Second Training Workshop and Symposium MURIA Group 25 – 27 July 2016

University of Botswana, Gaborone

Pharmacovigilance, NCD, DU Studies Abstracts

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Title of the abstract:	**Presence and Functionality of Drug and Therapeutics Committees (DTC) in Selected Nigerian Hospitals – Results of a Pilot Study**
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Background:
Inappropriate use of medicines is worldwide problem with significant adverse health and economic-related consequences that may be more telling in developing countries with scarce resources. The World Health Organization (WHO) have tried through the Essential Medicines List and Drug and Therapeutic Committee initiatives to address some issues related to the rational use of medicines. Presently there is little information regarding the presence and functionality of DTCs in Nigerian hospitals.
Objectives: To determine the availability and functionality of DTCs in Nigeria
Methods:
This cross-sectional, questionnaire-based study was conducted in 10 tertiary-level hospitals across Nigeria. The questionnaires were emailed to focal persons in selected institutions after initial contact was made by telephone
Results:
A total of 10 tertiary healthcare facilities across 4 geo-political regions of the country were involved in this pilot study. Five (50%) of the centres had existing DTCs, 8(80%) had infection control committees while only one had a sub –committee on antimicrobials. Only three DTCs had regular meetings while six centres had hospital medicines formularies modelled after the WHO Essential Medicines Lists (EML). The hospital formularies were usually in hard copies and distributed in the clinics, wards and pharmacies. The procedure of updating the formulary included submission of request by clinicians. Only one centre conducted periodic assessment of drug prescribing pattern to measure adherence to the formulary. Majority (80%) had drug information centres usually domiciled in the pharmacy department while evaluation of ADRs was done by existing pharmacovigilance units in nine of the participating centres. Only three centres had any form of quality assurance system while pharmaco-economic activities were carried out in two.
Conclusion:
The study revealed a significant lack in availability and sub-optimal functioning of existing DTCs in Nigeria. This might impact negatively on the rational use of medicines in the country.

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Title of the abstract:	**Comparison of selected prescribing indicators measured before and after the implementation of standard treatment guidelines in Swaziland**
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Background:
In 2012, Swaziland launched its first standard treatment guidelines (STGs) to improve care and treatment outcomes of common conditions.
Objectives:
The aim of this study is compare pre and post STG implementation prescribing patterns.
Methods:
Simple cross-sectional survey of out-patient prescriptions assessing prescribing patterns using WHO/INRUD prescribing indicators was carried out at 33 health facilities prior to launching the STGs in 2012. Two years after the launch of the STGs, a follow up study was carried out at the same facilities, geographically conveniently selected from all 4 regions of Swaziland, reflective of facility type (e.g. hospitals, clinics) and sector (e.g. private, public). Prescriptions for STIs, HIV and immunisations were excluded in the analysis to reduce bias. Data was analysed using Wilcoxon Signed Rank Test and Mann-Whitney U-Test using R.
Results:
The average number of medicines per encounter improved from 3.33 to 3.19 medicines per encounter. Percentage of encounters with an antibiotic prescribed improved from 59% to 52%. However both of these remain undesirably above the WHO recommendations of 1.7 and 23% respectively. Percentage of facilities with STGs improved from 60% to 100%. Percentage of encounters with an injection prescribed improved from 19% to 15%, within WHO standards.
Conclusions:
The implementation of the STG in Swaziland has had an overall positive impact on prescribing patterns, with small improvements in the extensive poly pharmacy and antimicrobial prescribing observed at pre-implementation. Patient education, training, supervision and mentorship on STG use and further studies into prescriber motivations and beliefs are recommended

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Title of the abstract:	**How can information on total national pharmaceutical markets in Africa support drug utilisation studies?**
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Details of other co-authors	

Background:
Drug utilization studies have been used effectively to support access to medicines, medicines safety and the rational use of medicines. Such studies require a range of data sources on both supply and demand. However, detailed total supply side data are not commonly available in most countries in Africa.

Objectives:
We sought to demonstrate how systematically-gathered national pharmaceutical market data can contribute to DUS in middle and low-income countries. Can national market data broken out by ATC, molecule, strength / formulation be used to support national treatment policies, assess gaps in access to treatment, monitor medicines use and assist investment decisions?

Methods:
Data on national imports of medicines were extracted from a national database established jointly between the Zambian Regulatory Agency, MMV, IMS Health, supported by TESS Development Advisors. Data included value and volume of products, pack, manufacturer and importer. Data were validated against other sources including procurement data. Analysis focused on compliance with national policy; importance of the public versus private sector; implications for access to medicines and medicines regulation.

Results:
The database provides accurate data on the declared national pharmaceutical market – total market data – to confirm assumptions; e.g. for antimalarials in Zambia we note the dominance of molecules on the national treatment guidelines, the public sector and gain measurable data on the size, structure and diversity of the private and not-for-profit sectors.

Conclusions:
This study shows how data can be systematically gathered at national level to monitor and understand detailed market trends. Such systems contribute significantly to the evidence base required for monitoring key aspects of drug utilization and national treatment policy. They allow the Regulatory Authority and Ministry of Health to monitor and react more quickly to changes which might affect medicines quality, affordability, policy or security of supply and create a positive policy dialogue.

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Title of the abstract:	**Baseline data for the development and evaluation of a structured pharmacovigilance system in Sebokeng Hospital, Gauteng Province**
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Background:
Although adverse drug reactions (ADRs) have the potential to cause significant harm in patients, ADRs are under-reported. In South Africa, evidence of a clear pharmacovigilance (PV) system to monitor and manage ADRs is a requirement for compliance with the National Core Standards.

Objectives:
To conduct a needs analysis amongst health care professionals (HCPs) at Sebokeng Hospital, Gauteng regarding structures for-, process followed- and outcomes of ADR reporting.

Methods:
This was the first phase of an operational, intervention study to develop, implement and evaluate a structured pharmacist-driven PV system for ADR reporting. Data were collected over a period of a week in 2015. All pharmacists, professional- and enrolled nurses and medical practitioners present at the facility were invited to anonymously complete a structured questionnaire. Ethical clearance and written informed consent were obtained.

Results:
The questionnaire was completed by 132 HCPs (nurses:58.3%; medical practitioners:23.5%; pharmacist assistants:11.4%; pharmacists:6.8%). The majority indicated ADR reporting is necessary (96.2%) and their professional obligation (89.4%). Only 18.9% were aware of an existing PV system in the hospital, 15.2% had an ADR form available, and 18.9% knew whom to submit the form. The majority (87.9%) had never reported an ADR, had never received training (93.9%), but wanted training (89.4%) on ADR reporting. Factors discouraging ADR reporting included not knowing how to report (53.8%), lack of time (37.1%), additional work (22.0%), uncertainty about the outcome reporting (32.6%), and lack of confidence to discuss ADRs (22.0%). Only 2.3% knew how many ADRs were reported, that ADRs are discussed by a committee (6.1%) and that feedback is received on reported ADRs (6.1%).

Conclusions:
Results indicated a need for training on ADR reporting, systems to be implemented to facilitate reporting of ADRs and feedback on the outcomes of reporting. Interventions to address these gaps are currently being implemented and will be evaluated in Phase 3.

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Title of the abstract:	**PREVENTION OF MEDICATION ERRORS DURING CARDIOPULMONARY ARREST**
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Background:
Cardiopulmonary resuscitation is an extremely demanding and stressful situation. The healthcare professionals are challenged with time for discussion about the treatment including the essential drugs for resuscitation. Medication errors during resuscitation are 39 times more likely to result in harm and 51 times more likely to cause death than in normal situation. The 1999 Institute of Medicine report, “To Err Is Human” reports that between 44,000 and 98,000 patients dies annually in the USA due to preventable medical errors.

Objectives:
Highlight the hazards and errors associated with resuscitation and recommend strategies on how to prevent medication errors during resuscitation.

Methods:
An electronic literature search was conducted by using MEDLINE, CINAHL and Cochrane databases (2007-2014). The following search terms medication errors, resuscitation evidence based guidelines, prevention of medication errors and resuscitation were used. The update of this clinical practice guideline is the result of reviewing research studies conducted in different countries.

Results:
The literature review revealed that the medication errors during resuscitation mainly occur due to the chaos of the resuscitation environment, incorrect prescription, incorrect labelling, poor communication and administering the wrong drugs.

Recommendations:
- A standardised emergency trolley should be made available throughout the organization.
- Assign full responsibility to the pharmacy for stocking/ restocking all medications.
- Provide and keep only the necessary medicines to manage ACLS.
- Do not stock medications that are not required for resuscitation
- Establish process for identifying the expired drugs.
- Regular simulations to help nurses and doctors learn about their expected roles during resuscitation and finding the medications on the trolley
- Inter disciplinary Debriefing meeting following resuscitation

Conclusion:
Medication errors during CPR pose a substantial danger to all patients. Intervention should focus on strengthening the system for patient’s safety.

Title of the abstract:	**PRESCRIBING ERRORS AND INTERVENTION OUTCOMES IN SELECTED TERTIARY HOSPITALS IN NIGERIA**
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Background and objectives:
Prescribing errors, particularly in the medical and paediatric specialties, are reported globally to affect about 52.0% of hospitalized patients with potential to cause harm. This study evaluated the nature and causes of prescribing errors in three purposively selected tertiary hospitals in Nigeria with a view to providing pharmacist-led evidence-based recommendations for their prevention.

Methods:
A retrospective review of out- and in-patient prescriptions from medical and paediatric units between January and December 2010 in Hospitals A, B and C. The baseline prescribing pattern was evaluated using the Nigeria Standard Prescribing Guidelines. Causes of prescribing errors were investigated using a prospective qualitative approach involving semi-structured face-to-face interviews and questionnaires guided by the Reason's accident causation model. Error rates were studied in the three hospitals while interventions were carried out at Hospital A. Interventions involved educational outreaches consisting of structured teaching and training. Error rate pre- and post- intervention was compared, to determine impact. Data were analysed using descriptive and Chi-square statistics

Results:
Commonest errors in out-patient prescriptions in Hospitals A, B and C were inadequate prescriber identification (66.6%), exclusion of direction of use (38.1%) and omitting end date of therapy (54.4%) while for in-patient prescriptions was missing end date of therapy: 65.9%, 71.3% and 86.0% respectively. Risk factors identified in error causation included organisational (91.0%), environment (50.0%), individual (45.0%), task (45.0%) and team (36.0%) factors. Organisational factors identified included inadequate training/experience, and absence of reference materials. Defences against errors, particularly pharmacists' involvement, were deficient. Reductions in drug-drug interactions 1.2% to 0.4% ($p<0.001$), omission of drug route 0.3% to 0.1% ($p<0.001$) and ambiguous orders 0.2% to 0.0% ($p<0.001$) occurred post intervention though with no change in overall error rates 5.8%, pre- and post- intervention ($p = 0.98$).

Conclusions:
Prescribing errors were common resulting from orders that lacked details. Continuing prescriber education and re-training will likely result in error reduction. Pharmacists' involvement in prescribing error prevention should be an on-going process.

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Title of the abstract:	**Initiatives on Medication Safety at Nyangabgwe Hospital**
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Background: Medications are the widely used therapeutic intervention and consequently the risk of adverse events associated with medication use remains a challenge to ensure patient safety worldwide. Several intervention strategies prevent occurrence of medication errors at various points of the medication use process. Nyangabgwe hospital pharmacy implemented an Independent Double Check System [IDCS] at two outpatient dispensaries to improve medication safety as part of their departmental annual performance plan. A comparative review of the initiative is discussed.

Objectives: To describe the annual incidence rates of actual errors, annual detection rates of potential errors and outcomes of patients who encountered an actual error at 2 dispensaries (OPD and IDCC) that implemented the IDCS and compare against 2 similar outpatient dispensaries (Diabetic and Psychiatry Dispensaries) that did not implement IDCS due to manpower shortage.

Methods: A retrospective cross sectional design was used to evaluate data from the pharmacy prescription intervention notes and medication system worksheet (ASSESS-ERR™ adapted from ISMP) used at the two dispensaries during the period of April 2015 to March 2016. Errors reaching the patient that may or may not have caused harm are termed as *Actual errors,* while errors picked and averted from the prescriptions and during the dispensing process were termed as *Potential errors*. From an estimated total of 289,098 items dispensed to 89,287 patients in the year, the annual incidence rates of actual errors, annual detection rates of potential errors and outcomes of patients who encountered an actual error were described and compared. Adverse Drug Reactions were excluded not considered as errors.

Results: Annual incidence rate for actual errors were 0.004% and 0.0057% in IDCS implemented dispensaries, whereas 0.0013% and no documentation in the unimplemented dispensaries respectively. Annual detection rate for potential errors were 0.2274% and 0.3532% at IDCS implemented dispensaries and 0.0116% and 0% in unimplemented dispensaries. Evaluation of the possible causes showed more than one cause for an error and 65.29% of the potential errors were from manual miscommunicated prescription orders and 42.77% from dispensing process at dispensaries. Of the 9 actual errors that reached the patients in the year, 5 patients returned the wrong medicines due to the knowledge they had on the product, 4 consumed the wrong medicines, 3 required additional tests and observation and 1 required no intervention except reassurance and counselling. IDCS requires manpower but essential to detect and prevent potential errors reaching the patient due to prescribing, transcribing and dispensing process errors to ensure patient safety, client confidence and avoid litigations arising from unintentional patient harm.

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Title of the abstract:	**Promoting Rational Use of Medicines through Therapeutics Committees in Namibia. Evidence from Kunene region**
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Background:
Namibia's Antimicrobial Resistance (AMR) intervention model identifies therapeutics committees (TCs) as key structures for promoting rational medicines use (RMU) to combat AMR. TCs affect medicines use through evaluating medicines use and developing policies for managing medicines use. There is limited documented medicines use evaluations (MUEs) by TCs in Namibia's facilities. Following an ABC analysis that identified paracetamol as one top expenditure item on the budget for pharmaceuticals, Kunene's regional TC assessed prescribing practices to determine compliance to Namibia's STGs.

Objectives:
To determine whether there was over-prescription of paracetamol by prescribers in Kunene region.

Methods:
A retrospective, cross-sectional review of 130 outpatient prescriptions at two health facilities in Opuwo district, Kunene region was done from November to March 2014/15 by nurses, doctors and pharmacy staff using a standard questionnaire. Prescriptions for commonly diagnosed conditions at public health facilities in Kunene region including HIV were analysed. Data was entered into an access database and analysed in excel.

Results:
Of the 130 prescriptions assessed, 83% complied with Namibia's STGs, 93% of non-compliant prescriptions were due to wrong treatment prescribed; 60% prescriptions had paracetamol, 20% of which were non-compliant to STGs. Prescriptions for HIV were 100% compliant with ART guidelines; average number of medicines per prescription was 2.8; 28% prescriptions contained an antibiotic; 89% of medicines were prescribed by generic name. Overall compliance to STGs and ART guidelines was high in Opuwo district, Kunene region.

Conclusions:
The results demonstrated good prescribing practices and RMU in Kunene region. Compliance to STGs and the impressive performance in RMU indicators in Kunene region were attributed to TC support activities including a TC training supported by the USAID-funded SIAPS project, quarterly ward visits, distribution of and prescriber training on STGs. TCs promote RMU and can ensure continuous improvement in RMU by assessing themselves through MUEs.

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Title of the abstract:	**ADHERENCE AND PATIENT RELATED BELIEFS TOWARDS THEIR MEDICATIONS AMONG THE ADULT HYPERTENSIVE OUTPATIENTS IN MWANZA TANZANIA.**
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Introduction:
Hypertension is a chronic disease which already affects one billion people worldwide, and needs a lifelong therapy with antihypertensives. Adherence to antihypertensive is very important to control hypertension and prevent hypertension related complications. However studies have shown that patients with chronic illness adhere only 50 % of their time to medication and the problem is much higher in developing countries. Patient's beliefs towards medications contribute much to the problem of non-adherence.

Study objectives:
To determine adherence and the association between adherence and belief towards medication among adult hypertensive outpatients at Bugando Medical Centre.

Material and methods:
Cross-sectional study was employed. Non-probability, convenient method of sampling was used to recruit the patient. Pre-designed questionnaires were used to gather information on adherence and patient related beliefs towards their medication. The main outcome was Adherence which was measured using the Morisky Adherence scale-8(MMAS-8).

Results:
Data was collected from 180 participants. Females accounted for 65 %. Adherence was low in 46 % of the studied population. On belief about medication, necessity was higher in the high adherent group (p-value 0.026) and concern was higher in the low adherent group ($p<0.01$).

Conclusion:
The adherence rate to antihypertensive is 54 %; this is low compared to the required level of adherence to antihypertensive medication which is ≥ 80%. Factors that were predictors of hypertension which are patient related beliefs towards their medication found to have a positive association with adherence.

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Title of the abstract:	**Medicine possession ratio as proxy for adherence to antiepileptic drugs**
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Background:
There is paucity of information on the prevalence of adherence to antiepileptic drugs (AEDs) in South Africa.

Objectives:
To determine the adherence status to AEDs among epilepsy patients; to observe the association between adherence status and age, sex, active ingredient prescribed, treatment period, and number of comorbidities.

Methods:
A retrospective study analysing medicine claims data obtained from a South African pharmaceutical benefit management company was performed. Patients of all ages (N=19,168), who received more than one prescription for an AED, were observed from 2008 to 2013. The modified medicine possession ratio (MPRm) was used as proxy to determine the adherence status to AED treatment. The MPRm was considered acceptable (adherent) if the calculated value was ≥80%, but ≤110%, whereas an MPRm of <80% (unacceptably low) or >110% (unacceptably high) was considered non-adherent.

Results:
Only 55% of AEDs prescribed to 19,168 patients during the study period had an acceptable MPRm. A further 30.58% of AEDs had an unacceptably low MPRm, whereas 14.27% had an unacceptably high MPRm. MPRm categories depended on the treatment period (P<0.001; Cramer's V=0.21) but were independent of sex (P<0.182; Cramer's V=0.01). Age group (P<0.001; Cramer's V=0.07), active ingredient (P<0.001; Cramer's V=0.07), and number of comorbidities (P<0.001; Cramer's V=0.05) were statistically but not practically significantly associated with MPRm categories. Analysis within each active ingredient group showed that the AED with the highest acceptable MPRm was oxcarbazepine (64.5%), followed by valproic acid (63.7%) and phenytoin (58.7%). The AEDs with the highest unacceptably low MPRm included gabapentin (38.07%, N=1,077) and clonazepam (32.87%, N=2,528), whereas levetiracetam (19.55%, N=1,795) and topirimate (16.32%, N=3,892) had the highest unacceptably high MPRm.

Conclusions:
Adherence to AEDs was relatively low; but is likely to improve with the treatment period. Further research is needed to determine the factors influencing epileptic patients' prescription refill adherence.

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Title of the abstract:	**Detecting potentially serious drug-drug interactions among South African elderly private health sector patients using the Matanović/Vlahović-Palčevski drug-drug interaction protocol**
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Background:
Elderly patients take, on average, 3-4 times more medicine items than the general population because of a higher prevalence of comorbidities, which, in turn, can lead to a higher number of medication items needed to treat these conditions, and subsequently, an increased risk for developing drug interactions.

Objectives:
To determine the prevalence of potentially serious drug-drug interactions and their relationship with sex and age, among elderly (≥65 years) in South Africa.

Methods:
A cross-sectional study was conducted using medication claims data for 2013, for a total of 103,420 medical aid beneficiaries' ≥65 years. Potentially serious drug-drug interactions were counted using the Matanović/Vlahović-Palčevski drug-drug interaction protocol, when two potential interacting drugs were supplied for overlapping days during a 30-day period. Chi-square test was used to determine the association between the prevalence of potentially serious DDIs and sex or age group.

Results:
In total, 65 of the 70 Mimica Matanović and Vlahović-Palčevski comprehensive protocol for drug-drug interactions were available in South Africa at the time of the study. A total of 331,655 potentially serious drug-drug interactions were identified among 912,712 prescriptions. A mean 0.36 (SD 0.7) (95% CI, 0.36-0.37) drug-drug interactions were encountered per prescription. There was no association between the mean number of drug-drug interactions per prescription and sex ($P< 0.001$, Cohen's d-value =0.10) or age groups ($F(3, 912,712)= 1093.05$, $P<0.001$; Cohen's d-value ≤ 0.16). The most frequent interacting drug combinations were between central nervous system drugs (30.6%), antihypertensives and nonsteroidal anti-inflammatory drugs (23.5 %), diuretics and nonsteroidal anti-inflammatory drugs (8.3%), angiotensin-converting enzyme inhibitors and potassium supplements (4.9%) and nonsteroidal anti-inflammatory drugs/aspirin and corticosteroids (4.8%).

Conclusions:
The Matanović/Vlahović-Palčevski comprehensive drug-drug interaction tool might be a useful initial screening tool that can be employed by prescribers and pharmacists alike in finding and preventing the most common potentially serious drug-drug interactions in practice.

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Title of the abstract:	**Vaccination coverage in underprivileged Grade-R school children in Nelson Mandela Bay Health District**
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Background:
Nelson Mandela Bay Health District (NMBHD) has been identified as an area with concerning rates of under-five year mortality and morbidity. Inadequate vaccination coverage has previously been investigated in other developing countries as a risk factor for chronic undernutrition.

Objectives:
The primary aim was to describe vaccination coverage in Grade-R school children in an underprivileged area of NMBHD, Eastern Cape.

Methods:
A descriptive, cross-sectional survey with a correlational component was conducted during 2015 at 16 schools in children older than 60 months of age. The schools were selected from three adjacent underprivileged areas of Port Elizabeth. Road to Health booklets which contain each child's vaccination history were assessed by trained fieldworkers who had to record whether the vaccinations were up to date or not. Descriptive statistics were used to present numerical and categorical data.

Results:
Nearly a quarter (n=61) of all children (n=265) did not have Road to Health cards available. Of the 204 children with cards, the vaccinations of only 42% (n=86) were up to date according to the records. The mean height-for-age Z-score of children with an up to date immunisation record was -0.53 SD versus -0.71SD in the group whose vaccinations were not up to date. No differences could be demonstrated between groups in terms of the weight-for-age Z-score or the BMI-for-age Z-score.

Conclusions:
The vaccination coverage in this sample was lower than the average coverage rates for the Eastern Cape. A trend linking stunting to incomplete vaccination schedules was observed. This may indicate that poor vaccination coverage can impact on growth in pre-school children. The low vaccination coverage in this older group of children need to be further investigated to determine the stage of drop-out. Transformative education messages about the importance of continued vaccinations beyond 18 months of age need to be developed and implemented.

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Title of the abstract:	**ANTIDIABETIC MEDICATION ADHERENCE AND ASSOCIATED FACTORS AMONG DIABETIC PATIENTS ATTENDED A TERTIARY CLINIC IN GABORONE, BOTSWANA.**
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Background:
Diabetes mellitus (DM), the most common endocrine disease in the world, is a major global public health problem. Lack of adherence to antidiabetic medication causes suboptimal glycemic control with increases rate of complications, cost and mortality

Objectives:
This study was conducted to assess the magnitude of antidiabetic medication adherence and assess associated factors among both patients with type 1 and 2 diabetes mellitus.

Methods:
A cross-sectional study was carried out from July to September 2015 among 380 randomly selected diabetic patients attending block 6 Clinic in Gaborone, Botswana. Eight item Morisky Medication adherence questionnaire was used to assess antidiabetic medication adherence. A structured questionnaire was used to collect information on factors influencing adherence including;- age, gender, level of education, type of diabetes, duration of diabetes, modality of treatment, documented complications and HIV status. Data were entered and analyzed using STATA Version 14. To assess the associations, logistic regression with OR and 95% CI was done .A p-value of < 0.05 or less was considered statistically significant.

Results:
According to Morisky scale; - 57.6%, 23.9% and 17.4% of patients had high, medium and low antidiabetic medication adherence respectively. The studied sociodemographic characteristics and clinical variables were not associated with antidiabetic medication adherence. HIV positive status was associated with a statistically signification better medication adherence at multivariate analysis (p-value=0.017, AOR = 0.31, 95% CI = 0.13-0.74).

Conclusions:
Adherence to antidiabetic medication was found to be suboptimal in a clinic set up where drugs are provided free of charge. Only HIV positivity was found to be significantly associated with better medication adherence, probably due to effect of being on multiple medications with more psychosocial support and counselling offered at HIV clinics,. There is a need to carry further studies to understand better patterns of medication adherence that are pertinent to Botswana settings.

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Title of the abstract:	**Using de-identified dispensing data to identify possible medication misuse and facilitate cross-national comparison.**
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Background:
Drug utilisation research contributes to rational use of medicines by optimising prescribing, including acute conditions such as upper respiratory tract infections or insomnia and anxiety. Pharmacotherapy should not be used as first-line treatment for insomnia and anxiety, and benzodiazepines should always be prescribed with caution due to their potential for addiction. Antibiotics must be prescribed with due diligence to reduce antimicrobial resistance, and the prescribing of antibiotics and benzodiazepines should follow local guidelines.

Objectives:
The primary objective was to develop a dataset of de-identified dispensing data in Australia that would be suitable for drug utilization research. The secondary objectives were to analyse two subsets of data - antimicrobials and benzodiazepines - to identify possible medication misuse and to facilitate cross-national comparison.

Methods:
Customised software was used to extract and de-identify dispensing data from three pharmacies in South East Queensland using protocols approved by an ethics committee at the University of Queensland, Australia. The South African data were obtained from a private medical insurance scheme following ethical approval from Nelson Mandela Metropolitan University (South Africa) and both datasets were analysed using retrospective drug utilization techniques.

Results:
Cross-national comparison of benzodiazepines showed a high frequency of alprazolam prescribing in South Africa; the drug was recently rescheduled to Controlled Drug status in Australia due to its potential for abuse. Trends in 'repeat' dispensing of antibiotics in the Australian dataset were cause for concern and nearly one-tenth of antibiotics were dispensed 30 days after prescribing.

Conclusions:
Software designed collaboratively by Kairuz, Pudmenzky, Rossato and Fredericks was suitable for drug utilisation research and has the potential to generate data for pharmacoepidemiological studies. Similar software could be used to generate cross-national studies about antibiotic patterns in Africa.

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Title of the abstract:	**Extent of substance abuse in Tanzania and the implications**
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Background:

Drug abuse is common all over the world. Abused drugs are psychoactive and make abusers engage in activities which are unacceptable in the community. For injecting drugs, the apparatus used is often shared and is unsterile. Unsterile injecting apparatus predispose the users to blood borne infections. People who use drugs often indulge in unprotected sex, which is a risk factor for acquiring sexually transmitted infections**.**

Methods:

A cross-sectional study of people who use drugs (PWUDs) aged 18 years and above, was undertaken in the urban area of Mwanza. People who use drugs who were either too sick or unable to answer questions, and those who refused to give consent to the study, were excluded. Data collection involved the use of a questionnaire (Face to face approach) and collection of blood and urine samples. The blood samples were used to determine the serological status of the participants, while the urine samples were used to detect presence of illegal drugs. Complete data was obtained for seven hundred and seventy out of the 774 PWUDs who were initially recruited into the study.

Results:

The project has shown that cannabis and alcohol are highly abused - 83.0% (n= 581) and 74.2% (n= 519) respectively - followed by khat at 38.3 % (n= 268). Heroin use was recorded in 34.0% (n= 238) and heroin injection was noted in 5.6% (n= 43) of the illegal drug users. HIV infection was detected in 8.6% of the drug abusers, while hepatitis B was seen in 3.8%, hepatitis C was detected in 2.9% and syphilis was detected in 2.5% of the participants. **Conclusion:** HIV infection in people who use drugs was high (8.6%) compared to that seen in the general population (5.1%) and also high rates of positive results for hepatitis C and syphilis were recorded. Among the intravenous drug users 6.3% were HIV positive**.**

Recommendations:

Education should be given to the substance abusers on the consequences of taking illegal drugs. Safe sex should be advocated, a methadone clinic and sober houses should be established in Mwanza. The Ministry of Home Affairs should increase efforts to prohibit the importation of illegal drugs.

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Title of the abstract:	**Prevalence of schizophrenia and compliance of schizophrenia patients to antipsychotic treatment in the private health care sector of South Africa**
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Background:
There is paucity of information with regard to compliance by schizophrenic patients to antipsychotic treatment in South Africa.

Objectives:
To determine the prevalence of schizophrenia as well as the compliance to treatment of schizophrenic patients in the private health care sector of South Africa, stratified by gender and age.

Methods:
A retrospective analysis was performed on data for 2008-2013 obtained from a Pharmaceutical Benefit Management Company. Prevalence of schizophrenia was determined by age and gender. Prescribing patterns were determined by comparing prescribed daily doses (PDD) to maximum recommended daily doses (MRDD). The medicine possession ratio was used as proxy to determine patient compliance with antipsychotics.

Results:
Overall women had a higher prevalence of schizophrenia than men, 54.04% *vs*. 45.96%, respectively. Men had a higher prevalence of schizophrenia between ages of 18 to 35 years, whereas women presented with a higher prevalence above the age of 35 years. Psychiatrists generally prescribed most (60.88%) antipsychotics, followed by general practitioners (29.27%). Several antipsychotics were prescribed above their MRDD. Age, gender and co-morbidities had no association with compliance to antipsychotics prescribed; however, type of active ingredient ($p < 0.001$; Cramer's $V = 0.1287$) and length of treatment period ($p < 0.001$; Cramer's $V = 0.2477$) played a role. The compliance status of antipsychotics prescribed was statistically significantly associated with age groups ($p < 0.0001$) and was independent of patient's gender ($p < 0.064$; Cramer's $V = 0.03$). The compliance status of antipsychotics prescribed had a statistically significant association with active ingredients ($p < 0.001$) and was independent of the number of co-morbidities associated with a schizophrenic patient ($p < 0.0902$).

Conclusions:
Type of active ingredient and length of treatment period were predictors of compliance to antipsychotics. In general antipsychotics were prescribed above their maximum recommended daily doses.

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Title of the abstract:	**A pre-service curriculum for capacity development in medicine regulation at the University of Namibia: process and outcomes**
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Background:
Medicine regulation is a critical strategy for rational medicine use. In sub-Saharan Africa, human resource capacity gaps in medicine regulation counter efforts on rational medicine use. Ineffective medicine regulation systems negatively impact on equitable access to quality medicines and public health. The WHO recommends pre-service training as a critical strategy for sustainable human resource capacity development; unfortunately access to medicine regulation programmes in sub-Saharan Africa is limited.

Objectives:
To develop and validate a pre-service curriculum on medicine regulation to increase local capacity among locally trained pharmacists.

Methods:
Pre-service training on medicine regulation regulating was identified as a key strategy for sustainable efforts on rational use of medicines. The University of Namibia, School of Pharmacy with assistance from USAID-funded SIAPS developed unit standards for medicine regulation course based on a process developed by the Management Sciences for Health, 2011. Local stakeholders from the Ministry of Health and Social services, Health professions council, the private sector and pharmaceutical industry validated the unit standards and teaching and learning methods through a consultative workshop.

Results:
A total of six stakeholder organizations were involved in the development and validation of five unit standards for a pre-service course on medicine regulation. The unit standards included overview of medicine regulation; medicine evaluation and registration; inspection and licensing of medicines; pharmacovigilance, quality assurance of medicines. A public-private-industry problem based collaborative teaching approach was recommended as the ideal teaching-learning approach. Pre-service module to be incorporated within the Pharmacy practice modules at qualification level seven in the third year of the B.Pharmacy programme. Competence based assessments methods will be adopted for this course including OSPE and case based discussions.

Conclusions*:*
Public-private-industry collaborative teaching is critical for pre-service capacity development on medicine regulation in the sub-Saharan Africa. Competence based training and assessment models are the most appropriate to impact skills on medicines regulation.

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Title of the abstract	**Changing environment for drug utilisation studies in Africa: Implications for the future**
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Background*:*
Increasingly recognised that it is essential to measure drug utilisation (DU) patterns alongside ongoing policies to enhance future appropriate use of medicines. Current knowledge about DU capabilities across Africa is variable. This needs to be addressed.
Methods:
Qualitative study of DU capabilities among members of MURIA.
Results:
DU capabilities vary from patient level data in ambulatory care among private insurers in for instance Botswana to more limited capabilities. In Botswana and South Africa, treatment of upper respiratory tract infections (URTIs) can be measured among private GPs and individual private insurers respectively. However in South Africa, currently no consolidated private insurer databases. DU data is available on a monthly basis in both ambulatory care and hospitals in Namibia, and there are also a pharmacovigilance databases. There are also disease specific databases in some countries, e.g. HIV and TB medicines in Namibia, Botswana and Swaziland. However in Kenya no longitudinal DU databases in ambulatory care exist. Utilisation and expenditure data can however be tracked in community pharmacies and hospitals in Kenya. No longitudinal databases currently exist to routinely measure DU in the public sector in Botswana, Nigeria, South Africa, Swaziland, Tanzania or Zambia. DU and expenditure data is also not readily available in the private sector in Nigeria and Tanzania. DU date is more readily available in public versus private sectors in Zimbabwe. Programmes are ongoing in most African countries to rectify this - including antibiotic point-prevalence studies among hospitals in Botswana as well as training courses. In addition, qualitative studies to assess the extent of dispensing of antibiotics including non-prescription medicines among community pharmacies, especially for URTIs given concerns, to influence future strategies.
Conclusions:
Currently variable DU capabilities exist across Africa. This is changing with a recognised need to document utilisation and expenditure patterns to enhance appropriate use of medicines especially in high priority areas such as infectious diseases. Groups such as MURIA can assist with this.

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Title of the abstract:	**Multiple interventions are typically needed to influence prescribing and dispensing behaviour; fact or fiction?**
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Background: Activities are needed to increase the prescribing and dispensing of low-cost generics to reduce patient co-payments as well as achieve universal access to healthcare. Initiatives are also needed to reduce inappropriate prescribing across sectors.
Objectives: Assess the impact of different interventions among different medicine classes and healthcare professions to achieve these aims.
Methods: Narrative review of published studies including those conducted by the co-authors.
Results: Multiple measures have increased the prescribing and dispensing of generics vs. originators. These include measures among key stakeholder groups to address concerns with generics including their quality. Multiple measures have resulted in high INN prescribing - up to 98% in Scotland – even for different salts (e.g. generic clopidogrel). High use of generics alongside supply-side measures can lead to low prices, e.g. generic omeprazole and simvastatin at just 2% of their originator prices in the Netherlands through preference pricing policies. Multiple measures have also increased the prescribing of generics vs. patented medicines in a class with limited change without such measures, e.g. PPIs, statins and renin-angiotensin inhibitors in Europe. Delisting patented medicines in a class has the greatest influence on their future prescribing. Multiple measures among key stakeholder groups have also decreased the prescribing of antibiotics, e.g. France and Slovenia. Enforcement of regulations regarding the dispensing of antibiotics without a prescription successful in a number of countries to reduce consumption. Such initiatives could be transferred to other countries, e.g. Zambia, to reduce inappropriate dispensing of antibiotics especially for respiratory tract infections to reduce antimicrobial resistance rates. Multiple measures are also needed in Nigeria to further improve the treatment of pregnant women with malaria building on recent successes. It is recognised though that it is difficult for health authorities to influence physician prescribing in certain classes, e.g. anti-psychotics.
Conclusions: Multiple demand-side measures have successfully reduced inappropriate prescribing of antibiotics as well as enhanced the prescribing of low -cost generics to save costs.

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Title of the abstract:	**Initiatives to progress drug utilisation projects in AFRICA via the newly formed MURIA group**
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Background*:*
Countries need to learn from each other to improve their appropriate use of medicines. These challenges resulted in bringing together researchers from across Africa to discuss drug utilisation (DU) research.
Objectives*:* Describe ongoing activities by the MURIA group to stimulate DU research.
Methods*:* Narrative review of publications, submissions and ongoing research activities
Results*:*
An initial 2-day meeting was held in Port Elizabeth, South Africa in January 2015. The outcome was the development of the MURIA group, with the first 2.5 day training workshop and symposium held in Botswana in July 2015. The one-day symposium included studies on antibiotic usage in Botswana, Namibia, South Africa, Uganda and Zambia, as well as discussions surrounding adherence to HIV treatments and side-effects associated with HIV treatment. There were also presentations on the sub-optimal use of generics in Kenya and Nigeria, and the rationale behind this. A number of publications have already emanated from the first meeting, with further research and publications planned across Africa. These include activities surrounding antibiotic stewardship, which resulted in a 2-day meeting in Botswana in February 2016 to plan antibiotic DU studies among the private ambulatory care sector for patients with URTIs as well as undertake research to measure antibiotic utilisation in both public and private hospitals in Botswana via a Point Prevalence Study. In addition, initiatives to enhance the rational use of medicines through increasing DTC activities as well as undertaking a DU training in Swaziland in March 2016. A regular newsletter is ongoing with the first issue in December 2015. The second MURIA conference is taking place in Botswana in July 2016, again including training workshops and a symposium, with anti-infectives again a key theme. This will help cement the MURIA group as a viable DU network across Africa effectively promoting the appropriate use of medicines. This is particularly important for antibiotic stewardship and non-communicable diseases given their increasing prevalence.
Conclusion:
The MURIA group is providing a viable and sustainable platform to stimulate DU research across Africa.

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Title of the abstract:	**Potential drug-drug interactions in paediatric outpatient prescriptions at four Nigerian general hospitals**
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Background: Drug-drug interactions are responsible for a significant proportion of adverse drug reactions among patients worldwide. Information regarding the incidence of potential drug-drug interactions among paediatric patients in Nigeria is limited.
Objectives: We explored the potential drug-drug interactions (DDIs) in paediatric outpatient prescriptions and the reported adverse events at four Nigerian general hospitals.
Methods: A prospective clinical audit was undertaken of potential DDIs in the prescriptions received by children presenting to the outpatient clinics at four general hospitals in Lagos, Nigeria over a 3-month period. Adverse events documented in the case files of the patients during follow up were extracted.
Results: Among 1233 eligible patients, 208 (16.9%) received prescriptions with at least one potential DDI. Seven classes of drugs were implicated in the potential DDIs of which antimalarial; Artemisinin combination therapies (179; 37.3%) predominate. Exposure was mostly to a single potential DDI (188; 78.3%) and this commonly involved promethazine and artemether/lumefantrine (111; 46.2%), as well as ciprofloxacin and artemether/lumefantrine (39; 16.2%). Exposure was mostly to major and serious (141; 58.8%), and moderate and clinically significant (83; 34.5%), potential DDIs. The overall exposure was highest among infants (106; 44.1%) and higher for males (138; 57.5%) than females. There was a significant association between the severity of potential DDIs and age (p= 0.046) but not with gender (p= 0.631) of the patients. Only 48 (23.1%) of the patients presented to follow up clinic of which 15 reported ADEs to promethazine and artemether/lumefantrine (n=8), promethazine and metoclopramide (n=4), and ciprofloxacin and artemether/lumefantrine (n=3).
Conclusion: Exposure to potential DDIs was substantial among children attending outpatient clinics in some general hospitals in Lagos. However, potential DDIs were associated with only a few adverse drug events that were reported. There is a need to improve education among prescribers including their risk: benefit to guide future prescribing.

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Title of the abstract	**Drug promotional activities in Nigeria: Impact on prescribing pattern and practices of medical practitioners.**
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Background:
The relationship between the pharmaceutical industry and medical practitioners continues to generate controversies worldwide. However, the relationship between Nigerian doctors and the drug industry and its impact on their prescription pattern and practice has not been well explored.

Objectives:
The main objective of this study was to investigate the impact of drug promotion by the pharmaceutical industry on the prescribing pattern of medical doctors working in three healthcare facilities in Nigeria.

Methods:
This cross-sectional questionnaire-based study was carried out among 250 medical doctors working in three tertiary healthcare facilities in Nigeria. The information obtained from the questionnaire was coded, entered and analyzed using IBM SPSS version 19.

Results:
Majority (154/87.5%) of respondents had drugs promoted to them within the preceding three months. Most of the encounters with pharmaceutical representatives were in the outpatient clinics (60.2%) and department clinical meetings (46%). The information provided during promotional activities included: brand name of the drug (79.5%), clinical indications (80.7%), contra-indications (54.5%), potential adverse effects (41.5%), reference materials (39.2%) and potential drug-drug interactions (27.3%). Most respondents (68.2%) had gifts distributed during these encounters with food items (70.5%) and souvenirs (68.8%) being the main forms of gratification. Majority, (107/60.8%) of respondents felt motivated to prescribe the promoted drug afterwards. Factors that influenced respondents positively towards prescribing the promoted drugs were: information provided (63.6%), cost benefit analysis of the product, reputation of the drug company (28.4%) and gifts received (4.5%). Most respondents (64.8%) felt that the relationship between doctors and representatives of the pharmacological industry should have some form of regulation.

Conclusions:
Drug promotional activities have some influence on prescribing pattern of Nigerian medical doctors. Gifts received during the promotional activities appeared not to have any significant effect on the decision to prescribe the marketed drug.

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Title of the abstract	**How do supply and affordability of antimalarial medicines vary across outlet type and what does this mean for effective and rational treatment?**
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Details of other co-authors	

Background:
Rapid access to effective diagnosis and treatment is essential in case of suspected malaria. Malaria treatment is generally accessed from a wide variety of sources, ranging from tertiary government hospitals, high end pharmacies down to itinerant salesman. The quality and affordability of medicines also varies, leaving some exposed to less effective medicines for a disease that can kill in just three days.

Objectives:
We sought to understand the range of different outlets actually providing antimalarial medicines, the variety of medicines available in each outlet type and the relative affordability of these.

Methods:
Focusing on the supply side, we adapted the WHO/HAI pricing study methodology to understand the range of outlet types across a district, followed by the standard WHO/HAI pricing study approach to measure product availability, price and affordability. Studies were carried out in Uganda and Malawi.

Results:
The studies provided detailed information on the very wide range of points of access for malaria treatment, as well as the broad definition of 'malaria medicine', which popularly included analgesics and sometimes cough medicines. The main drivers of product selection included affordability and traditional consumer preference, in a time when the antimalarials market should have been changing significantly towards more effective products. Products available in the public sector generally followed national treatment guidelines, while products in the private sector varied significantly. This highlights the importance of working in parallel on behaviour change information as well as ensuring a strong public sector supply for those who cannot afford more effective medicines.

Conclusions:
Drug utilisation studies support interventions on both supply and demand to optimise the use, affordability and availability of key medicines. By focusing on detailed supply dynamics, we can better understand the interplay between treatment seeking behaviour and supply / access to medicine to guide new policies and interventions such as long term affordability for more effective but more expensive classes of drugs.

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Title of the abstract	**Perception of Adverse Effects in patients on Carbamazepine Monotherapy for Seizure Control**
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Background:
Antiepileptic drugs have a high propensity to cause adverse effects because of their mechanism of action and metabolism through cytochrome 450 pathway. The presence of adverse effects is a major determinant of quality of life in patients living with epilepsy and is reported to be higher during initiation of therapy and during a new dose.

Objectives:
The study will assess reports of adverse effects in patient on long term use of carbamazepine monotherapy and determinant factors for the presence of adverse effects.

Methods:
This is a descriptive cross-sectional study involving 84 patients with epilepsy (who had been on carbamazepine for at 9 months) were assessed for adverse effects using Liverpool adverse effects profile score.

Results:
The study showed that 54(64.3 %) reported no adverse effect, while 30 (35.7%) had adverse effects. The median LAEP score was 21 (IQR=21-22) at 95% confidence interval (CI). The highest score was 28. The commonest adverse effect reported was memory problems which occurred in 12 (14.3%) of the patients, headaches 9(10.7%) others include restlessness, tiredness, sleepiness and depression. Adverse effects were significantly higher in females compared to males.(P=0.012). Females who had low educational levels also had a significantly higher report of adverse effect compared to their more educated counterparts. (p= 0.03). The dose, co-medications use including herbals, seizure control and presence of comorbid conditions did not significantly affect reports of adverse effects.

Conclusions:
In this study, perception of adverse effects was common in patients on long term use of carbamazepine. Adverse effects are more common in women and educational status of the women was a major determinant of perception of adverse effects.

Second Training Workshop and Symposium MURIA Group 25 – 27 July 2016
University of Botswana, Gaborone

Title of the abstract:	**Providing a study-based evidence to advocate for a large-scale establishment of effective Drug and Therapeutic Committees in referral hospitals in Democratic Republic of Congo (DRC)**
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Background
The pharmaceutical budget in DRC represents only 0.2% of the country's total budget. The limited resources available emphasize the need for strategies that promote rational use of medicines, which typically account for a large proportion of the budget. Establishing effective Drug and Therapeutics Committees (DTCs) in referral hospitals represents one such strategy. However, only 6% of referral hospitals in DRC have a DTC; the DTC concept is not widely understood, and there is lack of local studies to support how DTCs contribute to rational medicines use. The USAID-funded SIAPS Program conducted a medicines use study in five provinces to assess whether DTCs support rational medicines use.

Methods
Using a case-control study design, five hospitals with a DTC in place and five hospitals without were selected. Primary and secondary data were collected from multiple sources in each hospital. A total of 150 prescriptions in hospitals with DTC and 150 in those without were randomly selected to assess several medicine use indicators.

Results
The results indicate that hospitals with DTCs used medicines more rationally compared to those without DTCs for the following indicators: prescribing behaviors (number of medicines prescribed, use of antibiotics and injections, use of essential medicine list, and use of generics); patient knowledge of their medication (medicines prescribed, route of administration, frequency, and duration); prescriber adherence to national treatment guidelines (e.g., 60% of malaria cases were managed according to the standard guidelines in hospitals with DTCs versus only 40% in those without); and antibiotic prophylaxis for cesarean section.

Conclusion
The results indicate that hospitals with DTCs are more effective in using medicines rationally in a number of ways. This information may support decision makers and managers to better understand the value of DTCs and provides evidence to support the establishment of DTCs in a greater number of referral hospitals.