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Awareness of one health by veterinary medicine and human medicine clinical undergraduate students, University of Ibadan, Nigeria (2017/2018 Session)

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Background: One Health activities in Nigeria is reputed to have commenced at the Virology Department, University of Ibadan, Nigeria where Lassa fever was first diagnosed in 1969. Fifty years later, there are still rampant outbreak reports of emerging and re-emerging diseases, including Lassa fever in Nigeria. The objective of the final year DVM project study was to access the level of awareness of One Health among undergraduate clinical students (400 to 600 levels) of Faculty of Veterinary Medicine and College of Medicine, University of Ibadan, during the 2017

Methods and materials: The study utilized multiple choice questions covering various One Health topics to evaluate their level of Knowledge, Attitude and Practices of One Health. An independent t-test was performed to relate the knowledge of respondents in both Veterinary Medicine and Human Medicine students

Results: Virtually all the students had One Health knowledge, although most did not have detailed knowledge. Of the Veterinary Students, 65% had a good idea compared to 31.7% Medical Students. Veterinary students had excellent attitude towards One Health Concept while Medical Students had averagely very good attitude. Most Veterinary Students (56.7%) were eager to learn more about One Health compared to 23.3% of Medical Students. Generally, Veterinary students had more knowledge of One Health especially the 600 level students who had excellent knowledge.

Conclusion: The need of a paradigm shift of the clinical Medical students towards One Health was established. Multi-disciplinary International Student One Health Alliance (ISOHA) - formerly Students for One Health- clubs should be formed in all Nigerian Universities (especially those that train both Veterinary and Medical students), to provide a platform for students to collaborate and share One Health educational and professional development opportunities. Also to raise awareness for the One Health concept, encouraging interdisciplinary thinking towards complex health issues in the next generation of scientists and health professionals. Multidisciplinary annual One Health Day (November 03) Program events should also hold across the Universities to improve students' One Health Awareness- Knowledge, Attitude and Practice in Nigeria.

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Spillover of bat borne Rubulavirus in Australian horses – Horses as sentinels for emerging infectious diseases

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Background: Over 1000 horses are investigated annually for Hendra virus (HeV)-like illness, of which very few (<1%) test HeV positive. In Australia, in addition to HeV, other zoonotic viruses have affected horses including Australian bat lyssavirus, West Nile Virus (Kunjin), Murray Valley encephalitis virus and Ross River virus. In 1997, Menangle virus (MenPV), family *Paramyxovirus*, genus *Rubulavirus*, caused severe reproductive failure in pigs and influenza-like illness with rash in two piggery staff. MenPV has been isolated from Australian flying fox urine along with novel related rubulaviruses and HeV. We describe evidence of natural exposure to bat-borne rubulaviruses in Australian horses as well as seroconversion suggesting causality of severe respiratory illness.

Methods and materials: Three-hundred-and-seventy-four horses were tested by a multiplex microsphere-based immunoassay (MIA) for IgG against MenPV nucleocapsid (N) protein and a subset also against Tioman virus (TioPV) N protein and MenPV hemagglutinin-neuraminidase (HN) protein. Confirmatory testing comprised immunofluorescence assay (IFA) on Vero cells infected with MenPV and related rubulaviruses.

Results: Median fluorescence intensities (MFI) against MenPV N and a prior prevalence estimate of 20% were used in a Bayesian latent class model to determine appropriate cut-offs for positive test classification. Assay sensitivity was estimated assuming a specificity of both 95% and 99%. MFI reflecting potentially significant IgG to MenPV N protein was demonstrated in 34% (94/274) of horses with high perceived flying fox exposure (29% in QLD and 32% in NSW) whereas horses without plausible exposure recorded insignificant MFI. IFA confirmed antibodies to three of five related



flying fox rubulaviruses tested (MenPV, Yelloon virus and Grove virus).

Case presentations: Two young-adult geldings developed severe acute respiratory illness in 2016 featuring obtunded demeanour, tachypnoea, tachycardia, congested/hyperaemic mucous membranes, pyrexia and serous nasal discharge. Convalescent sera revealed a greater-than 10-fold increase in MFI to MenPV N (965 to 12,886). IFA confirmed antibodies to MenPV present in convalescent sera only.

Conclusion: We highlight the potential of optimised syndromic surveillance for emerging zoonoses and One Health benefit of horses as sentinels of emerging infectious disease. Future research should determine the significance of rubulavirus spillover to horses and any associated human health risks.

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Development of list of biological agents of security concern to enhance biosecurity and one health collaborations: Ethiopia's experience



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Background: Central to the Global Health Security Agenda and One Health of nations is creation by a country of a list of agents of concern. It is an official recognition by a nation that there are specific infectious agents and toxins that present severe hazards and a threat to the economy of the country. Creating list raises awareness of the scientific community, government and public that measures must be implemented. Cognizant to this, Ethiopia developed its own list namely Ethiopia's Hazardous Pathogens and Toxins List (ESHPT) with the objectives to protect the public from the agents on the list such as ability to detect the agents, prepare for rapid response, control the possession, use and transport of the agents, implement prevention and therapeutic capability, control entry of the agents into the country and support research.

Methods and materials: The Ethiopian Public Health Institute's (EPHI) with the technical assistance from the U.S. Centers for Disease Control and Prevention (CDC) Division of Select Agent and Toxins (DSAT) established technical working group (TWG) in April 2016 for the purpose of developing an ESHPT list for Ethiopia. The technical working group was made up of individuals from the EPHI, Ministry of Health, Ministry of Agriculture and its technical arms and Addis Ababa University Aklilu Lemma Institute of Pathobiology.

Results: After successive TWG meetings total of 68 list of pathogens and toxins identified to be included in Ethiopia's Hazardous Pathogens and Toxins List. The list is updated every 2 years and included 22 Zoonotic bacterial agents, 34 Viruses, 12 Toxins. The list was submitted to both Ministries of Health and Agriculture and got approval. The TWG enhanced the one health collaborations. Development of the list led to preparation of biosafety and biosecurity requirements proclamation which is under submission to parliament for the regulation of entities handling the agents. More than 30 potential entities are identified for enrollment into the regulation system.

Conclusion: Emergence of Global Health Security Agenda and One Health initiative helped Ethiopia helped to develop country

specific list pathogens and toxins which pose biosecurity concern to the country. Formation of the TWG enhanced collaborations between Health, Animal and environment sectors.

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blaNDM gene identified from clinical samples of companion animals: First description in Brazil



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Background: Emergence of acquired carbapenemases and their worldwide dissemination are a major global threat to antibiotic era and represent a major clinical challenge in both human and veterinary contexts. Carbapenems are broad-spectrum beta-lactam antibiotics employed for treatment of serious infections, usually considered as the last-line available therapy against multidrug-resistant (MDR) Gram-negative bacterial infections like those caused by extended spectrum beta-lactamase (ESBL) pathogens. The *New Delhi metallo-beta-lactamase* (NDM) was named after being discovered in India, in 2009, and has been isolated in several parts of the world. Until now, the occurrence of NDM appeared to be restricted mainly to humans, however the prevalence and characteristics of MDR genes in *Enterobacteriaceae* originating from companion animals are still not well known. Thus, this study aimed to investigate the occurrence of carbapenemase encoding genes in bacteria resistant to carbapenems, isolated from clinical samples of companion animals.

Methods and materials: There were considered bacterial isolates from dogs (97 strains) and cats (24 isolates) showing phenotypic resistance to carbapenems, identified during routine microbiological investigation between July 2018 and April 2019 in Joinville, Southern Brazil. Phenotypic resistance to carbapenems and the susceptibility profile to other common antimicrobials were determined by the disc-diffusion agar method. In addition, Modified Carbapenem Inactivation Method (mCIM) was used for phenotypic confirmation of carbapenemases in *Enterobacteriaceae*. The presence of *bla*NDM gene was confirmed by Real-time Polymerase Chain Reaction employing TaqMan probes.

Results: In this study, there were identified two MDR isolates (*Klebsiella pneumoniae* and *Enterobacter cloacae*) carrying the *bla*NDM gene derived from dogs urine.

Conclusion: To our knowledge, this is the first report of NDM identified in clinical isolates derived from companion animals in Brazil. Of note, the *bla*NDM gene may be located in readily transferable plasmids, increasing the variety of transmission vectors of resistance to carbapenems, also considering that the species carrying the gene identified in this study are widely distributed and shared among the environment, animals and humans.

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