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THE KENYA VETERINARY ASSOCIATION 57TH ANNUAL SCIENTIFIC CONFERENCE AND WORLD VETERINARY DAY CELEBRATIONS

GOLF HOTEL KAKAMEGA, KAKAMEGA COUNTY, KENYA

WVD Theme: "*PROMOTING EQUITY AND INCLUSIVENESS IN THE VETERINARY PROFESSION"*

26TH - 28TH APRIL, 2023

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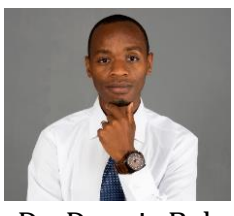

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CHAIRMAN'S WELCOME REMARK

It's another exciting year when we bring you a scientific conference loaded with great scientific knowledge. On behalf of the Kenya Veterinary Association, I welcome you to our 57th KVA Annual Scientific Conference at Kakamega Golf Club, Kakamega County. This year, the deliberations will focus on contemporary issues on animal and public health, including equity and inclusiveness in the veterinary practice to tackle current issues including pharmaceutical stewardship, animal welfare, and the one health approach for a robust system of building healthy communities. The conference theme is ***"Promoting Equity and Inclusiveness in the veterinary profession,"*** a recognition of the disproportionately fewer women and other marginalized groups in veterinary leadership, programs, and events.

The success of this conference is indebted to the Planning Committee that ensured the conference was planned and executed to the acceptable standard. The committee members were drawn from the representatives of the KVA National Executive Committee, the CPD and Scientific subcommittee, the Membership and Members' Welfare subcommittee, the IT and Publicity subcommittee, the Governance, Finance, and Resource Mobilization subcommittee, the KESCAVA Branch Executive Committee, the Western Branch Executive Committee, AHTTAK, KPVA, and KASPA.

I wish you a fruitful engagement

CONFERENCE PROGRAMME

57TH KENYA VETERINARY ASSOCIATION ANNUAL SCIENTIFIC CONFERENCE AND WORLD VETERINARY DAY CELEBRATION: (26TH - 29TH APRIL 2023: KAKAMEGA GOLF HOTEL)

THEME: "PROMOTING EQUITY AND INCLUSIVENESS IN THE VETERINARY PROFESSION"

Wednesday 26th April 2023

SESSION 1: Technological advances in veterinary medicine	
8.30-8.45am	**KEY NOTE**: Prescription need and prescription writing in veterinary practice: **Jafred Kitaa**
8.45-9.00am	Reducing synchronizing prostaglandin f2α dosage in dairy goats for enhanced goat artificial insemination uptake in kenya: Ascah Jesang
9.00-9.15am	An App (ACVLA) designed to address remote supervision of VPPs: Ameda
9.15-9.30am	Development of a three-face mobile application to support county artificial insemination subsidy programs and improve efficiency: Moses Olum
9.30-9.45am	Learner perspective on adoption of online/blended learning approach in the delivery of animal welfare training for animal health professional: Essau Serem
9.45-9.55am	**Q&A**
9.55-10.15am	KVB
10:15 - 10:45am	**Health break**
10.45-1.00pm	OPENING CEREMONY - Brooke East Africa (20mins) FAO (15mins)
1.00-2.00pm	**LUNCH**
SESSION 2a: Disease control (Vaccinology)	
2.00-2.20pm	Sponsor: KEVEVAPI
2.20-2.35pm	Evaluation of the Safety and Efficacy of Oil-Based Adjuvants for Production of FMD Vaccine: Michael Muthamia Kiraithe
2.35-2.50pm	Benefits of a multivalent vaccine including bovine viral diarrhea virus component in a randomized controlled trial on smallholder dairy farms: Daniel Muasya
2.50-3.05pm	Utilization of climate change information on visceral leishmaniasis preventation in baringo county, Kenya: George Kibet
3.05-3.15pm	**Q&A**
SESSION 2b :Disease control (Detection)	
3.15-3.30pm	Sponsor: ATLANTIS
3.30-3.45pm	Molecular detection of chlamydia abortus infection, farm level risk factors in sheep and goats in Kajiado, Kenya: Joshua Onono
3.45-4.00pm	Occurrence of serum antibodies to Toxoplasma gondii and associated risk factors in donkeys from Kirinyaga and Meru Counties, Kenya: Fred Obonyo
4.00-4.15pm	Role of private sector in animal health surveillance: Sam Kahariri
4.15-4.30pm	Prevalence and risk factors for Toxoplasma gondii in sheep and goats flocks in Kajiado County, Kenya: Joshua Onono
4.30-4.45pm	Synergizing Human and Animal Health Surveillance in Kenya: A time series analysis of Brucellosis incidence: Sam Kahariri
4.45-5.00pm	**Q&A**

	Health break
DAY 2: Thursday 27th April 2023	
SESSION 3: Ethnopharmacognosy, antimictobial stewardship	
8.15-8.30am	Sponsor: VMD
8.30-8.45am	The Role of Veterinary Pharmaceutical Industry-VISAK in AMR Stewardship in Kenya. VISAK
8.45-9.00am	A survey on the use of honey for wound management in veterinary practice in kenya: Purity Mochama
9.00-9.15am	Infection prevention and control in animal health as the key pillar in containment of AMR: Anima Sirma
9.15-9.30pm	The In service Applied Veterinary Epidemiology Training Programme and Information generated on Antimicrobial Use and Antimicrobial Resistance: Rina Sitawa
9.30-9.45am	Antimicrobial properties of venom from three medically important snakes in sub-Saharan Africa: Kennedy Lojau
9.45-10.00am	Reducing antibiotic use and spread of bacterial pathogens along the food value chain in a large scale pig production and value addition company in Kenya: Lucy Gatitu
10.00-10.10am	**Q&A**
10.10-10.20am	Sponsor: MEDISEL
10.20-10.50am	Health break
SESSION 4 :livestock value chains trade and markets	
10:50-11.05am	Sponsor: KCB
11.05-11.20am	Challenges and opportunities for african countries in the global meat trade due to recent african swine fever outbreak: Evans Muthuma
11.20-11.35am	Modelling the economic performance of small ruminant pastoralist flocks and the financial impact of changes in reproductive performance and mortalities: Joshua Onono
11.35-11.50am	Enterprises Supported by The Slaughterhouse Business: Case of Dagoretti Slaughterhouses Complex: Joyce Thaiya
11.50am-12.05pm	The dairy value chain – the critical role of the donkey in Nyandarua, Bomet and West Pokot: Moses Olum
12.05-12.20pm	Genomic diversity of bacterial isolates from camel milk in Kenya: Monica Maichomo
12.20-12.35pm	An assessment on the welfare status of working donkeys and their economic role in Lamu County, Kenya: Obadiah Singoei
12.35-12.55pm	Q&A
12.55-1.05pm	Sponsor: CFAO
1.05-2.00pm	Health break


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RIPPLE EFFECT
It starts on a Kenyan farm

SCIENTIFIC ABSTRACTS AND PRESENTATIONS

Infection prevention and control in animal health as the key pillar in containment of AMR

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Antimicrobial resistance (AMR) occurs when disease causing microorganisms are no longer responsive to previously effective antimicrobial drugs. In agriculture, antimicrobial drugs are used widely to treat and prevent diseases, promote growth, and enhance feed conversion efficiency in food animals and increase productivity in plants. Prudent use of antimicrobials contributes to food security, food safety, animal welfare and the protection of livelihoods. However, the use of antimicrobials eventually leads to antimicrobial resistance with consequences for human, animal, and environmental health. AMR can potentially increase the number of infections annually and can be associated with the emergence of more virulent pathogens, leading to more severe infections. National AMR situational analysis report of 2011 on trends and drivers for AMR revealed that in livestock production limited access to affordable veterinary services including consultancies and laboratory testing was an important factor leading to over-the-counter purchase of antimicrobials and their subsequent use without prescription in feed, water or treatment. Many of the farmers are not aware of mitigation measures to prevent infectious diseases and resultant need for antimicrobials. Large companies (feed manufacturers, hatcheries) lack incentives to produce inputs without antimicrobials.

Considering appropriate antimicrobial use constitutes a global public good, and hence the need to protect their effectiveness, the Kenyan government has undertaken a number of initiatives to prevent and contain AMR. Key among the initiatives is the national policy on AMR that was launched in 2017 and a National Action Plan (2017-2022) to implement it. This paper will discuss these initiatives and others that are key in preventing the emergence and spread of AMR in the context of infection prevention and control (IPC). IPC measures contribute to reducing the potential for organisms to develop resistance to antimicrobials. These measures can be implemented by veterinarians, farmers and other players in the animal health industry.

Keywords: antimicrobial resistance, drivers, IPC, biosecurity, animal health

A survey on the use of honey for wound management in veterinary practice in Kenya

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This was a cross sectional study where a questionnaire was administered to veterinarians in active clinical practice in Kenya. The aim of this study was to determine the veterinarian's knowledge and perception on use of honey in wound management in animals and to determine complications and challenges associated with the use of honey for wound management in animals in Kenya. The collected data was entered in statistical software and descriptive statistics computed.

The total number of respondents was 60 with the average years in practice being 2.4 - 4.0 years. Majority of respondents were in mixed practice 70% (42/60 with at least a Bachelor's Degree (85%). Bite wounds (73.3%), lacerations (51.6%) and abrasion wounds (43.3%) were the most commonly encountered wounds. 79.7% of the respondents indicated that they use honey to treat wounds in their practices with 77.1% learning about the use of honey in treating wound in formal training while 22.9% learnt from their peers. 60.4% of the respondents used raw/natural honey, 31.3% used processed honey while the remaining 2.1% used medical grade honey for treating wounds. Open wounds, contaminated and heavily infected wounds were more likely to get honey therapy. A once-per-day topical application of honey without bandaging the wound was the most popular technique. Increase granulation tissue and wound contracture were mentioned as the most evident benefits of using honey on wounds. Liquefaction of honey, stinging sensation and tissue dehydration were sighted as common complication. The main challenges encountered in use of honey included poor quality honey 52.1%, need for frequent application 39.5%, high cost of honey 29.2%.

It is concluded that the use of honey for wound management is prevalent in veterinary clinical practice in Kenya but its application faces a myriad of challenges that if addressed could increase its uptake in daily clinical use.

Keywords: Honey; Wounds; Healing; Veterinarians; Challenges

Knowledge and Information Generation on Antimicrobial Use and Antimicrobial Resistance by Frontline Animal Health Workers

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The need to capacity-build frontline animal health workers with the requisite skills for early detection and response to animal diseases including priority zoonotic diseases and antimicrobial resistance (AMR) in communities was determined as issue of high priority in the Joint External Evaluation (JEE) exercise conducted in Kenya in 2017. To respond to this need, the Food and Agriculture Organization

of the United Nations (FAO), in collaboration with the Government of Kenya, developed a comprehensive curriculum for Frontline In-Service Applied Veterinary Epidemiology Training (ISAVET). The training consists of one month of classroom training and 3 months of field based mentored training. As a requirement before graduation, trainees are expected to design and implement a field case study that seeks to generate an evidence base in addressing animal health challenges in their duty stations.

The programme has so far trained 78 AHSPs drawn from 39/47 counties. In line with THE NATIONAL ACTION PLAN ON AMR -2017 strategic objective on strengthening the knowledge and evidence base through surveillance and research three AHSPs trainees developed field reports on Antimicrobial Use and Resistance; 1)Adherence to Antibiotic Withdrawal Period following Treatment of Dairy Cattle in Kirimari Ward, Embu County,2021, 2)Coliform Mastitis Prevalence and Antibiotic Susceptibility in Bovine Milk Samples Submitted at Regional Veterinary Investigation Laboratory (RVIL) Nakuru from January to April 2022 and 3) Knowledge, Attitude and Practices on the Use of Veterinary Drugs and its association with Antimicrobial Resistance in Food-Producing Animals in Samburu East Sub-County.

Risk drivers for AMR in the animal interphase identified included; lack of awareness of the consequences of consuming milk containing antibiotic residues and treatment of livestock without consultation of AHSPs. To address this, livestock farmers should be sensitized on the dangers of consuming milk from animals under treatment with antimicrobials and the need to consult AHSPs to advise on treatment. In addition to this, there is need for governments, AHSPs, and other stakeholders to collaborate in providing livestock extension services and to ensure that there is limited access of antimicrobials to non AHSP professionals. These combined efforts would have an impact in reduction of AMU and AMR.

Keywords: Frontline animal health workers, In Service Applied Veterinary Epidemiology Training, Antimicrobial Resistance

Antimicrobial properties of venom from three medically important snakes in sub-saharan Africa.

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Background: Antimicrobial agents have kept disease-causing microbial infections at bay for many years. However, microbes continue to evolve by developing elaborate mechanisms to circumvent the efficacy or action of the currently available antimicrobial agents leading to antimicrobial resistance

(AMR). New policies and renewed research are therefore urgently required to mitigate the unfolding crisis of AMR. This study aimed to evaluate the antimicrobial activity of three crude venoms from Bitis arietans (Puff adder), Naja haje (Egyptian cobra), and Naja pallida (Red spitting cobra) against gram positive and gram negative bacteria.

Methods: Antimicrobial susceptibility test was performed using the disc diffusion method with Bacillus cereus and Staphylococcus aureus as gram positive bacteria and Escherichia coli, Klebseillae pneumoniae, and Salmonella typhi as gram negative bacteria. Nine antimicrobials were selected for comparison including Aztreonam (30 µg), Cefpodoxime (10 µg), Cefoxitine (30 µg), Streptomycin (25 µg), Ceftriaxone (30 µg), Nalidixic acid (30 µg), Tetracycline (30 µg), and Sulfamethoxazole (25 µg). The zones of inhibition of triplicate measurements were expressed as mean±standard deviation and analyzed by One Way Analysis of Variance (ANOVA) and Tukey's multiple comparison test. $p<0.05$ was considered significant.

Results: B. arietans venom was ineffective against all the tested pathogens. However, B. cereus and S. aureus were more susceptible to N. haje and N. pallida crude venoms than Aztreonam, Cefpodoxime and Nalidixic acid. S. typhi was more susceptible to N. haje and N. pallida venoms than Nalidixic acid and Sulfamethoxazole. K. pneumoniae was more susceptible to N. haje and N. pallida crude venoms than Sulfamethoxazole.

Conclusions: Naja haje and Naja pallida venoms exhibit broad spectrum of activity against both gram positive and gram negative bacteria but Bitis arietans venom is ineffective against bacterial pathogens. There is a need to explore which of the components of N. haje and N. pallida venom is responsible for the observed antimicrobial properties.

Keywords: Antimicrobial resistance, venom, Bitis arietans, Naja haje, Naja pallida

Biosecurity: A tool in reducing antibiotic use and spread of bacterial pathogens along the food value chain in a large scale pig production and value addition company in Kenya.

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The insatiable demand for pork and its products has led to increased use of antimicrobials in growth promotion and therapeutics. This is a major contributor to AMR. This study was carried out to determine measures undertaken by a vertically integrated pork enterprise to reduce antimicrobial use in the pork value chain and prevent the spread of AMR genes along the food chain.

An observational study and in-depth discussions were carried out in a Kenyan large-scale commercial pig farm between May and June, 2022 to determine the biosecurity measures in the farm, slaughter facility, food processing and sales units.

Biosecurity measures in the farm included; treated footbath and wheel dips, restriction of entry and movement and practice of closed herd system. Routine vaccination, cleaning and disinfection of destocked pens were carried out. In addition, raw materials for feed processing were subjected to organoleptic evaluation and laboratory analysis to determine the nutritive value, moisture content, and presence of mycotoxins. Feed formulation was then done considering optimal nutritional value to cater for different classes of pigs. Water used on farm and in the slaughter facility was routinely tested for quality. Meat was stored in a cold chain overnight to lyophilize and butchering done in sections depending on the final product. In-coming and out-going air in the processing area was filtered to avoid contamination of meat. Personal hygiene, grooming and adorning of PPEs was mandatory to all personnel. Food handlers are tested every 6 months for communicable diseases and every 2 months for staff in high care units producing ready to eat products. Transport of meat and meat products was done in cleaned and disinfected dedicated refrigerated trucks.

Reduced disease incidence on farm and negative results on microbial analysis of products confirm that appropriate biosecurity measures reduce use of antimicrobials. Further use of vaccines prevents diseases reducing need for antimicrobial use whilst a closed herd system, and movement restrictions prevents disease spread. Formulating proper nutritional value elements boost immunity. Feed and feed product analysis enhance clean feeds free from pathogens. Sanitation control of water being used reduces contaminants passing to products.

Key words: Pigs, Antimicrobial resistance (AMR), Biosecurity, Value chain, Kenya

Molecular detection of chlamydia abortus infection, farm level risk factors in sheep and goats in Kajiado, Kenya

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Chlamydia abortus is a zoonotic pathogen and there is limited information on infections of sheep and goats in Kenya, and use of molecular techniques for its detection has not been exploited. This study investigated prevalence and risk factors of chlamydia abortus infection in sheep and goats in five wards

in Kajiado County: Kenyawa Poka, Ildamat, Iloodokilani, Matapato South and Kaputei North. A random sample of 148 sheep and 199 goats' blood samples were drawn from 1560 blood samples which had been collected from 130 pastoralists' households in Kajiado County. Genomic DNA were extracted using a commercial thermo-scientific; Gene JET whole Blood genomic DNA purification Mini-Kit. To amplify Chlamydia abortus, DNA extracted from EDTA whole blood were tested using conventional PCR targeting 16S-rRNA-16S-23S rRNA and IS1111 transposase element respectively. Out of the one hundred forty-eight (42.7%) and 199 (57.3%) tested against the DNA of Chlamydia abortus; 86/347 (24.8%) samples tested positive. In regards to species; Chlamydia abortus DNA was detected in 30/148 (20.3%) from sheep whereas 56/199 (28.1%) from goats. The prevalence of Chlamydia abortus in Ildamat was 15/43 (34. 9%), in Iloodokilani 49/155 (31.6%), in Matapato south 5/46(10. 9%), in Kenyawa poka 10/65(15.4%), and in Kaputiei north 7/38(18.4%). Risk factors associated with chlamydia abortus positivity were water sources during raining season p <0.0.5, farmers reporting cases of abortion p <0.0.5, and consumption of fermented raw milk by households p <0.0.5. These findings show that Chlamydia abortus is endemic in the area and is a public health hazard. It is recommended that the disease is prioritised by surveillance systems, and increased public education to mitigate its impact in flocks and people at risk of exposure.

Key words:

Occurrence of serum antibodies to Toxoplasma gondii and associated risk factors in donkeys from Kirinyaga and Meru Counties, Kenya

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Toxoplasma gondii is an intracellular protozoan parasite of zoonotic and economic importance in humans and animals respectively. Occurrence of the infections in donkeys have previously been reported in various countries from Africa, but no previous reports exist for donkeys in Kirinyaga and Meru counties in Kenya. The objective of this study was to determine the occurrence of antibodies to T. gondii and the associated risk factors in domestic donkeys from the two counties. Blood samples were collected from 363 randomly selected donkeys from the two counties. The samples were tested for antibodies to T. gondii using a commercial kit ID Screen® Toxoplasmosis Multi-Species Indirect Enzyme-Linked Immunosorbent Assay (ELISA). Epidemiological questionnaires and interviews with 139 randomly selected donkey owners were used to collect information on risk factors of Toxoplasmosis. Toxoplasma gondii serum antibodies were detected in 26.4 %(96/263) of the examined

donkeys. The results of the analysis showed that donkey age (OR = 2.484, p = 0.005) was associated with an increased risk of occurrence of antibodies against T. gondii while county of origin of the donkey (OR = 0.182, p = 0.000), residential place of the donkey (OR = 0.301, p = 0.003), rearing chicken (OR = 0.203, p = 0.007), and donkey production system (OR = 0.644, p = 0.012) were associated with reduced risk of T. gondii occurence. This study provides the first epidemiological information on T. gondii infection in donkeys in Kenya. The presence of antibodies to T. gondii in donkeys and their close association with humans' points to a high probability of transmission of the parasite to people and other animals. The authors recommend further research involving more donkeys and regular monitoring and control of T. gondii infections in donkeys.

Keywords: Toxoplasma gondii, Donkeys, ELISA, Occurrence, Risk factors, Central Kenya

Synergizing Human and Animal Health Surveillance in Kenya: A time series analysis of Brucellosis incidence

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Brucellosis is one of the most widespread and important zoonotic infections of humans globally but is also among the most neglected diseases. "Brucellosis has a high prevalence in the Mediterranean, Middle East, Asian, and African regions." In Kenya, the disease is endemic and listed among the priority zoonotic diseases. This study aimed at investigating the association between reported human and animal brucellosis cases in different livelihood zones and demonstrating the application of mathematical models in forecasting brucellosis incidence in humans. "We conducted a time series analysis of the incidence of human zoonosis in Kenya using data from animal and human official health records from

2014 to 2019." Tests for association were done between the outcome (incidence of human brucellosis) and other predictors using linear regression models. Auto ARIMA and ETS models were fitted to the data, incorporating 1-4-month lags for the monthly incidence of human brucellosis." In univariable analysis, combined cases for all the species, livelihood zones, cattle cases, and camel cases were significantly associated (P-Value ≤ <-0.2) with human brucellosis and were included in the multivariable model. In multivariable analysis, livelihood zones and animal cases without any lag were significantly associated (P-Value ≤ 0.05) with human brucellosis occurrence. Livelihood zones and animal cases at the third moving average (k=3), were significantly associated. The data confirms that there exists a positive association between human and animal brucellosis. According to data collected by the surveillance systems, the forecasting models showed that none of the animal species has a better predicting capacity than the others. In conclusion, since certain animal species can be used as sentinels for diseases like brucellosis, animal health surveillance data can be used to inform the human health surveillance system and therefore aid in forecasting public health events enabling timely and effective interventions. However, the surveillance systems must be sensitive enough to capture all events while ensuring they do not forecast and give a false alarm. The existing data in the official surveillance system may not entirely reflect the situation on the ground since for instance some animal species are expected to be better predictors of human brucellosis than others. We recommend a comprehensive evaluation of both surveillance systems to identify potential gaps and better understand the observed deviation from the expected epidemiology of human brucellosis in Kenya.

Keywords: Brucellosis, surveillance, zoonotic, time series, and forecast.

Prevalence and risk factors for Toxoplasma gondii in sheep and goats flocks in Kajiado County, Kenya

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Toxoplasma gondii is a pathogen of veterinary and public health importance. However, there is a paucity of studies that have reported its occurrence in flocks of sheep and goats in arid and semi-arid areas in Kenya. A cross-sectional study was conducted in Kajiado County in five wards: Kenyawa Poka, Ildamat, Iloodokilani, Matapato South and Kaputei North. The objective was to determine prevalence of Toxoplasma gondii infection in sheep and goats using serological and molecular methods and its associated risk factors. A semi-structured questionnaire was administered to 130 randomly selected

small ruminant pastoralists' households, and data collected on flock sizes, sources of water, presence of cats, history of abortions, and neonatal mortality, and consumption of raw meat, milk and blood. A total of 1,464 serum samples from female animals; sheep (n=842) and goats (n=622) in 122 flocks, were tested for anti-Toxoplasma gondii antibodies using Indirect Enzyme-Linked Immunosorbent Assay (indirect- ELISA). Furthermore, sero-positive samples were tested for presence of Toxoplasma gondii DNA material in blood using conventional Polymerase Chain Reaction. Sixty-six flocks had at least one positive case with a prevalence of 54% (66/122; 95% CI: 45.3-62.7). Kenyawa Poka ward had highest prevalence (15.9%), followed by Matapato south (14.7%), Ildamat (12.5%), Kaputiei North (9.1%) while Iloodokilani had the lowest at 2.57%. While individual animal prevalence was 9.0% (76/842; 95% CI: 7.3-11.2) in sheep and 12.5% (78/622; 95% CI: 10.2-15.4) in goats. Toxoplasma gondii DNA was detected in 89% (137/154; 95% CI: 83.0-93.0) of seropositive sheep and goats. None of the risk factors had a significant association with flock sero positivity. Findings provide evidence of the risk of exposure to this pathogen by pastoralists. These pastoralists had limited knowledge on zoonoses, handled aborted materials from livestock without protectives, and some reported consumption of raw blood, raw meat and unpasteurized milk. Public health education to pastoralists is recommended on how flocks get infected with the pathogen, and mitigation measures for the risk of exposure to infections and its transmission to pastoralists' household from their livestock.

Key words:

Factors associated with Japanese Encephalitis Virus seropositivity in hunted wild animals from Yamaguchi prefecture, Japan

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Introduction: Japanese encephalitis virus (JEV) is a zoonotic, vector-borne virus spread primarily by Culex mosquitoes, and it causes acute encephalitis in horses and humans. JEV is widely endemic to Southeast Asia and the Western Pacific region but has been reported in Namibia. Continuous serosurvey for JEV antibodies in wildlife is important in determining disease distribution and amplifiers. The study determined the factors associated with JEV seropositivity in hunted wildlife from Yamaguchi prefecture.

Methodology: Blood samples were collected from 476 wild animals captured by licensed hunters to detect JEV antibodies using indirect enzyme-linked immunosorbent assay (ELISA). Data on the sampling date, city area, sex, weight and animal species were captured. Descriptive statistics and logistic regression were used to evaluate the association between predictors and seropositivity.

Results: Serum antibodies against JEV were detected in wild boars (92.2%, 189/227), sika deers (7.3%, 15/158) and Nutria (0.5%, 1/61). All the badgers (n=9) and Japanese macaques (n=21) tested negative. In the final multivariable logistic regression model, the odds of testing seropositive were higher for wild boars (OR=365.39, 95%CI 41.63- 3205.49) and Sika deers (OR=2.27. 95%CI 0.22, 23.29) when compared to Badger, Nutria and Japanese macaque. Compared with Mine city, the odds of testing seropositive were lower for Sanyo-Onoda city (OR= 0.27, 95% CI 0.11, 0.69) but similar to that of Ube city (OR= 0.29, 95%CI 0.08, 1.05) and Yamaguchi city (OR= 0.40, 95% CI 0.10, 1.59). Also, the odds of testing seropositive were higher for samples collected in the years 2021 (OR= 5.72, 95%CI 2.52, 12.97) and ≥ 2022 (OR=2.32, 95%CI 1.07, 5.03) compared with ≤2020.

Conclusion: We conclude that the wild boars and Sika deers play an important role in the transmission and/or amplification of JEV.

Key words: Japanese encephalitis virus; Seropositivity; Wild boar; Sika deer; Yamaguchi

Earthranger health: A new tool for enhancing wildlife disease surveillance.

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Introduction: Many emerging infectious diseases of global importance to human health can also cause significant morbidity and mortality in wildlife populations, before spilling over into people. For example, human Ebola virus epidemics are often preceded by outbreaks of haemorrhagic fever in non-human primates and forest antelopes. Early detection of outbreaks through targeted surveillance of wild animals has been identified as a crucial component of pandemic prevention strategies that can reduce human fatalities, avert economic disasters, and support wildlife conservation.

Methodology: The Kenya Wildlife Service, Wildlife Research and Training Institute, the Directorate of Veterinary Services, Smithsonian's Global Health Program, the International Livestock Research Institute and San Diego Zoo Wildlife Alliance, are collaborating to develop and pilot an wildlife health syndromic surveillance reporting module for EarthRanger (https://www.earthranger.com/), in 13 conservancies in Kenya. Rangers will be trained to collect standardised wildlife health syndromic

surveillance data using a mobile phone App. The data will be verified, and cases responded to by the vet in charge who will then report the case in KABS platform. These reports will then be analysed to show spatial and temporal distribution of the reported cases. Collected data will be transmitted in a standardized format in near real time linking wildlife, veterinary and human health professionals to initiate a coordinated One Health response.

Results: Eighty two rangers have already been trained in 5 out of the 13 conservancies. Trainings and data collection will continue. Feedback from rangers is already showing that there is a critical gap in collecting wildlife health data and this will play a big role in improving reporting and response.

Conclusion: Wildlife health surveillance has been identified as a critical gap in Kenya's zoonotic disease surveillance strategy. This pilot will equip veterinary services in Kenya with the ability to early warning and the ability to rapidly detect and respond to unusual events in domestic and wild animals, laying the groundwork for a tool that can be scaled to other protected areas using Earth Ranger platform.

Key words: Detection, Early-warning, EarthRanger, outbreaks, response, syndromic surveillance, wildlife.

Conservation of wild carnivores in Samburu through improving domestic carnivore welfare - community animal health initiative

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Introduction: Because the Samburu community live alongside wildlife, predation of domestic animals is a source of conflict. Domestic dogs in this community play an integral role in reducing predation by alerting herders of predators. However, these interactions pose a threat of disease spillover. In 2017 and 2019, outbreaks of Canine Distemper in Samburu and Laikipia occurred, causing mortalities of domestic and African wild dogs. Domestic dogs were drivers of the disease during livestock movements.

Consequently, the Community Animal Health Initiative was started in October 2021 to improve domestic carnivore welfare by providing veterinary services, and consequently reduce disease occurrence. This is a partnership between Ewaso Lions, VetinWild, Animal Care Centre and Samburu County.

Method: This programme operates in Westgate Community Conservancy as a mobile unit. It provides clinical and preventative treatments like vaccinations as well as population control services. Main diseases under surveillance are Rabies, Canine Distemper and Transmissible Venereal Tumor. Data on

all animals, conditions and interventions are recorded in addition to sampling for disease screening. Education on responsible animal ownership and One Health occurs routinely.

Results: Over 1000 cases in Westgate were attended within one year, with outbreaks of Canine Distemper and Rabies detected in dogs, creating an early detection system in monitoring risk of spillovers. Moreover, over 6000 vaccinations done in Samburu East.

Conclusion: This model has demonstrated the importance of One Health to conservation and impacts of private-public partnerships in Samburu.

Key words: Wild carnivores, dogs, conservation, One Health, diseases

Changing temporal patterns of anthrax outbreaks among wildlife in Kenya and the current measures instituted to control the outbreaks

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Anthrax, a bacterial zoonosis of global health security and public health importance is primarily a disease of domestic and wild herbivores transmitted through ingestion of Bacillus anthracis spores from soil and/or vegetation. The disease can cause large-scale loss of wildlife and domestic animals and is a major threat to conservation of endangered wildlife species. We investigated the frequency of outbreaks and control measures put in place through reviewing records of anthrax cases and outbreaks in wildlife in Kenya from 1999 to 2022 from veterinary services database at the Kenya Wildlife Service. Although, isolated cases of anthrax have been reported over time in Kenya, an increased frequency of outbreaks has been observed since 2006, occurring after every 3 to 5 years and affecting different species in different geographical areas. Recurrence of an outbreak within the same area was reported in one wildlife protected area but the second outbreak was less severe causing lower mortality and affecting lesser number of species than the first one. Control measures instituted following outbreaks include early detection through laboratory confirmation, intensive carcass mopping-up and disposal, disinfection of carcass sites and vaccination of endangered species within the outbreak area. From the findings of the study, the recommended method is deep burying of carcasses coupled by disinfection of burial and carcass sites with 10% formaldehyde and caustic soda as this is effective in containing outbreaks and to a large extent preventing recurrence as well as reducing intensity of recurrent outbreaks. We concluded that due to the emerging temporal patterns of anthrax outbreaks, the wildlife management authorities should be alert and vigilant, and should put up contingency measures for prevention and control.

Key words: Anthrax, bacillus, control, outbreak

Prevalence of antibiotic residues in pork in Kenya and the potential of using gross pathological lesions as a risk-based approach to predict residues in meat

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Introduction: The human population is growing and urbanizing. These factors are driving the demand for animal-sourced proteins. The rising demand is favouring livestock intensification, a process that frequently relies on antibiotics for growth promotion, treatment and prevention of diseases. Antibiotic use in livestock production requires strict adherence to the recommended withdrawal periods. In Kenya, the risk of residues in meat is particularly high due to lack of legislation requiring testing for antibiotic residues in meat destined for the local market.

Methodology: We examined pig carcasses for gross pathological lesions and collected pork samples for antibiotic residue testing. Our aim was to determine if a risk-based approach to residue surveillance may be adopted by looking for an association between lesions and presence of residues. A total of 387 pork samples were tested for antibiotic residues using the Premi®Test micro-inhibition kit.

Results: The prevalence of antibiotic residues was 41.26% (95% CI, 34.53–48.45%). The logistic regression model found no significant associations between gross pathological lesions and presence of antibiotic residues.

Conclusion: We recommend that the regulating authorities strongly consider routine testing of carcasses for antibiotic residues to protect meat consumers. Future studies should be conducted at the farm level to establish farming practices that may be contributing to the high prevalence.

Keywords: antibiotic residues; food safety; gross pathological lesions; maximum residue limits; public health, One Health

Meat safety knowledge, attitude, and practices of slaughterhouse workers in Kajiado, Kenya

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A major contributor to the poor meat safety status in Kenya is low levels of slaughter hygiene knowledge and practices among slaughterhouse workers. The study determined knowledge, attitude, and practices (KAPs) of workers from 7 category B slaughterhouses in Kajiado County on slaughter hygiene and meat safety (SHMS). Semi-structured questionnaires were administered to managers, meat inspectors (M.I) and slaughterhouse workers. Out of a total worker population of 96, 78 responded, yielding a response rate of 81.25 %.

Majority (92.3 %) of workers lacked SHMS training. Workers had high knowledge with overall mean score of 19.2 ±2 out of 24, high personal hygiene scores (9.9 ± 0.8 out of 11); moderate carcass contamination scores (4.2 ± 0.8 out of 6), meat-borne illnesses score (3.1 ±1 out of 4), and temperature intervention scores (2.1 ± 0.6 out of 3). Knowledge scores significantly differed across age groups, as middle-aged workers (35 - 44 years) scored highly in overall knowledge (20.0 ± 1.8) than the elderly (55 + years; 18.1 ± 1.8). Similarly, middle-aged workers scored significantly higher in carcass contamination knowledge (4.6 ± 0.7) than the youth (24 – 34 years; 4.0 ± 0.7) and the elderly (3.7 ± 0.9). There were no significant differences observed in knowledge scores across slaughterhouses, education levels, and slaughterhouse roles.

Moderate scores were recorded in attitude and differed significantly across slaughterhouses ($p < 0.05$), with a mean of 33 ± 5 out of 40. Five slaughterhouses, M1A, M1B, M1C, M2B, and M3 attained positive attitude scores of 35.6 ±2.5, 36 ±2, 32.7, 34.9 ±2.8 and 34.4 ±3.1 respectively which were significantly higher ($p < 0.05$) than scores in M4 and M2A that attained neutral and negative scores of 30 ± 3.8 and 28.8 ±8.5 respectively. Workers with no formal education displayed more positive attitude ($p < 0.05$). There were no significant differences observed in attitude scores across age groups, education levels, and slaughterhouse roles.

High scores were also recorded in practices and differed significantly across slaughterhouses ($p < 0.05$), with a mean of 59.3 ± 3.5 out of 65. All slaughterhouses attained good practice scores above 57. However, M2A had significantly higher score (62.6 ±2.4) than the rest.

There was no association between worker knowledge and attitude scores with hygienic practice. There was also no significant difference in KAP scores between trained and untrained workers, and mean daily kill across slaughterhouses.

Carcass decontamination practices by workers across slaughterhouses differed from that of the M.I. Surface and hand-held equipment sanitization practice was observed as poor. Medical testing practice

was significantly different across slaughterhouses ($p < 0.001$) and infection rates of zoonoses and occupational hazards as high as 33 % in some slaughterhouses.

The study concluded that although high knowledge was scored by slightly more than half of the workers, poor practices in carcass decontamination, facility sanitization and medical examination calls for slaughter role-specific training, provision of pre-requisite programs and PPEs', enhanced biohazard control, and strict oversight of worker medical testing.

Key words: knowledge, meat contamination, safety, slaughterhouses, training, zoonoses

Assessment of bacterial quality of beef from selected butcheries in peri urban areas of Nairobi.

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Unhygienic meat handling practices predispose the meat to contamination by pathogenic and spoilage bacteria which can lead to sickness, food loss, and economic costs. Despite the existence of food safety policies in Kenya, well-structured risk assessments are rarely done, and enforcement of regulations is weak. Evidence-based studies to address bacterial contamination of beef and unhygienic handling practices are needed. The objectives of the study were to assess the microbial quality/contamination of beef sold in selected butcheries in peri-urban areas of Nairobi and the associated handling practices of butcher shop attendants. These data will be used to guide the design of a meat safety intervention.

A descriptive, cross-sectional study design was used, and 200 beef samples were collected by purchasing beef fillets from 200 randomly selected butcheries. A checklist was used for the visual observation of beef-handling practices. Total coliform and Escherichia coli were enumerated using 3M Petri film EC count plates and Salmonella chromogenic agar was used to isolate Salmonella. Species identification was done using the Matrix-assisted laser desorption/ionization-time of flight mass spectrometry (MALDI-TOF MS).

Sixty-one percent of samples had levels of total coliforms above the acceptable regulatory limit (EU standards). Additionally, 36% of samples had levels of E. coli above the acceptable regulatory limit but no Salmonella was detected. Eighty-five percent of the butcher attendants neither washed their hands before nor after handling the meat and 91% handled money while selling meat at the same time. The presence of microbial loads above the regulatory limit indicates poor beef handling practices which were also observed, increasing the risk of foodborne illness in consumers. There is a need for the education of stakeholders in the beef supply chain on the appropriate handling of meat and the importance of these practices to public health.

Keywords: Bacteria, contamination, meat, Nairobi.

Effective Management of Cancer Pain in Dogs and Cats

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Introduction: Many types of cancer in dogs and cats are sources of pain to the affected animals. This pain remains undermanaged in these species. Cancer pain, if untreated / undertreated, negatively impacts both the patient's important physiologic functions and quality of life, thus the need for its effective management.

Objective: To establish the types of cancer that cause pain in dogs and cats and the current therapies employed for its management.

Methodology: This was a scoping literature review of published works on cancer pain in dogs and cats, with specific focus on: types of cancer that cause pain, specific underlying causes of cancer pain, available therapies in current use in its management and innovations into the future of cancer pain management.

Results: Examples of cancers associated with pain in dogs and cats include: melanomas, carcinomas, sarcomas, lymphomas, and mast cell tumours, affecting skeletal and soft tissues and body organs. Specific underlying causes of cancer pain include: direct invasion of tumour cells into normal tissues; distension, compression and obstruction of normal tissues and internal organs secondary to tumour infiltration; inflammatory processes elicited by cancer cells within the cancer microenvironment; tissue hypoxia; and from therapeutic interventions employed in cancer pain management. Available cancer pain treatment modalities in dogs and cats include: radiotherapy, chemotherapy, surgery, potent pharmacologic agents and complementary supportive adjunct therapies. There are promising innovations into the future of cancer pain management therapies.

Conclusion: Many types of cancer are a source of pain in dogs and cats. Many therapies are available for treatment of cancer pain, targeting their specific causes. Effective management of this pain however requires its early recognition and diagnosis and appropriate choice of management approach. Supportive and complementary care therapies have a place in the management of cancer pain.

Keywords: Pain Management, Cancer, Companion Animals

Dog bite injuries in Kitui county, Kenya: 2017-2021

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Introduction: Dog bites continue to be a serious public health issue due to its association with the transmission of rabies virus. Globally, an estimated ten million individuals are affected by dog bites, with an estimated 59,000 individuals succumbing to dog-mediated rabies. In Kenya, there are no studies estimating the dog bite incidences, however annual mortalities resulting from dog-mediated rabies are estimated as 523 (95% CI 134-1,100). The main objective of this study was to assess major risk factors associated with dog bites in Kitui County, Kenya between 2017 to 2021.

Methodology: We recruited 387 dog bite patients (cases) and 387 non-bite patients (controls) for the case control study from Mutomo mission hospital and the Ikutha level 4 hospital records. Major risk factors investigated included patient's demographics, the geographical location, and season. Multivariable logistic regression analysis evaluated the association between risk factors and being a dog bite case. In the final model, pairwise interactions among variables were evaluated, and the model fit was evaluated using receiver operating characteristics and area under curve.

Results: The study found that the dog bite incidence was highest in Kanziko ward in Kitui South subcounty. Fifty one percent (108 bites) of dog bite victims were children under fifteen years, with 53% (68) being men and 36% (77) being bitten on the limbs. Dog bites mostly (44%,93) occurred between October and December (short rainy season). Majority (60%,127) of the dogs implicated in the bite incidences had unknown ownership status. Age group and season were identified as the most significant variables for high dog-bite incidences in Kitui South subcounty.

Conclusion: Targeting school-going children for improved knowledge on dog bites may prove more effective in reducing dog bite injuries in Kitui South subcounty.

Keywords: Dog-mediated rabies, Dog ownership, Anti-rabies virus vaccines

Welfare of dogs kept by the nomadic pastoralists of Amboseli ecosystem

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In the low-income nomadic pastoralist communities of Africa, the dog forms an essential part of the community as they are used for guarding and protecting livestock from predators. The dogs thereby help reduce the human wildlife conflicts mainly by accompanying the herders to the grazing fields that are predominantly inhabited by wildlife, hence exposing the dogs to disease risks that are inevitable in these ecosystem. Despite the vital role played by dogs within the pastoral community and the heightened exposure to disease risk, little research has been conducted regarding the welfare of these dogs. most studies have focused on the interaction between domestic dogs and wildlife. This study assessed the management and welfare of dogs in the pastoralist communities through administration of questionnaires and focused group discussions, based on the 5 animal freedoms Further, floatation and mac master techniques were used for qualitative and quantitative analysis dog fecal samples. A total of 110 respondents were interviewed and 85 dog fecal samples were collected for helminth analysis.

Results indicate that women participate more in feeding dogs than men. The dogs are mainly fed on kitchen remains. 45% of the respondents feed their dogs 3 times a day, and 70% provided water for their dogs. The median age for dogs in the community is 3 to 4 years. 65% of non-confined dogs are reported to die of disease while 50% of confined dogs are more likely to die of old age or intentional killing. Interestingly, fewer non-confined dogs (14%), than confined dogs (20%) died of predation.

54% of dogs were unvaccinated, the most commonly reported conditions were rabies, (36%) helminths (22%) and mange (25%). While the most common external parasites were ticks (45%) and lice (22%). The identified worms included Strongyle, Uncinaria, Toxocara, Dipylidium, Alaria, and Taenids, while the highest eggs per gram (epg), was 15,000.

It is concluded that there is a poor approach to the care of dogs indicated by lack of vaccination, a high helminth and ectoparasite variety and load despite the value attached to dogs by the community.

Key words: *Amboseli ecosystem, Dog welfare, Helminths, Pastoralists, Worms.*

Evaluation of the Safety & Efficacy of Oil-Based Adjuvants for Production of FMD Vaccine

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Foot and Mouth Disease (FMD) causes major economic losses due to reduced milk yield, mastitis and loss of weight and productivity among the infected animals. Furthermore, FMD is a major constraint to local and international trade in livestock and livestock products. Globally, FMD is controlled through vaccination, quarantine and culling of infected animals. Inactivated FMD vaccines currently in the market are formulated with aluminum hydroxide (aqueous) gel (alum) and require multiple doses to maintain protective immunity. Oil adjuvants offer a suitable option as they can potentially provide a longer duration of immunity. A double-blind clinical study was completed to evaluate if a Single dose oil adjuvanted quadrivalent FMD vaccine was safe and could provide a one-year duration of immunity. Thirty FMD-naive animals were randomly allocated to three treatment groups (n=10/gp), a T01 Saline control group, and T02 and T03 groups that were administered with a single dose of FMD quadrivalent vaccine formulated with oil-based adjuvant A, or oil-based adjuvant B, respectively. Twelve months post vaccination, animals were challenged with serotype O FMD virus. Efficacy was measured by prevention of foot lesions.

The two oil adjuvanted vaccines demonstrated an excellent safety profile as no adverse reactions were observed. Protective antibody levels (≥1:23) were maintained through most of the 12 months. In response to challenge, the vaccines administered to T02 and T03 group cattle prevented foot lesions in 85.7% and 100% of animals, respectively. In comparison, 71.4% of controls developed foot lesions. There was a significant difference ($p<0.05$) between the control and the T03 vaccine group in development of foot lesions but not between controls and T02 group ($p=0.1026$). Data was statistically analyzed by the Fisher Exact Test.

Development and implementation of this single dose oil adjuvant FMD vaccine would improve compliance and make FMD control programs more effective in the region.

Benefits of a multivalent vaccine including bovine viral diarrhea virus component in a randomized controlled trial on smallholder dairy farms

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The use of a multivalent vaccines with a bovine viral diarrhea virus (BVDV) modified live (ML) component is a beneficial prevention intervention to mitigate substantial cattle losses from diseases. In Kenya's smallholder dairy farms (SDFs), there is limited information on the use of multivalent vaccines for BVDV control. This research sought to determine the benefits of multivalent BVDV vaccination in a randomized controlled trial on SDFs in Meru, Kenya.

The study recruited a total of 384 randomly selected cows on 292 SDFs. With random block allocation, 185 cows were injected with a single dose of multivalent BVDV modified live vaccine (Pyramid® FP 5; Boehringer Ltd.), while 199 cows were injected with a placebo. On the first farm visit, a questionnaire was used, and animal examinations were done to record the baseline level of current and reported disease, along with other cow and farm level data. After one year, a return to the farms recorded the same data, for time-varying variables. Mixed multivariable Poisson regression modeling was used to determine factors associated with the reported disease counts.

The count of reported diseases in one year for the cows ranged between 0 and 6 diseases, with a mean of 1.4. There was an overall reduction in reported disease in the vaccinated group during the second visit. The reduced specific disease conditions being pneumonia, diarrhea, anorexia, and uterine disease. There were lower reported disease counts in cows within farms that bought in-calf replacement heifers and in farms with more land. The multivariable model had four significant variable interactions including visit number and vaccination intervention.

In Conclusions, the vaccinated animals had lower reported disease during the one-year follow-up period, adjusting for the reported disease counts on the first visit. Multivalent vaccine with a BVDV component was shown to be beneficial in SDF herds.

Key words: BVDV, multivalent, vaccine benefits, smallholder dairy.

Utilization of climate change information on visceral Leishmaniasis prevention in Baringo county, Kenya

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Vector Borne infections are highly climate sensitive due to the influence of weather condition on availability, dispersal and life cycles of vectors and intermediate hosts. In Kenya, several diseases are regarded as 'climate-sensitive', leishmaniasis being one of them. Understanding the climatic effects on the epidemiology of these infections and timely information dissemination is relevant in providing solutions to spread of these infections in Kenya. The objective of the study was to establish the access and utilization of climate change information on Visceral Leishmaniasis prevention practices by residence of Baringo County. The study adopted a cross sectional research design; the study population

consisted of 384 household respondents, 20 focus group discussants and 11 key informants. Sampling technique involved; purposive sampling to select Baringo county and Baringo South sub-county based on previous history of the disease in these areas, simple random sampling procedure was applied to select wards and to identify the 384 households participating in the study. This study utilized semi structured questionnaires, focused group discussions, institutional questionnaires and key informants interview as instruments for data collection. Analysis was done using descriptive statistics, t-test to differentiate variables on demographic and Chi-square test ($\chi 2$) to test observed data on variables. The findings showed that majority (93.2%) of the community members had heard of visceral Leishmaniasis. However, a substantial number (83.9%) did not have adequate knowledge of the disease. The study also found out that (68.5%) were knowledgeable on the effect of climate change on visceral Leishmaniasis. However, utilization of information on effect of climate change information in the community was still low with only (49.5%) of the community utilizing the information in VL prevention practices. The study concludes that even though majority of community members were aware of effect of climate change on visceral leishmaniasis, a substantial number were not utilizing this information in prevention of the disease. The study recommends for improvement in knowledge about the disease and awareness creation programs targeted towards improving not only the knowledge but also the attitude and practices regarding VL and its preventive measures

Keywords: utilization of climate change information, visceral Leishmaniasis, Baringo

Reducing estrus synchronizing prostaglandin f2α dosage in dairy goats for enhanced goat artificial insemination uptake.

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Dairy goat farming is preferred globally as an alternate climate smart livestock, due to its high drought and heat resilience, less methane emission and better disease resistance. This study was carried out to determine optimal dose of prostaglandin ($PGF_2\alpha$) required for estrous synchronization in goats and to access the farmers' attitudes and perception on artificial insemination (AI) in goats. A structured questionnaire was administered to 200 goat rearing farmers, in Mukurwe-ini Sub County in Nyeri County. This was followed by a controlled experiment involving 45 healthy, cycling, non-pregnant dairy goats aged 1.5 to 3 years, randomly allocated into three groups of 5 goats each. The positive control group received 500µg, group 2 received 250µg and group 3 received 125µg of Cloprostenol (estroPLAN) intramuscularly (IM). Double injection protocol of 11 days apart was used. The heat response, onset, intensity and duration were observed, animals that exhibited heat signs were served.

Survey data was analyzed using R software version 4.03 and comparisons done using Pearson chi-square test at 95% confidence interval while experimental data were analyzed using two-way ANOVA.

98% of farmers used natural mating, a significant 71.4%were willing to pay for AI services though they perceived this technology to be expensive. Whereas the heat response for group 1 and 2 were similar, group 2 had the highest pregnancy rates (84.6%). It is concluded that goat rearing in Nyeri was through small scale practice involving 2-5 goats. Lowered dosage of PGF2α (250µg) was effective and efficient in synchronizing goats as it had the highest conception rate (84.6%).

Key words: Artificial inseminations, goats, prostaglandins, synchronization

Learner perspective on adoption of online/blended learning approach in the delivery of animal welfare training for animal health professional training in Kenya and select institutions in East, West and Southern Africa

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Background: This study explores the adoption of an online/blended learning approach in the delivery of animal welfare training among learners for animal health professional training in Kenya and select institutions in East, West, and Southern Africa.

Method: All the institutions approved to offer training in Animal Health in 2020 by the Kenya Veterinary Board, (18 institutions) were selected, in addition to select institutions in The Gambia, Liberia, Malawi, Rwanda, Uganda and Tanzania. Online surveys employing the Survey-Monkey platform were used to obtain information on the learning environment and resources of institutions in the context of the delivery of animal welfare training via a blended/online approach and the learners' perspective of online/blended learning approach in animal welfare training.

Results: Students from eight (8) countries and twenty-eight (28) institutions participated in the study, fourteen institutions were from Kenya, thirteen (13) from other African countries and one (1) from Europe. Eighty-three percent (83%) of the participants supported the suitability of animal welfare training via online/blended learning approach (n=517) with most of them agreeing that content coverage was at least above average, 49.6% (n= 508) in addition to concurring that the learning satisfaction from online/blended learning was the same as traditional classroom learning, 57.9% (n=498). Slightly more students prefer remote/blended learning, 45%, to traditional classroom learning, 38%, (n= 508). Despite a general positive acceptance of the approach, only 52.5% had access to an internet-capable device, 36.2 % had access to the timely availability of recordings/teaching notes and 26.2 %, had access to reliable internet connectivity (n=516). Pedagogical tools students had interacted with the most and had the most preference for in descending order were videos, photos, and case reports. There was very limited exposure to resources such as wikis and virtual ward rooms.

Conclusion: Online/blended learning approach in training animal welfare has been largely accepted by learners undertaking animal health related courses in Africa. It offers an opportunity for the continuity of learning even during periods when traditional classroom sessions are restricted, like during the COVID-19 pandemic. Training institutions nonetheless are yet to fully support this approach via investments in learning resources, technology and pedagogical tools required to facilitate both access and a quality learning experience. Learning sponsors also have a role to support remote learning by facilitating access to devices and a conducive remote-learning environment. The findings of the study could be extrapolated to other courses taught at institutions of higher learning.

Keywords: Online/Blended Learning, Animal Welfare Training, Animal Health Professional Training, Online Surveys, Africa

Development of a mobile application to support county artificial insemination subsidy programs and improve efficiency.

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Artificial Insemination (AI) has been practiced in Kenya for close to a century. Its primary aim was to help prevent reproductive diseases among dairy herds as well as help improve the local breeds. This has been largely achieved and lately, AI has morphed into a technology used to introduce and maintain superior genetics in dairy and beef breeds with an aim at improving production and productivity.

Artificial Insemination (AI) services have previously been hampered by high cost, poor accessibility, and availability of quality services. The private sector has been carrying out this service through co-operative societies, supported by individual private providers, but with unsatisfactory performance. With devolution of Agriculture and Veterinary services, most counties have subsidized AI with varying degrees of success.

A recent study carried out by KALRO indicated repeat breeding as a key challenge to fertility of small holder dairy animals. This is caused by various factors including poor nutrition, poor reproductive management, and reproductive infections. Despite counties having spent significant budgetary allocations to subsidize AI, animal follow ups are still a challenge as well data collection on artificial insemination. Due to this, most counties cannot quantify the success rates of these AI subsidies as well as determine the success rates of individual inseminators as an evaluation criterion of every AI technician.

To utilize technology to provide solutions to this challenge, a three – face mobile application was developed for use by farmers, AI service providers and Players in the semen delivery chain to track and monitor semen distribution and service provision. All cadres of users in Kakamega county were trained on the app use and it has been pretested through simulations. The app has shown immense ability to collect and collate data, simplicity to use and great potential to revolutionize AI service delivery and data collection to ensure improved service delivery and therefore success of Artificial insemination.

Key words: Breeding, Data, Mobile app, artificial insemination (AI)

Genomic diversity of bacterial isolates from camel milk in Kenya

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Camels (Camelus dromedaries) are vital dairy animals in the vast arid and semi-arid regions of northern Kenya, where camel mastitis seriously endangers the already drought-ravaged livelihoods of local pastoralists. In these regions, clinical and subclinical mastitis leads to massive economic losses. Bacteria is a significant cause of mastitis in domestic animals and some pathogens are zoonotic thus of public health importance. However, bacterial causes of camel mastitis in Kenya are not well understood. Thus, we investigated bacterial causes of mastitis in camels in Laikipia and Isiolo counties where bacteria were identified using both conventional and molecular methods. This information is useful to inform mastitis control strategy and consideration in vaccine development. Cultured bacterial isolates were identified using catalase test, gram staining and Lancefield grouping before DNA extraction. Genomic DNA was extracted and sequenced using MinION system. From the assembled genomes, the taxonomy of the organisms was ascertained using BLAST2seq v2.5. Genomic data revealed presence of Streptococcus agalactiae, Enterococcus faecium/gallinarum/hirae/durans/Casseliflavus, Lactococcus lactis, Staphylococcus aureus, Brevibacillus, Bacillus licheniformis, Bacillus haynesir, Exiguo bacterium and Rothia nasimurium. Literature indicates most of these bacterial isolates are of clinical importance to varying degrees. However, a few could be regarded as commensals or environmental contaminants, thus their impact on milk safety need to be further assessed. Mastitis causes significant losses in milk production and lead to premature culling. The results of this study are significant considering the husbandry practices in pastoral areas where farmers rely on antibiotic sensitivity tests (AST) for effective treatment. Moreover, there is concern over reliance on culture results alone where mixed pathogens abound and the likely impact on antimicrobial use (AMU) and antimicrobial resistance (AMR) since recommended milk withdrawal periods are rarely observed. The study recommends adoption of highly sensitive tests to enhance milk safety as well as AST of the bacterial isolates.

Key words: Mastitis, Camels, bacterial causes

Modelling the economic performance of small ruminant pastoralist flocks and the financial impact of changes in reproductive performance and mortalities in Kajiado County, Kenya

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Pastoralist small ruminant production systems provide vital sources of livelihoods in many low-to-middle income countries, but their financial performance are understudied. This study aimed to ascertain the economic performance of pastoralist small ruminant flocks in Kajiado County, Kenya, and assess the financial impact of mortalities and changes in performance indicators.

A retrospective survey of 130 pastoralist small ruminant flocks captured production and economic data for a 12-month period via interview. Integrated production and economic models were developed, simulating an annual production cycle of flocks grouped by their performance levels (low, medium, and high) and trading activities (pastoralist-only and pastoralist-traders). Gross margins of different groups, and the financial impact of mortalities, were estimated. Sensitivity analyses were conducted for select performance indicators to assess their relative economic importance.

On average, pastoralists not purchasing supplementary feed (79% of flocks) had gross margins of KSh 3,016 – KSh 3,123 per reproductive female. Those with feed costs had a negative return of KSh -3,311. Goat production generated 2.43-2.51 times greater returns than sheep production. For the average mixed flock, high efficiency flocks achieved 2.04-2.06 times greater returns than medium, and 12.19-14.25 times greater returns than low. Pastoralists with trading activities had 3.82-4.01 times greater returns than those without. Financial losses due to mortality were 17.81% of the starting flock value on average. Fecundity rate and abortion rate in sheep, and parturition rate in goats, had the greatest economic impact. The models could assist decision-making towards improving the economic performance of pastoralist flocks and evaluation of interventions.

Challenges and opportunities for african countries in the global meat trade due to recent african swine fever outbreak

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African Swine Fever (ASF) is a highly contagious haemorrhagic disease of pig family consisting of domesticated swine, wild boar, warthogs, bush pigs and giant forest hog. Due to its highly contagious nature and resilience of ASF virus under various environmental conditions, it is easily spread through contact with infected pigs and pig products. The disease has no cure or vaccine and is almost always fatal to the affected animals. The recent ASF epidemic, which has been described as one of the biggest animal disease outbreak ever seen, has spread to Europe, Russian Federation and Asia, with far reaching effects in China, which is home to about half of global pig population and leading pork consumer in the world. The spread of ASF is mainly contributed by proliferation of backyard pig production with poor animal husbandry practices and low biosecurity system. Increased international travel has resulted in

the likelihood of pork products being smuggled by travelers leading to infected pork products coming in contact with susceptible animals. The epidemics of ASF will have a negative effect on the global meat market due to its impact on the supply and demand of meat, resulting in price spike of these food commodities. The global soybean market is likely to suffer due to decreased demand of soybeans, a main component of pig feed occasioned by decline in pig population. African countries need to improve their sanitary measures and reduce the trade restrictive animal diseases such as ASF epidemic to benefit from increased demand of animal source food.

Key words- African Swine Fever, pig population, pork, meat market.

The role of the donkeys in the dairy value chain in Nyandarua, Bomet and West Pokot Counties in Kenya.

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The role of the donkey in the dairy subsector was studied in three counties namely Nyandarua, Bomet and West Pokot. These are counties where dairy farming is an important economic activity as a source of household income, employment, nutrition, and food security. Due to road network challenges, uneven terrains and high costs of motorised transport, the donkey has become a critical player in production and link to markets for milk producers under such circumstances. This makes them incur less costs in production and access markets in good time reducing post-harvest and therefore improving livelihoods. This study involved conducting household surveys, key informant interviews as well as focused group discussions to elicit information and data on the role of donkeys in the dairy value chain from production to marketing. Farming was the main occupation of 78% interviewed households living in rural communities in the three counties. Livestock farming was practiced by 96% while 82% kept at least one donkey as a service animal. These donkeys transport an estimated total of 5.5 million litres of milk valued at Kes 196 million annually at minimal costs in terrains which are sometimes not accessible to motorised transport. This significantly reduces post-harvest losses in milk from these households. The donkey users earn an approximate revenue of Kes 14 million across the 3 study counties. This underscores the need to protect the donkey populations in these regions and underpins the need to improve the health, welfare and working conditions for the donkey.

Key words: Donkey, milk, value chain

Assessment of the working donkeys' welfare and their economic role in Lamu County, Kenya

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Donkeys play a vital role in the livelihood of the community in Lamu, they are the main source of transport and considered part of the culture. The residents depend on the donkeys for transportation of all forms of products from the sea front to the hinterland and vice versa exposing them to welfare issues. The aim of this study was to determine the welfare status of working donkeys and their economic role in Lamu county. Multipronged data collection tools involving primary and secondary data collection methods were used in this study. A total 99 respondents were interviewed in Amu, Shella, Kipungani and Manda Maweni. The most common welfare issue in the Island included overgrown hooves (15.8 %?), lameness (6.4%?) and colic (4.9%?). The donkey is the backbone of the economy in the county, for example, in coral stone business, they fetch up to Kes 123600 in revenue. This study concludes that the donkey is a critical pillar and is an enabler of almost all economic activities in Lamu Island and other adjacent islands. and the animals are exposed to serious welfare issues during work. There is a need for the county to develop a policy to protect the donkeys against abuse and neglect.

Key words: Donkey welfare, policy, livelihoods, economy

Gendered impact of the mode of newcastle disease vaccine administration on poultry income in Machakos county

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Newcastle disease remains a major constraint limiting a fast-paced development of the poultry sub-sector. Most initiatives aimed at commercializing indigenous poultry enterprises in Kenya as an avenue for women empowerment have integrated a Newcastle disease vaccination component. In Machakos

County, initiatives to promote indigenous poultry production were implemented by research and development agencies, and vaccine uptake has been encouraging. However, changing patterns on ownership of indigenous poultry enterprises, with men taking ownership and control of the enterprise, has also been observed. This calls for gendered analysis of aspects related to the vaccine. The common modes of vaccine administration are as an eye drop or mixing it with drinking water. However, there is a dearth of information on the impact of the mode of administering the vaccine. A poultry enterprise survey was conducted in Machakos county where 286 female-owned and 221 male-owned poultry enterprises vaccine adopters were randomly sampled. An analysis of the mode of vaccine administration and its impact on income generated from the poultry enterprise was computed using an endogenous treatment regression model. Among other resultrs, the study reveals significantly higher incomes from male-owned poultry enterprises compared to their female counterparts. Administering the vaccine as an eye drop contributes positively and significantly to increased poultry income by 122% and 162% in female and male-owned poultry enterprises respectively. Mixing the vaccine with drinking water had a negative and significant impact on income from the poultry enterprise. The paper recommends administration of Newcastle disease vaccines as an eye drop for enhanced income generation.

Keywords: female-owned, male-owned, Newcastle, vaccine, impact,

Assessment on working donkeys' welfare issues and major health problems in Mt Elgon Sub County, Bungoma County

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A cross sectional study was conducted in September 2019 to assess the major welfare and health related problems in working donkeys in the wards of Chepyuk, Kaptama and Elgon of Mt. Elgon sub county. Both direct animal assessment and farmer interviews were conducted using standardized equine based welfare assessment tool and owner- behaviour monitoring tool respectively to collect data. Forty-five (45) working donkeys were proportionally sampled and assessed for body lesions, body condition scores, ectoparasites, hoof shape, and their general health. Significant findings were that 80% had abnormal hoof shape in all the four limbs and 66% of the working donkeys had hobbling wounds. Fifty (50) respondents were interviewed on adoption of husbandry practices such as harnessing, tethering, basic wound management, ectoparasite control, feeding and seeking of donkey health and farriery services. Among these respondents interviewed, 33.7% adopted improved husbandry practices. Availability and access to donkey welfare and health services and respondents' knowledge, attitude,

practices, and behaviour levels have significant association regarding adoption of improved husbandry practices. Even though great proportion of respondents (34.0%) were seeking farriery services, an enormous number of donkeys working in the area were exposed to hoof problems due to inadequate access to quality farriery services. Quality farriery is essential to ensure donkey welfare, and many intervention donkey welfare programs in Kenya train farriers, and educate owners, regarding the farriery needs of donkeys. The study provides important insights into the opportunities in developing quality donkey farriery in the region.

Key words: *animal welfare, farriery services, harnessing,*

Breed and trait preferences of dairy cattle keepers in Senegal based on gender

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Identification of breed and trait preferences of livestock farmers is regarded as a prerequisite for enabling them to make the best use of available animal genetic resources. The objective of this study was to document cattle breed and trait preferences, across male and female dairy-cattle keepers with the aim of identifying a breeding objective for smallholder dairy cattle keepers in Senegal. The study used data from 507 respondents in the regions of Diourbel and Thiès. These regions are located in an agro-pastoral production system and were purposefully selected due to their high range of dairy cattle breeds. The data was collected during the baseline survey of the Senegal Dairy Genetics Project. R statistical package was used to analyze for descriptive statistics and X^2 (Chi square) values for and between male and female respondents for local, cross and exotic cattle breeds. The results show that 71.9% of male and 64.2% of female respondents preferred crossbreed to either local or exotic cattle. Across all respondents, the main advantage for crossbreed was high milk yield (85.9%) while their main disadvantage was high feed intake (61.8%). Distribution of named cattle breed advantages was statistically significantly different between male and female respondents for local and crossbreed cattle ($p=0.04$) and not exotic cattle ($p=0.51$). On the other hand, the distribution of cattle breed disadvantages between male and female respondents was similar ($p>0.05$). Although milk yield was the most important preferred cattle trait (rank=1), all named traits except sale value of calves and calf mortality

were ranked first by some farmers. For sustainability and acceptance, future breed improvement programs targeting smallholder farmer preferred genotypes in Senegal should focus on the diverse objectives of the farmers rather than on a particular trait.

Key words: Senegal. Milk yield. Crossbreed. Dairy cattle keepers. Breed and trait preferences. Gender.

A cross-sectional study on gastrointestinal parasite infection in sheep on Kenya farms.

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Introduction: Gastrointestinal parasites (GIP) infection are among the major limitation to production in sheep. Production losses caused by these gastrointestinal parasites are manifested by a mortality of up to 40%, a reduction in wool and loss of live weight (up to 50 %). Taking into consideration GIP impact and the necessary measures, it is crucial to test their level of infection. This study determined the faecal egg and oocyst counts of gastrointestinal parasites and the factors associated with strongyle type-eggs in Kenyan sheep.

Methodology: This was a cross-sectional study in which farm and animal-level data and faecal samples were collected from 1640 sheep from 30 purposively selected farms in Ruai, Kamulu, Utawala and Shujaa areas. The faecal samples were subjected to coprological examination using sodium chloride floatation fluid and McMaster counting chamber to determine counts of strongyle-type eggs and coccidia oocysts with a detection level of 100 Egg/oocyst Per Gram (EPG, OPG) of faeces. Descriptive statistics and multilevel mixed effect logistic regression analyses were used to determine factors associated with strongyle- type egg count > 200 per gram of faeces ($p<0.05$). The receiver operating characteristics curve was used to assess the overall diagnostic performance in the final model.

Results: The strongyle-type eggs were detected in 45.5% (746/1640) of the sheep and the mean EPG was 486.0+- 858.9, a median of 200 and a range of 0-16,700. The coccidia oocyst was detected in 49.4% (810/1640) of the sheep and the mean EPG was 341.7+- 1782.4, a median of 0 and a range of 0-60,000. In the final multivariable regression model the odds of detecting epg>200 was 1.66 times higher for sheep shedding coccidia oocysts than those that did not. The odds for detecting epg>200 was 3.7 times for sheep in Ruai administrative area compared with those in Kamulu, Utawala and Shujaa areas combined. The odds for detecting epg>200 was 0.2 and 0.7 times for sheep flocks dewormed during

the dry season and throughout the year, respectively, compared with those dewormed during the onset of the rains. The ROC area was 74.6% suggestive of good model performance.

Conclusion: We conclude strongyle-type eggs and coccidia oocysts are present in the Ruai, Kamulu, Utawala and Shujaa areas sheep. The strongyle-type eggs were mainly associated with the location of the farm, coccidia infestation and deworming season. The farmers should be educated on the importance of strategic gastrointestinal parasite control to minimize their effects on sheep.

Key words: gastrointestinal parasites, sheep, strongyle-type egg, coccidia oocyst, farm location, deworming season.

Common Parasites Affecting Farmed Tilapia and Catfish in Central Kenya

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Parasitic infections are a hindrance to fish productivity at farm level worldwide. This review aimed at assessing common ecto- and endo-parasites affecting Nile tilapia (*Oreochroms niloticus*) and African catfish (*Clarias gariepinus*) in aquaculture systems in Kiambu, Kirinyaga and Nyeri counties in the central highlands of Kenya. The review relied on previous studies conducted in the region to determine the prevalence of ecto- and endo-parasites of farmed tilapia and catfish. A total of 1292 fishes (968 tilapia and 324 catfish), comprising of 901 (69.7%) earthen pond fish and 391 (30.3%) plastic liner pond fish were purchased from grow-out farms. Tilapias were mainly raised under semi intensive farming system in earthen ponds while catfish were mainly raised in liner ponds. The sampled fish were euthanized, necropsied and then examined for parasitic infestations by visual observation and light microscopy. Of the fish sampled, 387/1292 (29.9%) were infested by one or more parasite species. The ectoparasites recovered from the skin were protozoan ciliate species (*Piscinoodinium*; *Trichodina*; *Ichthyophthirius*; *Ambyphrya)* and a flagellate, *Ichthyobodo* spp. Others were monogenean species recovered from the gills (*Dactylogyrus*) and skin (*Gyrodactylus*), respectively. Leeches (*Pisciola* spp.) were recovered from the skin. The endoparasites included trematodes of the eyes (*Diplostomum* spp.) and skin/muscle (C*linostomum* spp.; *Neascus* spp.). Others were nematodes from the abdominal cavity (*Contracaecum* spp.) and the intestines (*Paracamallanus* spp.). An acanthocephalan (*Acanthocephalus* spp.) and cestodes (*Proteocephalus* spp.; *Caryophyllaeidea* spp.) were recovered from the intestines.

The earthen ponds had a significantly higher parasite infection relative to the liner (19.7%) ponds ($p<0.05$). Parasitic infections were significantly higher in tilapia (51.5%) compared to catfish (29.5%) ($p<0.05$). Digenean trematodes were the most prevalent parasites with *Diplostomum* spp. recovered in both fish species, while C*linostomum* spp. and *Neascus* spp. were only found in tilapia. *Contracaecum* spp. was only recovered in catfish raised in earthen and liner ponds. The diversity and distribution of recovered parasites varied between sub-counties of various study counties ($p<0.05$). Further studies are recommended to determine the impact of these parasites on aquaculture fish production and their public health importance in Kenya.

Key words: Catfish, *Contracaecum.*, *Diplostomum*, pond, tilapia, *Trichodina*

Enterprises Supported by the Slaughterhouse Business: Case of Dagoretti Slaughterhouses Complex

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When one thinks of a slaughterhouse, it is easy to just think of trade in meat, offal, hides and skins and the by-products such as bones, horns and hooves, gall stones, bile and pizzles *inter alia.* The Dagoretti slaughterhouse complex supports many more livelihoods than those directly dealing with meat and meat co-products and by-products. In a like manner, whenever a new slaughterhouse is opened, these enterprises automatically establish in the neighbourhood. There is very little available data on the extent and value of this "non-meat" industry around the meat industry. Majority of these enterprises contribute to the hygiene and safety of meat and meat products. These include the selling and hiring and cleaning of PPEs, the packaging material providers and the transport service providers. These enterprises play a significant role in overall safety of the meat and meat products and can, if not well capacity build be a source of contamination.

At the Dagoretti slaughter complex, example of these enterprises includes those tailoring, washing, repairing or hiring out PPEs, those selling meat packaging material, fabricators and hiring out of meat transport containers, those hiring out transport vehicles, including vehicles and motor cycles, meat mincing- service providers, people offering knife sharpening services and food vendors. These enterprises are to a large extent gender disaggregated, with majority of food vendors and cleaning of PPE being women, and the transport and knife sharpening being male dominated. The other enterprises have about equal numbers of all gender including youth.

This paper described the types of enterprises and estimates the value of the "non-meat" industry around Dagoretti slaughterhouses complexes.

The primary data will be obtained from interviewing a purposefully selected members in each of the groups of entrepreneurs. These will be guided by their consistency in the enterprise and also those who have been in the business for longer. The government office at Dagoretti will also inform on roles played by each group. Data cleaning will entail detecting and correcting corrupt or inaccurate records

from the database. The project team will analyze the quantitative data to generate descriptive and inferential statistics

Key words: non-meat enterprises, slaughterhouse

Evaluation of the formation of humoral immunity against IB virus by Polimun IB VAR 2 and Polimun IB H-120 vaccines

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The causative agent of avian infectious bronchitis (IB) has a pronounced genetic variability due to the emergence of mutations and recombinations. Vaccination programs with vaccines from different strains are not always effective, as new variants of the virus, such as the IB VAR2, are emerging. This variant has become widespread in the Middle East, Africa and Europe.

We evaluated the formation of humoral immunity against IB virus. For this purpose, four groups of 15 chickens were formed from SPF chickens. The first (control) group was not vaccinated. Groups 2, 3, 4 were vaccinated at day-old with Polimun IB H-120 vaccine. After 14 days, groups 2, 3, 4 were vaccinated with Polimun IB VAR 2 by different methods (intraocularly, drinking method, spray). Seven days after vaccination with Polimun IB VAR 2, tissue samples were taken for histopathological examination. During the experiment, the formation of humoral immunity and the clinical condition of chickens were evaluated.

The high effectiveness of the vaccination program has been proven. All methods of vaccine injection ensured the formation of specific immunity. Humoral immunity from 14 to 42 days after vaccination was detected in 92-100% of vaccinated birds. In the first days after vaccination, minor pathological changes characteristic of IB were observed, but no clinical signs of the disease were detected in vaccinated chickens during the observations.

The research results demonstrate the safety and efficacy of using different methods of vaccination of Polimun IB VAR2 in 14-day old SPF chickens. In addition, the vaccination scheme against IB in which vaccines against different genetic variants, including VAR2, are used, provides a protective immune response against the IB virus.

Key words: Infectious bronchitis of chickens, VAR2, vaccine, immunity.

Traditional remedies and other characteristics among human snakebite survivors in Baringo county, Kenya, 2010–2020: a case series

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Introduction: Seeking traditional remedies following snakebites leads to avoidable deaths in rural settings in developing countries.

Methodology: In this case series study, we identified and recruited 169 snakebite survivors in Baringo county, a hard-to-reach region in north-western Kenya, who experienced snakebites from 2010 to 2020 using a snowballing technique. We explored associations between traditional and hospital care in managing snakebites and other characteristics. $\chi 2$ tests assessed these categorical differences.

Results: Fifty-four (33%) of the survivors used traditional remedies to manage snakebites. The majority (56%) were men and aged >18 y (72%); 59% had low education levels and income. They sourced water from rivers or lakes (93%) and used charcoal as an energy source (74%). These survivors (>67%) resided in households practicing free-range and stall-feeding animal husbandry systems and in houses with thatch roofing or an earthen floor structure. Also, >62% reported muscle tremors, fever and chills, while 80% visited health facilities for further treatment.

Conclusion: Community sensitization covering the risks of non-effective remedies and escalation of training to traditional healers could improve the speed of referrals in hard-to-reach snakebite hotspots. Medical anthropology studies could explore the enablers of continued use of traditional remedies in snakebite management in rural communities.

Keywords: envenomation, North-western Kenya, pastoralists, snakebite, traditional remedies

Investigating farmer-led use of trypanocides administered to cattle in Tanzania

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Introduction: African animal trypanosomiasis (AAT) in Sub-Saharan Africa causes significant losses to livestock keepers. Trypanocide failure has been reported but it is unclear how much is due to drug resistance or misuse of trypanocides. Our study looked at farmers' trypanocide practices in Serengeti

district (SD), Tanzania to evaluate methods of administration as this can contribute to failure of treatment and prophylaxis outcomes.

Methodology: A longitudinal one-year observational study was carried out in the high risk AAT area in SD. Twenty-one farmers owning a minimum of 30 cattle, over six months of age and self-reporting high use of trypanocides were recruited (30 animals/farm). Whenever farmers intended to treat their cattle with trypanocides, the project veterinarian was notified to examine the animals, collect blood, and record treatment practices. Data analysis included descriptive statistics (proportions with 95% CI) conducted in R.

Results: A total of 295 treatments were initiated on the study population of 630 cattle, 174 with isometamidium, 112 with diminazine aceturate and 9 with homidium chloride. Most isometamidium treatments (87%) were administered prophylactically, while diminazine and homidium treatments (96% and 89%, respectively) were administered to cattle that the farmer perceived to be sick. Only 52% of the trypanocides were adequately administered when considering dose, route of administration, competency of administration, and drug storage conditions. Only 35% of the animals were positive for Trypanosoma on the day of treatment, with *T. congolense* the most common species.

Conclusion: Results indicate low prevalence of Trypanosoma infection among cattle treated with trypanocides and a high prevalence of inadequate trypanocide administration, which can contribute to trypanocide failure.

Key words: African animal trypanosomiasis; Trypanocide resistance; Trypanocide failure.

Capacitating One Health in Eastern and Southern Africa (COHESA) – Building the future One Health workforce

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Introduction: With more than 60% of human infections originating from animals and the recognition that health is highly interconnected[2] it is key to have a workforce which can address complex One Health (OH) issues[3]. One aim of COHESA is to build the future OH workforce by understanding and supporting OH higher education in 11 countries in eastern and southern Africa (ESA). A study was designed to establish an inventory of OH courses within higher educational institutes (HEI) in ESA and to understand core OH competencies.

Methodology: A list of HEIs was developed by OH experts and snowballing. A questionnaire was administered to participants from HEIs to identify OH courses offered and gain a better understanding of key competencies that OH training should consider. Analysis of qualitative data was via coding to

evaluate for themes. Proportions of respondents were used to present quantitative data. Approval to conduct the study was obtained from ILRI's ethics board (IREC).

Results: A total of 99 experts from 49 HEIs have participated in the survey to date. Within Kenya, four experts were interviewed from two HEIs. Additional interviews (5) are planned. Data from the two institutions show they offer OH courses resulting in an academic qualification at Bachelors and Master of Science level. The top technical competencies reported to be essential for OH by respondents were epidemiology (100%) and OH principles (100%), whereas data management (93%) and systems thinking (93%) were the top essential cross-cutting competencies.

Conclusions: There are many existing OH courses developed by ESA institutions and COHESA plans to develop a database to assist learners with a matching system to find relevant courses. Respondents to the survey identified that both technical and cross-cutting competencies are key to both the future workforce and their trainers, to enable cross-sectoral engagement and OH solutions delivery.

Key words: One Health Education; One Health Competencies; Higher Education Institute

African Continental Free Trade Area (AfCFTA): *Raising Awareness among Veterinarians*

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Introduction: The AfCFTA is a flagship program on trade by the African Union (AU). It aims to create a unified continental market in the over 50 African countries.

Methodology: An online desk review was conducted to elaborate on the AfCFTA. The review was conducted by scanning existing literature for relevant data which was then analyzed to support the research topic. Literature sources reviewed included reports, conference proceedings and official publications.

Results: Agricultural and food commodities, including animal and animal products, are the major goods in the AfCFTA since they represent over 75% of the trade. Implementation of the AfCFTA has potential to optimize returns from the animal-based products, thus raising demand for veterinary services. At continental level, benefits of implementation include a) multi-lateral cooperation for disease control, b) harmonized Sanitary and Phytosanitary (SPS) measures, c) markets for animal and animal products, and d) employment/business opportunities for veterinarians.

Application of non-tariff measures (NTMs), such as SPS measures, remains an impediment to effective trade. SPS measures are country laws, regulations and procedures that seek to protect animals, plants and humans against pests and disease, and in which veterinarians are vital. To eliminate NTMs, the AfCFTA agreement contains provisions for SPS measures in Annex 7 to prevent SPS measures from having negative effects on trade.

Implementation of Annex 7 of the AfCFTA has faced challenges including limited enforcement of SPS measures, inadequate infrastructure, weak coordination mechanisms, duplicated mandates among regulatory agencies within countries, low awareness of SPS issues among decision-makers, and limited scientific data sharing among agencies for policy creation. To address these challenges, and to operationalize Annex 7, AU developed the SPS Policy Framework. The framework provides guidance to countries to boost intra-African trade and facilitates harmonization of countries' SPS policy.

Key words: AfCFTA, SPS, Animal, Annex 7, Trade

The case for gender equality and equity in the vet profession

Marilyn Karani

Leave no one behind is the central promise of the Sustainable Development Goals 2030. The transformative plan of action if attained will lead to equality, peace and prosperity for all.

Sustainable Development Goal 5 in particular provides for Gender Equality and envisions equality for all and the empowerment of women and girls. Gender equality is a basic Human Right and it is thus the duty of all states to ensure that they provide a conducive environment for equality for all. So far, Studies show, that no country has successfully achieved Gender Equality and that the last years' gains have been reversed due to the Covid 19 pandemic. The sustainable Development Goals report 2022 is quite clear that the world is not on track to achieve gender equality by 2030.

Professions in particular, bear the brunt of gender inequality and this is quite apparent in STEM. The Veterinary Profession is of no exception.

It is important to note that, the Veterinary Profession is key to ensuring the achievements of the Sustainable Development Goals and is tasked with enforcing animal health and welfare which are key components to food safety and security as envisioned by the Sustainable Development goals on eradicating poverty (SDG1), SDG 2 on ensuring Zero hunger and SDG 3 on ensuring good health and wellbeing.

The important role of the Veterinary profession calls for the involvement of both sexes equally to achieve the task.

This paper will examine the distinction between Gender Equality and Equity in correlation to the veterinary profession in Kenya. Further, the paper shall elaborate on the state of Gender equality and Equity in the Veterinary Profession in Kenya. Moreover, the paper shall discuss challenges and barriers to the realisation of Equality and Equity in the profession as well as the impact of gender inequality on mental health at the workplace.

The paper will aim to give a causal analysis between the state of Gender Equality and the wellbeing of members in the profession. It will also recommend strategies and programs that will lead to Gender Equality in the Profession.

PARTNERS PROFILES

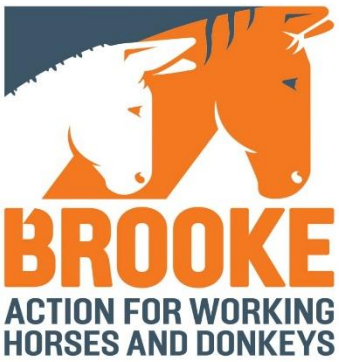
Formerly known as Assia Pharmaceuticals Limited, Bimeda Limited has been in operation in Kenya since 1968 and it has been one of the largest distributors of Veterinary Pharmaceutical products. Assia was distributing both Human and Animal Health products and was a subsidiary of Teva group of Israel which is an international company with manufacturing and marketing plants mainly in the U.S and Europe.

In March 2009, Assia was divested to Phibro Animal Health Corporation, an American manufacturer and marketer of Animal Health Pharmaceutical and nutrition products. During this period, the decision was taken to specialize in Animal Health products, thus the name changed to Assia Animal Health Limited in May 2009.

Bimeda Limited acquired Assia Animal Health Limited from Phibro in March 2011. Bimeda is a world leader in Animal Health with its headquarters in Dublin Ireland and develops and manufactures a wide range of high quality Veterinary products which are sold in five continents and more than seventy five countries worldwide.

Bimeda Limited is one of the largest Veterinary Pharmaceutical distributors and manufacturers in Eastern and Central African region with offices spread in Kenya, Uganda, Rwanda, Burundi, S. Sudan and Tanzania. Bimeda Limited office in Nairobi serves as a distribution center both for Kenya and the wider East African region and its market share is one of the largest in the Animal Health Pharmaceutical sector. The product range is comprised primarily of Bimeda products and Assia branded products; some product lines are produced locally in Kenya.

Contacts: Bimeda Limited, Funzi Road off Enterprise Road, Industrial Area, P.O. Box 30620 – 00100, Nairobi, Kenya. Tel: +254 20 6537622-6. www.Bimeda.co.ke



The Brooke Hospital for Animals is a UK based international animal welfare charity committed to improving the lives of working horses, donkeys and mules in the world's poorest communities. The Brooke operates in 11 countries across Africa, Asia and Latin America through providing veterinary treatment, training and community based programs to improve animal health and welfare.

In Kenya, there are over 1.8 million donkeys, two-thirds of which play a major role in Kenya's economy especially in rural poverty reduction through transport and tillage.

The Brooke has been funding animal welfare programs in Kenya since 2001 through partnership with KENDAT in Embu; VSF-B in Garissa; Farming Systems Kenya in Nakuru; Animal Welfare and Public Health in Kisumu and Homabay; Kenya Veterinary Association in Kajiado; Vetworks in Narok and CARITAS in Kitui and Tharaka-Nithi., the Brooke is currently reaching approximately 219,000 donkeys,

In 2013, the Brooke established its East Africa regional office in Nairobi for closer management, development and further expansion, Contacts: The Brooke – East Africa, 5th Floor, Taj Towers, Upper Hill. P.O. Box 43220 – 00100, Nairobi, Kenya. Mobile: +254 700 307 709. www.thebrooke.org.

CKL Africa has been the leading animal health company in East and Central Africa, since inception in 1906. For over a century, CKL has delivered high quality products and solutions for livestock farming that is unparalleled in the region. CKL is a principal supplier of tried, tested and trusted brands in animal health and crop farming sectors, all developed with the key objectives of increasing production and productivity on the farms. The quality of Our Brands that make up the range of high quality products and solutions offering by CKL is unparalleled in the region. Through our exclusive countrywide distributor system, a strong regional presence in Tanzania, Uganda, Burundi and Rwanda, we ensure our products are readily available throughout the greater East Africa region conveniently and cost-efficiently.

The Donkey Sanctuary was founded in 1969 by Dr Elisabeth Svendsen MBE. It is only through her amazing devotion to donkeys and hard work that the Sanctuary grew to the international charity it is today.

Our Mission is to transform the quality of life for donkeys, mules and people worldwide through greater understanding, collaboration and support, and by promoting lasting, mutually life-enhancing relationships. We hope to see a world where donkeys and mules live free from suffering, and their contribution to humanity is fully valued.

During the last 25 years, The Donkey Sanctuary Kenya has made profound difference to the lives of donkeys and people all over the country. This is down to the drive and beliefs of our wonderful Founder, our staff, volunteers, and of course our fantastic supporters and partners worldwide, however there is still much to do to improve the health and welfare of donkeys in Kenya. To this end we are going to provide technical support, participatory training and educational programs geared towards enhancing ability of the communities to address and manage their own donkey welfare challenges using the local resources they have. Contacts: The Donkey Sanctuary Kenya, P.O. Box 24203 – 00502, Nairobi, Kenya. Tel: + 254 (020) 2679265

Elgon Kenya is the regional agro input powerhouse with a dedicated focus to uplift millions of smallholder farmers through embracing technology to transform farms and lives. It is the first agro input company in East Africa to attain the prestigious Superbrand status.

Its modern, superior, high yielding, fast maturing, disease resistant wide array of seed varieties have become a boom among farmers across the region. The seed department works round the clock to ensure farmers have seeds that boost yields and income.

This has been complemented by a host of game changing farm technologies that are redefining agriculture especially among smallholders. Elgon's miniature irrigation kit (kadogo drip kit) and greenhouse sheeting materials ensures that farmers can produce food round the year without relying on rainfall.

Elgon has rolled out plant clinics where farmers to meet with researchers and experts with a view to exploring problems areas and finding lasting solutions. Elgon's farmers award scheme, the National Farmers Awards now in its sixth year has created soil celebrities and enticed more into farming.

Elgon has forged strategic partnerships with respected global brands including BASF, Dupont, Arysta and Excel Crop Care, Bayer, Syngenta. And in a bid to respond to growing market demand for livestock products, we recently launched the animal health department and partnered with The Netherlands based Interchemie, a global powerhouse in animal health as the sole distributors in Kenya.

Elgon Kenya also unveiled a first of its kind information center equipped with agronomists & Vets who address farmers' concerns by answering their questions and advising them on the best options in their ventures. To complement this hub, Elgon also rolled out a 24/7 online information center that allows customers to place their orders online at the click of a button.

Food and Agriculture Organization of the United Nations

The Food and Agriculture Organization (FAO) is a specialized agency of the United Nations that leads international efforts to defeat hunger.

Our goal is to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives. With over 194 member states, FAO works in over 130 countries worldwide. We believe that everyone can play a part in ending hunger.

Kenya Animal Genetic Resources Centre

For Superior Animal Genetics

The Kenya Animal Genetic Centre formally known as Central Artificial Insemination Station (CAIS) was established by Kenya Gazette Notice Number 557 of 19th June 1946 with the objective of controlling venereal diseases and genetic improvement of exotic dairy cattle. The current mandate of KAGRC is to produce, preserve and conserve animal genetic material (semen embryo, tissues and live

animals) and rear breeding bulls for provision of high quality disease free semen to meet the national demand for export. In order to meet its mandate, KAGRC works in close collaboration with other breeding organizations such as Kenya Stud Book, the Dairy Recording Services of Kenya and the Livestock Recording Center. Together, these organizations implement the Contract Mating and Progeny Testing Programmes. The organization also works closely with the breed societies as well as individual and institutional farms which provide herds for the breeding program.

KENYA VETERINARY BOARD

KVB was established to regulate veterinary profession and education in 1953 during the colonial government. KVB only regulated veterinary surgeons until the advent of the Veterinary Surgeons Veterinary Paraprofessionals (VSVP) Act, 2011. Besides regulating veterinary paraprofessionals the VSVP Act mandates the Board to exercise general supervision and control over veterinary training, business, practices and employment of veterinary surgeons and veterinary paraprofessionals in Kenya and advice the government in relation to all aspects thereof.

The objective of the regulation is to safeguard animal health and welfare, promote human health and protect the economic interest of the public.

Part of the Dawa Group of Companies, Medisel (K) Ltd. has an annual turnover of more than $20m, a milestone first achieved in 2012. The company ranks as one of the top 5 pharmaceutical companies in Kenya. With over 200 employees, Medisel (K) Ltd. has maintained one of the most commendable growth stories.

The company offers and distributes over 500 pharmaceutical, surgical and veterinary products of utmost quality and also markets a wide range of hospital equipment furniture as well as allied and diagnostic products.

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Production and Quality Control departments as per WHO cGMP standards and is managed by qualified and experienced technical staff in Production, Quality Control and Quality Assurance along with a team of expert technicians and professionals. The manufacturing facility is GMP compliant and is licensed by Veterinary Medicine Directorate (VMD).

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Study on the safety and immunogenicity of the vaccine POLYMUNE IB VAR 2

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Animal Health Matters


BRAVECTO
VETPHARE AFRICA


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57th KVA Annual Scientific Conference
Theme: "Promoting Diversity, Equity and Inclusiveness in the Veterinary Profession"
Venue: Kakamega Golf Hotel
World Veterinary Day Celebration Field Day
Annual Scientific Conference
26th - 28th April 2023
Field Day: Lubao Livestock Market
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