infection in Cape Town, South Africa: A retrospective cohort study***

**Introduction:** South African National HIV management guidelines recommend an early diagnosis of HIV, especially in children. Tuberculosis (TB) is a leading contributor of co-morbidity in HIV-infected children and early initiation of antiretroviral therapy (ART) has demonstrated benefits to reduce morbidity. The study aimed to investigate prevalence and possible risk factors of a delayed diagnosis of HIV in TB/HIV co-infected children managed at Tygerberg Hospital (TBH), Western Cape Province. **Methods:** A retrospective cohort study was conducted in children (<13 years) managed with both TB and HIV at TBH during 2012; data were collected from routine medical and laboratory records, as well as electronic TB treatment registers. Children were classified as co-diagnosed with TB/HIV if HIV diagnosis occurred within 7 days prior to TB diagnosis and TB symptoms were recorded at the time of presentation. Descriptive and univariate analysis were performed. **Results:** Of 91 children managed with TB/HIV co-infection during 2012, 38 (42%) were diagnosed simultaneously with TB and HIV. Of 53 children diagnosed with HIV before TB, 8/20 (40%) not receiving ART were eligible, and 9/33 (27%) who did receive ART reported treatment interruption. Co-diagnosis with TB/HIV was more likely if maternal HIV status was not known at child's birth (OR 3.2, 95%CI 1.12-8.18;  $p=0.02$ ) and if children were older than one year at age of HIV diagnosis (OR 3.28, 95%CI 1.16-9.25,  $p=0.02$ ).

**Conclusion:** TB diagnosis is providing an important opportunity to test children for HIV. Missed opportunities for HIV prevention, earlier diagnosis and ART initiation were identified. *This operational research was partly funded by Fogarty International Centre Grant (3U2RTW007370-05S1).*

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***Seroprevalence and epidemiological profile of blood donors at the Kisantu Referral Hospital St LUC, Democratic Republic of Congo***

**Introduction:** Blood transfusion is an altruistic act but can be dangerous. Transfusion of transmissible infectious agents such as human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV) and syphilis must be subject to regular and permanent epidemiological surveillance in order to reduce their transmission. This study aims to determine the epidemiological and serological profile of blood donors at the Kisantu Referral Hospital St LUC. **Methods:** This cross sectional study was conducted among blood donors during 32 months period from September 2010 to November 2015 at the Kisantu Referral Hospital St LUC. The parameters analyzed included sex, age, donor category and the results of infectious markers tested. For the screening, only the rapid tests were used (Determine HIV 1 and 2, Determine HBsAg, HCV One Step and RPR). Statistical analysis was performed using Epi Info 7, and chi-square test or Fisher exact test (when recommended) was used to find a relationship between epidemiological parameters and seropositivity to tested antigens. The significance level was set at  $p < 0.05$ . **Results:** A total of 7434 blood donors were

collected, 6787 males (91,30%) and 647 females (8,70%); sex ratio M/F was 10,5. The majority of the donors were aged between 26-35 years (39,52%) and 18-25 years (32,28%); the average age was  $31,1 \pm 9,1$  years. Seroprevalence rate was 4,76% in HBV followed by 2,93% and 1,86% in HIV and HCV respectively and 0,66% in syphilis. Donors aged between 36-45 years was significantly associated with seropositivity to HBV ( $p < 0.0001$ ). **Conclusion:** A high prevalence of HBV was found in our series. This allowed us to argue that an epidemiological surveillance system should be strengthened within the national blood program in the Democratic Republic of Congo and a second serological test should be suggested to reduce the risk of transfusion-transmitted infections.

#### 64. Jacob Gobte NKWAN

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#### ***Using local technology and resources to promote infection prevention in the Cameroon Baptist Convention Health Services (CBCHS).***

**Introduction:** Although 80% of deaths are caused by infectious diseases, infection prevention programs are quite limited, or even completely absent in most developing countries. Even where they are available, they are unable to respond to most critical infection control needs due to lack of material, human, and financial resources. Therefore, the aim of this project is to adapt local resources to meet local infection prevention realities. The Cameroon Baptist Convention Health Service is a network of over 100 health facilities operating in six of ten regions in Cameroon and serving over 1 million patients per year. It comprises seven hospitals, 28 integrated health centers, 50 primary health care centers, a drug production and distribution unit, a training school with many training programs and other projects. Although hand hygiene was taught in all training programmes, the practice in the field was poor due to limited hand washing points. **Methods:** In addition to regular training, the infection prevention team and the hospital infection prevention nurse made very important innovations which led to a significant improvement in infection prevention and subsequent drop in infection rates. Some desperately needed equipment and material including alcohol hand rub, injection trolleys, and hand washing points were produced locally and adopted for use across the entire Cameroon Baptist Convention Health system. Production and distribution of hand rub was scaled up from 2012 and is now used across the entire system, including primary health care centers. **Results:** Hand hygiene compliance has improved, neonatal skin infections have dropped, and there is a general improvement in infection prevention practices CBCHS. **Lessons learned:** infection prevention is not "rocket science". It is the consistent application of simple, inexpensive, and readily available technology and resources

#### 65. Nicole Iba ALAMA Steve AHUKA-MUNDEKE, Jacques KOKOLOMAMI, Sheila Mandondo MAKIALA, Nadine Matsung NGWAKA, Flore Bisambu LUINZIA, Liliane NGENZIE O SABI, Didier Nkoko BOMPANGUE, Octavie Metila LUNGUYA, Jean Jacques Tamfum MUYEMBE

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#### ***Prevalence of Helicobacter pylori antigens and antibodies in asymptomatic children in Kinshasa, DR Congo***

**Introduction:** The prevalence of *Helicobacter pylori* (*H. pylori*) infection in children is not well known in Kinshasa/DR Congo. Some Congolese studies on this infection focused only on clinical aspects of the disease in adults, probably because of lack of appropriate methods for the diagnosis in children. Nowadays, in DR Congo several non-invasive diagnostic tools are available appropriate to diagnose the infection in children. The aim of this study was to determine the prevalence of *H. pylori* infection in Congolese children in Kinshasa. **Methods:** It is a cross-sectional and descriptive study that took place from September 2015 to 2016 in Kinshasa. First, we analyzed by ELISA, 184 children from 0 to 10, recovered to the international for the research of the anti-*H. pylori* IgG. Secondly, by the immunochromatography technique on tape, 417 stool samples collected from children from 0 to 10 years old in households in Kinshasa, analysis to search for antigens. **Results:** The prevalence was 59.8% and 43.9% respectively for the antibody and the Antigen. Prevalence was related to age both for (50%, 51.2% and 78.7%) antibodies to the Antigen (26%, 43.4% and 50%), for the age groups of < 1 year, 1-5 and 6-10 years respectively. Varied multi analysis, and 1 to 5 years 6 to 10 years, popular neighbourhood children, children with servants and those with history of gastric disease had emerged as the major factors associated with *H. pylori* infection. **Conclusion:** This study showed that prevalence of *H. pylori* infection is very high on Congolese children in Kinshasa, which gets very early in touch with this germ.

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***Molecular epidemiology of hepatitis B virus in Central African Republic***

**Objectives:** The aim of this study was to strengthen the molecular data on HBV with HIV co-infection circulating in the Central African Republic (CAR). **Methods:** Eluates from DBS were tested with commercial ELISA kits (Abbot-Murex Kit) to detect markers of HBV and HIV infection. A total of 299 samples were used, including 250 randomly drawn among the 555 HBV mono-infected and 49 HIV/HBV co-infected samples DBS were directly used for DNA extraction (Kit QIAGEN) and followed by PCR (preS1 for HBV)/RT-PCR (RT and Prot for HIV) for genotyping.

**Results:** The overall prevalence of HBsAg was 12.8% and Hbc antibodies were 19.7%. HBV/HIV co-infection marker was founding in 11.8%. This prevalence was high in all CAR prefectures. The rate of HBsAg was fairly uniform among the different age groups: 15-24 years (13.5%), 25-34 years (11.8%), 35-44 years (12.5%) and >44 years (12.3%). In addition, the HBsAg rate in rural areas (13.5%) was close to that in urban areas (11.8%). We successfully amplified 79/299 HBV strains (26.4%) and 6/49 HIV strains (12.2%). Phylogenetic analysis and mapping indicate that the E genotype (93.5%) is present in all CAR prefectures. The D Genotype (6.5%) probably including recombination D/E is found in 5 prefectures. For HIV strains co-infected with, the recombinant circulating forms CRF02\_AG, CFR01\_AE and CRF11\_cpx were founding The preS1 gene profile of HBV involved in the co-infection did not show a particular figure.

**Conclusion:** These results show that the populations of the different prefectures of the Central African Republic are uniformly infected with HBV with particularly high prevalence for hepatitis B. The E genotype is prevalent in all CAR prefectures and co-circulating with the genotype D in few prefectures. It will be interesting to decipher the complete genome of E genotype strains to get better information.

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***Eco-epidemiology of malaria in the South-Kivu Province of the Democratic Republic of the Congo***

**Introduction:** Malaria is still a public health problem in the Democratic Republic of the Congo. The fight against this disease faces new challenges such as the emergence, in sub-Saharan Africa, of new forms of Plasmodium falciparum resistant to artemisinin based therapies, or the rise of evolutionary modes that do not conform anymore to the classic epidemiological phases of malaria transmission areas in tropical regions as described by Mouchet and Carnevale. The national malaria fight program of the DRC still refers to that classification. Knowing the environmental and human particularities of each health zone of the South Kivu, which have an influence on the spacial distribution and the temporal evolution of malaria, would allow public health actors to set down fight interventions that would be more targeted and specific to each health zone of the South-Kivu. **Objective:** Determine environmental and human factors that have an influence on malaria distribution in the South Kivu. **Methods:** An ecologic study will be performed on data collected in the 34 health zones of the South Kivu from January 2010 to December 2015. Variables will be considered at the scale of the health zone and will consist of weekly malaria cases, weekly average temperature and precipitation, average elevation of the health zone, land-cover expressed in NDVI, and practices of pisciculture, market gardening and rice growing in the health zone. Thematic maps of the distribution of malaria cases expressed in attack rate of each health zone will be performed. Temporal series will be decomposed with the Cleveland Algorithm to highlight the seasonality. Link between malaria cases and environment factors will be modelled with the GAMLSS model and risk clusters will be extricated. **Results:** (Results will be available by July 11th 2017, the study is presently on-going). **Conclusion:** (Conclusion will be available by July 11th 2017, the study is presently on-going).

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***Prevalence, risk factors and outcomes of rifampicin-sensitive & -resistant pulmonary tuberculosis identified by Xpert MTB/RIF assay in a post-conflict region, Eastern DR Congo, 2012-2015***

**Objective:** To determine the prevalence, predictors and clinical outcomes of rifampicin-sensitive resistant pulmonary tuberculosis (RS and RR-TB) in South-Kivu Province, DR Congo. **Methods:** We performed a retrospective cohort study of RS- and RR-TB cases at 10 urban and rural community health treatment centers in South-Kivu province, DR Congo, identified by Xpert MTB/RIF from October 2012 to January 2015.

Multivariable logistic regression was performed to identify independent risk factors for RR-TB. **Results:** Of 16,430 TB suspects, 1365 (8.4%, 95% CI: 7.9% - 8.7%) had RS-TB and 152 (0.9%, 95% CI: 0.7% - 1.1%) had RR-TB. Compared with RS-TB cases, RR-TB cases were more likely to be smear-positive (70.4% vs. 3.8%,  $P < 0.001$ ), to be retreatment cases after earlier treatment default or failure (31.1% vs. 5.2%;  $P < 0.001$ ) or to have a history of 3 (or more) previous episodes of TB (15.9% vs. 1.1%;  $P < 0.001$ ). The treatment success rate (treatment completion or smear conversion) in patients with RS-TB was 94.0% (1111/1182) on standard 6-month RS-TB Regimen, while it was 89.5% (17/19) vs. 57.1% (76/133) ( $P < 0.001$ ) for RR-TB patients on 9- vs. 20/24-month MDR-TB Regimen, respectively. Also, overall, 59 (38.8%) patients with RR-TB vs. 71 (6.1%) with RS-TB died or were lost to follow-up ( $P < 0.001$ ). Risk factors independently associated with RR-TB were: 2 prior episodes of TB ([aOR] = 4.7, 95% CI 3.0 – 7.3  $P < 0.001$ ) and 3 prior episodes of TB ([aOR] = 21.8, 95% CI 10.8 – 43.9  $P < 0.001$ ); positive sputum smear ([aOR] = 2.1, 95% CI 1.4 – 3.2,  $P = 0.001$ ) and male gender ([aOR] = 1.2, 95% CI 1.0 – 1.3,  $P = 0.018$ ).

**Conclusions:** The prevalence of RR-TB was low, and more likely in males, smear-positive and retreated/failed TB cases and was associated with substantial mortality. There is room for improvement by scaling up timely diagnosis (including DST) and access to effective short-course MDR-TB regimens in this setting.

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***Association between respiratory syncytial virus infection in infancy and subsequent asthma: A metaanalysis of observational studies***

**Introduction:** It has been shown that respiratory syncytial virus (RSV) bronchiolitis in infancy can increase the risk of asthma. This review will aim to describe the association between RSV bronchiolitis in infancy and subsequent asthma. **Methods:** Relevant articles were retrieved from PubMed and Web of Science. A random effect meta-analysis was done using the Open Meta Analyst software to evaluate the influence of RSV bronchiolitis as a risk factor of subsequent asthma. **Results:** Five studies met the inclusion criteria and showed that people who had suffered RSV bronchiolitis in infancy had a higher risk to develop asthma (OR: 4.03; 95% confidence interval (CI): 2.23 to 8.31,  $p$ -value  $< 0.001$ ) compared to those who did not have bronchiolitis in infancy. The heterogeneity of this meta-analysis was moderate ( $Q = 11.28$ ,  $p$ -value  $< 0.024$ ,  $I^2 = 64.56\%$ ). Two outlying studies were found that had results that diverged with the rest of the studies. After removing these two outlying studies, the heterogeneity of the study became null ( $I^2 = 0$ ) and the asthma risk in the RSV group became higher (OR=8.01; 95% CI: 4.30 to 14.93,  $p$ -value  $< 0.001$ ). **Conclusion:** The results from this meta-analysis suggest that RSV bronchiolitis in infancy can precipitate subsequent asthma. Further studies are needed to confirm this association. However, prevention of RSV bronchiolitis is suggested to be able to decrease the risk of asthma.

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***Genetic characterization and seroprevalence of peste des petits ruminants virus in South Kivu, Eastern of Democratic Republic of Congo***

**Introduction:** Peste des petits ruminants (PPR) is an acute viral disease of small ruminants caused by PPR virus (PPRV). The disease causes high morbidities of up to 100 % and mortality rates between 50 and 90% in domestic small ruminants. **Objective:** To confirm the presence and characterize PPR virus (PPRV) in Eastern of Democratic Republic of Congo using Real-time Polymerase Chain Reaction (RT-PCR) and seroprevalence among wild

immunosorbent assay (cELISA) and establish their phylogenetic relationship by sequencing the nucleoprotein (N), fusion (F) and hemagglutinin (H) genes. **Methods:** Samples including oculonasal swabs, tissues and whole blood were obtained from live goats and/or sheep with clinical presentation suggestive of PPR; also from goats that died naturally in South Kivu (Eastern DRC). The serum samples were examined for the presence of antibody against PPRV by cELISA. The molecular diagnostic and characterization was done using RT-PCR. **Results:** The prevalence with RT-PCR was 64.7% (n=150). Phylogenetic analysis based on the sequencing of N, F and H genes indicated that PPRV obtained in South Kivu clustered genetically with PPRV strains of Lineage III, together with PPR viruses from East Africa, including Tanzania, Uganda and Kenya. An overall seroprevalence of 45.3% (n=320 sera) from which 53.4% (n=240) was found in goats and 21.3% (n=80) in sheep. The clinical signs observed in goats and/or sheep suspected with PPR included proliferative and self-resolving lesions around the muzzle and lips of involved animals, serous mucopurulent nasal and ocular discharge, fever, diarrhea, lacrimation, matting of eye lids, cutaneous nodules, erosion on the soft palate and gums and labored breathing. **Conclusions:** The PPRV lineage III is circulating in South Kivu and the seroprevalence in the unvaccinated samples is high involving several risk factors. Therefore the control of this disease seems to be important to avoid the spread in the entire country and across.

**71.** Esto BAHIZIRE, Paluku BAHWERE, Philippe DONNEN, P Lundimu TUGIRIMANA, Serge BALOL'EBWAMI, Michèle DRAMAIX, Chouchou NFUNDIKO, Raphaël CHIRIMWAMI, Kanigula MUBAGWA  
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***High prevalence of anemia but low level of iron deficiency in preschool children during a low transmission period of malaria in rural Kivu, DR Congo***

Anemia is a worldwide public health concern especially in preschool children in developing countries and iron deficiency (ID) is generally assumed to cause at least 50% of the cases. However, data on this contribution are scarce. To close this gap we determined in 2013 the contribution of ID in the etiology of anemia and measured others factors associated to non-iron deficiency anemia (NIDA) in 900 preschool children randomly selected during a two-stage cluster nutritional survey in the Miti-Murhesa health zone, in Eastern DR Congo. In these children we collected socio-demographic, clinical and biological parameters and determined the nutritional status according to the WHO 2006 standards. Anemia was defined as altitude adjusted hemoglobin < 110 g/L and ID was defined as serum ferritin < 12 µg/L or < 30 µg/L in the absence or presence of inflammation, respectively. Median (interquartile range) age was 29.4(12-45) months. The prevalence of anemia was 46.6% (391/838) among whom only 16.5% (62/377) had ID. Among children without signs of inflammation only 4.4% (11/251) met the ferritin-based (unadjusted) definition of ID. Logistic regression analysis identified ID, history of fever during the last two weeks and mid up arm circumference < 125 mm as the only independent factors associated to anemia. In conclusion, anemia is a severe public health problem in the Miti-Murhesa health zone but NIDA is mostly predominant and needs to be further studied. Control of infections and prevention of acute undernutrition (wasting) are some of appropriate interventions to reduce the burden anemia in this region. *VLIR-UOS Project ZRDC2010MP068 and the David and Alice Van Buuren foundation*

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***Performance of SD Bioline Malaria Ag Pf/Pan rapid test in the diagnosis of malaria in South-Kivu, DR Congo.***

**Objective:** Use of malaria rapid diagnostic tests (RDTs) has improved the management of this disease. We evaluated the validity of the SD-Bioline Malaria-Ag-Pf/Pan™ (Batch 60952) RDT supplied by the Malaria Control Program of the DR Congo. **Methods:** Children (n=460) aged below 5 years seen in curative care (CC) for suspected malaria and in pre-school consultation (PSC) in two rural centers underwent clinical evaluation and capillary blood collection for microscopic reading of thick smear (TS) and thin film (BF), and for RDT. Sensitivity (Se), specificity (Sp), positive (PPV) and negative (NPV) predictive values of the RDT, and the

corresponding accuracy and Youden indices were determined using microscopic data as reference. Results were compared using the Chi-square test. **Results:** Microscopy showed malaria infection in 53.8% of CC and in 10.8% of PSC children. Similar results were obtained using the RDT (CC: 47.1%; PSC: 18.3%;  $P > 0.05$  vs. microscopy). Se of the RDT was 82.1%, Sp 92.0%, PPV 88.5% and NPV 87.4%. RDT positivity was significantly ( $p < 0.01$ ) associated with some symptoms (chills, profuse sweating) and with a recent history of malaria attack. In addition, Se of the RDT depended on parasitemia and decreased at low parasite density. **Conclusion:** SD-Bioline Malaria-Ag-Pf/Pan™ RDT has a relatively good sensitivity and specificity but seems useful only for high parasitemia. Negative SD Bioline Malaria Ag Pf/Pan™ RDT should be complemented with microscopy when clinical signs suggest malaria.

**73.** Abioye OYEWALE, Adebayo OGUNNIYI, Adedoyin RUFAL, Ahadi BIRINDWA

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### ***Economic shocks and healthcare expenditure among farming households in Nigeria***

A strong link has been established between the health status of farmers and their productivity. Combined with the high level of poverty and unstable economy, the prevalence of economic vices such as terrorism, herdsman-farmer conflicts, land conflicts, oil spillage and the volatile nature of the agricultural sector could increase the susceptibility of farmers to economic shocks that could affect their welfare. Health expenditure is mostly out-of-pocket payments and it could be an indicator for access to healthcare and its utilization in the country. Using the 2015 General Household Survey Data, this study assessed the influence of economic shocks on healthcare expenditure. Analytical tools used are descriptive statistics and the Heckman's two stage regression model. About 54.62% of the farmers had incurred healthcare expenses at an average of ₦5650.02. More males (31.62%), uneducated farmers (38.46%) and those in the Northeast (39.66%) and Southsouth (32.94%) had experienced at least one type of shock. However, the type and magnitude of shock varied with zones as death/illness of household member, theft and loss of property and job loss were highest in the Southeast (12.75%), Northeast (30.68%) and Southsouth (2.78%) while price fluctuations (11.53%) and fall in food prices (21.17%) were highest in the Northcentral. The likelihood of spending on health increased with farmers that were disabled ( $\beta=0.10$ ), did not use mosquito nets ( $\beta=0.05$ ), female ( $\beta=0.05$ ) and value of farmers' output ( $\beta=0.04$ ) while it decreased with farmers in the north ( $\beta=0.02$ ) and very old farmers ( $\beta=0.01$ ). The amount spent on health decreased significantly with farmers that had experienced theft and loss of property ( $\beta=0.03$ ) and farmers without phones ( $\beta=0.21$ ) and access to electricity ( $\beta=0.36$ ). It however increased with age ( $\beta=0.01$ ), females ( $\beta=0.01$ ), illness or death of household member ( $\beta=0.06$ ) and fall in prices of major food items ( $\beta=0.29$ ).

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### ***Assessment of nutritional status of children aged 36-59 months attending nursery schools in Bukavu***

**Objective:** This study aimed to assess the nutritional status of children aged 36 to 59 months attending nursery schools in Bukavu. **Methods:** The study was descriptive and cross-sectional covering the period from February 8 to 22, 2016. The data were collected during a double-blind survey in nursery schools for children aged 36 to 59 months. Anthropometric parameters of the selected children were measured and indices calculated. Socio-demographic and environmental information was provided by the parents of students. **Results:** We examined 563 students. Among them, 287 students (51.0%) were female. The average age was 48 months with extremes ranging from 36 months to 59 months. Overall, the nutritional status of children was good: 62 (11.0%) students were under-weight; 59 (10.4%) students suffered from growth retardation; 21 (3.7%) students were wasted and overweight and/or obesity affected 20 (3.5%) students. No student had a MUAC less than 12.5 cm and none had edema. The educational level of 62.3% of parents was university. For 58.4% the family household size varied between 5 and 10 people.

**Conclusion:** The majority of children were in good nutritional status. There are cases of malnutrition in nursery schools in Bukavu: wasting and overweight. The level of parents' education and household size influence the nutritional status of children. There is a significant statistical difference between the index weight for age and household size.

Objectif :

Cette étude avait pour objectif d'évaluer l'état nutritionnel des enfants âgés de 36 à 59 mois fréquentant les écoles maternelles de Bukavu.

Méthode :

L'étude était transversale et descriptive couvrant allant du 8 au 22 février 2016. Les données ont été collectées au cours d'une enquête à double aveugle réalisée dans les écoles maternelles chez les enfants âgés de 36 à 59 mois. Les paramètres anthropométriques des enfants sélectionnés ont été mesurés et leurs indices calculés. Les renseignements socio-environnementaux et démographiques nous avaient été fournis par les parents des élèves.

Résultats :

Nous avons examinés 563 élèves. Parmi eux, 287 élèves (51,0%) étaient de sexe féminin. La moyenne d'âge était de 48 mois avec des extrêmes variant de 36 mois à 59 mois. Globalement, l'état nutritionnel des enfants était bon. 62 (11,0%) élèves souffraient d'insuffisance pondérale; 59 (10,4%) élèves souffraient de retard statural ; 21 (3,7%) élèves souffraient d'émaciation et le surpoids ou/et l'obésité touchés 20 (3,5%) élèves. Aucun élève n'avait un périmètre brachial inférieur à 12,5 cm et aucun n'avait d'œdèmes.

Le niveau d'instruction de 62,3% des parents était universitaire. Pour 58,4% des familles la taille de ménage variait entre 5 et 10 personnes.

Conclusion :

La majorité des enfants était en bon état nutritionnel. Il existe des cas de malnutrition en milieu scolaire maternel dans la ville de Bukavu : émaciation et excès pondéral. Le niveau d'instruction des parents et la taille du ménage influencent l'état nutritionnel des enfants. Il existe une différence statistique significative entre l'indice poids pour âge et la taille du ménage.

75. Rosalie BIABA APASA, Renee BULLOCK, K MUBAGWA

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***Understanding women's empowerment and transitions into the agricultural sector in Kinshasa, DRC***

Our study aims to better understand and evaluate an intervention approach that seeks to economically empower women who have worked, or are currently working, as prostitutes in peri-urban areas near Kinshasa, located in DRC. Specifically, the research will explore the effects of a multi-sectoral economic and health-based approach to improve women's economic, nutritional and personal well-being. We will present results from mixed methods approaches, including a baseline study in which a questionnaire that took about one hour to complete was administered to a total of 450 women. The questionnaire was used to collect socioeconomic characteristics of a demographic segment that is often marginalized from development and livelihood improvement activities. In addition, details to better understand social and structural drivers of women's engagement in prostitution and factors that lead to and support their transition to alternative careers in the areas of agriculture and agribusiness were explored. Preliminary results are that 69% of the respondents reported that they have worked as prostitutes at some point in their lives. The range of women's ages were from 15-74 and the mean age of women is 34. Eight percent of the women respondents were married and 54% have at least one child. Overall, their education levels are low: 90% did not complete secondary school. On average, women enter this work at the age of 20. Remuneration was sometimes reported to be less than \$ 1USD. Less than one third of the sample, 28%, are engaged in agricultural farm activities. Further analysis will explore the feasibility and potential mechanisms to support a transition to profitable positions within agricultural value chains, e.g., food processing and agro-dealers. *(Support by Bill and Melinda Gates Foundation).*

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