



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
University of Botswana, Gaborone**

Dear Delegate

Firstly welcome to the first MURIA Group workshop and Symposium at the University of Botswana, Gaborone. This has been made possible with the help of the University of Botswana and their administration team, the Ministry of Health of Botswana, Botswana Public Officers' Medical Aid Scheme, IUPHAR and the Swedish Research Council.

We would like to thank everyone who has submitted an abstract to make this first MURIA symposium a success scientifically. We believe we have put together an interesting and stimulating programme to enhance future collaboration between us.

As you can see, the abstracts have been arranged into themes. These include anti-infectives including ARVs and antibiotics (pages 2 to 19) as well as a variety of drug utilisation issues and challenges (pages 20 to 37).

We would like to thank the reviewers as well as all members of the Scientific and Programme Committees for their time to make this programme as stimulating as possible.

We hope you enjoy the first MURIA symposium and look forward to future meetings, future collaborations and future scientific publications together.

Amos Massele and Brian Godman, Chairman and Secretary Scientific and Programme committees

ANTI- INFECTIVES



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Title of abstract:	Utilization of immunological markers in HIV/ART Monitoring: Towards universal ART access and effectiveness
Name of submitting author:	Dr. Sarah Nanzigu
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Details of other co-authors including their organizations/ affiliations:	<ul style="list-style-type: none"> • Lars Gustafsson, Karolinska Institutet • Jaran Eriksen, Karolinska Institutet • Paul Waako, Makerere University College of Health Sciences.
<p><i>Background:</i> Immunological and virological monitoring are both recommended for effective HIV/ART care, however, access to the latter is limited by resources, and it shouldn't take precedence over ART expansion or regimen change. This implies that low resource settings may continue to rely on immunological monitoring, even after universal ART access is achieved. CD4 cell values are the most employed immunological markers, however, variation in these values are reported. The extent of variation in health African populations is poorly documented and perhaps underestimated, but may affect HIV/ART outcomes.</p> <p><i>Objectives:</i> We studied variability in relevant baseline immunological characteristics in HIV negative and positive Ugandan populations, and explored its role in HIV/ART response. This was part of a PhD thesis project.</p> <p><i>Methods:</i> HIV seronegative Ugandans (n=206) were recruited for a cross-sectional study of variations in CD4 reference ranges, while records for 426 ART naïve, HIV infected Ugandans, were used to determine the effect of baseline CD4 cell values on immunological recovery.</p> <p><i>Results:</i> A fivefold difference in CD4 cell values (ref. range 418-2106) was observed for the HIV negative population, which is wider than the international reference range (500-1500) based on for HIV/ART clinical decisions. Low income, high altitude and prevalent tropical illnesses, were associated with lower CD4 cell values in the HIV seronegative population. On the other hand, poor immunological recovery was observed among patients who initiated therapy at very low baseline CD4 cell values; 26% of patients with baseline CD4 <100 cells/µl had immunological recovery, compared to 46% of patients with baseline CD4 ≥100 cells/µl. Although categorization was not done for most relevant demographic factors, patients from high altitude, and females, showed better immunological recovery potential.</p> <p><i>Conclusions:</i> Population characteristics, including immunological variations, affect HIV/ART response or its interpretation, and population based CD4 cell values may improve HIV/ART care.</p>	



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Title of Abstract	Assessment of nevirapine-related adverse reaction reports received from 2008 to 2011 in Namibia
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<p><i>Background:</i> Nevirapine's (NVP) manufacturer recommended the avoidance of NVP in females and males with baseline CD4 counts >250 and >400, respectively. This safety measure was impugned by researchers who found no difference in adverse reactions (AR) based on CD4-count. The WHO recommended NVP-based ART for patients with CD4-counts <350.</p> <p><i>Objective:</i> To find out whether the increase in CD4-count threshold for initiation of ART would result in an increase in number and severity of NVP-related AR.</p> <p><i>Methods:</i> We accessed Namibia's AR reports in VigiFlow®. NVP-related skin and liver adverse reaction reports: (1) received in 2011 were compared with those received in the Previous Years-; (2) were compared with the same reactions associated with other medicines-, using reporting ratio, proportional reporting ratio, and the Students T-Test.</p> <p><i>Results:</i> The database comprised of 1,074. NVP-related liver and skin reactions were 208 (2011) and 99 (Previous Years). The proportions of reports related to ARV in 2011 and Previous Years were comparable (RR=1; p=0.87). The NVP-related reactions were more in 2011 than in the Previous Years (43.2% vs. 16.7%: RR = 2.6; p <0.0001). Grade3 and 4 reactions related to NVP were more in 2011 than in the Previous Years (SKIN: 22.7% vs. 5.6%: RR = 4.1; p <0.0001; LIVER: 8.5% vs. 2.2%: RR = 3.9; p <0.0001), but not for grade1 & 2 reactions (SKIN: 8.5% vs. 6.2%; RR = 1.4; p =0.16; LIVER: 2.7% vs. 2.4%; RR = 1.1; p = 0.73).The increase in reports was observed for both female and male patients (p<0.01). The increase in grade3 and 4 reactions was unique to NVP.</p> <p><i>Conclusion:</i> A NVP safety signal was detected after shifting ART initiation to higher CD4 counts. The Ministry of Health halted the plan of initiating NVP-based ART in patients with high baseline CD4 counts, meaning that locally derived data can protect patients from drug-induced harm.</p>	



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Title of Abstract	Tenofovir Substitution in Namibia based on an Analysis of the Antiretroviral Dispensing Database
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<p><i>Background:</i> In the management of HIV infection, tenofovir is preferred to its predecessors in the antiretroviral therapy (ART) nucleoside backbone. Tenofovir's (TDF) preference is based on its safety profile. Nevertheless, TDF causes adverse reactions, some of which warrant its substitution. The substitution is suggestive of occurrence of TDF-related adverse reactions. The rate of substitution of TDF with another nucleoside reverse transcriptase inhibitor (NRTI) in Namibia was unknown.</p> <p><i>Objectives:</i> The objective of this review was to measure the rate of TDF's substitution for the period of January 1, 2008 to November 30, 2011, and to compare the gender difference in the rates of TDF's substitution.</p> <p><i>Methods:</i> We accessed antiretroviral medicine dispensing records from the national antiretroviral dispensing database (NDB). We selected patients who were started on a TDF-containing conventional ART regimen – 2NRTI+1NNRT. We used the initial and current ART regimens to identify records of TDF's substitution with another NRTI.</p> <p><i>Results:</i> A total of 84,741 patients were initiated on ART (Jan-1-2008 to Nov-30-2011); 52,612 patient-records were excluded from the analysis by exclusion criteria. Of the remaining 32,129 records, 59.4% (n=19 096) and 40.6% (n=13 033) were for female and male patients, respectively. Of these, 1.2% (n=380) had their TDF substituted with another NRTI. Of the females and males, respectively, 1.1% (95% CI: 0.9-1.3; n=210) and 1.3% (95% CI: 1.1-1.5; n=170) had TDF substituted with another NRTI. No gender difference was observed (p-value = 0.11).</p> <p><i>Conclusion:</i> The percentage of patients for whom TDF was substituted with another NRTI, possibly due to TDF-related adverse reactions, was within the current published limits. However, 1.2% is likely not a true representation of the percentage of patients who experience adverse events because some patients could have been maintained on TDF even in the presence of adverse events. Further investigation is required to determine the clinical reasons for TDF's withdrawal.</p>	



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Title of abstract:	Evaluation of adherence and treatment response among HIV-Infected patients on HAART in a primary healthcare clinic in South Africa.
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<p><i>Background:</i> The benefits of highly active antiretroviral therapy (HAART) in the management of HIV-infected patients are well established. HAART has been shown to improve CD4-cell counts, thus decreasing morbidity and mortality among HIV-infected patients through the suppression of plasma HIV-1 RNA.</p> <p><i>Objectives:</i> To evaluate adherence and treatment response of HIV-infected patients receiving HAART from a primary Healthcare clinic in South Africa.</p> <p><i>Methods:</i> Data were collected from 86 HIV-infected during a descriptive cross-sectional study using a standardized-questionnaire and face-to-face-exit interviews. Pill-counts technique was performed and adherence-rate of $\geq 95\%$ considered acceptable. Data were analyzed using SPSS 22.0. Univariate-factors associated with poor-adherence to HAART were assessed using ANOVA and $p \leq 0.05$ considered statistically significant.</p> <p><i>Results:</i> Of 86 HIV-infected patients, 63(73.3%) were females and 23(26.7%) males and were enrolled on HAART for $35.5(\pm 31.8)$ months ranging from 1–137 months with mean age (\pmSD) of $35.6(\pm 9.6)$ years. Of these, 27(31.40%) and 25(29.07%) were on WHO stages 2 and 3 respectively. Adherence-rate computed from 32 patients revealed 23 (71.9%) having poor adherence-rate. Whilst the mean CD4-count at the initiation of HAART was $232.4(\pm 169.2)$ cells/mm³, the latest was $433.7(\pm 242.9)$ cells/mm³. Thirty-two (37.2%) patients on Lamivudine (3TC), Tenofovir (TDF) and Efavirenz (EFV) (regimen 1A-TDF) 24(75%) had poor adherence-rate. The commonest adverse effects (ADEs) experienced by patients on regimen 1A-TDF and TDF, Emtricitabine (FTC) and EFV (regimen FDC) were CNS-related (35.3%) followed by ENT (23.3%).</p> <p>Among the evaluated variables, those associated with poor-adherence to HAART were: salary \geq R2000 ($\chi^2=4.3, p=0.043$); WHO-staging 2 and 3 ($\chi^2=12.09, p=0.007$) and total number of other tablets (≥ 4 combined tablets) ($\chi^2 = 10.81, p=0.029$). Although there was no association between recent CD4-levels and adherence-rate ($p=0.40$), all patients with CD4-levels above 500 cells/mm³ were non-compliant. Despite no association between educational-level and adherence-rate ($p=0.36$), all patients with primary- level of education were non-compliant.</p> <p><i>Conclusions:</i> Despite an observed overall improvement of patients' immune response following HAART, poor- adherence remains a major challenge. ADEs associated with regimen 1A-TDF and the burden associated with the use of ≥ 4 combined tablets, clinical improvement, and lower earnings remain the contributing factors</p>	



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Title of abstract:	A Systematic Review of Efavirenz and Neuropsychiatric Side Effects
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<p><i>Background:</i> Efavirenz is part of the first-line treatment for human immune-deficiency virus (HIV). Studies have shown that almost half of the patients who are initiated on efavirenz will experience some form of neuropsychiatric side effect.</p> <p><i>Objectives:</i> The aim of the study is to provide an overview of the literature on the neuropsychiatric side effects caused by efavirenz.</p> <p><i>Methods:</i> A comprehensive review was conducted by selecting and reviewing all studies concerning HIV-positive patients on efavirenz reporting neuropsychiatric side effects. The articles included spanned the time period January 2001 to December 2014. The total number of articles amounted to 13.</p> <p><i>Results:</i> The age range of patients across all studies was 37 to 41 years with a high percentage of all populations being male. The scales used to measure the incidence and severity of side effects varied between the studies. The most commonly reported side effects included sleep quality (nine studies), depression (eight studies), dizziness (seven studies) and anxiety (seven studies). The studies showed that the side effects were generally mild and did not warrant the discontinuation of efavirenz.</p> <p><i>Conclusions:</i> Due to the varying nature of the measuring scales used, the studies cannot be directly compared. Older patients were not made part of any population and need to be included for completeness of the HIV population. The severity of the HIV or WHO stage of disease was not mentioned in any of the studies. This could be a possible risk factor for the onset of neuropsychiatric symptoms. Generally patients with psychoses have not been included in studies concerning efavirenz as it is not common practice to use efavirenz in this population. However, as efavirenz does not commonly induce severe side effect that warrant discontinuation, it could be considered that efavirenz may also be used in psychiatric patients with a similar outcome.</p>	



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Title of abstract:	Variabilities in Efavirenz Pharmacokinetics, Pharmacogenetics and Therapeutic Outcomes among HIC Treatment Naïve Ugandans
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<p><i>Background:</i> Efavirenz-based HAART is preferred for first line, including in patients with HIV-TB co-infection. However, variations in pharmacokinetics of efavirenz are widely documented, questioning the generalization of doses currently used.</p> <p><i>Objectives:</i> We studied variations in the pharmacokinetics and pharmacogenetics of efavirenz in HIV-infected Ugandans, explored its role in HIV/ART response, and made a genotype-based efavirenz dose recommendation for the adult population. This was part of a PhD thesis project.</p> <p><i>Methods:</i> A total of 263 HIV positive, ART naïve Ugandans, of which 157 were TB co-infected, were recruited and followed for 8 months after starting ART. Their data were used to study the effect of pharmacogenetics and antituberculous treatment on efavirenz pharmacokinetics. Population pharmacokinetic modelling of data from 99 of the HIV only patients was done to determine the optimal genotype-based efavirenz dosing for the population. A one-compartment model with first-order absorption (NONMEM) adequately described the data.</p> <p><i>Results:</i> Variations in efavirenz pharmacokinetics were observed, and 95% of the patients reached steady state maximum plasma concentrations (C_{max}) above the recommended range of 3.2-12.6 $\mu\text{mol/L}$. Efavirenz-related central nervous system toxicity was observed in 40 (69%) of 58 patients who were evaluated, and 95% of these had efavirenz plasma concentrations above the recommended range. CYP2B6 genotype influenced efavirenz clearance and plasma levels, irrespective of rifampicin co-administration. Patients with CYP2B6*6/*6 genotype had lower apparent oral clearance and higher plasma concentrations of efavirenz, while efavirenz autoinduction was prominent in CYP2B6*1/*1 genotype. Basing on the PPK model, efavirenz exposure was twice as high among patients with CYP2B6*6/*6 genotype compared to those without the mutation. Daily doses of efavirenz 450 mg and 300 mg, gave adequate drug exposure in the general and CYP2B6*6/*6 Ugandan adults populations, respectively.</p> <p><i>Conclusion:</i> Population genetics affect the pharmacokinetics and response to antiretroviral treatment, and pharmacogenetic-based dose modifications of antiretroviral therapies is needed.</p>	



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Title of abstract:	Drug use Policy and its' Impact on Antibacterial Prescribing in Government Hospitals in Swaziland
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<p><i>Background:</i> Several factors affect how physicians select the antibiotics they prescribe. For any particular diagnosis, doctors' choices may be limited either by costs, availability of medicines and most importantly by government policy. Since the goal of pharmacotherapy is to make drug use as rational as possible, this study was conducted not only to investigate how government's drug use policy affect the rational use of antibacterials but to also identify interventions which can improve the rational use of antibiotics in the Kingdom of Swaziland.</p> <p>The objectives were to:</p> <ul style="list-style-type: none"> • The ultimate purpose of this drug utilization study was to determine whether drug therapy has been rationalized or not. • Determine how government health policies impact on drug use and especially on antibacterial use. • Determine the various classes of antibacterial being used and why they are the preferred choice. • Quantitatively determine the amount of antibacterial drugs used (by number of doctors' prescriptions issued per unit of drug agent) within the study period. • Determine the antibacterial prescribing habits of doctors and make important recommendations on how to improve rational antibacterial use. <p><i>Methods:</i> A questionnaire survey was conducted among 17 medical doctors practicing at Raleigh Fitkin Memorial Hospital, Piggs Peak Hospital and Family Life Association Clinic (FLAS). All these health care facilities are based in Swaziland.</p> <p><i>Results:</i> Among antibacterial drugs used over 12 months, amoxicillin was the most often used (182,038 prescriptions), ceftriaxone was the second most often used (104,988 prescriptions), metronidazole was third (98,141 prescriptions), penicillin V.K. was fourth (72,352 prescriptions) and erythromycin was fifth (28,368 prescriptions). The most common diagnoses across several departments were respiratory tract infections, sexually transmitted infections, urinary tract infections, pelvic inflammatory disease, gastroenteritis, skin infections, wound infections, meningitis and ear infections. No correlation was found between Swaziland's drug policy and doctors' prescribing in government hospitals. Doctors prescribed on the basis of patient diagnosis and drug availability.</p> <p><i>Conclusions:</i> Antibacterial use in Swaziland government hospitals may be considered irrational due to the lack of essential antibiotics. Irrespective of diagnosis, doctors used only a small range of mostly broad spectrum antibacterials. In order to improve the rational use of antibiotics, it is important that the government and facilities management should first establish and strengthen an effective antibiotics drug management systems and therapeutic committees in hospitals which will comprise of doctors, pharmacists, microbiologists and hospital managers. Increase the availability and variety of appropriate antibiotics especially those that are pathogen specific. Ensure that hospitals have adequate laboratory facilities with well equipped modern diagnostic equipments and chemicals reagents for laboratory cultures and sensitivity tests.</p>	



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Title of abstract:	Antibiotic prescription patterns in HIV infected patients - an analysis of the relationship between CD4 count and antibiotic treatment outcomes at a tertiary care hospital in Botswana.
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<p><i>Background:</i> While HIV related bacterial infections require antibiotic therapy the demand for antibiotics and the consequent drug resistance are on the rise. Prescription pattern, profiles the extent of antibiotic use to improve appropriateness. The relationship between CD4 cell counts and the outcomes of antibiotic treatment are unknown.</p> <p><i>Objectives:</i> The study describes antibiotic prescription pattern in hospitalized adult HIV patients and examines if there is a relationship between CD4 cell count and the outcomes of antibiotic treatment.</p> <p><i>Methods:</i> Retrospective cross sectional review and correlational design was used. Demographic and disease characteristics; selected WHO core drug use indicators and Defined Daily Dose [DDD] were used for description of prescription pattern and consumptions. Spearman's rho correlation (r_s) test and Point biserial correlation test r_{pbi} were used to examine relationships.</p> <p><i>Results:</i> Empiric prescribing was rampant; Culture and Sensitivity Test [CSTs] orders rare. 85.81% of antibiotics prescribed in generic names; 85.71% of injectable antibiotics amounting to 51.77% of prescriptions consumed 98.87% of the antibiotic cost. Only 16.35% of GIT stable patients had an oral switch. Average cost per encounter was 357.37BWP (36.44USD). 91.31% of prescribed antibiotic doses administered; all antibiotics prescribed from Botswana Essential Drugs List. Consumption of Cefotaxime 1g injection was 66.5 DDD/100 bed days; 39.2 and 17 DDD/100 bed days for Cotrimoxazole 480mg tablets and Amoxicillin with Clavulanic acid 375mg tablets respectively.</p> <p>Correlation studies revealed very weak positive correlation between CD4 count and Clinical Response Time; very weak negative correlation for Length of Hospital Stay and weak negative correlation for In-Patient Mortality that were not statistically significant.</p> <p><i>Conclusions:</i> Restrictive antibiotic policies, guidelines and stewardship programs that promote appropriate antibiotic use are crucial. No significant relationship observed between CD4 counts and identified outcomes of antibiotic therapy. Further studies warranted to examine the factors that are associated with empiric prescribing behavior in HIV prevalent settings.</p>	



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Title of abstract:	Making Antibiotic Choices: Formula Derivation and Usage in the Rational Selection of Antibiotics in the Empirical Treatment of Infections
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<p>Background: Antibiotic prescribing in the empiric treatment of infections is commonly done in medical practice. Done appropriately this option of infection treatment can be cost effective and life-saving. Done inappropriately however, it orchestrates the stage for antibacterial resistance development, much as it serves as a cause of failures in the treatment of infections. As a mainstay of infection treatment, particularly in developing countries, providing practical and feasible means of selecting antibiotics in the empirical treatment of infections is seen as a realistic and very important approach to promoting appropriate prescribing and use of antibiotics.</p> <p>Objectives: The study principally aimed at developing mathematical formulae to aid the appropriate selection of antibiotics in the empirical treatment of infections.</p> <p>Methods: Data from records of culture sensitivity test results within a circumscribed clinical environment comprising five hospitals in Lesotho were compiled and analysed to ascertain bacterial pathogen associations with infections and the sensitivities of same to prescribed antibiotics. Formulae quantifying the characteristics of antibiotics with regard to their cost and activities against associated bacterial isolates of given infections were derived from probability laws. Applicability of derived formulae in the rational selection of antibiotics was demonstrated in selecting antibiotics most appropriate in the empirical treatment of urinary tract infections (UTIs) among inpatients of our confined clinical environment of study.</p> <p>Results: <i>Escherichia coli</i>, <i>Klebsiella</i> spp, <i>Proteus</i> spp, non-haemolytic Streptococci, <i>Streptococcus pyogenes</i> and <i>Pseudomonas</i> spp in that order were identified as the most common uropathogens isolated within our circumscribed clinical environment of study. Two mathematical formulae were derived and used in quantifying the activity and cost characteristics of prescribed antibiotics. Cefotaxime and ciprofloxacin were considered most appropriate for use in treating UTIs empirically among inpatients within our study site hospitals.</p> <p>Conclusions: Quantifying and using procedurally antibacterial activities and cost characteristics of antibiotics provides a feasible means of making antibiotic choices in the empirical treatment of infections.</p>	



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Title of abstract:	Assessment of the appropriateness of antibiotic prescriptions in Lesotho public hospitals: a novel methodology based on principles of antibiotic prescribing
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<p>Background: Inappropriate prescribing and use of antibiotics is a worldwide problem and a known cause of antibiotic resistance. Antibiotic prescriptions are audited for appropriateness most often by determining extents to which antibiotics are prescribed in conformity with treatment guidelines or with some criteria of appropriateness determined by panels of antibiotic experts. In clinical environments where neither elaborate antibiotic treatment guidelines nor services of antibiotic experts are available it may become necessary to access the appropriateness of antibiotic prescriptions using alternative approaches.</p> <p>Objectives: The study primarily aimed at assessing the appropriateness of antibiotic prescriptions using an assessment tool formulated from principles of antibiotic prescribing.</p> <p>Methods: Relevant data on procedures of infection diagnosis and prescribed antibiotics were retrospectively collected from both inpatient and outpatient case reports. These were analysed to ascertain the appropriateness of prescribed antibiotics. A novel approach based on prescriptions' conformities to sets of criteria developed from principles of antibiotic prescribing was used. Computer instructions that examined prescriptions' conformities to the criteria sets were developed for the purpose. These were encoded into the statistical programme employed in data analysis and used to run the data. The procedure classified the prescriptions into seven predetermined categories of appropriateness as ascertained by the extents to which they satisfied predefined conditions.</p> <p>Results: Antibiotic prescriptions emanating from inpatient and outpatient settings were successfully categorized into groupings of different degrees of appropriateness. Up to 32.2% of 307 inpatient and 78.4% of 865 outpatient prescriptions assessed were found appropriate for the empiric treatment of infections for which bacterial pathogens were considered absolute or possible aetiologies.</p> <p>Conclusions: The use of a prescription assessment tool based on principles of antibiotic prescribing is a feasible option of assessing the appropriateness of antibiotic prescriptions. For its cheapness and versatility we recommend its adoption in antibiotic prescribing studies, particularly in low income countries.</p>	



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Title of abstract:	Evaluation of antibiotic use in the treatment of acute respiratory infections (ARI) in children under-five at households in Kampala-Uganda
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Details of other co-authors including their organizations/ affiliations:	Kagoya Harriet Rachel ; <i>MPH; MBA-Project management</i> School of Public health, Faculty of health science Makerere University Kampala - Uganda
<p><i>Background:</i> Self-medication with antibiotics at households is a common practice in Uganda. Despite that most ARI are of viral aetiology, their symptoms overlap those of malaria and bacterial infections. Unfortunately limited medicine use evaluations focus on strengthening household use of antibiotics in the management of ARI in children under-five years.</p> <p><i>Objectives:</i> We evaluated the use of antibiotics in the management of ARI in children under-five years with ARI at households in Kampala Uganda.</p> <p><i>Methods:</i> A study was of a descriptive cross-sectional observational design. Households were selected from five divisions of Kampala using the WHO 30-cluster method. Caretakers of children under-five were interviewed using a questionnaire in June - July 2011. The main outcome variable was use of antibiotics in management of ARI. Data analysis was done using SPSSv21 by chi-square and Pearson correlation tests.</p> <p><i>Results:</i> Out of the 200 households, common cold with cough was the most prevalent ARI syndrome 98(49%; $p < 0.001$). Most ARI cases 107(53.5%; $p = 0.322$) were inappropriately managed. The rate of antibiotic use in ARI was 86 (43%; $p < 0.001$). Amoxicillin 27/86(31.4%) and cotrimoxazole 26/86 (30%) or both 11/86 (12.8%) were the most used antibiotics. Antibiotics were mainly used to treat common cold with coughs 40/86 (46.5%) or a common cold 13/86 (15.1%) or common cold, cough with sinusitis 11/86 (12.7%) or common cold cough with sore throat 9/86 (10.5%). There was a significant correlation between antibiotic use and the presence of pneumonia symptoms, level of education of caretaker, source of the medicines.</p> <p><i>Conclusions:</i> The household use of antibiotics in the management of ARIs in the under-fives in Kampala is suboptimal. Overlap of ARI symptoms is a key driver in overuse of antibiotics at households. Household based medicine use evaluations and interventions may strengthen the rational use at community level.</p>	



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Title of abstract:	Antibiotic dispensing behaviour: Public and private sector pharmacies in Nelson Mandela Bay, South Africa
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<p>Background: Overprescribing often leads to the misuse and overuse of various antibiotics. As a result, antibiotic resistance is an emerging global threat which needs to be addressed. In addition, pharmacists' antibiotic dispensing behaviour need to be analysed, irrespective of the happenings in pharmacy.</p> <p>Objectives: The primary aim of the study was to assess antibiotic dispensing behaviour in public and private sector pharmacies. Also, to determine factors that influence pharmacists' dispensing behaviour.</p> <p>Methods: This study exposed BPharm students to aspects such as qualitative research. To achieve this educational objective, and the objectives of the study, only one focus group was conducted. The focus group involved four pharmacists with experience in public and private pharmacy in the Nelson Mandela Bay area. Digital voice recorders were used to record the focus group. The duration of the focus group was 45 minutes. Thematic analysis was conducted to identify important themes.</p> <p>Results: Themes identified that the socio-economic status of patients, patient satisfaction, their knowledge of antibiotic indications and the professional relationship with health care professionals influence the prescribing behaviour of doctors. Also, patient expectations and patient satisfaction affected private sector institutions more than public sector institutions. Furthermore, their limited knowledge of the efficacy and use of antibiotics contribute to the misuse thereof in both sectors. Participants also indicated that pharmaceutical companies influence doctors' prescribing behaviour and pharmacists' dispensing behaviour respectively.</p> <p>Conclusions: These themes impact doctors' prescribing decisions, and as a result, influence pharmacists' dispensing behaviour. It is evident that the effective use of antibiotics requires the participation of doctors, pharmacists and patients.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
University of Botswana, Gaborone**

Title of abstract:	An audit of compliance with the antimicrobial prescribing care bundle in Internal Medicine at University Teaching Hospital in Zambia
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<p>Background: Antibiotics are one of the most widely prescribed drugs in the hospital setting. A significant proportion (50%) of antibiotic usage within hospitals has been described as inappropriate. Antimicrobial stewardship audits ensure appropriate prescribing thereby preventing/delaying emergence of antimicrobial resistance.</p> <p>Objectives: The overall aim of this clinical audit project was to pilot the implementation of an adapted antimicrobial prescribing care bundle, and to compare compliance of antimicrobial prescribing with the care elements (standards) of the antimicrobial prescribing care bundle before and after implementation.</p> <p>Methods: A prospective quasi – experimental clinical audit project was conducted on medical wards. The study comprised a control phase prior to implementation of an adapted 'Start smart, then focus' care bundle and an intervention phase following implementation. The study involved review of clinical records of 128 study patients on selected parenteral antibiotics in each study phase.</p> <p>Results: The percentage compliance of prescribing antibiotics in the presence of clinical evidence of bacterial infection was 87.5% and 90.6% in the control and intervention groups respectively ($p = 0.022$). The percentage compliance with respect to collection of appropriate culture specimens was 65.6% in the control group and 71.9% in the intervention group ($p < 0.001$). The percentage compliance of antimicrobial prescribing with documentation of appropriate prescribing decision option by 48 hours of antimicrobial therapy was 50% in the control group and 64.8% in the intervention group ($p < 0.001$). The percentage overall compliance with all care elements was 5.5% in the control group compared to 35.9% in the intervention group ($p = 0.044$).</p> <p>Conclusions: Implementation of an antimicrobial prescribing care bundle was associated with improvement in the quality of antimicrobial prescribing in terms of compliance with care elements of the bundle.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
University of Botswana, Gaborone**

Title of abstract:	Fluoroquinolone prescribing patterns in the private healthcare sector of South Africa, 2005-2012
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<p><i>Background:</i> Increased prescribing of antibiotics is a global concern.</p> <p><i>Objectives:</i> To investigate longitudinal prescribing patterns for fluoroquinolones in the South African private healthcare sector.</p> <p><i>Methods:</i> A retrospective analysis of medicine claims data (National Pharmaceutical Product Index codes, number of dosages dispensed, number of days' supply) of 3 788 438 patients older than 18 years (male/female ratio 1.2:1), obtained from a nationally representative Pharmacy Benefit Management company (PBM), was conducted. Fluoroquinolones were classified using the ATC index. Data were expressed in the average DDD/prescription/patient/year and the DDD/1000 inhabitants/day (DID). All statistically significant results were considered with a probability of $p < 0.05$.</p> <p><i>Results:</i> Fluoroquinolones represented 28% of all antibiotic prescriptions (N=7 069 563) claimed during the study period. A mean of 1.45 ± 0.92 (95% CI 1.44 - 1.45) prescriptions were claimed per patient in 2005 compared to 1.31 ± 0.71 (95% CI 1.31 - 1.32) during 2012 (Cohen's $d=0.2$). The association between prescriptions and gender ($p < 0.0001$, Cramer's $V = 0.02$) and age groups ($p < 0.0001$, Cramer's $V = 0.04$) was statistically but not practically significant. Ciprofloxacin [1.30 DID(2005) vs. 1.19 DID(2012)], levofloxacin [0.46 DID(2005) vs. 0.67 DID(2012)] and moxifloxacin (0.51 DID(2005) vs. 0.44 DID(2012)) were most claimed. The average DDD/prescription/patient/year for ciprofloxacin increased from 4.12 ± 3.21 (95% CI 4.10 - 4.13) in 2005 to 4.84 ± 2.27 (95% CI 4.83 - 4.86) in 2012 ($p < 0.0001$, Cohen's $d=0.2$), vs. 5.47 ± 4.57 (5.43 - 5.52) in 2005 to 7.52 ± 3.72 (7.48 - 7.56) during 2012 for levofloxacin ($p < 0.0001$, Cohen's $d=0.5$), and 5.89 ± 5.45 (5.85 - 5.94) in 2005 to 5.90 ± 4.84 (5.84 - 5.96) in 2012 for moxifloxacin ($p < 0.0001$, Cohen's $d=0.002$).</p> <p><i>Conclusions:</i> Although prescriptions decreased, the total amount of the drug dispensed for more popular active substances increased, warranting further investigation.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
University of Botswana, Gaborone**

Title of abstract:	Dispensing of co-amoxiclav to elderly patients: A database analysis
Name of submitting author:	Dr Theunis J van W Kotze
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Details of other co-authors including their organizations/ affiliations:	Prof Ilse Truter, Leader, DURU, Nelson Mandela Metropolitan University Dr Brent C Knoesen, Postdoctoral candidate, DURU, Nelson Mandela Metropolitan University
<p><i>Background:</i> Amoxicillin with clavulanic acid (co-amoxiclav), a combination of a penicillin and a beta-lactamase inhibitor, is prescribed for a wide range of bacterial infections. It is available commercially in various fixed-dose combinations.</p> <p><i>Objective:</i> To analyse the dispensing patterns of co-amoxiclav to elderly patients with emphasis on the spectrum of fixed-dose combinations.</p> <p><i>Methods:</i> A retrospective drug utilisation study was conducted on a dispensing database for 2013. All prescriptions for co-amoxiclav dispensed to patients 60 years and older were extracted and analysed.</p> <p><i>Results:</i> A total of 51951 co-amoxiclav products were dispensed to 37949 elderly patients. Patients were dispensed on average 1.37 (SD=0.83) co-amoxiclav products during the year. The average age of patients was 69.27 (SD=7.74) years. More products were dispensed to male patients (56.47% of products) compared to female patients (43.53%). Most products were tablets, followed by suspensions (2.85%). Only one injection was dispensed. The average cost per product was R126.06. Prescribing peaked in the winter months (May to August), with 39.09% of products dispensed during these months. Ten different dosage strengths and formulations were dispensed. The combination of 125 mg clavulanic acid and 875 mg amoxicillin in tablet form was the most frequently dispensed (59.94% of all products dispensed), followed by the combination of 125 mg clavulanic acid and 500 mg amoxicillin (14.70% of all products dispensed). One trade name product accounted for 31.29% of all co-amoxiclav products dispensed. The 62.5 mg clavulanic acid and 250 mg amoxicillin per 5 ml suspension was the most frequently dispensed suspension (30.09% of all suspensions dispensed). Interestingly, most suspensions (81.24%) were dispensed to younger patients (60 to 69 years). Only 9.92% of products were linked to ICD-10 codes. Of these, diseases of the respiratory system (J) were the most common.</p> <p><i>Conclusions:</i> One specific combination and one specific trade name dominated prescribing.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
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Title of abstract:	Knowledge and behaviour surrounding antibiotic prescribing
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<p><i>Background:</i> Inappropriate antibiotic use is an increasing public health issue leading to increasing antimicrobial resistance. Knowledge and perceptions regarding antibiotics and subsequent prescribing behavior are key to future antibiotic prescribing with a number of activities undertaken across countries to improve subsequent prescribing.</p> <p><i>Objectives:</i> Undertake an extensive literature review across countries, including studies in Namibia, to ascertain current knowledge and behavior towards antibiotics. Subsequently, use the findings to guide future health authority and hospital activities.</p> <p><i>Methods:</i> Principally an extensive literature search from 1990 to 2014 across all sectors of care including ambulatory and hospital care</p> <p><i>Results:</i> 19 articles were included in the review; 8 in ambulatory care, 7 in hospital settings, and 4 in both, across all countries. This included a recent study from Namibia identifying inappropriate practices, e.g. (i) only a limited number of physicians (17%) send samples for microscopic identification prior to prescribing antibiotics, (ii) physicians in Namibia recognise the need for guidelines/ further training to improve prescribing, similar to studies from the Congo and Lesotho. Overall, the systematic review demonstrated that physicians still have inadequate knowledge and misconceptions generally about antibiotic prescribing. Moreover, some physicians although aware that antibiotics are of limited benefit in certain conditions still prescribed them. Several factors influenced the prescribing of antibiotics including patients' expectations, severity and duration of infections, uncertainty over diagnosis, potentially losing patients to other physicians and the influence of pharmaceutical companies. Pocket-sized guidelines including the Sanford Guidelines were generally seen as an important source of information for physicians.</p> <p><i>Conclusions:</i> Inadequate knowledge of prescribing was prevalent among physicians. However, many physicians were interested in improving their antibiotic prescribing. Multifaceted interventions targeting all key stakeholders including patients are needed to improve future antibiotic prescribing. This is happening in a number of countries leading to improvements in prescribing and reduced resistance.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
University of Botswana, Gaborone**

Title of abstract:	Pharmacists' perceptions of the prescribing and use of antibiotics in primary care in Nelson Mandela Bay, South Africa
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Details of other co-authors including their organizations/ affiliations:	Dr Brent C Knoesen Drug Utilization Research Unit (DURU), Nelson Mandela Metropolitan University
<p><i>Background:</i> Antibiotics deserve their place as one of the most powerful pillars of modern medical care, but it is reported that the development of antibiotic resistance seems to be emerging faster than the availability of new antibiotics. This is widely recognised as a major threat to public health.</p> <p><i>Objectives:</i> The primary aim of the study was to determine pharmacists' perceptions of the prescribing and use of antibiotics in primary care in Nelson Mandela Bay, South Africa.</p> <p><i>Methods:</i> A questionnaire survey on antibiotic prescribing and usage were conducted in pharmacies during 2014. Purposive sampling was used.</p> <p><i>Results:</i> Eighty percent of respondents were of the opinion that antibiotics are overprescribed. Amoxicillin, or the combination of amoxicillin with clavulanic acid, was indicated by 87.5% of respondents as the most often dispensed in their pharmacies, with azithromycin, clarithromycin and ciprofloxacin also commonly dispensed. One trade name product was mentioned by 43.8% of respondents as the antibiotic product they most often dispensed. The most common diagnoses for which antibiotics were dispensed were upper respiratory tract infections (URTIs) and sinusitis. On average more females (60.0%) were dispensed antibiotics. Most antibiotics were dispensed to adult patients (44.4%) and children (23.1%). On the question whether respondents think that pharmacists should prescribe antibiotics, 50.0% of pharmacists indicated that they do not agree and 31.3% agreed. The main reason given was that pharmacists are not qualified to diagnose. However, with further training they will be able to diagnose minor ailments and advise prescribers.</p> <p><i>Conclusions:</i> The most common use for antibiotics in this study was for URTIs, with one antibiotic dominating prescribing. Although pharmacists were of the opinion that they are not qualified to prescribe antibiotics, it was clear that there is a role for pharmacists in advising prescribers on the rational use of antibiotics.</p>	

Others including
epilepsy, IBS,
mental health,
elderly and
generics



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
University of Botswana, Gaborone**

Title of abstract:	Drug use pattern in patients with epilepsy: Effect on drug compliance, seizure control and reports of adverse effects.
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<p>Background: Comorbidities are observed in epilepsy like other medical conditions. These comorbidities sometimes require treatment thus increasing drug burdens and the possibility of drug interactions. These may subsequently affect compliance, seizure control and reports of adverse effects.</p> <p>Objectives: This study will assess the effect of co-administration of other drugs on compliance, reports of adverse effects and seizure control in patients on carbamazepine monotherapy for the treatment of epilepsy.</p> <p>Methods: This is a descriptive study in which 84 patients with epilepsy on carbamazepine monotherapy for at least 9 months were assessed. Drug compliance was defined as adherence to prescription in terms of frequency and dosage. Seizure control was defined as seizure freedom for at least 6 months. Liverpool adverse effect profile score was used to document and grade the severity of adverse effects. The medications used were documented.</p> <p>Results: A total of 21 (25%) were on other medications which include antihypertensive drugs -8, amitriptyline-7, propranolol-2, aspirin-7 and multivitamin supplements-3. Some participants took more than one drug. Amitriptyline was used to treat neuropathic pain in one patient and for prevention of primary headaches in addition to propranolol. Four (19%) of these were compliant to therapy in contrast to 28 (44.4 %) who were only on carbamazepine. ($p = 0.038$) A total of 42.9% of patients on carbamazepine only were seizure free compared to 38.1% in the other group. ($p = 0.70$) Similarly, 35.7% of those on carbamazepine only reported adverse effects while 28.6% of patients who took other medication reported adverse effects. ($P = 0.43$) There was no difference in severity of adverse effects between the two groups. ($P = 0.60$).</p> <p>Conclusions: Compliance was significantly lower in patients who were co-administered other drugs however, there was no significant difference in seizure control or reports of adverse effects.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
University of Botswana, Gaborone**

Title of abstract:	One-day Drug Utilization Review of Prescribing Practices and Patterns at Kenyatta National Hospital Out-Patient Department (Pharmacy 15), Kenya
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<p>Background: Bad prescribing habits lead to ineffective and unsafe treatment, exacerbation or prolongation of illness, distress and harm to the patient and higher costs. Monitoring of prescriptions and drug utilization studies can identify the problems and provide feedback to prescribers so as to create awareness about irrational use of drugs.</p> <p>Objectives: The study sought to evaluate the prescribing practices and patterns at Kenyatta National Hospital outpatient department (Pharmacy 15).</p> <p>Methods: A sample of 60 prescriptions was selected by systematic random sampling. Data from the prescriptions was abstracted using a pre-designed data collection form, entered into and analyzed using Excel software.</p> <p>Results: The average number of drugs prescribed per prescription was three. Only about two-thirds (65%) of the prescribed drugs were actually dispensed at Pharmacy 15. Slightly more than half (52%) of the drugs were prescribed by generic name. Fixed-dose combination drugs accounted for majority (70%) of the drugs prescribed using brand names. Prescribing by brand names was highest in interns and registered clinical officers (61%). Almost all drugs prescribed (95%) were consistent with the hospital tender list.</p> <p>Conclusions: In order to increase the number of drugs actually dispensed and minimize stock outs, there should be prompt ordering from the main pharmacy store, consistent updating of bin cards in the pharmacy and adequate funding for procurement of drugs. All prescribers need to be sensitized on the need and benefits of generic name prescribing as well as avoiding polypharmacy. There is urgent need for a hospital formulary.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
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Title of abstract:	CO-MORBIDITY OF AND TREATMENT FOR IRRITABLE BOWEL SYNDROME, DEPRESSION AND ANXIETY IN RESIDENTS OF RETIREMENT VILLAGES
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<p><i>Background:</i> Irritable bowel syndrome (IBS), depression and anxiety are very common and often co-occur. Data for depression prevalence in the elderly in South Africa is available, but there is no data on the prevalence of anxiety and IBS in this population. Further, the existing literature does not report on the influence of medication use on these conditions.</p> <p><i>Objectives:</i> The aim of this study was to determine the prevalence and co-morbidity of IBS, depression and anxiety in retirement village residents against the background of the pattern of antidepressant, anxiolytic and gastrointestinal medication use.</p> <p><i>Methods:</i> Two hundred ambulant residents older than 50 years were recruited from 2 retirement villages in an urban setting in South Africa by means of convenience sampling. A cross-sectional observational study was performed with a questionnaire consisting of the Manning criteria and the Hospital Anxiety and Depression Scale, supplemented by custom-designed questions to evaluate medication use.</p> <p><i>Results:</i> The prevalence of IBS, depression and anxiety were found to be 4.5%, 3.0% and 4.5%, respectively. Sixty-nine participants (34.5%) reported antidepressant use. Forty-one participants (20.5%) reported the current use of benzodiazepines. Proton pump inhibitors (PPIs) were used by 17.5%. The majority of participants using antidepressants, anxiolytics and PPIs were taking these for one year or longer. Participants taking PPIs or antidepressants were more likely to experience symptoms of IBS than those not taking PPIs or antidepressants and these differences were statistically significant. Benzodiazepines did not have an influence on the presence of IBS symptoms.</p> <p><i>Conclusion:</i> The lower than expected prevalence of IBS, depression and anxiety diagnosis occurred against the background of a high level of prolonged antidepressant, anxiolytic and proton pump inhibitor use. Yet, the use of the PPIs and antidepressants contributed to individual symptoms of IBS when compared to groups not on these drugs.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
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Title of abstract:	Counselling in community pharmacies in the Nelson Mandela Metropole: Codeine-containing analgesics
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<p><i>Background:</i> Community pharmacists have a responsibility to provide quality counselling to their clients, especially with respect to codeine-containing analgesics.</p> <p><i>Objectives:</i> The primary aim was to review the literature regarding counselling on codeine-containing analgesics and to evaluate the content of counselling provided by community pharmacists when dispensing these agents. Specific objectives included determining the type of information community pharmacists provide their clients when dispensing these agents, what information they expect to be included in the counselling session, and how this information compare to the requirements in the Pharmacy Act.</p> <p><i>Methods:</i> A literature review on the counselling required when dispensing these medicines was performed. Based on these findings, a questionnaire was designed. Ten community pharmacies in the Nelson Mandela Metropole (NMM) will be randomly selected to participate in the survey. Fieldworkers will present one of two questionnaires to two pharmacists in each community pharmacy. Data obtained will be statistically and qualitatively analysed. The results obtained will be compared to the regulations regarding the counselling of these agents.</p> <p><i>Results:</i> Literature on the appropriate counselling on analgesics is scarce, especially related to codeine-containing analgesic products. A questionnaire was designed to focus on the information, in retrospect, provided to clients with regards to codeine-containing analgesics and another questionnaire was designed to focus on the information clients perceive as important regarding the counselling of these agents. This part of the study is currently underway and the results should indicate the quality of information community pharmacists provide their clients regarding codeine-containing analgesics. Results should also indicate if additional awareness needs to be created among community pharmacists with respect to the importance of the counselling of these agents.</p> <p><i>Conclusions:</i> Community pharmacists play a valuable role in ensuring the rational use of codeine-containing analgesics, and also can provide an important educational role in informing clients against the risk of abuse of these agents.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
University of Botswana, Gaborone**

Title of abstract:	Client perceptions of communicating with community pharmacists in the Nelson Mandela Metropole
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<p><i>Background:</i> Pharmacy is an information-driven profession in which community pharmacists are responsible for ensuring patient-centred pharmaceutical care on a daily basis. It is therefore important for community pharmacists to ensure effective communication with patients, clients and other health care professionals.</p> <p><i>Objectives:</i> The aim of this article is to identify the perceptions of clients with respect to their experiences when communicating with community pharmacists in the Nelson Mandela Metropole (NMM).</p> <p><i>Methods:</i> A qualitative approach was followed to achieve the aim of this study. Three focus groups, consisting of 17 participants from different socio-economic backgrounds selected by means of purposive sampling, were conducted to achieve the aim of the study. The same focus group protocol, consisting of four group activities, was followed in each focus group. Thematic analysis was applied to identify various themes. Tesch's seven steps of descriptive analysis were mirrored during the process of thematic analysis. The good practices guidelines of Green and Thorogood was applied to ensure rigour. This increased credibility and confidence in the reliability and validity of the three focus groups.</p> <p><i>Results:</i> The results indicated that pharmacist-client communication plays a valuable role in community pharmacies in the NMM. Participants stated that community pharmacists require skills such as making eye contact, listening, and communicating in a common language. Community pharmacists must also be courteous, compassionate, honest and trustworthy when interacting with clients.</p> <p><i>Conclusions:</i> For clients to receive health advice and to ensure the medicines received are used rationally, community pharmacists should communicate effectively. In order to do so, various communication skills are required. The perception of clients visiting community pharmacies should therefore not be ignored.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
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Abstract

Title of abstract:	Medicines utilisation research by pre-graduate students in the Kingdom of Saudi Arabia
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<p>Background: Mini research projects are a requirement and part of the pre-graduate training programme at the King Khalid University (KKU). This overview targets three medicine utilisation research projects by pre-graduate students in KKU. All the studies were conducted in a hospital environment such as outpatients or similar setting in the Asir Region, of the Kingdom of Saudi Arabia.</p> <p>Objectives: The objective is to give an overview of three graduation research projects. This review is descriptive and reflecting on the outcomes of three studies.</p> <p>Methods: The three studies were descriptive quantitative studies. The first study was an observational and retrospective study collecting data from 144 prescriptions of patients' records. The second study used a cross sectional study design and collected data from 149 patient records. The third study was a descriptive investigation and data from 118 patients were collected.</p> <p>Results: The first study concluded that antibiotic usage in the setting was inappropriately prescribed in terms of broad-spectrum antibiotics in mostly respiratory tract conditions followed by gastrointestinal tract conditions. The second study found prescribing consistent with JNC7 guidelines. Moreover, the study reported room for improvement of drug utilisation and a critical need for better blood pressure control. The third study found that the average daily dose of omeprazole were in line with international guidelines but that utilisation and rational prescribing should be investigated further.</p> <p>Conclusions: It may be concluded that pre-graduate research projects, may contribute to a better understanding of drug use patterns and have potential to impact on overall rational prescribing in the hospitals of the Southern Region of the Kingdom of Saudi Arabia.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
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Title of abstract:	Complementary and Alternative Medicine: Comparing the curricula of a South African and Namibian Pharmacy programme
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<p><i>Background:</i> Complementary and Alternative Medicine (CAM) is part of the legislative frameworks for health practitioners in South Africa and Namibia, yet not all health professions educate their students adequately in CAM. A variety of CAM products are sold in pharmacies, yet pharmacists often lack knowledge of these products and therapies.</p> <p><i>Objectives:</i> To compare the curriculum content of a Pharmacy programme in South Africa and in Namibia, and to propose a possible minimum standard curriculum for CAM in the BPharm curriculum.</p> <p><i>Methods:</i> The two CAM curricula were quantitatively and qualitatively compared using the 2104 curricula.</p> <p><i>Results:</i> The CAM module at the South African university is presented in the final semester of the BPharm programme as part of a larger module. It consists of lectures equivalent to eight contact hours (2.25 credits, 22.5 notional hours). Lectures cover the CAM philosophy, the classification and general overview of therapies, legal and regulatory aspects, homeopathy, nutritional therapies, herbal medicine and mind-body therapies. Likewise, the CAM module in Namibia is presented in the first semester during the final year (4th year). It is, however, an independent module, made up of lectures equivalent to 32 contact hours, amounting to eight credits. The module is divided into four themes, aimed to equip students with knowledge, skills and attitudes to provide patients with unbiased information and advice on CAM. Lectures cover the overview of CAM, classification of CAM, regulatory and quality assurance, alternative medical systems, biologically-based therapies and manipulative and body-based therapies.</p> <p><i>Conclusions:</i> There were clear similarities between the CAM curriculum content of the two pharmacy Programmes. Surveys and informal discussions with students indicated that the knowledge of pharmacy students regarding CAM appears to be inadequate, and commonly used therapies could therefore be covered in more detail in the undergraduate pharmacy curriculum in the South African and Namibian Programmes.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
University of Botswana, Gaborone**

Title of abstract:	Establishing drug utilisation research in regional North Queensland
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<p><i>Background:</i> Quality Use of Medicines is a core objective of the National Medicines Policy in Australia. Health outcomes of people in rural areas are often poorer than those in metropolitan cities and regional data are needed to enable investigation of the usage patterns of medicines. Administrative data are available from a government agency at a cost, and can be used for drug utilisation purposes; however, there is a lack of data for pilot studies in specific geographical regions. Data informs debate, and a custom-designed dataset to investigate medicine usage in specific regions is needed in order to provide dispensing data for analyses that can contribute to the health objectives of people in regional and rural areas.</p> <p><i>Objectives:</i> The aim of this project is to obtain dispensing data for drug utilisation research and to provide a platform for informed debate about prescribing and usage trends in a regional area of the state of Queensland, Australia.</p> <p><i>Methods:</i> Pharmacy managers will be approached in person during a recruitment drive along three routes and a distance of >2500kms. Customised software will be installed on pharmacy computers to extract and de-identify data using a procedure that received ethical approval from a large research-intensive university. Data originating from all participating pharmacies will be merged into a single data repository for analysis.</p> <p><i>Results:</i> Findings from a preliminary concept phase indicate that the data can be visualized spatially and temporally i.e. the proposed dataset has the potential for geo-mapping. An application for funding is currently being processed.</p> <p><i>Conclusions:</i> Once established, this study has the potential to provide data suitable for the analyses of medicine usage in regional North Queensland. The data would be particularly useful to identify areas of potential misuse of medicines and to generate comparative prescribing patterns.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
University of Botswana, Gaborone**

Title of abstract:	Benzodiazepine prescribing: A qualitative cross-national comparative pilot between Australia and South Africa
Name of submitting author:	Dr Therése Kairuz
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<p><i>Background:</i> Benzodiazepines have anxiolytic, sedative, hypnotic and muscle relaxant effects and are used to treat anxiety, panic and sleep disorders. They may result in an altered mental state, including euphoria, resulting in misuse and abuse. Drugs with a shorter half-life are associated with more severe withdrawal symptoms and dependence, although symptoms vary between patients. Benzodiazepines used orally for recreational purposes include diazepam, alprazolam, temazepam, flunitrazepam and, to a lesser extent, triazolam and lorazepam.</p> <p><i>Objectives:</i> The primary aim of this pilot study was to investigate benzodiazepine prescribing patterns with a specific focus on cross-national comparative dispensing.</p> <p><i>Methods:</i> A retrospective, cross-sectional, cross-national comparative drug utilisation study was conducted on two datasets of prescriptions dispensed in 2010 and 2011. The Australian data consisted of de-identified dispensing data that was extracted from three pilot sites (pharmacies) in a metropolitan city in Australia. A method was developed that permitted qualitative comparisons, Comparative Relative Percentage Frequency.</p> <p><i>Results:</i> Six active ingredients accounted for more than a four-fold difference in prescribing between the two countries: temazepam and nitrazepam were dispensed more frequently at the Australian pilot sites (21 times and nine times respectively) while bromazepam, midazolam and lorazepam were dispensed more frequently in South Africa (65 times, seven, and five times respectively). Zolpidem was dispensed twice as frequently in South Africa compared to the Australian sites, while zopiclone was dispensed 11 times more frequently. Prazepam, brotizolam, flurazepam and chlordiazepoxide were not available or were not subsidised medicines in Australia at the time of the study.</p> <p><i>Conclusions:</i> Differences may have been influenced by local administrative, financial or therapeutic restrictions. Although overuse is difficult to prove in studies conducted on databases, medicines usage studies are an important tool that can be used to monitor for potential misuse. Studies in cross-national trends may play a role in identifying potential drug misuse and future comparative studies with Australia and other countries may yield important results.</p>	



**First Training Workshop and Symposium MURIA Group 27 – 29 July 2015
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Title of abstract:	Potentially inappropriate prescribing in elderly South African patients
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<p><i>Background:</i> Potentially inappropriate prescribing (PIP) is more likely to occur in elderly patients on account of multiple chronic disease and/or health problems. Screening tools have been formulated to identify potentially inappropriate prescribing in older people, of which the “Beers' criteria” is the most widely used.</p> <p><i>Objectives:</i> To assess the medications used by an elderly population on a South African Pharmacy Benefit Management company (PBM) claims database during 2013, aiming to identify the potentially inappropriate medications according to the 2012-Beers Criteria.</p> <p><i>Methods:</i> A cross-sectional analysis of 4,334,836 medicine items (drugs) claimed for 103 420 patients ≥65 years (female/male ratio 1.3:1), were carried out. PIP indicators from the Beers criteria were applied to data on prescribed drugs and diagnoses. Overall prevalence of PIP and prevalence according to individual criteria were estimated. Associations were assessed by logistic regression analysis, odds ratios (ORs), and 95% Wald confidence intervals (CIs), at $p=.05$ level.</p> <p><i>Results:</i> The overall prevalence of PIP was 41.04%. The most common examples of PIP were use of oral and topical patch estrogens with or without progestins (12.6%), followed by use of zolpidem (8.4%), meloxicam (7.4%), amitriptyline (6.6%) and diclofenac (6.5%). PIP was more common in patients aged 65–68 years (odds ratio 1.18, 95% CI, 1.17-1.19, $p<.0001$). This association decreased with age to 0.86 (95% CI, 0.85-0.87, $p<.0001$) in those aged >78 years. PIP was associated with female gender (age-adjusted odds ratio 1.45, 95% CI, 1.44-1.46, $p<.0001$). Several items on the Beers criteria list did not appear on the data, such as benzotropine, trihexyphenidyl, eszopiclone, megestrol, dronedarone, carisoprodol, chlorzoxazone and sulindac.</p> <p><i>Conclusions:</i> PIP was prevalent on the claims database; however, it decreased with age. Estimation of PIP prevalence by application of the Beers criteria should be compared to other PIP criteria to validate the effectiveness of this list in South Africa.</p>	



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Title of abstract:	Prevalence of Inappropriate Medicines Prescription among elderly Nigerian patients- A Comparison of BEERS and STOPP criteria
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<p><i>Background:</i> Inappropriate medication prescription among the elderly is a major problem with significant negative health consequences. The Beers and STOPP (Screening Tool of Older Persons' potentially inappropriate Prescription) criteria are common tools used for screening of potentially inappropriate medications.</p> <p><i>Objectives:</i> The primary objective of the study was to estimate the incidence of PIM among elderly Nigerian patients using the earlier mentioned tools</p> <p><i>Methods:</i> This prospective study was conducted among elderly patients attending the general outpatients' clinics of two tertiary healthcare institutions in the South-Western part of Nigeria. The patients' age, gender, diagnosis for which the patient was receiving treatment and prescribed drugs were the information retrieved from the medical records. The WHO drug use indicators were applied in the drug utilization aspect of the study while the Beers and STOPP criteria were used to define the inappropriateness or otherwise of the prescribed medications</p> <p><i>Results:</i> The mean number of drugs per prescription was 4.1 ± 1.2 while the median number of drugs prescribing by generic name was 46.5 % (IQR: 35). Using Beers criteria for the assessment of prescription of potentially inappropriate medications, 106 (30.3%) of all patients had at least one inappropriate medication prescribed with a total of one hundred and twenty six cases recorded. Screening for PIM using the STOPP criteria, we found 55 (15.7%) of the study participants with at least one potential encounter. Female sex, number of prescribed medications and co-morbidities were positively associated with prescription of a PIM using both tools.</p> <p><i>Conclusions:</i> Prescription of PIM is highly prevalent among elderly Nigerian patients using these two tools. Developing a tool that takes into consideration local disease pattern and relevant medications.</p>	



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Title of abstract:	Pattern Of Drug Prescription In a Nigerian Urban Tertiary Health Care Facility
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<p><i>Background:</i> Rationale use of drugs increases the quality of health care, ensures cost effectiveness in health care delivery and better therapeutic outcomes. It however remains a problem in most parts of the world especially in the developing nations.</p> <p><i>Objectives:</i> This study was carried out to describe the pattern of drug utilization in a Nigerian Urban Tertiary Health Care Facility and evaluate the quality of prescriptions.</p> <p><i>Methods:</i> This was a cross sectional study of all prescriptions received at the Pharmacy Department of the Lagos State University Teaching Hospital, Nigeria for the month of November, 2013. All prescriptions were analyzed for some standard indices of rationale prescription. Descriptive Statistics were done using SPSS version 17.0.</p> <p><i>Results:</i> There were 7,516 encounters with a total of 14,794 drugs prescribed. The mean number of drugs per encounter was 2.3±1.4 drugs. Practically all classes of drugs were represented with Antibiotics being the most prescribed (26.2%), followed by Analgesics (19.4%) and Antihypertensive drugs (10.4%) respectively. Only 47.8% drugs were prescribed using generic name while there were 25% encounters with injections. The percentage prescription from the Essential Medicines Lists of the hospital was 27.9%. The Cephalosporins alone constitutes 34.2% of the antibiotic use.</p> <p><i>Conclusions:</i> There were deficiencies in the quality of drug prescriptions studied as well as poor indices of rational use of medicines among the prescribers. Appropriate measures needs be identified and implemented to improve on the use of medicine.</p>	



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Title of abstract:	Reporting of Adverse Drug Reactions in Private Sector Pharmacies in the Nelson Mandela Metropole, South Africa
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<p><i>Background:</i> South Africa is faced with a quadruple burden of disease, placing strain on its health system. To promote the importance of drug safety monitoring or Pharmacovigilance to the health system, Nelson Mandela Metropolitan University (NMMU) offered an elective Pharmacovigilance course to the 2014 final-year Bachelor of Pharmacy students. NMMU worked with Systems for Improved Access to Pharmaceuticals and Services (SIAPS), a USAID funded programme, to implement the course, including a mini research activity. Initiatives are in progress in the public sector to monitor drug safety but little is known about the existing pharmacovigilance systems in the private sector.</p> <p><i>Objectives:</i> To obtain an initial understanding of the knowledge, attitudes and practice of pharmacists related to pharmacovigilance, in the private retail pharmacy environment.</p> <p><i>Methods:</i> A cross-sectional face-to-face interview, using random sampling, was conducted with private retail pharmacists using a structured questionnaire. Twelve pharmacies were included. Frequency analysis and Pearson's chi-square tests using STATA version 10.0 were conducted.</p> <p><i>Results:</i> All 12 (100%) pharmacists agreed to participate. Ninety percent (n=11) were aware of what pharmacovigilance entailed, and 70% (n=8) conducted daily pharmacovigilance activities. Only 40% (n=5) could precisely define the term pharmacovigilance. Thirty percent (n=4) had participated in adverse drug reaction (ADR) training. Participants who were trained and reported ADRs were more likely to score higher on concepts related to pharmacovigilance as compared to their colleagues (p=0.16 and p=0.90). No association between training and reporting ADRs (X^2 p= 0.69) existed. Of all the participants who knew what ADRs are, only 30% (n=4) had been trained. A potential area for concern was that 40% (n=5) did not know who was responsible for ADR reporting.</p> <p><i>Conclusions:</i> The number of respondents was too small to make definite conclusions. A more comprehensive study is needed. However, this study highlighted the need for pharmacovigilance training in the retail pharmacy environment.</p>	



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Title of abstract:	Antidepressants and Parkinson's disease
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<p><i>Background:</i> Depression is a non-motor symptom that occurs in approximately half of patients suffering from Parkinson's disease.</p> <p><i>Objectives:</i> The aim of the study was to determine the prescribing of antidepressants concomitantly with medication for Parkinson's disease.</p> <p><i>Methods:</i> The study consisted of a drug utilisation review involving a retrospective, cross-sectional, quantitative analysis of prescription records obtained from a national medical aid administrator for the year 2010. The records were analysed to determine the prescribing patterns of antidepressants to patients with Parkinson's disease.</p> <p><i>Results:</i> A total of 1 774 products were dispensed throughout the year. Of these, 65.16% were antidepressants and antiparkinsonian products constituted 34.84% of the total. The average number of products dispensed to each patient for the year was 13±10.45. Female patients received more antidepressants (65.40%), but antiparkinsonian product prescribing did not exhibit a large difference between genders. The majority of patients (n = 38) were aged 50 to 59 years and received the majority of antidepressants (n = 308; 26.64%) and antiparkinsonian products (n = 191; 30.91%). It was noted that patients received more antidepressants than antiparkinsonian products across all age groups. The selective serotonin reuptake inhibitors (51.47%) were the most commonly prescribed antidepressants and levodopa-containing agents (37.54%) were the most often prescribed antiparkinsonian products.</p> <p><i>Conclusions:</i> Given the number of antidepressants prescribed to patients with Parkinson's disease, the condition warrants appropriate attention. Further research needs to be conducted to ensure that diagnosis is accurate and depression is recognised as not just an emotional response to the disease, but rather as an integral part of the disease, as well as into the treatment of depression in patients with Parkinson's disease to determine whether these patients may be treated as those without a motor disorder and to determine the effects of optimising dopaminergic therapy before initiating antidepressants.</p>	



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Abstract

Title of abstract:	An assessment of the effects of prescribed anti-hypertensive drug therapies on blood glucose levels of maturity onset diabetic patients on treatment with oral hypoglycaemic drugs: The case of selected Health Centres in Lesotho.
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<p>Background: Antihypertensive drugs may cause changes in blood glucose levels The concurrent use of these medications with hypoglycaemic drugs in diabetic patients may contribute to inadequate control of blood glucose levels.</p> <p>Objectives: To investigate the effects of prescribed antihypertensive agents on fasting blood glucose levels of non-insulin dependent diabetic patients on treatment with oral hypoglycaemic medications.</p> <p>Method: Data on fasting blood glucose levels of diabetic patients on hypoglycaemic and antihypertensive drug treatments were collected retrospectively over a six-month period. Data sources were medical records of patients attending diabetic clinics in five health centres in the Maseru Health Service Area of Lesotho. The records were categorised into two basic patient groups, namely, patient groups treated with only oral hypoglycaemic agents and patient groups treated with same agents concurrent with antihypertensive agents. Differences in the means of the initial and end of six-months period fasting blood glucose levels of patient treatment groups were determined and compared.</p> <p>Results: Differences existed in FBGLs of paired groups of diabetic patients treated on one hand with only oral hypoglycaemic medications and those treated on the other hand with same hypoglycaemic treatments concurrent with antihypertensive drug treatments.</p> <p>Conclusions: Hydrochlorothiazide prescribed singly or in combination with other antihypertensive drugs was implicated in increased blood glucose levels in patient groups receiving the medication. Captopril decreased blood glucose levels of diabetic patients on oral hypoglycaemic agents. Atenolol and nifedipine appeared not to have any effects on patients' fasting blood glucose levels.</p>	



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Title of abstract:	Generic drug prescribing in Nigeria: knowledge, perceptions and attitudes of physicians
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<p><i>Background:</i> Generic medicines usually have the same quality, efficacy and safety properties as branded ones while being available at relatively more affordable prices.</p> <p><i>Objectives:</i> The primary objective of this study was to evaluate physicians' understanding of the concept of "generic medicines". Additional objectives were to evaluate physicians' perception of generic medicines regarding safety, efficacy and also to assess the physicians' practice of generic prescription.</p> <p><i>Methods:</i> This cross-sectional and questionnaire based study was conducted among medical doctors working in tertiary healthcare facilities located in the four geo-political regions of Nigeria. The questionnaire consisted of sections on general characteristics of the participants, assessment of the physicians' understanding of the concept of generic medicines, their perception of its safety and efficacy and attitude towards its' prescribing.</p> <p><i>Results:</i> The response rate was 74.3% (191/257) with a preponderance of the male sex (85.9%). The mean knowledge score recorded was 5.3 (SD 1.8) with 70 (36.6%), 69 (36.1%) and 52 (27.2%) of respondents having poor, average and good knowledge respectively. Cross-tabulation of the knowledge level of respondents showed significant statistical significance ($P = 0.047$) with duration of practice but not with position (0.36), subspecialty (0.40) and sex (0.64). Majority (71.7%) of respondents did not agree that generic medicines are of lower quality than branded medicines. Therapeutic failure was a major concern in 82.7% of the physicians and this might discourage them from prescribing these low-priced medicines. Majority (63.9%) of respondents were not in support of generic substitution by pharmacists.</p> <p><i>Conclusions:</i> This study has identified some gaps especially in the areas of perception and practice of generic medicines prescription. Also the issues raised by generic substitution of prescribed drugs should be addressed through consultations by various stakeholders and the formulation of a national guideline on generic substitution.</p>	



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Title of abstract:	Addressing barriers to the prescribing of medicines for mental health
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<p><i>Background:</i> Mental health is complex to treat, with the majority of medicines having similar effectiveness but different side-effects and actions. Consequently, treatment should be individualised for optimal outcomes. However, appreciable differences in costs and patient co-payments can influence choices and subsequent care.</p> <p><i>Objectives:</i> Literature review and reimbursed prices for mental health medicines to see if differences in prices and co-payments are a barrier to effective care.</p> <p><i>Methods:</i> Retrospective observational studies in Europe, Nigeria and US. Current reimbursed prices for mental health medicines in Botswana, Nigeria and UK. Conversion to US\$ 2015 for comparisons.</p> <p><i>Results:</i> Typical antipsychotics previously constituted over 95% of antipsychotics prescribed in Nigeria where the average prices of atypicals have been up to 35 times that of typicals (DDD based). Similarly TCAs are the most preferred antidepressant helped by costs approximately ¼ of SSRIs. This can cause concern if the patients' economic status interferes with good quality prescribing. In Poland, significantly lower co-payments for olanzapine appreciably increased its utilisation versus risperidone, although changing with similar co-payments following generic risperidone. In the US, greater adherence with generic antidepressants with lower co-payments. No apparent clinical problems with generic antipsychotics or antidepressants in Europe and US. Prices falling in Nigeria should help with choices, e.g. in 2014 generic atypicals down to 60 - 70N/ DDD (olanzapine 250.00N/DDD and risperidone 335.00N/ DDD in 2011) and sertraline at 45N/ DDD in 2014 (paroxetine 150N/DDD in 2011). Current prices (US\$/ DDD) include: Olanzapine (Botswana – 0.6167; Nigeria – 0.201; UK – 0.052), risperidone (Botswana – 0.1900; Nigeria – 0.251; UK – 0.031), sertraline (Nigeria – 0.226; UK – 0.060) and fluoxetine (Botswana – 0.0360; Nigeria – 0.327; UK – 0.058).</p> <p><i>Conclusions:</i> Authorities increasingly recognise that mental health treatment should be individualised. Increased availability of good quality low cost generics should be the goal of all authorities to improve care. Good progress in Nigeria in recent years to obtain lower prices for generics. However, opportunities in both Botswana and Nigeria to further lower prices of generics to improve care if associated with appreciable patient co-payment.</p>	