

**ABSTRACTS FOR ON-GOING RESEARCH IN THE UNIVERSITY OF ZIMBABWE  
(2014-16)**

**FACULTY OF AGRICULTURE**

**1. Supporting smallholder farmers in southern Africa to better manage climate-related risks to crop production and post harvest handling (CLIRCS)**

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**Project summary**

*The overall objective of the project is to contribute to improved and sustained household and national food and nutrition security in southern Africa through better management of climatic risks by smallholder farmers. The project is led by the United Nations Food and Agriculture Organization (FAO) with funding from the European Union following a competitive grant call under Food Security Thematic Programme (FSTP) - Global Programme on Agricultural Research for Development (ARD). Specifically the project aims to: i) Develop and promote innovative techniques, methods and approaches to managing risks to crop production and post-harvest handling associated with drought, floods and cyclones; ii) Strengthen regional knowledge and institutional arrangements on risk management for crop production and post-harvest handling in climate disaster-prone areas. The project is implemented Madagascar, Malawi, South Africa and Zimbabwe. In Zimbabwe the project is implemented in Hwedza*

(high potential prone to drought) and Mbire (prone to drought and floods) Districts. Both areas have high incidences of malnutrition. The project employs the SOFECSA Learning Centre approach, which brings together national research institutions, public extension (Agritex), private seed and fertilizer companies and farmers. The project also seeks to strengthen postgraduate training among the participating countries through exchanges and joint student supervision. Initiated in 2011, the project is expected to end in June 2016.

**Key words:** Climate risks, crop production techniques, soil fertility, Farmer Learning Centres, co-innovation

## **2. Strengthening African capacity in soil geochemistry to inform agricultural and health policies**

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### **Project summary**

The overall objective of this project is to strengthen capacity and improve knowledge of soil geochemistry in Malawi, Zambia and Zimbabwe through training of PhD students, and technicians and as well as strengthening capabilities in laboratory techniques in participating universities and research institutions in the three countries. The project is funded by the Royal Society (RS) and UK Department for International Development (DFID). Understanding soil

geochemical processes is vital to provide the evidence-base for sound policy decisions in agriculture (e.g. effects of liming and nutrient inputs from conventional and organic sources) and public health (e.g. mineral deficiencies/toxicities). The project seeks to establish a cross-disciplinary Doctoral Training Network (DTN) will be established to build a firm foundation in soil geochemistry skills, including: analytical chemistry; experimental design; geospatial data collection and integration; geochemical and statistical modelling; soil management; vocational skills. One of the anticipated outcomes of the project is the establishment of PhD training programs in Malawi and Zambia and international benchmarking of PhD training across the three countries. In Zimbabwe, the project is implemented in Hwedza, Mutasa and Mbire Districts. Started in 2015, the project is expected to end in 2020.

**Key words:** soil geochemistry, capacity development, food and nutrition security

### **3. Agro-ecology based aggradation-conservation agriculture (ABACO): Targeting innovations to combat soil degradation and food insecurity in semi-arid Africa**

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#### **Project summary**

Research evidence indicate that poor soil fertility and soil physical degradation are major limitations to food security in sub-Saharan Africa), putting many smallholder farmers in a vulnerable position. Degradation of natural resources, caused by population pressure, inappropriate practices and climatic variability, threatens agricultural productivity. Conducted in Hwedza and Makoni districts (2011-2015), the project sought to address some of these challenges through establishment of stakeholder partnerships, and building on emerging SOFECSA innovation platforms in Mozambique and Zimbabwe. The overall objective was to reduce the vulnerability of smallholder farmers to climatic variability by building capacity through co-innovation platforms to design, evaluate and implement targeted technological options for and mechanisms to promote adoption of conservation agriculture (CA) based on agroecology principles to combat land degradation and food insecurity in semi-arid regions of Africa. The project was led by the African Conservation Tillage Network (ACT) and implemented by SOFECSA in Mozambique and Zimbabwe. The specific objectives were: i) To adapt CA systems to local farmer circumstances, evaluating its principles for effects sought by communities in terms of food production and land rehabilitation in the face of climatic variability; ii) To promote the adaptation/appropriation of technologies by local communities through co-innovation platforms; iii) To assess the social and economic viability

and tradeoffs of implementing CA at farm and village scales, and across scenarios, to inform policies; iv) To promote dissemination of targeted CA alternatives and approaches through divulgation, training and capacity development; To reinforce existing knowledge networks on CA and build their institutional capacities for research and development partnerships. The project employed a combination of approaches including innovation platforms, farmer learning centres and experimentation to test integrated soil fertility management (ISFM) and conservation agriculture technologies and principles in farmers' fields. The major outcome included revealing the practical limitations of the approaches and their potential adaptation to suit farmer circumstances and promote increased productivity to alleviate food security challenges faced by different categories of households in the face of climate change. High labour demands and lack of mechanization were major factors limiting potential transformation of smallholder agriculture. The project led to the development of options for restoring productivity of soils that are otherwise abandoned by farmers due to lack of response to fertilization.

**Key words:** integrated soil fertility management, conservation agriculture, participatory action research, land degradation, poor soil fertility

## **COLLEGE OF HEALTH SCIENCES**

### **4. Vulva cancer at Harare and Parirenyatwa Central Hospitals**

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#### **Background/Introduction**

The incidence of cancer of the vulva has been noted to be increasing worldwide. There is no information on the incidence of cancer of the vulva among women at Harare and Parirenyatwa Central Hospitals.

#### **Objectives**

To determine the prevalence of cancer of the vulva at Harare and Parirenyatwa Central Hospitals and to determine the most common symptoms that are the most common physical findings in patients presenting with the disease and the treatment modalities that are offered.

#### **Methodology**

The study is a cross-sectional observational study. In the retrospective component, data will be collected from the records of patients who will have been treated for cancer of the vulva at the two hospitals in the last five years. In the prospective component, data will be collected from patients presenting with cancer of the vulva at the two hospitals over the coming one year.

#### **Setting**

The setting is the gynaecological wards and outpatient departments of hospitals as well as the Department of Pathology and the Radiotherapy Centre.

#### **Participants**

The participants are patients who have been treated for cancer of the vulva at the two hospitals over the past five years and those who will be treated for the disease over the coming one year.

#### **Intervention**

There will be no intervention in the study.

#### **Main Outcome Measures**

The main outcome measures will be the incidence of cancer of the vulva, the symptoms that the patients present with and the treatment modalities that they receive.

### **5. Factors Associated with Human Immunodeficiency Virus First Line Treatment failure in Zvishavane District, Midlands Province, 2014**

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## **Background**

Globally, reported prevalence of first line Human Immunodeficiency Virus (HIV) treatment failure show inter-region and intra-region variability. However, there has been a significant increase in prevalence of HIV treatment failure over time since antiretroviral therapy (ART) roll out in Sub-Saharan Africa. Zvishavane district had the highest prevalence of HIV treatment failure at 16%, which is well above regional prevalence of 5.5%, in Midlands Province in 2013. The district was the least performer in Zimbabwe on Early Warning Indicator (EWI) 1 (on time pill pick up). While the district achieved 86%, which is above national target, on EWI 2 on retention in care, it fell short of national target on EWI 3 on pharmacy stock outs. The study was conducted to determine factors associated with first line HIV treatment failure in Zvishavane district.

## **Objectives:**

To determine factors associated with first line HIV treatment failure in Zvishavane district

## **Methodology**

A 1:1 unmatched case control study was conducted. A case was an HIV patient who was on first line ART for at least 6 months in Zvishavane district and switched to second line ART regimen because of treatment failure during the 2013/2014 period. A control was an HIV patient in Zvishavane district who was on first line ART, had been on first line ART for at least 6 months and has not failed first line ART. Random sampling was used to recruit study participants. Epi Info™ was used to generate means, frequencies and odds ratios at 95% confidence interval and a level of significance of 0.05. Forward stepwise logistic regression was used to determine independent risk factors for first line HIV treatment failure.

## **Results**

Independent risk factors associated with first line HIV treatment failure were poor adherence (<80% adherence) to ART (AOR=5.14, CI 2.75-9.62), drug stock outs (AOR=3.02, CI 1.20-6.98), CD4 count of <50 cells/mm<sup>3</sup> (AOR=3.25, CI 1.47-7.16) and baseline WHO Stage 3 or 4 (AOR=1.95, CI 1.05-3.61). Significant risk factors were drinking alcohol (OR=2.05, CI=1.08-3.90) and long patient waiting time (OR=2.49, CI 1.48-4.19). Significant protective factors were receiving at least one individual counseling on ART (OR=0.35, CI 0.18-0.69), disclosure of HIV status (OR=0.34, CI 0.14-0.80) and having previously undergone Prevention of Mother to Child Transmission (PMTCT) (OR=0.41, CI 0.17-0.96). Both cases and controls had good knowledge of first line HIV treatment failure.

## **Conclusion**

Multiple etiological factors were associated with first line HIV treatment failure in the district. Poor adherence, difficulties accessing ART, CD4 Count of <50 cells/mm<sup>3</sup> and baseline WHO Stage 3 or 4 were demonstrated to be independent risk factors for HIV first line treatment failure in the district. Providing counseling, disclosing HIV status and receiving PMTCT were significantly protective in Zvishavane district.

## **6. Prevalence of TP53 tumour suppressor gene codon 72 polymorphism in Zimbabwean patients with cervical cancer**

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## **Introduction**

The polymorphisms in the tumour suppressor gene *TP53* have been investigated as candidate genetic markers for the risk of developing cancer. Several studies have shown that the single nucleotide polymorphism (SNP) of the codon 72 of the tumour suppressor gene *TP53* which results in an amino acid change may be associated with increased risk of cervical cancer in some populations. The aim of this study was to determine the frequency of the *TP53* 72G>C (codon 72) polymorphism and their potential association with the risk of developing cervical cancer in Zimbabwean women.

## **Methodology**

Clinical data was abstracted from the records of patients who had histologically confirmed cervical cancer attending the Radiotherapy Centre (RTC) at Parirenyatwa Hospital Harare, Zimbabwe. Consenting participants provided blood samples for genetic analysis. Additional control participants were recruited from the National Blood Service of Zimbabwe (NBSZ). Genomic DNA was extracted from the whole blood samples and amplified by the polymerase chain reaction (PCR). Genotyping of the codon 72 polymorphism was performed using the restriction fragment length polymorphism (RFLP) method. Genotype and allele frequencies were determined and association with other clinical variables was determined using logistic regression and risk of cervical cancer was determined using odds ratio (OR) calculations.

## **Results**

The frequencies of the Arg/ Arg; Arg/Pro and Pro/Pro in cervical cancer patients were reported as 15.07%, 43.84% and 41.10% respectively. The association between the *TP53*Arg/Arg genotype (GG) and the development of cervical cancer was not statistically significant.(OR=1.78; P-value= 0.29; 95% CI, 0.54-6.12).

## **Conclusion**

The frequency of the Arginine/Arginine genotype was low in cervical cancer women compared to the Proline/Proline genotype as has been reported in other Black African populations. There was no association between the Arginine/Arginine genotype and increased risk of developing cervical cancer.

## **7. Incidence Of Deep Venous Thrombosis In Cervical Cancer Patients Before Radiotherapy Treatment**

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## **Background/Introduction**

Cervical cancer is the commonest cancer amongst female Zimbabweans. Most patients present for radiotherapy treatment with locally advanced disease. HIV infection is common in

cervical cancer patients. Deep vein thrombosis (DVT) in cervical cancer patients presents a great challenge to the treating team of physicians due to the high risk of bleeding in these patients during anti-coagulation treatment. Those patients who develop DVT before radiotherapy treatment may have a poor prognosis.

### **Aim**

To determine the incidence of DVT in cervical cancer patients before radiotherapy

### **Methodology**

#### **Design and Setting**

This was pilot study carried out at the Radiotherapy Centre, Parirenyatwa Hospital, Harare, Zimbabwe.

#### **Participants**

Study participants were 100 consecutive consenting patients referred for treatment with cancer of the uterine cervix.

#### **Methods**

All participants were offered a d-dimer test using Cobas 232 Point of Care System. Patients who had a positive d-dimer test and/or had clinical signs of DVT had a Doppler scan to confirm the diagnosis.

#### **Results**

Mean age of patients was 51, range from 32 to 84 years. Of the patients who were fully staged, only 12.8% (11/98) had early stage disease (FIGO stage less or equal to 2A). Positive d-dimer test results did not correlate well with positive Doppler scan results. DVT was diagnosed in 15% (15/100) of patients. There was no association between HIV infection and the risk of DVT noted in this study.

#### **Conclusion**

There is high incidence of DVT in patients with cancer of the cervix, and this may affect prognosis

### **8. Transactional nature of occupation: Caring for your own child with HIV**

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UZ-CHS Department of Rehabilitation

#### **Background**

Various calls have been made within the occupational therapy profession to shift focus towards occupation. Gaining an understanding of peoples' experiences of the occupations that they engage in is one way of shifting towards a focus on occupation. In Zimbabwe there is a growing population of mothers caring for their biological children who are infected with HIV. Many of these children present with HIV-related Neuro-developmental delays (NDDs). This study focused on exploring the experiences of Zimbabwean mothers caring for their child/ren with HIV related NDDs.

## **Methodology**

A descriptive phenomenological approach was used to uncover their lived experiences of caring for a child with HIV-related NDDs. Data generated from phenomenological interviews conducted with five mothers was analysed thematically using a simplified version of the Stevick-Colaizz-Keen method.

## **Results**

The major themes; Resilient acceptance '*Ndozvazviri*' and rekindled hope for the future emerged from the findings. The findings revealed the transactional nature of the mothers' experiences of the occupation of caring for a child with HIV-related NDD. Personal factors interacted with contextual factors such as stigma, culture and socioeconomics to shape their caring experiences, making caring for their child a difficult and demanding role that they could not easily entrust to another.

## **Conclusion/Recommendations**

The findings of this study encourage occupational therapists to consider carefully the transactional nature of occupation and how the mothering role positively shapes identities in the design of interventions for the mothers.

## **9. Rehabilitation Professionals' perceptions of treating clubfoot using the Ponseti method.**

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## **Background**

Clubfoot is the most significant foot deformity that develops in a foetus in the womb affecting approximately 1-2 per 1000 live births worldwide (Gavrankapetanović & Baždar, 2011). Worldwide, a conservative technique called Ponseti method is used to obtain and maintain correction of the clubfoot so that a patient has a functional, pain free foot with good mobility. Ponseti was introduced in Zimbabwe 4 years ago and it is now used in most healthcare centres after training of health professionals through workshops. This study's aim was to get the perception of rehabilitation professionals on treatment of clubfoot using the Ponseti method.

## **Methodology**

A Cross sectional descriptive study using convenient sampling method was used to gather data from 41 Rehabilitation professionals who were trained on the Ponseti method practising in Harare and Chitungwiza. A questionnaire with both open and closed questions was used for data collection. Data from open ended questions was analysed thematically. Data entry was done using Microsoft excel and analysed using simple descriptive methods.

## **Results**

The study showed that all n=41(100%) Rehabilitation Professionals perceived the ponseti as an effective method in the treatment of clubfoot. Those who had previously used other methods 26(63%) revealed that they favoured the Ponseti method because it has better results than the method they have used before. Amongst challenges faced when using ponset method, 25(61%) agreed that caregivers were not compliant to treatment and a total of 22(54%) participants agreed that lack of knowledge by the caregivers of this new method was a challenge which hinders progress in treating clubfoot using ponseti.

## **Conclusion/Recommendations**

Recommendations were that there is need to increase awareness of Ponseti treatment method for Clubfoot as well as decentralised the services to district hospitals to reduce costs for the caregivers and improve compliance.

## **10. Perspectives of caregivers towards physiotherapy treatment of children admitted with burns in central hospital in Harare: A cross-sectional study**

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### **Background**

Each year more than 300 000 human beings lose their lives from fire related burn injuries only. In most cases three quarters of those deaths are accounted to children below the age of 14 year olds in low and middle-income countries. Besides death burn patients face other greater challenge as more than a million survivors develop burn complications, which include contractures, scarring, physical impairments and deformities. These problems eventually lead to handicap, stigmatization and later in life affecting their quality of life. Paediatric burns affect not only the burn survivor but also the caregiver. However, most studies concerning burns focus on the epidemiology, complications, mortality rate, medical and physiotherapy management of burns and a few explore on the role of caregivers. In Zimbabwe, there is dearth of literature exploring caregivers' perspectives towards physiotherapy treatment on their admitted children with burns. Considering the important role caregivers' play in the rehabilitation process of paediatric patients, this is a significant shortcoming and there is a need to consider their perspectives and expectations towards treatment received.

### **Objective**

To determine the perspectives of caregivers towards the physiotherapy intervention being administered to their children

### **Methodology**

A descriptive cross-sectional study was used with participants conveniently derived from central hospitals in Harare, Zimbabwe. A reliable and content validated questionnaire was self-administered to a sample of 34 caregivers (mean age= 30, Standard deviation= 9.87) with paediatric burns patients below the age of 12 years. Data analysis was conducted using Statistica version 12.

### **Results**

Caregivers' response rate was 91.1% (n=31). The majority of the caregivers (96.8%) indicated that physiotherapy was necessary for the proper healing of burns. Satisfaction with physiotherapy services in general in the ward was reported to be high among 93.5% (n=29) of the caregivers. However, 61.9% of the caregivers were not carrying out ward programmes at all as indicated by the supervising physiotherapists. There was a statistically significant association between caregivers perspectives on the importance of physiotherapy and the explanation of the treatment plan by the physiotherapists [ $X^2(1)=12.90$ ,  $p=0.01$ ]. The majority of the caregivers stated that, "I'm satisfied with physiotherapy because my child is improving and getting better and she can now do some of the things that she could do before she got burnt" and "my child is healing well without disability."

## **Discussion**

Positive perspectives towards physiotherapy were portrayed, as all of the participants indicated that their children were improving on commencing physiotherapy and that they would all want to continue with rehabilitation regardless of being satisfied or not. There was a significant association between caregivers' perspectives on the importance of physiotherapy and the explanation of the treatment plan by the physiotherapist to the caregiver prior treatment. However the results showed that about 32% of the caregivers believed physiotherapy made their children cry a lot all the times. It can therefore be assumed that the crying of the children might be one of the reasons why 42% of the participants were not willing to carrying out the ward programme. Procter et al (2010) stated that pain and crying is very common in rehabilitation but can be handled by encouragement and education.

## **Conclusion**

Caregivers viewed physiotherapy treatment for burns as important and necessary for proper healing of burn wounds in children. The study found that it is important for physiotherapists to explain and educate the caregiver on the importance of physiotherapy prior to treatment as this determines willingness of the caregiver to participate in the ward programme

## **11. Stress levels and factors associated with stress in outpatient stroke survivors: A case of St Giles Rehabilitation Centre.**

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## **Background/Introduction**

Stroke is amongst the leading causes of death in the world and it is also the leading cause of disability amongst adults in the world. Recovery from stroke is usually coupled by both physical and psychological challenges, which predispose stroke survivors to stress. The effects of stress are very fundamental and can lead to very considerable changes such as being unable to perform activities of daily living thereby fostering dependence on other people. This study as aimed at determining the stress levels and factors associated with stress in outpatient stroke survivors.

## **Methodology**

Consecutive sampling method was used to select thirty-nine (39) outpatient stroke survivors at St Giles Rehabilitation Centre. An adapted P-10 Perceived Stress Scale was used to calculate stress levels of each of the participants and a researcher administered questionnaires were used to collect data on the factors associated with stress in outpatient stroke survivors. Questionnaires were completed as the patients were waiting for treatment and after receiving their treatment. Data analysis was done using Microsoft Excel programme 2013 and Epi info version 7.

## **Results**

The mean age of the participants was 61 years and a greater percentage of the participants 25(64.1 %) were female. Close to three quarters 29(74.4%) of the participants were experiencing their first ever episode of stroke. The average stress level was 21.28, with a standard deviation of 5.69 and a variance of 32.41. Out of the 39 participants, 20(51.2%) of

the participants had high stress levels that warranted them for stress management sessions. The average stress levels for stroke survivors who were in their first year of recovery was 23.44 which was the highest, followed by those in their second year 20.92. The factors that were associated with high stress levels included attendance of medical review appointments (33(85.7%)) and being employed 25(65.2 %).

### **Conclusion**

The challenges that come with surviving stroke predispose survivors to stress. The high levels of stress noted in stroke survivors warrants the need for treatment and review programmes that assess and manage stress in stroke survivors.

## **12. Hypoglycaemic Effects of a Traditional Medicinal Plant**

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### **Background/Introduction**

Diabetes mellitus is a chronic metabolic disorder whose prevalence is on the rise worldwide. Treatments with allopathic medicines come with some disadvantages, which have necessitated the continuous search for alternatives. Scientific search for hypoglycaemic agents from medicinal plants as recommended by the World Health Organisation expert Committee has become even more imperative.

### **Aim(s)/Objective(s)**

The root bark extract of *Annona stenophylla* that is traditionally used in the management of diabetes mellitus was screened for determination of the hypoglycaemic effects and possible mechanisms of action proposed.

### **Methodology/Design and Setting**

In a laboratory-based experiment performed at the Department of Physiology University of Zimbabwe, powdered plant material was extracted separately with water, methanol or ethanol. Alloxan induced diabetic rat model was used to determine the extract's hypoglycaemic effects. Extracts effects on glucose uptake were tested using established cell lines. Total RNA was isolated and using RT-PCR, glucose transporters 1 and 4 expression levels were quantified. Translocation of GLUT 4 was assessed using flow cytometry. Plant extract was screened for phytoconstituents, following which toxicity testing was done.

### **Main outcome Measure(s)**

Blood glucose lowering effects, increased insulin levels through inhibition of enzymes and increase in GLUT 4 transporters.

### **Results**

The pattern of decrease in blood glucose for *A. stenophylla* extract treated groups in alloxan diabetic rats was similar to the glibenclamide treated group (45 % and 46 % decrease respectively). Plant extract long term treatment showed a slight increase in serum insulin levels ( $0.19 \pm 0.01 \mu\text{g/ml}$ ). For carbohydrate metabolizing enzyme assays, the plant extract inhibited  $\alpha$ -amylase activity ( $64 \pm 3.0 \%$ ). In all glucose uptake assays, different concentrations of *A. stenophylla* plant extract showed an increase in glucose uptake. *A.*

*stenophylla* extract was not associated with adverse effects during toxicity testing. Thin layer chromatography of the prominent band peak was proposed to be alkaloidal in nature and identification of the probable compounds was concluded to be either pentyl 2 pyridyl ketone or octyl pyridine.

## Conclusions

This study confirms the ethnopharmacological uses of *A. stenophylla* suggesting that the aqueous extract acts through a combination of mechanisms indicating potential for diabetic products formulation.

## 13. Molecular identification of non-tuberculous Mycobacterium species in cattle and humans in Zimbabwe

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## Background

Nontuberculous Mycobacteria (NTM) are made up of highly heterogeneous bacteria that are found ubiquitously in various environmental sources (water, sewage, soil, food), animals and humans. To date, more than 100 species of NTM have been identified. Some of the mycobacteria are now known to be opportunistic pathogens in humans. Rapid laboratory identification of these bacteria at species level is therefore critical if infections are to be controlled appropriately. In this ongoing ambitious project, we are identifying species of NTM that are prevalent in cattle and humans in Zimbabwe using molecular methods.

## Methodology

Cattle cowdung samples are being collected throughout Zimbabwe and NTM isolated and identified in our laboratory at the university. NTM isolates which are stored at the National Microbiology Reference Laboratory (NMRL) are also being identified in our laboratory. These isolates from NMRL were collected throughout Zimbabwe during the National TB survey of 2014 by the Ministry of Health and Child Care. DNA of NTM isolates is extracted and subjected to amplification by polymerase chain reaction before sequencing. Bioinformatics of the sequences is used for molecular identification of the mycobacteria to species level.

## Results

So far from a small sample of 26 NTM isolated from cattle, the following NTM species were identified: *M. neoaurum*, *M. fortuitum*, *M. goodii*, *M. arupense*, *M. septicum* and *M. elephantis*. From a sample of 81 NTM isolated from humans, 40 (49.4%) were *M. avium* complex (MAC) species. The other 41 isolates (50.6%) were identified as *M. lentiflavum*, *M. terrae*, *M. paraense*, *M. kansasii*, *M. moriokaense*, *M. asiaticum*, *M. novocastrense*, *M. brasiliensis*, *M. elephantis*, *M. paraffinicum*, *M. bohemicum*, *M. manitobense*, *M. intermedium*, *M. tuberculosis* complex, *M. parakoreense*, *M. florentinum*, *M. litorale*, *M. fluoranthenorans*, *M. sherrisii*, *M. fortuitum* and *M. septicum*. Two isolates could not be identified, but were closely related to *M. montefiorensis* and *M. phlei*.

## Conclusions

So far, we have identified several species of NTM in cattle and humans in Zimbabwe. Interestingly, most of the species are known to be opportunistic human pathogens and need great attention. Further studies are ongoing to ascertain the true diversity and prevalence of NTM in Zimbabwe.

#### **14. Developing a curriculum for MBCHB students on point of care tests for medical diagnosis**

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##### **Objective**

To develop a curriculum that ensures that MBChB students acquire the knowledge, skills and competency to appropriately utilise point of care tests POCTs

##### **Methodology**

The study involves performing a needs assessment and getting information from key stakeholders in the health sector. Data is collected by use of, a questionnaire, interviews, focus groups discussions, direct observations and literature review.

##### **Design**

Needs assessment study

##### **Participants**

Key stakeholders in the health sector

##### **Anticipated outcomes**

Results of the general needs assessment will be used to development curricular and strategies to prepare and give students the required knowledge, skills, attitudes and confidence to make full and effective use of appropriate point of care tests in various Zimbabwean health point of care settings.

#### **15. Evaluation of Rapid One-Step Prostate Specific Antigen test against an established ELISA method**

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UZ-CHS Department of Medical Microbiology

##### **Objective**

To evaluate the analytical performance of the rapid one-step immunochromatographic PSA assay against an established ELISA method

## **Methodology**

### **Design**

A comparative study conducted between June 2012 and May 2013

### **Setting**

Department of Chemical Pathology, College Health Sciences, UZ

### **Samples**

Serum sample left over from routine PSA testing

### **Results**

The rapid test correctly classified 46 (97.9%) as negative (PSA < 4ng/ml) and 94 (95%) as positive (PSA ≥ 4ng/ml). However one (2.1%) sample and 5 samples (5%) were wrongly classified as positive and negative respectively. All 18 (100%) of PSA RDT performed on female samples were correctly judged as negative. Accuracy, sensitivity, specificity negative and positive predictive values of PSA RDT were 95.9%, 94.95%, 97.87%, 90.2% and 98.95% respectively. There was a strong positive correlation between the ELISA PSA values and the semiquantitative PSA values from the RDT (r=0.91)

### **Conclusion**

The rapid one-step immunochromatographic test is a useful preliminary screening tool from which positive results could be quantified using the established methods and crude indication of the magnitude of PSA elevation can be obtained by semi-quantitative estimation. The test is cheap, simple to perform and avails results within a short period of time.

## **16. Serum S100B measurement as a diagnostic tool and prognosis predictor in head trauma in resource limited settings: Insights from Harare, Zimbabwe.**

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2:UZ-CHS Department of Immunology

3: UZ-CHS Department Surgery

### **Objective**

To evaluate serum S100B levels as an additional tool for traumatic brain injury (TBI) diagnosis in a resource limited setting.

### **Study**

A prospective study

### **Setting**

Parirenyatwa Hospital, Harare Zimbabwe.

### **Participants**

90 consenting individuals: 50 TBI suspects (HIP),20 healthy individuals (AHP) and 20 patients with non neurological conditions (NNCP).

## **Results**

Participants' median age was 33.0 interquartile range (IQR): 28-43 years, with more males than females being recruited ( $p=0.001$ ). The major cause of TBI in this study was motor vehicle crashes (78%). Median S100B levels were significantly higher in TBI suspects compared to AHP and NNCP ( $p=0.001$ ), with high levels associated with high mortality rate. A CT scan result positive for neurological damage and severe head injury based on the Glasgow Coma Scale (GCS) was associated with high serum S100B levels ( $p=0.003$  and  $p=0.002$  respectively). A serum S100B above 350pg/ml with a median of 442pg/ml was uniformly fatal.

## **Conclusion**

Despite the small sample size, our study highlights the potential of S100B measurements in diagnosis and prognosis prediction for TBI cases in settings where CT scan is unavailable and or unaffordable.

## **17. The diagnostic utility of serum Neutrophil Gelatinase Associated Lipocalin in Acute Kidney Injury at a Central Hospital in a resource constrained setting**

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UZ-CHS, Department of Chemical Pathology

## **Objective**

To determine the utility of serum NGAL as a biomarker of acute kidney injury in patients admitted into medical wards.

## **Methodology**

### **Design**

A comparison study done between Jan 2013 and May 2014

### **Setting**

Parirenyatwa Central Hospital, Harare, Zimbabwe

### **Participants**

Adult patients presenting with suspected acute kidney injury at Parirenyatwa Hospital,

## **Results**

There was a statistically significant correlation between NGAL and urea or creatinine ( $r=0.85$ ;  $r= 0.46$  respectively). A significant inverse correlation was observed between NGAL and eGFR ( $r= -0.97$ ). A NGAL value of greater than 600ng/ml of NGAL was highly predictive of renal replacement therapy (RRT) with an area under curve of 0.64

## **Conclusion**

Serum NGAL measurement seems to be a suitable biomarker for AKI because it correlates closely with renal function and allows timely identification of high-risk patients. NGAL levels are a good estimator of glomerular filtration rate.

## 18. Host serum vitamin d levels and related gene polymorphisms in resistance and susceptibility to *Mycobacterial tuberculosis*

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### Background

An estimated one-third of the global population is asymptotically colonized by *Mycobacterium tuberculosis* but only about 10% of these develop active disease. Questions arise whether some individuals are naturally more prone to developing active pulmonary TB (pTB) than others or whether other factors besides socioeconomic factors are important triggers for disease development. Genetic makeup of the host and bacterium has been reported as mediating immune response to TB.

Several genes have been reported to be associated differentially with susceptibility to TB in different ethnic groups. Among these are the polymorphisms of vitamin D binding protein (VDBP) and of the vitamin D receptor (VDR) and serum vitamin D levels. Studies from different geographical settings have reported different findings. No such studies have been done in Zimbabwe so far yet the knowledge of the effects of serum vitamin D levels and different types of VDR or VDBP may contribute to the design of new therapeutic strategies including vaccine development. The objective of this study is to determine the role of serum vitamin D levels and polymorphisms of VDR and VDBP in determining resistance/susceptibility to pTB.

### Methodology

A case control study involving 532 study participants with confirmed human immunodeficiency (HIV) and TB status. The cases are 266 consenting participants with confirmed pulmonary TB and the controls are 266 participants with no pTB. Stratified sampling was used to enroll equal numbers of participants to generate the following participant strata pTB<sup>+ve</sup>/HIV<sup>+ve</sup>, pTB<sup>+ve</sup>/HIV<sup>-ve</sup>, pTB<sup>-ve</sup>/HIV<sup>+ve</sup> and pTB<sup>-ve</sup>/HIV<sup>-ve</sup>. Thus, serum vitamin D levels and the frequencies of the different genotypes will be compared across the four strata to determine association with pTB susceptibility.

## 19. Malaria Rapid test kits

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UZ-CHS Department of Medical laboratory Sciences

### Background/Introduction

The mainstay of malaria diagnosis has been the microscopic examination of blood, utilizing blood films. More recently, modern techniques utilizing *Plasmodium* antigen tests or polymerase chain reaction have been discovered, though these are not widely implemented in

malaria endemic regions. Rapid tests are still regarded as complements to conventional microscopy but with some improvements they may well replace the microscope. Many of the test kits used in Zimbabwe produced outside the country. Rapid technologies are simple and there is no reason why they are not tested and designed by local scientists, provided they are given support from industry, government arms and institutions of higher learning. There is a need and opportunity for accelerated growth in our health setting through development, evaluation and utilization of rapid tests. The antigens used in many currently available commercial assays include surface proteins such as: histidine-rich protein-2 (HRP-2). However, variants that escape monoclonal recognition have now been identified and may be responsible for false-negative tests. Hence the need to develop robust test kits targeting molecules that are stable such as: *Plasmodium falciparum* lactose dehydrogenase (pLDH), *Plasmodium falciparum* glutamate dehydrogenase (pGluDH) and *Plasmodium falciparum* DNA. Our research project will carry out experiments aimed at developing rapid test kits for diagnosis of malaria due to *Plasmodium falciparum*.

## **20. Trends of rubella incidence during a 5-year period of case based surveillance in Zimbabwe**

Chimhuya S<sup>1</sup>, Manangazira P<sup>2</sup>, Mukaratirwa A<sup>3</sup>, Nziramasanga P<sup>3</sup>, Berejena C<sup>3</sup>, Shonhai A<sup>3</sup>, Kamupota M<sup>4</sup>, Gerede R<sup>4</sup>, Munyoro M<sup>5</sup>, Mangwanya D<sup>6</sup>, Tapfumaneyi C<sup>7</sup>, Byabamazima C<sup>8</sup>, Shibeshi EM<sup>8</sup>, and Nathoo KJ<sup>1</sup>.

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### **Background**

Rubella is a disease of public health significance owing to its adverse effects during pregnancy and on pregnancy outcomes. Women who contract rubella virus during pregnancy may experience complications such as foetal death or give birth to babies born with congenital rubella syndrome. Vaccination against rubella is the most effective and economical approach to control the disease, and to avoid the long-term effects and high costs of care for children with congenital rubella syndrome as well as to prevent death from complications. Zimbabwe commenced rubella surveillance in 1999, despite lacking a rubella vaccine in the national Expanded Programme on immunization, as per the World Health Organization recommendation to establish a surveillance system to estimate the disease burden before introduction of a rubella vaccine. The purpose of this analysis is to describe the disease trends and population demographics of rubella cases that were identified through the Zimbabwe national measles and rubella case-based surveillance system during a 5-year period between 2007 and 2011.

### **Methodology**

Data from the Zimbabwe National Measles Laboratory for the 5-year study period were analysed for age, sex, district of origin, seasonality, and rubella IgM serostatus.

### **Results**

A total of 3428 serum samples from cases of suspected measles in all administrative districts of the country were received by the laboratory during this period. Case included 51% males

and 49% females. Of these, 2999 were tested for measles IgM of which 697 (23.3%) were positive. Of the 2302 measles IgM-negative samples, 865 (37.6%) were rubella IgM-positive. Ninety-eight percent of confirmed rubella cases were children younger than 15 years of age. Most infections occurred during the dry season.

## **Conclusions**

The national case-based surveillance revealed the disease burden and trends of rubella in Zimbabwe. These data add to the evidence for introducing rubella-containing vaccine into the National Immunization Programme.

## **21. Characterization of Cryptococcus species in HIV-Cryptococcal meningitis co-infected patients in Harare, Zimbabwe**

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4: Department of Medical Microbiology & Infectious Diseases, Canisius-Wilhelmina Hospital, Nijmegen, Netherlands

## **Background**

The invasive fungal disease cryptococcosis is caused by members of the basidiomycetous yeast genus *Cryptococcus*, although the existence of over a hundred *Cryptococcus* species only a few are able to cause disease. Identification of pathogenic *Cryptococcus* species is important in guiding management of patients as well as in describing their epidemiology. This study was aimed at characterizing *Cryptococcus* species in HIV-CM coinfecting patients and their association with patient survival outcome.

## **Methodology**

This was a descriptive longitudinal study, which investigated the prevalence and characteristics/features of *Cryptococcus* species isolated from HIV-CM coinfecting patients. This study was conducted at a tertiary teaching hospital in Harare in patients aged  $\leq 18$  years. Biotyping and genotyping assays were used to speciate the *Cryptococcus* isolates into species and sub-genotypes.

## **Results**

One hundred patients with a median CD4<sup>+</sup> count of 27 (interquartile range 12-50 cells/mm<sup>3</sup>) were enrolled. *C. neoformans sensu stricto* was isolated at prevalence of 77% (57), *C. gattii sensu lato* 17.6% (13) and inter-species hybrids 5.4% (4). Biotyping and genotyping assays had a good agreement in speciating the *Cryptococcus* isolates. The overall mortality was 49% and there was no association between the clinical outcome and isolated *Cryptococcus* biotype ( $p=0.306$ ).

## **Conclusion**

The study demonstrates the accuracy and reliability of biotyping methods in differentiating the different pathogenic *Cryptococcus* species causing HIV associated *Cryptococcal meningitis* in Zimbabwe and further supports the information gathered from other studies around the world.



## **FACULTY OF COMMERCE**

### **22. Empowering Employees for Enhanced Firm Performance in Zimbabwe's Manufacturing Sector: The Case for Bulawayo Based Manufacturers.**

Samuel M. Gumbe and Isaac Chaneta

Zimbabwean firms particularly those in manufacturing have been greatly affected by the opening up of the economy which has seen the influx of cheaper foreign goods. This has created intense competition for the sector as customers opt for the more affordable foreign products. The result of this competition has been the decline of capacity utilisation by the local manufacturers which has also been accompanied by firms closing down, retrenching staff or at times refusing to award salaries that match the poverty datum line as they seek to survive. On the other hand, employees faced with possibility of losing employment or earning low salaries have accused employers/managers of being self-centered in the decision making process. It is for this reason that this study was carried out to ascertain the extent of employee empowerment in Zimbabwe's manufacturing sector. The study is confined to large scale manufacturers who are on Confederation of Zimbabwe Industries (CZI) register operating in Bulawayo, the 2<sup>nd</sup> capital city of the country. The study uses the qualitative approach and is case study of Bulawayo based manufacturers. Proportional representation is used to draw a sample 33 firms from 16 strata that make up the sub-sectors of the country's manufacturing sector. The study findings reveal that the sampled firms are moderately high on engaging employees in empowerment programmes. However the findings also reveal that managers, to a large extent, treat employee contributions as only fairly important. Thus the study concludes that there are fairly low levels of employee empowerment in the sector in Bulawayo. The study recommends that as a way of raising employee levels of empowerment, the firms should adopt the Strategic Human Resources Management and the Total Quality Management Approach.

### **23. Product management strategies in a "dollarized" economy. A case study of Zimbabwe's consumer products manufacturing sector (2009 – 2014)**

Samuel Gumbe and Godfrey Muponda

The purpose of this study was to establish product management strategies that can be employed by firms operating in a multi-currency economic system which is also experiencing depressed demand for consumer goods. The study was based on two cases of the largest consumer goods manufacturers in Zimbabwe. The study's proposition was that the two firms had adopted aggressive product management strategies which made their products competitive. The results of the study were based on in-depth interviews with marketing executives in both cases and other field observations. The findings confirm that the firms operating in such a restrictive can survive by adopting aggressive product management strategies which include adding new product features, qualities and extending their product lines.

**Key words:** *deflation; product mix; product range; dollarization; product management*

## **Enhancing Business Opportunity Identification Processes in Zimbabwe's Manufacturing Sector: The Case of Bulawayo's manufacturing sector**

Samuel M. Gumbe and Isaac Chaneta

The manufacturing sector in Zimbabwe plays a critical role in the economic development of the country like employment creation, contributing to the country's GDP and saving and generating foreign exchange. It is for this reason the Government of Zimbabwe (GoZ) has crafted a number of programmes aimed at rejuvenating it since it started to decline in the late 1980s. However the programmes seem to have benefitted foreign competitors as the sector experienced further decline resulting in the country becoming a net importer, capacity utilisation in the sector declining and unemployment rising as firms closed shop. This study sought to establish why the sector is failing to identify opportunities that are presented in the government initiated programmes thereby allowing foreign competition to benefit at their expense. The study sought responses from top managers of the sampled 68 manufactures from Bulawayo. The sample was drawn from the 16 sub-sectors that constitute the Zimbabwe's manufacturing sector. Study findings reveal that the sampled firms have weaknesses in the way the scan the environment. The study is concluded by proffering relevant recommendations.

## **24. Challenges affecting establishment and sustainability of tourism public private partnerships in Zimbabwe**

J.P . Sai, N. Muzondo and E. Marunda

Public Private Partnerships (PPPs) provide governments and businesses with a unique cooperation framework for mutual gain. The major goal of this paper is to identify the challenges influencing the establishment and sustainability of PPPs in the tourism sector in Zimbabwe. Nine variables impeding the establishment and sustainability of PPPs were identified from a critical review of existing literature. A survey of public and private sector organisations that participated in the 2013 edition of the Zimbabwe International Tourism and Travel Fair confirmed that only three of the variables in the theoretical framework were challenges. Consequently, the paper offers a tentative empirical model of tourism PPP establishment and sustainability with two sets of independent variables i.e. challenges and other variables. The academic implications for the study are that future studies should test the tentative model and investigate the determinants of successful PPP establishment and sustainability in general. At least two public policy implications for the government and its agencies can be drawn from this study. To successfully court businesses into PPPs the government needs to, ideally, take into consideration private sector views in fine-tuning its PPP policies. The government also needs to educate its administrative agencies to appreciate that PPPs can be established in any area including mega events and destination marketing.

## **25. Challenges affecting establishment and sustainability of tourism public private partnerships in Zimbabwe**

Judias Peter Sai, Edmund Marunda and Noel Muzondo

Public Private Partnerships (PPPs) provide governments and businesses with a unique cooperation framework for mutual gain. The major goal of this paper is to identify the challenges influencing the establishment and sustainability of PPPs in the tourism sector in Zimbabwe. Nine variables impeding the establishment and sustainability of PPPs were identified from a critical review of existing literature. A survey of public and private sector organisations that participated in the 2013 edition of the Zimbabwe International Tourism and Travel Fair confirmed that only three of the variables in the theoretical framework were challenges. Consequently, the paper offers a tentative empirical model of tourism PPP establishment and sustainability with two sets of independent variables i.e. challenges and other variables. The academic implications for the study are that future studies should test the tentative model and investigate the determinants of successful PPP establishment and sustainability in general. At least two public policy implications for the government and its agencies can be drawn from this study. To successfully court businesses into PPPs the government needs to, ideally, take into consideration private sector views in fine-tuning its PPP policies. The government also needs to educate its administrative agencies to appreciate that PPPs can be established in any area including mega events and destination marketing.

## **26. Effects of advertising on consumer behavior in low density houses: The case of Marlborough, Zimbabwe**

Alice Z Zinyemba and-Irvine Manase

This paper presents findings of a research that was carried out to establish the buying behavior of low density households in Zimbabwe and how they are influenced by the various forms of advertising. A questionnaire was administered to a sample of 75 respondents representing 75 households in Marlborough, Harare. The results of the study showed that 50% of the respondents strongly agreed that their decision to purchase a product was influenced by advertisements. They also indicated that they understood and preferred outdoor media more than television and print media which came second and third respectively in the order of preference. More than 75% of the respondents agreed that they bought advertised products more than those which are not advertised. The results also showed that consumers in Zimbabwe are slow in accepting and adopting the internet as a form of advertising. It can be concluded from this study that it definitely pays to advertise one's products. It is also important that an advert should carry a strong message that is convincing to the consumers as indicated by 50% of the respondents. It can also be concluded that the Zimbabwean market has not yet fully embraced online advertising. The study recommends that outdoor media should be used more than any other forms of advertising in low density areas as it is the most preferred and most understood media choice. It is also recommended that since more women than men do the purchases for households in low density areas advertisements should target women more than men.

## **27. Effectiveness of visual merchandising on customer supermakert choice**

Dr A Zinyemba

The retail market structure in Zimbabwe has changed from being a monopolistic structure to a perfect competition structure with many players coming in. It has become necessary now more than before for retailers to look at ways to influence customers' supermarket choice decisions. Previous researchers have established that visual merchandising variable plays a greater role in influencing customer store decisions. This study aimed at establishing the extent to which visual merchandising variables influence customer supermarket choice decisions and at establishing which among the variables, are the most critical in customers' minds in evaluating supermarket choice. The research was carried out in supermarkets around Harare Central Business District, Msasa and Ruwa. A descriptive survey method was used to get information from customers about their behaviours, attitudes and values. Systematic sampling was used to select the customers (respondents). A total of forty customers were surveyed representing the sample size. Results show that all visual merchandising variables affect customer store choice in varying degrees. Store choice decisions were also found to be influenced by other factors like customer care, promotions, prices, and quality of merchandise with customer care and prices being the most considered by customers in making their choice decisions. The study recommends that retailers should pay particular attention to all visual merchandising variables as results show that all variables have varying degrees of influence on customer store choice. Retail players must also pay more attention on product variety and displays and interior store designs which are the major variables that customers consider when making store choice decisions.

## **28. The enhancement of sustainable tourism education and training to primary school level and rural communities in Zimbabwe**

E. Marunda

In a bid to mitigate adverse long term effects in biodiversity and loss of wildlife and to prepare communities for the challenges arising out of tourism and hospitality developments in their vicinity, it is vital that communities living next to tourist attractions be educated so that they practice eco-tourism or sustainable tourism as a matter of priority. This study postulates a model for the development of a curriculum for the education of primary school learners in Zimbabwe and for the training of rural communities living within or neighbouring tourism resorts and attractions. Such a curriculum should equip primary school learners and communities with the requisite knowledge to preserve and protect their environment effectively. Introducing tourism and hospitality education at primary school and community level augments benefits for school learners and rural communities.

## **29. Proposed strategies for improving academia and industry collaboration**

Ed Marunda and El Marunda

Sustainable national development is determined by a country's economic development, its people's mind-set and their capabilities. Accordingly, an infrequent, minimised frequency of seminar discussions and conferences on research findings by both academia and industry, not only retards the rate of collaboration between the two, but grossly hampers a nation's economic development as well as people's standard of living. A critical review of literature and observations underlined the challenges faced in the potential collaboration of academia and industry in Zimbabwe. These include, a varied perception of research findings, misdirected national scholarships, limited opportunities for local academic publications, a few lecturer entrepreneurs, great variation between practice and theory of basic business concepts and business practices abating the guiding philosophy of unhu /Ubuntu. The conclusion drawn was that, solving socio-economic problems through research by academia and industry takes second place to acknowledging unethical business conduct, which in fact deters academia and industry from collaborating with each other. It is advanced that to effectively promote the academia-industry collaboration, there is need to significantly increase the national research budgets and local on line publication opportunities for researchers. Other measures include implementing government policies designed to allow college and university lecturers run enterprises, increasing funding of technical entrepreneurship education, a well-balanced, transparent disbursement of local national scholarships and the creation of media space for nationwide discussions on research findings. Ultimately, the glue for the academia-industry collaboration lies in encouraging localised seminar discussions on research findings by students on attachment, their college and company supervisors, culminating in conferences for academia and industry.

### **30. Strategies for Enhancing 21st Century Global Literacy with Zimbabwe in Mind**

Ed. Marunda and El Marunda

Global literacy rankings are based on basic literacy, which refers to the ability to read, write and understand in a local language. This traditional basic definition of literacy is in itself a deterrent from exploring and creating a wider literacy definition that also takes cognisance of functional and higher proficiency literacy levels within a wider curriculum context. Secondary research through a critical literature analysis has uncovered findings on the state of traditional basic literacy rates, on the global literacy ranking map. Relationships between traditional basic literacy rates and the economic development of a country have also been examined. Additionally, the secondary research findings also reveal strategies that enhance literacy levels such as e-learning, traditional reading, home schooling, business start-up programme, youth national service, on-line tertiary study programme, summer camps, entrepreneurship training, volunteer programmes and communication for development based research. To further enhance literacy, the article recommends extensive use of connectivity platforms facilitating e-learning and e-teaching, developing expanded home schooling and supporting communication for development based research.

### **31. Challenges Affecting Establishment and Sustainability of Tourism Public Private Partnerships in Zimbabwe**

P. J. Sai, N. Muzondo, E. Marunda

Public Private Partnerships (PPPs) provide governments and businesses with a unique cooperation framework for mutual gain. The major goal of this paper is to identify the challenges influencing the establishment and sustainability of PPPs in the tourism sector in Zimbabwe. Nine variables impeding the establishment and sustainability of PPPs were identified from a critical review of existing literature. A survey of public and private sector organisations that participated in the 2013 edition of the Zimbabwe International Tourism and Travel Fair confirmed that only three of the variables in the theoretical framework were challenges. Consequently, the paper offers a tentative empirical model of tourism PPP establishment and sustainability with two sets of independent variables i.e. challenges and other variables. The academic implications for the study are that future studies should test the tentative model and investigate the determinants of successful PPP establishment and sustainability in general. At least two public policy implications for the government and its agencies can be drawn from this study. To successfully court businesses into PPPs the government needs to, ideally, take into consideration private sector views in fine-tuning its PPP policies. The government also needs to educate its administrative agencies to appreciate that PPPs can be established in any area including mega events and destination marketing.

### **32. What determines the resilience of retail business in an unstable business environment?**

#### **Evidence from Harare**

Maxwell Sandada

Over recent years, a growing number of researchers and practitioners have developed an interest in the concept of organizational resilience. Amid the turbulent, complex and unpredictable business environment, organisational resilience is regarded as useful in helping organisations to thrive. The purpose of this study was to investigate the influence of organizational learning, innovation, organizational flexibility and business networks on the resilience of retail organisations in Harare, Zimbabwe. A quantitative approach was used in this study in which two hundred and three retail managers were randomly selected. The results indicate that both organizational learning and innovation have a statistically significant predictive effect on retail business resilience. The results also indicate that both organizational flexibility and business networks do not have statistically significant impact on retail business resilience. Therefore, to be resilient in turbulent environments, retail organisations need to create an environment that promotes learning and innovation.

### **33. Transition from informality to formality' perceptions of informal traders in the Harare metropolitan area**

Maxwell Sandada

The size of the informal business and the proportion of working people in this sector continue to grow in Zimbabwe. In order to expand its revenue collection base, the government intends to devise mechanisms to formalise the activities of this sector. However, little is known about the perceptions of informal traders on formalising business activities. To address the identified research gap, the current study sought to explore the perceptions of informal business owners about formalising their business activities. A qualitative paradigm was

adopted using in depth interviews to collect data from a sample of 30 participants who were selected purposively selected. The interview transcripts produced four major themes namely: barriers to formality, informality benefits, informality disadvantages, and formality enablers. It became evident that informal traders are aware of disadvantages of operating informally and the benefits of formalising business activities. The results also indicate that entry barriers namely high taxes, tedious and costly registration procedures, corruption government and municipality officials, high rentals of business premises, lack of requisite skills and lack of access to finance inhibit the demand for formality. Recommendations arising from the results of the study and avenues for future research are made.

#### **34. Mission and vision, environmental scanning and formality of strategic planning as predictors of the performance of small and medium enterprises (SMEs) in the Gauteng province of South Africa**

Maxwell Sandada

Faced with volatile business conditions and the hyper competitive market environment, SMEs are continuously focusing on finding ways to improve their performance. This paper attempts to establish the effect of mission and vision, environmental scanning and the formality of the strategic planning process on the performance of SMEs. A quantitative research approach was pursued through a self-administered survey questionnaire. Descriptive statistics, correlation analysis and regression analysis were used to analyse the data. The main findings of the study suggest that, the mission and vision statements, environmental scanning and the formality of strategic planning have a positive effect on the performance of SMEs. The formality of strategic planning emerged as the factor with a stronger impact on SME performance than environmental scanning and mission and vision. The study provides some practical insights for SMEs for improving their performance in line with the identified effect of these three factors. Ultimately, improving their performance along these factors is set to reinforce SME sustainability and which will further stimulate their profitability.

### **FACULTY OF EDUCATION**

#### **35. Voices from Zimbabwe on why men avoid literacy programmes**

Dr Davidson Midzi

This article is a result of a study conducted in Mazowe district to determine factors that militate against men's participation in the current Zimbabwean functional literacy programme (FLP). The study aimed to find out which factors in adult literacy programme played a role in shaping the attitudes, experiences and views of men to either take part or refrain. Flowing from the findings, a support strategy has been established to see to it that men receive continuous encouragement to take active part in adult literacy services. The research utilized the case study design based on purposive sampling technique to construct findings through the use of interviews. Through a semi-structured questionnaire and in-depth interviews with focus groups supplemented by observations, the writer was able to generate valuable information on why men avoid literacy programmes. The study has captured the voices of the respondents as to their perceived views regarding the factors militating against men's participation in literacy

programmes. Their voices are informative and could resonate with other voices elsewhere in Africa.

Furthermore, this was an important study because in order to retain male participants in the programme, it recommends that a supportive environment be put in place. Voluntary literacy tutors need to be trained in design and delivery of instruction as well as in mobilizing strategies, so that they are sensitive to male participants' circumstances. The income generating projects in which men are currently involved, need to be made more viable in order to boost their morale.

**Keywords:** Voices, Zimbabwe, men, avoid, literacy, programmes

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### **36. Describing attributes of competent school headmasters: A case study of ten school headmasters in Metropolitan Bulawayo Region-Zimbabwe**

Madhlangobe, Lewis, Mawere, Virginia H., and Hungwe, Godwin

The purpose of this qualitative research study was to identify and describe specific leadership attributes related to outstanding SI leadership in Zimbabwean schools. The question that guided this study was; how do teachers name and describe the attributes of exceptional school leaders in Zimbabwe? Ten (10) school headmasters, 52-teachers, 81-parents and 82-students participated in this study. Literature reveals that most reported effective school leadership qualities were studied in contexts of developed countries but no study has specifically discussed results related to outstanding leadership in Zimbabwe. For this study we used questionnaires and interviews to collect data related to known cases from participants in Zimbabwean school contexts. Key findings revealed that the participants for this study reported that efficient school heads exhibit the following specific leadership attributes that enhance school improvement that they lead—(a) show clear knowledge, and understanding of cultures of people they lead, (b) exhibit outstanding communication skills and use of current forms of technology; (c) create healthy school climates; (d) create teacher-leadership teams; and (e) they encourage collective ethical decisions making strategies among others. We concluded that school leaders who influence improved learning outcomes and improvement of the schools foster communication skills that enhance workplace relationships that in turn help to uplift educational standards in their schools

**Key Words:** School Improvement, Leadership practices; Standards for school improvement; Effective leadership qualities; Leadership characteristics/attributes

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**37. Persistence, Perseverance, and Success (PPS): A case study to describe motivational factors that encourage Zimbabwe Open University (ODL) students to enrol, persist, and graduate with master's and doctorate credentials**

Lewis Madhlangobe, Jennifer Chikasha, Onias Mafa, Primrose Kurasha

The purpose of this qualitative study was to describe motivational factors that increased open distance learning (ODL) students' capacity to successfully graduate with master's and doctoral credentials. Study background revealed that Zimbabwe Open University (ZOU) persistently experiences increased levels of student dropout and competition from conventional universities that introduce ODL through "block-release" programs. We used a descriptive qualitative research approach to collect and analyse data—hence, data collection through audio-recorded open-ended semi-structured interviews helped to maintain accurate accounts of data. We presented data through themed reporting enhanced by direct quotes from participants. Our research broadly concluded that once participants registered to study, perceived attention from various social angles created immense motivational factors ranging from institution motivators, personal factors, and social-generated motivators such as fear of what society would think of them all motivated them to persist and graduate with proposed credentials.

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**38. School improvement strategies: a case study to understand teacher-self reported experiences with effective leadership approaches used in primary and secondary schools in Zimbabwe**

Dr. Lewis Madhlangobe, University of Zimbabwe; and Dr. Tawanda Madhlangobe, Seabrook College, Essex, UK

The purpose of this mixed methods study was to understand and describe self-reported experiences with effective School Improvement strategies used by school heads in primary and secondary schools. Focus group interviews and surveys with parents, school heads and teachers helped to inform the research questions identified for this study. The overall findings reveal that schools' organizational efficacy is collectively achieved when school headmasters practice and implement instructional leadership strategies and behaviours gleaned through the following five broad professional growth-oriented themes emerging from this study: (a) using inclusive leadership strategies; (b) encouraging team-work among teachers; (c) teacher participating in collective information gathering to create a shared school vision; (d) and leadership helping to fulfil contractual agreements among teachers, students and parents; and (e) ensuring availability of instructional resources and technology. From the findings of the current study, we reached the general conclusion that information availability and processing at school level will always allow for increased collective participation by teachers in the school improvement (SI) agenda through the enhancement of holistic organizational learning power. Schools that learn as organizations improve fast.

**Keywords:** Collaborative efforts; School Improvement (SI); School Improvement Strategies (SIS); Organizational learning; Organizational effectiveness; Teacher professional growth

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**39. The power of culture in the teaching-learning approaches for teachers within the Zimbabwean context: A follow-up of the publication on Culturally Responsive Leadership (CRL)**

Dr. L., Madhlangobe

The purpose of this theory to practice paper was to introduce and discuss the inclusive and responsive instructional teaching model that may be adopted to help Zimbabwean teachers to reduce the impact of learning problems related to diversity among students' learning needs, leading to continuous development and school improvement. The context reveals needs for conceptualization of the philosophy that diversity in Zimbabwe is becoming a reality in the classrooms. Meanwhile, teacher training colleges and universities continue to produce teacher graduates with skills that fit the pre-independence era. Students' under-achievement, drop-out rates and post-secondary unemployment reveals widening gaps between students' learning experiences and instructional approaches. The model we suggest first introduces a need to understand that knowledge and reality about teaching approaches should be placed under continuous improvement. That approach has the potential to benefit teachers, professional development organizers, teacher-training curriculum and the policy makers—each group in its own diverse way. Learning for students from one grade level and school level **to the next** will show seamless benefits for students since instructors will uniformly show deeper understanding of students' learning needs. Our broad conclusion and summary suggests that once teachers understand the role of culture in the way students process new information, they will use inclusive strategies that we perceive will help motivate students to learn effectively.

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**40. Self-perceived problems experienced by novice teachers: A descriptive case study of twenty-three Zimbabwean teachers**

Dr. Madhlangobe, L

Educating children successfully is a relationship of behaviours that connect to teacher preparation and the work environment that the teacher performs in. Teacher credentials define the success of the teachers and that of the students that they teach. There is need to view student learning outcomes in the light of the teacher preparation levels. The purpose of this study is to find answers to the question, *how novice teachers view their early experiences in the real early experiences?* Findings of this study have the potential to respond help shape the teacher preparation curriculum to match the requirements of the modern Zimbabwe classrooms at primary schools level. The answers to the research question will attempt to satisfy the expected learning standards.

**Key words:** *curriculum implementation; teacher influence; student's ways of knowing; students' culture; and learning styles*

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**41. Instructional practices that work with Zimbabwean high-school students in transitioning between topics: A qualitative case study with three outstanding of Physics, Chemistry and Mathematics teachers in the Midlands Province in Zimbabwe**

L. Madhlangobe

The purpose of this study will be to answer the question, *what works, and how do we know it works in the teaching and learning of critical science subjects?* Educating children successfully is a relationship of effective teacher behaviours that help to bond teaching approaches to students successful learning outcomes. Findings will help influence other science teachers to use creative ways to influence students' learning outcomes, interests in science and mathematics and increase teacher student creativity. Teacher influence on student learning outcomes determines national development. In Zimbabwe in particular, findings of this qualitative research study have the potential to respond help shape science curriculum delivery requirements to influence graduates who will help develop the national development.

**Key words:** *curriculum implementation; what works; teacher behaviours; students' ways of knowing; learning outcomes; and learning styles*

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**42. Evaluating the impact of parental involvement in learning outcomes: A report from secondary and primary school children and their parents in the Midlands Province in Zimbabwe**

Madhlangobe, Madhuku, Chivandire & Nyakudya

The role of parents of parents in the success of their children is demonstrated in diverse ways. There is need to understand how parents value the importance of the success of their children. Similarly, describing the approaches that school leaders that succeed through involving parents in the education of their children is critical to the way educational leadership credential may be designed. Currently in Zimbabwe, there are many blame games that exist in the sphere of educating children. It is the purpose of this current study to collect qualitative data that may be used to initiate discussions on parental involvement

**Key words:** *parental involvement; ways of knowing; students' culture; and learning styles*

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#### **43. Coping with Global Warming: Using the Zimbabwean cultural and religious beliefs as human compliance behaviour determinants for reducing global warming**

L Madhlangobe., & F. Machingura

The potential that indigenous knowledge has to inform the understanding of, and shape responses to climate change is showing increasing attention, especially if we embrace the view that scientific ways of knowing are less accessible to the rural majority. Perceptions around new knowledge and strategies for regulating and dealing with climate change are constructed, operationalized, and largely delimited to the narratives within the western domains. While Zimbabwean indigenous populations may not share equal responsibilities for the effects of climate change as their developed-world counterparts, responsibilities for future consequences rest in their human climate-change compliant behaviours. This co-authored paper aims to translate local theoretical appreciation of knowledge about causes of climate change into the practical daily lives of the Zimbabwean indigenous knowledge systems when contrasted with the western ways of understanding and strategizing to control climate change. The dialogue will be guided by the question; *how do Zimbabwean indigenous people use their cultural and religious ways to adapt to current trends in climate change?* Understanding indigenous people's use of their combined cultural and religious knowledge systems to make sense of; and respond to climate change may offer innovative ways for directly engaging indigenous communities in practical partnership strategies and ethics for solving climate change concerns. It may help to integrate indigenous knowledge systems and interpretations of developing environmental processes to a collective strategy for fostering climate-change-compliant behaviours.

**Key words:** *indigenous ways of knowing; climate change; knowledge systems; culture; and religion*

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#### **44. Denoting HIV and AIDS: the language of stigma in the Shona language**

Liveson Tatira

This paper argues that language plays a very important role in human communication. Thus, language can be used in a positive way when it comes to HIV and AIDS issues. The paper argues that in denoting HIV and AIDS in Shona language, the terms used are not positive in fighting against the stigma of the disease. Language is best used in such a way that it creates hope for the people who are infected with HIV and AIDS. At the present moment, the

language used to denote the illness leaves people helpless and disillusioned. The paper does not proffer alternative terms to denote HIV and AIDS for fear of being prescriptive but rather challenges society to discard terms which are in present use. By sensitising society of the negative terms, it is hoped that new and friendly terms would be generated by the same society which introduced the existing unpalatable terms. We take cognisance of the fact that terms generated by society itself are more likely to be acceptable and have a greater impact than those prescribed by the academics.

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#### **45. Depiction of polygamous marriage in selected pre-colonial Shona narratives**

Liveson Tatira

This chapter examines the depiction of polygamous marriage in the pre-colonial narratives which are also referred interchangeably to as romances and Old World Novels in the discussion. An interrogation of the romances shows that the depiction of polygamous marriage is tainted with negativity. The men involved in polygamous marriage are portrayed as ruthless in their acquisition of women. The Shona chiefs are painted abusing their power, especially in the process of adding one wife after another. They risk the lives of their fighters as they wage fierce battles in order for them to capture women they want to marry.

In some instances, a polygamous man is depicted in a very unrealistic way, he is very weak administratively, drunkard, lazy and violent. All the expected attributes of a polygamous man are negated. The issue that polygamous marriage served a functional purpose in the pre-colonial period is not reflected and at worst distorted. The chapter, therefore, argues that the stereotypical unfavourable depiction of polygamous marriage in the Shona narratives is meant to serve a purpose. The narrative writers seem to be on a calculated mission of demonising polygamy in order to scare off readers who might be cherishing the practice. The writers might be feeding on the colonial myth that considers pre-colonial Shona marriage as deficit in moral values. The colonialists, through their writings about the Shona marriage, wanted Shona people to believe that prior to colonialism, they led a chaotic life, which illicitly begged for a colonial redemption.

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#### **46. The role of indigenous Shona cultural beliefs and practices in the conservation of the environment**

Liveson Tatira

This chapter interrogates the role of indigenous Shona cultural beliefs and practices in conserving the environment. The chapter explores and investigates the importance of such

beliefs and practices in conserving the environment. The chapter argues that the Shona beliefs and practices help to enforce environmentally friendly behaviour. It is through the beliefs and practices that the Shona people are discouraged from destroying their environment. There are a wide range of taboos, among other things, which are meant to conserve trees, animals, both domestic and wild, land, bodies of water and birds, to mention but just a few. The chapter argues that the conservation of the environment becomes effective because it is not human-policed but is perceived to be supernaturally enforced. Among the Shona people, supernatural enforcement becomes a way of life rather than a mere human externally cohesive force.

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#### **47. The Shona children traditional games**

Liveson Tatira

This paper is an attempt to show the richness embedded in the Shona children games. The Shona children games if not properly analysed would pass for any other pastime activities for children. However, Shona children games were much more than pastime games. Through the various games, children were afforded the opportunity to exercise their bodies and keep them fit. Children games offered children a variety of skills and knowledge. Cognitive skills were developed as children got involved in games that challenged their cognition. Children learned issues of negotiation, skills to evade potential enemies, skills for quick problem solving and skills for dancing, all which were/are very important for their day to day survival. The games also taught them to live in harmony with others as well as to obey authority and to cooperate with others.

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#### **48. Zimbabwe's 'Four-Pathway' Schools' Proposal for Technical and Vocational Skills Development: Implementation Challenges, Benefits and Prospects**

Hardy Chitate

The first Commission of Inquiry into Education and Training (CEIT) was instituted on 2 January 1998. The commission reviewed completely Zimbabwe's education system against the background of the demands of the Third Millennium and made several recommendations. One of those recommendations was the establishment of a 'four-pathway' senior school system designed to develop technical and vocational skills among Zimbabwean students that are usable in their future formal employment or informal self-employment. Regrettably, the new education structure has not yet been fully implemented up to now. This paper makes a modest contribution to the on-going debate about challenges associated with renewed attempts to vocationalise secondary education in Zimbabwe. Through a critical analysis of

related documents and interviews with key stakeholders, evidence is marshalled in support of the view that the innovative ‘four-pathway’ skills empowerment project, unlike Education With Production (EWP) of the 1980s, which failed to take off, is a product of a wide consultative process. Because of its commendably public approach, the innovation seem to enjoy a secure ground-base with the generality of Zimbabweans. However, chief among other factors in an apparent situation that exists in which some recalcitrant technocrats in the relevant ministries are prepared to scuttle what is arguably the best education system ever designed in the post-Independence Zimbabwe right at the shoals of its implementation. For, the proposed curricular change project has far-reaching implications for staffing in the affected ministries. At best, some of the key personnel may be redeployed, at worst retrenched. Hence the sluggish structural reform of the current Zimbabwean education system. The project has massive potential to increase supply of skilled manpower and participation of Zimbabwean future citizenry in the economic development of the country. Such a noble experiment at curriculum diversification, therefore, needs the full support of all Zimbabweans.

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#### **49. Interrogating the irrationality of the rational and child sexual abuse in Zimbabwe: The call for education for *hunhu* / *ubuntu***

Ngoni Makuvaza

This paper bemoans the current scourge of child- sexual abuse as well as the recent disturbing phenomenon of female rapists bedevilling the nation. It is particularly disconcerting when it is reported that, “there are over 2000 child rape cases reported each year in Zimbabwe” (Daily News, Saturday 2, November, 2013). We consider this as a serious problem which needs urgent attention. However, it is our claim that, this scourge is concomitant with man’s broad search for ‘happiness’. Thus, we put it that; this insatiable search for happiness has regrettably created a dilemma or paradox for 21 st century man in Zimbabwe. This paradox hinges on man’s incessant and insatiable thirst for rational goods (happiness) through irrational means. Essentially, this has culminated in what this study refers to as the ‘paradox of the rational’ or the paradox of the ‘irrationality of the rational’. To interrogate this problematic malady, we posit the following theses: (a) there is need to revisit and ‘renegotiate’ the dominant perception regarding the rationality of man, (b) Zimbabwe is systematically sliding towards the ‘irrationality of the rational’, and lastly (c) it is not jails and stiffer penalties (not even ‘fencing’) on the offenders that can contain this scourge but probably a ‘cultural rationality’ anchored on *chivanhu* and *hunhu*. To this end, we posit education for *hunhu* / *Ubuntu* as having potential to address this problem. In this paper, ‘man’ shall refer collectively, to both male and female.

**Key Terms:** *happiness, human nature, rational, irrationality, cultural rationality, group / communal rationality, education for hunhu, chivanhu, hunhu.*

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## **50. *Chivanhu/Isintu* and children's philosophical dispositions to philosophise: Reflections on children's inquisitiveness and a call for philosophy for children in Zimbabwe primary schools**

Ngoni Makuvaza & Oswell Hapanyengwi

The thesis being defended in this paper is that, the disposition to philosophise is inherent in all children. However, this characteristic propensity is to a large extent, enhanced or compromised by the world-view in which the child is born and grows. Accordingly; among the Shona of Zimbabwe, we put it that this disposition is being seriously compromised by *chivanhu*. We present *chivanhu* as the world-view of the Shona as well as the indigenous black Africans of sub-Saharan Africa, from which arises their philosophy of life as well as the resultant sensibilities and consciousnesses. Necessarily, *chivanhu* conceived as a world-view of the Shona determines the manner they interrogate and interpret the world in and around them. To this end, we present three propositions, firstly; we think the school is strategically positioned to address this problem by emphasizing on dialogical as well as learner-centric pedagogy. Secondly; we urge that, the adult members of society who are the custodians of *chivanhu* should transform from being inhibitors to facilitators of children's' philosophizing. Essentially; we argue that, philosophy should be introduced into the primary school curriculum in Zimbabwe, because it also has potential to enhance the learning of the child in general.

**Key words:** *chivanhu, hunhu, philosophising, gnosiological cycle, teacher-centric pedagogy, dialogical pedagogy*

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## **51. *Hunhu/Ubuntu* and the idea of Shona personhood: A tripartite perspective**

Ngoni Makuvaza

The thesis defended in this paper is that; on the basis of Samkange and Samkanges' presentation of the concept of *hunhu/ubuntu*, the Shona conception of personhood presented a conundrum. This was based on the claim that, the Shona seem to have a unique conception of personhood, which we considered as tripartite. Consequently, three types of *vanhu* (human beings or persons) among the Shona were identified, notably; *munhuwo* (mere human being), *munhuwo zvake* (mere person) as well as *munhu kwaye*(an ideal person). Essentially, these three categories of people were conceived as the basis for the stated claim for a tripartite view of personhood among the Shona. However, it was noted that ordinarily this sounded like illogicality especially to 'outsiders'. Accordingly, this paper was premised on 'unpacking' this apparent obfuscation. To that end, the paper interrogated the three conceptions of a person identified above, which were posited as the basis of the tripartite view of personhood among the Shona.

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## **52. Gender differences in academic/main subjects study: A case of Madziwa Teachers' College students**

Wallace Kasiyabvumba and Manuel Rwodzi

The study investigated gender differences in academic /main subjects study at Madziwa, a primary school teachers' college in Zimbabwe. The study focused on, inter-alia, trainee teachers' choices of academic/main subjects, participation and performance in those subjects. The sample consisted of 77 student teachers and 17 lecturers. Amixed methods approach with triangulation was used to gather quantitative and qualitative data using questionnaires, semi-structured interviews, focus group discussion and document analysis. Findings indicated that: in performance there was no extreme qualitative difference between male and female trainees, but quantitatively males were distinctive in sciences and females in languages. Differential treatment of male and female trainee teachers by lecturers, trainees' efforts and attitudes towards academic subjects also influenced the trainees' performance. The study recommended increasing: the pool of main subjects from which trainees could choose, balancing gender when recruiting lecturers in order to have enough role models for the trainees and enrolling students and sensitising college stakeholders on policies of fair gender practices, in remedying the gender differences. Keywords: Gender differences, academic/main subjects, mixed methods research, triangulation INTRODUCTION The Constitution of Zimbabwe Act (2013) Amendment number 20, section 17,

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## **53. Labelling of learners in Zimbabwean secondary schools: A psychological and social challenge**

M. Rwodzi, K. Gotosa and F. Muchenje

This paper advocates for the (greater) utilization of Carl Rodgers' humanistic principles in the post-colonial Zimbabwean classrooms focusing especially on (primary and secondary school) classroom practice, which includes learner identity, development and the language of instruction. The colonial classroom was by nature eurocentric (Mazonde, 2009), oppressive, dictatorial, prescriptive, task and teacher centred. But now that Zimbabwe is an independent state, the paper argues through a review of existing literature that the traditional transmission frameworks that guided colonial classrooms resulting in the production of dehumanized learners (Shizha and Kariwo, 2011), should be relegated to the dust bin to pave the way for greater engagement of humane ones based on humanistic principles which foster independence and freedom in the education system, particularly in the learners. Further, the

paper advocates that classroom practice in post colonial Zimbabwe should be founded on the humanistic perspective which centres on the satisfaction of human interests, human culture, and fulfilment of human potentials and the democratic ideal of humanity as a whole, in its bid to re-Zimbabweanise/re-Africanise the learner in particular (and the education system in general). This should allow for maximization of the innate capacity of the student to achieve, create personal and social meaning, and become a valuable contributing member of the Zimbabwean society. Zimbabwean values enshrined in, inter-alia, our heritage; indigenous languages/mother tongues, 'hunhuism' and ZimAsset would be promoted resulting in the moulding of a Zimbabwean brand of a learner-cum- citizen who can hold his/her own amongst other peoples of the world.

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#### **54. Entrepreneurship: A strategy for transforming the economic status of persons with hearing impairment in Zimbabwe**

Jane Mutasa

The plight of persons with disabilities is a reality and conspicuously thrives in Zimbabwe. It is demonstrated by massive marginalisation in most areas of development. The employment sector is where such persons are most aligned. Solutions to this dilemma have remained elusive. Entrepreneurship, a process of starting one's own business can be a mitigatory measure in transforming this undesirable tendency thus giving more flexibility to the disabled to control their working environments. This study attempted to identify ways in which people with hearing impairment could be empowered to become entrepreneurs. A theoretical perspective based on the Emancipatory Disability Model was used. A survey was conducted on fifty hearing impaired persons. Ten interviews to ascertain strengths, weaknesses, opportunities and threats that surrounded business establishment opportunities in Zimbabwe were conducted. Results showed that some of these persons were self-employed in small scale, non -sustainable businesses. These were vending activities on commodities such as vegetables, cell phone accessories and stationery. Their environment of operation was not stable. They needed technical training, advisory and financial support, to become fully established entrepreneurs.

**Key words:** *hearing impairment, disability, entrepreneurship, employment, business, marginalised*

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#### **55. Infusing multiple intelligences (MI) theory into teaching: Opportunities for meaningful learning**

Pedzisai Goronga, Martha Dozva, Roswitta Gatsi & Douglas Gasva

The purpose of the study was to find out if primary school teachers knew that their curriculum was organised according to Howard Gardner's Multiple Intelligences Theory. The study fell into the qualitative research domain. A case study was used in which only one rural school was purposively selected on the basis of ease of accessibility and convenience to the researchers. All the 11 teachers at the school participated in the study. Interviews and focus groups were used to collect data. The study established that teachers did not know that the primary school curriculum was organised according to multiple intelligences. Teaching concentrated on those subjects that are examined at the end of the seventh year course. Assessment was skewed towards the traditionally valued core subjects like English and Mathematics. Subjects like Art and Design, Music and Physical Education were not assessed at all. However, participants showed their keenness to develop and assess the traditionally neglected subjects if resources, facilities and support were made available.

**Keywords:** Curriculum, Multiple Intelligences, Challenges, Assessment, Facilities.

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#### **56. Grade seven pupils' perceptions towards English composition tests as an instrument of performance measurement: A case study at Karoi Junior Primary School, Zimbabwe.**

P.Gorongwa, T. Kufa, R. Gatsi and D. Gasva

This study sought to find out Grade Seven pupils' perceptions towards English composition tests as an instrument of performance measurement. Twenty (N=20) pupils participated in the study. Questionnaires and interviews were used as data gathering instruments. The study established that, generally, Grade Seven pupils have positive perceptions towards English composition writing. It was also found out that teachers teach composition writing in their classes and it again emerged that handwriting of pupils influenced the award of marks by teachers. The study recommends that teachers should take advantage of pupils' zeal to write English compositions by giving them as much practice as possible as well as giving timeous feedback on written compositions. There is also need by parents to take an active role in the education of their children by assisting them in English composition writing at home.

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#### **57. Developing strategies for the promotion of indigenous knowledge systems in Africa's development: A perspective from the south**

F. Muchenje and P. Goronga

This paper seeks to show the role of a reformed school curriculum in promoting the use of Indigenous Knowledge Systems and thus creating an appropriate technology base. An

overview of the Marxist theory as a guiding theoretical perspective is also presented. The paper goes on to define Indigenous Knowledge Systems and their utility in medicine, agriculture, and nutrition and ethno veterinary science. The paper takes the position that unless the current education system is reformed so as to incorporate Indigenous Knowledge Systems, investment made in education will not bear much fruit. The significance of using different school subjects as vehicles for the transmission of Indigenous Knowledge has also been highlighted. The paper concludes the discussion by showing the challenges facing Indigenous Knowledge Systems where issues such as documentation (to preserve the Indigenous Knowledge Systems from being unnecessarily lost) and patenting (legitimatising ownership of Indigenous Knowledge Systems) are presented.

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### **58. From whose perspective anyway? The quest for African disability rights activism**

Tsitsi Chataika, Maria Bergs and Abraham Mateta and Kudzai Shava

In this chapter, we illustrate how disability rights are still framed within charitable and neo-colonial approaches. We expose the links between the disabling norms and values of neoliberalism, and how rights become included in development discourses and debates (i.e. linked to poverty reduction work). We, thus note a top-down flow of information, terminology and discourses of 'rights' and 'empowerment', which pander to a stratification of Africa, and stereotypes of disabled people in particular, as on the lowest levels of global society. Using examples from Southern and West African contexts, we show how the existence of external and internal gate-keeping and tokenism, as opposed to an open debate on genuine disability mainstreaming and inclusion. This is linked to the ways in which 'rights' discourses are becoming commodities used by donor-linked funding and programme cycles for development aid. While a lot of hope is on the Convention on the Rights of Persons with Disabilities, we show how genuine partnership is rarely achieved. Rather, there is a focus on 'soft' rights. In reaction to this, we challenge the African disability movement and its allies to reclaim notions of rights in their own terminology (i.e. Ubuntu), and work on 'hard' rights, leading to change in policy and practice. Our quest is to push for a legitimate 'marriage of commitment' between the global north and Africa in the rights debate. We believe that it is from this form of African renaissance that can emancipate the disability movement in Africa. Eventually, we hope that social justice, empowerment and genuine partnership would promote African disability rights, and ensure the realisation of the post-2015 sustainable development agenda.

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### **59. Book review of A.S. Kanter: The development of disability rights under international law: from charity to human rights (2014)**

Tsitsi Chataika

This ‘must read’ book presents an accessible, personal style and diverse content, which is clearly a reflective product of conversations, ideas and experiences Arlene Kanter has shared with several people in the fields of disability and law. She provides unique insights into the Convention on the Rights of Persons with Disabilities (CRPD) and how it evolved from its foundation as an international legal framework. A unique feature of this book is the author’s involvement in the CRPD generation process. Hence, the narrative reflects upon all aspects of the CRPD from personal and interactive perspectives. The author’s personal experiences clearly exhibited in this book, sets it apart from most disability rights texts, while at the same matching well-thought out academic writings. In this book, Arlene Kanter examines the status of the rights people with disabilities under the international law prior to the adoption of the CRPD. She further critically analyses the CRPD drafting process, its potential for achieving disability rights and its complexities from an insider’s perspective. This is so because Kanter made known her participation in the CRPD drafting process, an aspect that significantly enriches this text. Kanter further argues that by articulating what she refers to as the ‘new human rights’ (for example, the right to live in the community, accommodations and support) as well as new interpretations of existing human rights (for example, liberty, security, integrity, access to justice and freedom from torture and ill-treatment), the CRPD is not only significant for people with disabilities, but for the general development of international human rights law. Kanter strongly believes that the success of the CRPD rests on the extent to which individual countries enforce their own domestic laws and policies, guided by this international instrument. Apart from domesticating the CRPD, Kanter also takes the changing of societal attitudes towards people with disabilities as a critical element in ensuring access to disability rights.

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## **60. Global institutions and their engagement with disability mainstreaming in the south: development and (dis)connections**

Tsitsi Chataika and Judith A. McKenzie

With the increase of disability activism internationally, various global institutions and international development organisations have started to mainstream disability in their work, mostly at the level of rhetoric. Many have also developed disability statements and policies to guide their work. This chapter explores these developments, examining what strategies such organisations have adopted to introduce the disability strand in their work. At the same time, we provide a critique of how efforts at mainstreaming or including disability in their work is translated into practice. In the process, we, expose some barriers that continue to maintain disability on the peripheries of inclusive development; and practices that sometimes may work to the detriment of disabled people’s emancipation. We also briefly reflect on the World Report on Disability, exploring the possibilities of it being used as a catalyst to the institutions’ disability mainstreaming efforts. We draw on additional examples emerging from Africa where we reside, in the search for promising practices, where there is genuine disability mainstreaming by international agencies in trying to understand disability as an

ubuntu and development agenda.

## **FACULTY OF VETERINARY SCIENCE**

### **61. The epidemiology and ecology of *Bacillus anthracis* infections (anthrax) in wildlife/livestock interface areas in Zimbabwe**

Norman Leo Mukarati

Department of Clinical Veterinary Studies, Faculty of Veterinary Science, University of Zimbabwe.

#### ***Problem Statement***

This is an epidemiological study of anthrax at the wildlife / domestic livestock / human interface areas in Zimbabwe. The project is aimed at studying the incidence and pattern of anthrax outbreaks in wild and domestic animals at the interface and establishing the possible role of each animal species in disease propagation. Samples will be collected from known past anthrax carcass burial sites to isolate and identify the bacterial strains and elucidate the relationships of the various isolates by molecular techniques (molecular epidemiological study). Similarly, samples will also be collected from fresh cases as may occur during this project. Both wild and domestic carnivores will be studied through serology for their potential as sentinels for anthrax in the range. The project has three study sites namely, Great Limpopo Transfrontier Conservation Area (GLTFCA), Kaza-Kavango TFCA and Mana Pools each with three interface types denoting intensity of animal species interaction - porous, semi-porous and amorphous. These interface types alongside environmental and meteorological factors will be taken into account in this study for the better understanding and control of anthrax at the interface.

#### **Expected outputs / or outcomes from the research:**

The research will lead to a better understanding of the interaction of factors in the epidemiology and ecology of anthrax at the wildlife / livestock interface. This will improve predictability of anthrax at the interface and therefore enhance timely pre-emptive measures such as vaccinations to save domestic livestock and endangered wild animal species at the interface. This way, wildlife conservation alongside profitable livestock production will be promoted while also minimizing an important zoonosis from infecting humans. Further, the identification of *Bacillus anthracis* strains will lead to better understanding of the epidemiology of anthrax at the interface vis-à-vis the differential impact on animal species. The *B. anthracis* strains obtained will add to the global pathogen gene bank maintained by the world Organization for Animal Health (OIE) for development of diagnostic tests and vaccine development.

Other outputs will include improved surveillance for anthrax for better disease prevention measures, at least four publications in referred journals and a Doctor of Philosophy degree awarded by the University of Zimbabwe.

## 62. Milk production in goats on veld hay supplemented with selected legume forages

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**Problem:** Nutrition is a major constraint in smallholder livestock production; hence, the use of alternative sources becomes essential. Snyman, (2010c) observed lower kid mortality in supplemented does compared to those not supplemented during lactation. Alternative affordable sources of feed such as forage legumes that provide protein, vitamins and mineral elements, which are lacking in mature natural grassland pastures, especially during the dry season (Baloyi *et al.* 2008), can be an option. Therefore, this research was designed to investigate the effects of supplementing *Desmodium uncinatum*, *Mucuna pruriens* and *Vigna unguiculata* forage legumes to low quality veld hay on milk production in indigenous goats.

**Findings:** There was significant ( $P < 0.05$ ) difference in the milk yield of the goats on different treatments. Milk quality parameters were not significantly different ( $P > 0.05$ ) among goats on different treatments. Daily live weight loss was significantly higher ( $P < 0.05$ ) in goats on diets supplemented with Cowpea compared to the commercial goat feed, Silverleaf desmodium and Velvet bean. Feed conversion ratio was highest in goats supplemented with the Silverleaf desmodium, followed by Cowpea, however, they were not significantly different ( $P > 0.05$ ). These supplements have high protein level. Animals suffer from malnutrition in dry season thus affecting their potential performance. Hence the use of these feeds lead to better performance.

**Expected outcome:** The three selected legume forages used reflect that they can provide good quality forage for use as supplement to relatively low quality basal diets of veld hay on animals in the smallholder communal areas. Milk produced by these indigenous goats has unique characteristics (higher fat and protein content) making it better than the milk of specialised dairy goats.

### **63. Occurrence of zoonotic viruses of importance among bat populations in Zimbabwe and the risk factors involved**

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Professor Gift Matope - UZ Faculty of Veterinary Science  
Professor Lovemore Gwanzura/UZ College of Health Sciences  
Professor Davies Pfukenyi – UZ Faculty of Veterinary Medicine  
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**SUMMARY/DESCRIPTION OF PROJECT:** Bats have been recognized as carriers of important disease-causing zoonotic agents, such as rabies and filoviruses (Ebola and Marburg). These viruses can be transmitted directly from bats to people, or via livestock and companion animal host, or they can be transmitted indirectly via fomites. The study aims to identify zoonotic viruses in circulation among bat populations in Zimbabwe, the role of ectoparasites in viral transmission, seroprevalence among the human population at risk and the risk factors involved in the transmission of these viruses. A total of one thousand, two hundred blood and tissue samples will be collected from six bat species at specific sites, namely *Eidolon helvum*, *Epomophorus wahlbergi*, *Rousettus aegyptiacus*, *Nycteris thebaica*, [*Micropteropus pussilus* & *Nycteris Cambiensis*]. Ectoparasites found on the bats will also be collected. Blood samples will be collected from persons within the local community on a voluntary basis that is in-contact with infected bats populations. The serum samples from both bats and human will be tested for the presence of antibody using the ELISA, and the bat tissue samples and ectoparasites, will be tested for the presence of the viral genome using the RT-PCR, for both lyssaviruses and filoviruses. The risk factors involved in the transmission of zoonotic viruses from bats to human and domestic pets will be determined through the administration of a questionnaire among the local community.

### **64. Pharmacological and phytochemical studies of some Zimbabwean Ethnoveterinary medicinal plants used for animal wound management**

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This research project is focussed on the development of local or indigenous knowledge systems for the enhancement of public health and animal welfare. It was motivated by the realization that modern/conventional medicines though effective have disappointed many especially on issues to do with drug resistance, side effects and/or adverse drug events among other negatives associated with modern pharmaceuticals. Communities have knowledge systems passed from generation to generation that have sustained both human and animal life. Also it is important to note that many (humans and/or animals) world over are relying on herbal medicines for their primary healthcare needs. It is also factual that most modern medicines were derived from nature. The knowledge and practises in communities will guide much of the research activities to be done particularly which plants to investigate, methods of extraction, methods of assay, potential uses as well as possible drug developmental pathways to follow. Pharmacological (e.g. antimicrobial, anti-inflammatory, mutagenicity, etc.) and phytochemical (qualitative and quantitative) studies will be conducted on *Cissus quadrangularis* (Muvengahonye or Murunjurunju) stem and leaf, *Adenium multiflorum* (Chisvosve) and *Erythrina abyssinica* (Mutiti) bark and leaf extracts. Isolation and possible identification of promising compounds will be done. Also samples will be collected in a way that will minimize the impact on results of variations due to issues like seasons and geographical locations. Clinical trials will be conducted on relevant samples.

#### **65. PCR-based detection of Babesia species in ticks collected from dogs in Chinamora, Zimbabwe**

Ms E Gori, Briony Bray and Candiss Diamondis

Babesiosis is a disease of worldwide significance and there are 12 Babesia species affecting dogs. Three main subspecies of large Babesia infect dogs – *B.canisvogeli*, *B.caniscanis* and *B.canisrossi*, each transmitted by different vectors and differing in pathogenicity and geographical distribution. *B.canisvogeli* and *B.canisrossi* are thought to be endemic in Zimbabwe but no research has been done to confirm this. The small babesia, *B.gibsoni* and *B.annae* (*B.microti*-like) are thought not to be present in Zimbabwe. The main vectors of *B.canis* are *Rhipicephalus sanguineus* and *Haemaphysalis leachileachi*. Transmission to the vertebrate host is through saliva during blood meals, and the sporozoites directly infect red blood cells. The severity of babesiosis in dogs ranges from subclinical infection to mild anemia to widespread organ failure and death, depending largely on the Babesia species. Other factors include age, immune status and concurrent illness.

The most common clinical signs of babesiosis are hemolytic anemia and thrombocytopenia. Imidocarb dipropionate and diminazine aceturate are the most widely used anti-piroplasm drugs and can be supported with IV fluids and blood transfusions. Babesia specific species present and causing disease in Zimbabwe are not known. No research has been done on the presence of specific species of Babesia in Zimbabwe. Babesiosis is one of

the most important vector-borne diseases in Zimbabwe and the presence of different species presents a significant challenge to practitioners with regard to diagnosis and therapy.

Information from this study could aid the development of vaccines.

- Vaccination against babesiosis is registered in some countries but cross-immunity studies have shown that there is little or no cross-protection between the *Babesia* species due to antigenic differences. (Kramer, 2009)
- Combination vaccines show greater protection against heterologous challenge (Schetters et al, 2001), and have been developed in South African and Japan, but without confirmation of the species prevalent in Zimbabwe, there is the risk of introducing new species into the country

### **Main Objective**

To characterise the *Babesia* species present in ticks found on dogs in Chinamora, Zimbabwe by PCR

### **Objectives**

1. To determine the occurrence and prevalence of *Babesiacanis* in ticks removed from dogs
2. To determine the *Babesiacanis* subspecies present in ticks in Zimbabwe

### **Methodology**

*Babesia* species will be determined by PCR in ticks collected from dogs in Chinamora.

### **Expected outcomes**

Prevalence and types of *Babesia* species causing babesiosis in dogs will be determined.

## **66. Role of mechanical vectors in the transmission of *Anaplasma Marginale* in Zimbabwe.**

Dr Mudavanhu Nyagura

### **Problem statement:**

*Anaplasma marginale* in Zimbabwe is transmitted by *Boophilus*. Mechanical vectors are also reported to play a significant role in the transmission of *Anaplasma marginale*. The role of mechanical vectors has not been quantified and experiments to determine the relative efficiency of transmission of the *Boophilus* ticks and the mechanical vectors have not been done in this country. Control measures against anaplasmosis in this country are mainly targeted at controlling the tick vector and little attention to mechanical vectors for example tabanid flies without any data on relative efficiency of transmission of the parasite by these different vectors. Little is known about the genetic diversity of *A. marginale* isolates within individual herds in Zimbabwe

### **Expected results:**

The following data is expected from this study

- ✓ The genetic range of *Anaplasma marginale* in Zimbabwe
- ✓ The relative efficiency of transmission of *Anaplasma marginale* by the *Boophilus microplus* tick and the tabanid flies

## **67. Morphological, biochemical and behavioural effects of *Boophonedisticha* administration in induced neurodegenerative amnesia animal models**

Ellen Mwandiringana

### **Problem statement**

The specific cure for amnesia of Cognitive Dysfunction Syndrome and Alzheimer's disease is still unavailable and under investigation. However, prevalence of the conditions is increasing since modern medicine has increased the life span across many species. There is need to approach this situation at various angles including herbal options. Despite vast literature on traditional applications of *Boophonedisticha* for memory enhancement, the mechanism of action is not known, hence the need to investigate this aspect as well.

### **Findings**

#### *Morphological tests findings*

Histological sections of the hippocampus were evaluated for dentate gyrus arm width, cellular layers, cellular morphology and mature, immature, apoptotic, astrocytes and microglial cell counts. The sections for all the groups showed two molecular layers of the dentate gyrus with upper and lower granule cell arms made up of mature, immature, astrocyte, microglia and apoptotic cells all compactly packed in layers. Between the arms was the hilus with pyramidal cells (large cells with long processes), astrocytes and microglial cells

Results revealed that low dose *B.disticha* (10mg/kg) caused increased number of immature cells indicative of neuro-regeneration and is consistent with histological findings of Fluoxetine treated rats (see Table 1). High doses of *B.disticha* showed high number of mature cells, apoptotic cells and low number of immature cells suggestive of unabated neurodegeneration as shown in Table 1 below.

In conclusion, *B.disticha* hydroethanolic extract has a potential to treat neurodegenerative diseases at low doses (10mg/kg) because it caused neurogenesis in neurodegeneration-induced rats. However neurogenesis could not be solely attributed to *B.disticha* therapy, therefore it is recommended that immunohistochemistry be conducted in further studies to mark cells produced due to *B.disticha* therapy.

### **Expected outputs and/or outcomes from the research:**

1. Project is expected to provide material for DPhil for Ellen Mwandiringana.
2. Publications will be produced from this work and will be published in refereed journals.

3. Patent and drug development for neurodegenerative diseases including Alzheimer's disease and Cognitive Dysfunction Syndrome.

**68. Bovine dermatophilosis: Awareness, perceptions and attitudes in the small-holder sector of north-west Zimbabwe**

Ndhlovu DN and Masika, P.J

**Problem statement:**

There is a paucity of information with regards to farmers' perceptions, attitudes and usage of drugs with regards to the disease. Knowledge of these attitudes, perceptions and options will assist animal-health decision makers in developing optimum control and management strategies for bovine dermatophilosis.

**Findings**

The results showed that 45.4% of the herds were clinically positive for dermatophilosis and most farmers (79.5%) were generally aware that dermatophilosis was a cattle disease. In the event of a dermatophilosis outbreak in a herd, 74.1% of the farmers treated their cattle using antibiotics, the proportion of farmers treating cattle did not differ ( $p > 0.05$ ) across the diptanks. Fifty-two farmers (52/63) indicated that drugs had to be administered four to seven times before an animal recovered from infection. Tetracyclines were the antibiotics used by most farmers (79.3%) to treat dermatophilosis with 19.1% using penicillins. There were concerns raised by farmers about the effectiveness of these drugs against bovine dermatophilosis. Across the study sites, 48.6% and 27.6% of the farmers perceived bovine dermatophilosis to be an important disease at herd and area level respectively. A small proportion (12.4%) of the farmers regarded bovine dermatophilosis as a potential zoonotic disease. The high level of stockowners' general awareness, with regards to bovine dermatophilosis sets ideal conditions for the mobilization of farmers by animal health authorities, in the control of the disease. Further research however needs to be undertaken to investigate effective antibiotic delivery protocols and the potential zoonotic impact of bovine dermatophilosis in a situation of high disease prevalence.

**Expected outputs:** Influence policy and direction to be taken with regards to farmer training and management of dermatophilosis

**69. Risk factors associated with clinical dermatophilosis in smallholder sector cattle herds of Zimbabwe at the *A. variegatum* and *A. hebraeum interface***

D.N. Ndhlovu and P.J. Masika

**Problem statement:**

In Zimbabwe, research on bovine dermatophilosis has been conducted focusing on its control, prevalence and distribution(Chatikobo et al. 2001, Chatikobo et al. 2004, Chatikobo et al. 2009). Potential risk factors related to bovine dermatophilosis and its association with *A. variegatum* and *A. hebraeum* ticks have not been reported

### **Findings**

Across-sectional study was conducted to investigate factors for clinical dermatophilosis herd level positivity in smallholder dip tanks from Gokwe (Chemawororo, Gwanyika), Kwekwe (Koronika) and Chegutu (Chivero) Zimbabwe between September 2013 and April 2014. A total of 185 herds were clinically examined for disease and tick infestation. *Amblyommavariegatum* and *A. hebraeum* ticks were identified in situ with further laboratory confirmation. The potential herd-level risk factors for clinical dermatophilosis were tested using multiple logistic regression with herd infection status (positive, negative) being the binomial outcome and risk factors being predictors. Of the herds examined clinical bovine dermatophilosis was detected in 45% (84/185; 95% CI: 38.2, 52.6%) of the herds. The herd prevalence ranged from 6.9% (95% CI: 0.00, 16.7) to 56.7% (95% CI: 43.8, 69.6) with Chivero and Chemawororo dip tanks recording the lowest, and highest prevalence respectively. Herds infested with *A. variegatum* were associated with higher odds (OR= 6.8; 95% CI: 1.71, 27.10) of clinical dermatophilosis while the association was not significant ( $P > 0.05$ ) in *A. hebraeum* infested herds. A history of having bought cattle (OR=3.5; 95% CI: 1.09, 11.12) compared to not buying was associated with increased herd clinical positivity status. It was concluded that management practices aimed at movement and tick control would help reduce the prevalence of clinical dermatophilosis in cattle herds.

**Expected outputs:** Animal health decision makers are informed on potential risk factors for dermatophilosis and on how the disease should be managed.

**Keywords:** Fisher's exact test, ticks, exudative, univariate

## **70. Analysis of fat-soluble vitamins in milk by spectrophotometry**

C. Mascara

**Summary:** Measurements of vitamins A, D, E and K in milk and milk products is being attempted using spectrophotometry as an alternative to more expensive methods like HPLC. This will enable scientists to track the deterioration of milk from milking to consumption, and also verify the data on infant milk fortification.