

# **DRUG UTILIZATION IN SOUTHERN AFRICA: AN APPLICATION**

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# Focus of Research entity

**appropriate medicine  
usage patterns in both  
the public and private  
health care sectors in  
South Africa and factors  
that may influence the  
usage of medicine**



# Focus of presentation

**Recap of DUR**

**Application of  
DUR**

**Examples of  
DU studies in  
Africa and SA**

**Sources of  
medicine  
usage data**



# A recap on drug utilization research

- **Research in drug utilisation began in 1960**
- **Pharmaceutical industry early on expressed the need for drug utilisation data to monitor the performance of their sales representatives**
- **Development of the Intercontinental Medical Statistics, IMS database.**
- **Concerns about drug expenditure was the major incentive in the development of statistics on drug use.**
- **Statistics initially compiled for**
  - **Financial decisions;**
  - **Administrative decisions; and**
  - **Reimbursement decisions**
- **But also contributed to data directly applicable to health studies**

- **Inappropriate and poor quality drug prescribing, and usage are common both in developed and developing countries worldwide.**
- **Formal studies on the prescribing and usage patterns of medicine in South Africa are very limited.**
- **Medicines continue to be an important driver of health care and medical scheme costs in South Africa.**
- **Aging medical scheme population.**
- **Burden of health care costs - prevalence of chronic diseases .**
- **Not only the number of chronic diseases - but also the complexity.**
- **2010 Mediscor Medicine Review- Top 5 therapeutic groups according to total expenditure for 2010 were the antihypertensive drugs , cytostatics, antidepressants, antidiabetic drugs and hypolipideamic agents.**

# Assessment of medicine usage

- **Assess the accessibility, quality and cost-effective care**
- **Monitor trends in consumption.**
- **Provide a benchmark for comparison with similar countries, regions and facilities**
- **Compare medicine usage against evidence-based principles or guidelines**
- **Increase awareness of stakeholders about medicine use**
- **Identify problematic areas to develop targeted intervention strategies**

- **The thalidomide disaster further emphasized the importance of monitoring the extent and pattern of drug use to assess the incidence and distribution of the risk of drug use.**
- **A study regarding the sales of antibiotics in 6 European countries, showed remarkable differences between countries between 1966 and 1967, but the researchers could not explain these differences (Engel & Siderius, 1968 )**
- **Their work inspired the WHO to organize its first drug consumption meeting in Oslo in 1969.**

# WHO definition of Drug utilization research

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**“marketing, distribution, prescription and the use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences”**

## MEDICAL CONSEQUENCES



- **Benefits**
- **Risk associated with diseases**
- **Benefit-risk ratio**

## SOCIAL CONSEQUENCES



- **Therapy traditions**
- **Trends in drug use**
- **Drug abuse and dependence**
- **Inappropriate drug use**
- **Drug regulations**

## ECONOMIC CONSEQUENCES



- **Cost of drugs and treatment**
- **Drug pricing**
- **Allocation of resources to health and drug budgets**

# Drug utilization studies vs. DUR programs

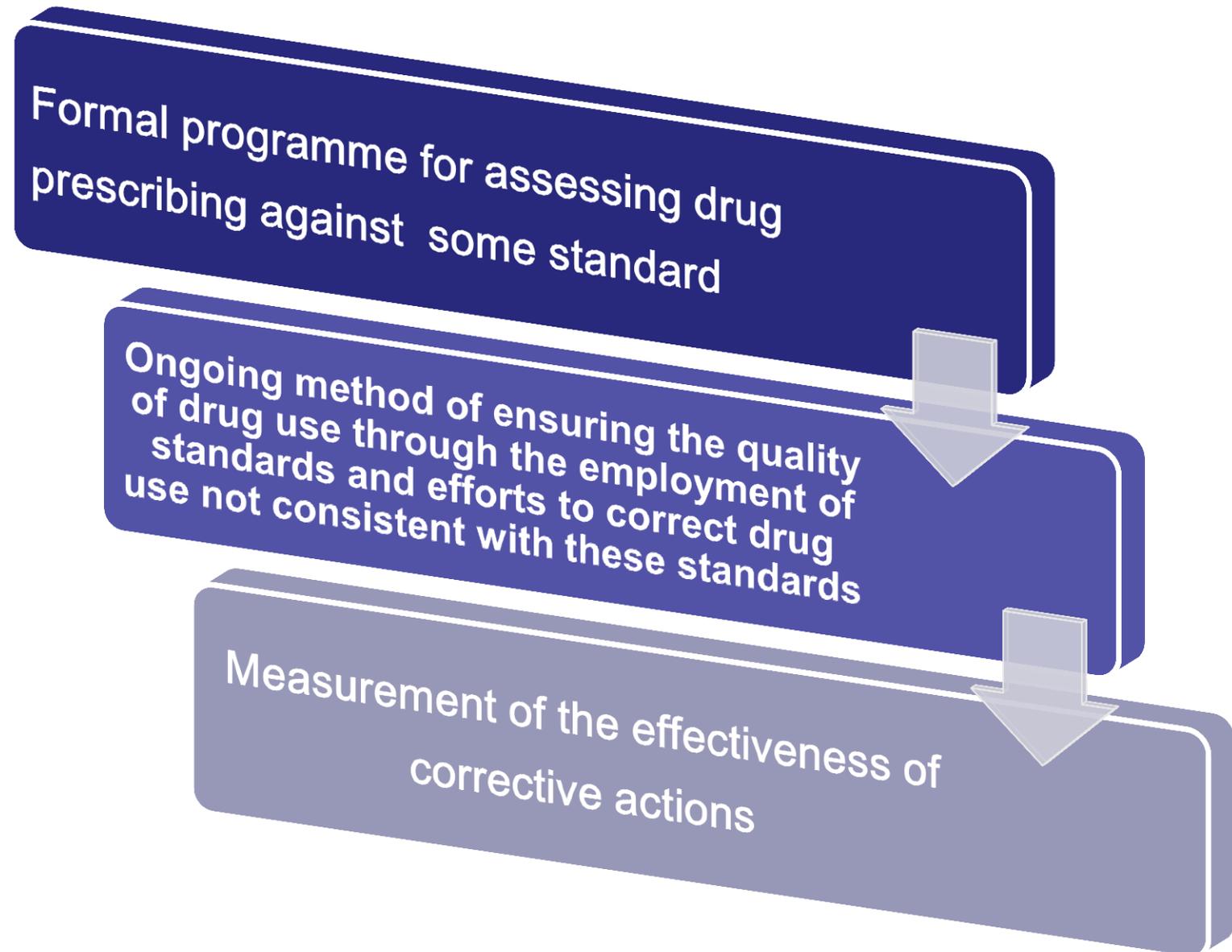
Drug utilization  
studies

- In the realm of research

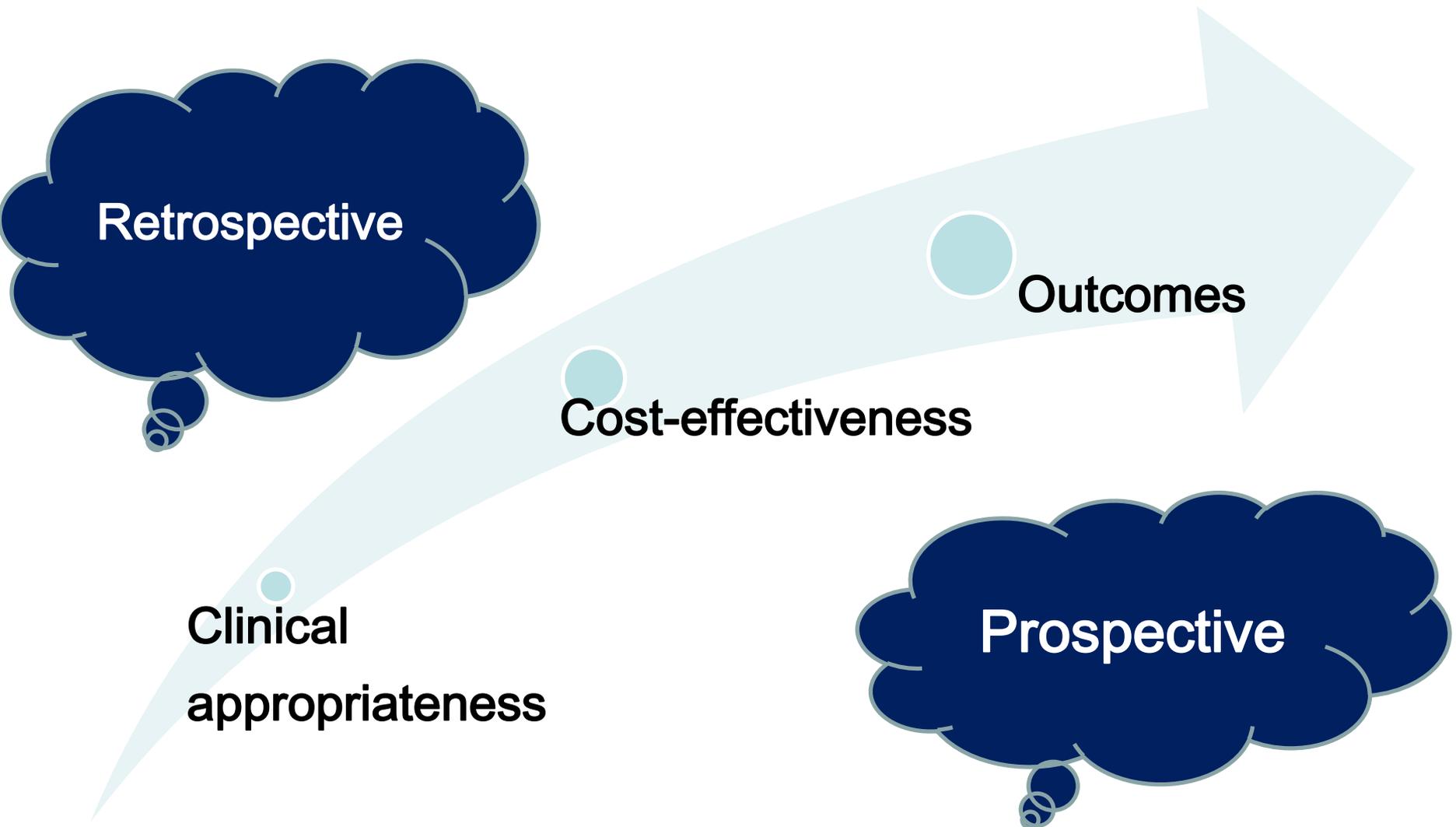
Drug utilization  
review  
programs

- In the realm of  
management

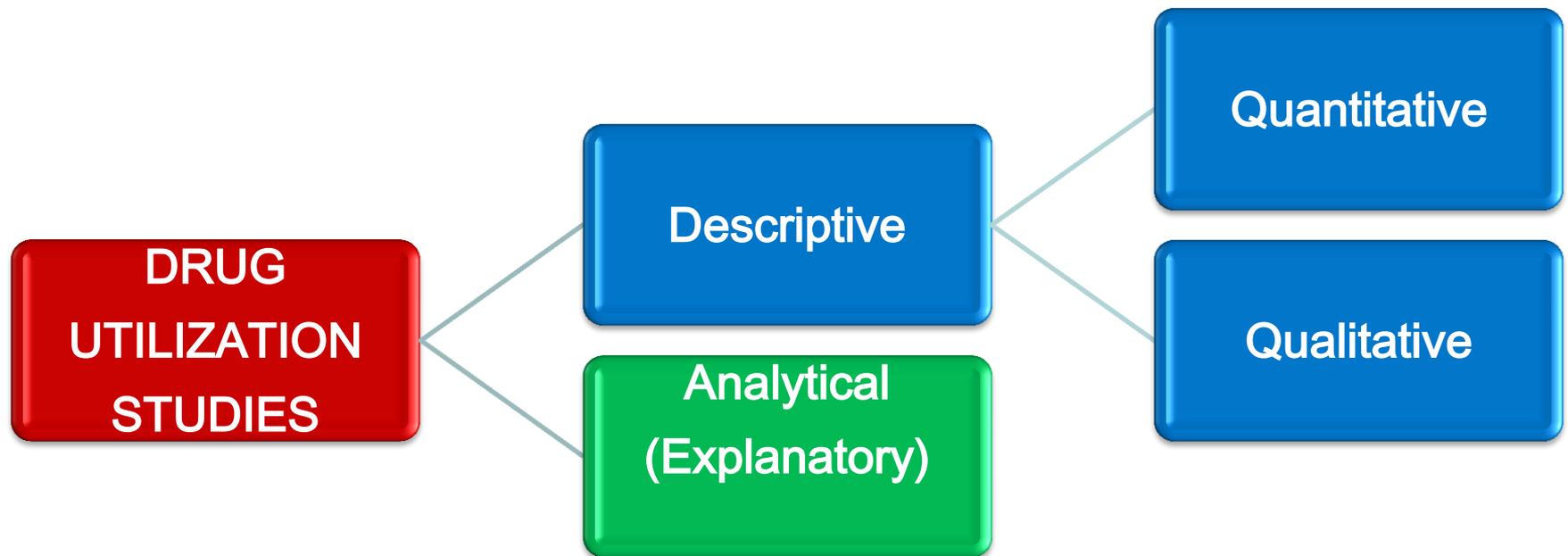
# Drug utilization review programs



# Drug utilization review programs



# Drug utilization review studies



# Drug utilization research in relation to other disciplines

## Drug utilization research

- collection of descriptive and analytical methods
- for the quantification, understanding and evaluation of the processes
- of prescribing, dispensing and consumption of medicines, and for the testing of interventions to enhance the quality of these processes.

## Pharmacoepidemiology

- to describe, explain, control and predict the uses and effects of pharmacological treatments
- in a defined time, space and population.

Pharmacoepidemiology - focuses to a greater extent on the quantitative benefits and risks of drug treatment in cohorts of patients,.

DUR - focuses more on drug exposure and differences in the quality and quantity of drug use in different countries, regions and settings

## Pharmacovigilance

- "The science and activities relating to
  - the detection, assessment, understanding and prevention of adverse effects or any other drug-related problems”
  - closely related to drug utilization research
  - DUR includes descriptive and analytical studies of the use of drugs
- vs.
- pharmacovigilance mostly encompasses surveillance of adverse effects after short and long-term use of medicine.

## Pharmacoeconomics

- The description and analysis of the costs of drug therapy to health care systems and society
- Focus has over time shifted from more descriptive analyses to more analytical approaches which included outcomes of therapy.

- **International comparisons of drug utilisation**
- **Drug utilization research to evaluate the quality of medicine**
- **Usage studies (Quan)**
- **Studies of prescription habits (Qual)**
- **Studies of the incidence of prescriptions (Quan)**
- **Therapeutic profile studies (Quan)**
- **Survey of medical reports**
- **Studies on patient adherence, patient cooperation and patients' knowledge of medicine (Qual)**
- **Studies regarding the effect of medicine including ADRs (Qual)**
- **Tool in interventions to change prescribing (Qual)**
- **Development of prescribing indicators**

# International comparisons of drug utilization

- Different levels – from local to international
- Benchmarking drug utilisation
- Prerequisite: Data are collected and aggregated in a standardised, uniform way
- The ATC/DDD methodology of WHO enables such comparisons:
  - Defined daily dosage (DDD) / 1000 inhabitants
  - DU90% - drugs that account for 90% of the prescribed volume

**Versporten et al., 2011. European Surveillance of Antimicrobial Consumption (ESAC): outpatient penicillin use in Europe (1997–2009).**  
*J. Antimicrob. Chemother.* (2011) 66 (suppl 6): vi13-vi23. doi:  
10.1093/jac/dkr454

**Background** Data on 13 years (1997–2009) of outpatient penicillin use were collected from 33 European countries within the European Surveillance of Antimicrobial Consumption (ESAC) project and analysed in detail.

**Methods** For the period 1997–2009, data on outpatient use of systemic penicillins aggregated at the level of the active substance were collected using the Anatomical Therapeutic Chemical (ATC)/defined daily dose (DDD) method (WHO, version 2011) and expressed in DDD per 1000 inhabitants per day (DID). For detailed analysis of trends over time, seasonal variation and composition of outpatient penicillin use in 33 European countries, we distinguished between narrow-spectrum penicillins (NSP), broad-spectrum penicillins (BSP), penicillinase-resistant penicillins (PRP) and combinations with  $\beta$ -lactamase inhibitors (COP).

- **To provide deeper understanding of the subjective aspects of prescribing, dispensing and utilization of drugs and**
- **The interactions between health care providers and patients.**
- **Examples of qualitative research methods:**
  - **In-depth interviews**
  - **Focus group discussions**
  - **Observations**
  - **Various consensus methods**

- **Examples**
  - **To explain why patients do not adhere to their treatment**
  - **To examine physicians' use of treatment guidelines**
  - **To study the drug choice process**
  - **Can also help to understand why interventions fail.**
  - **Help to explore patient's perspectives on drug use**

# Addressing gaps in pharmacovigilance practices in the antiretroviral therapy program in the Eastern Cape Province, South Africa

[Karine Wabø Ruud](#), [Sunitha C. Srinivas](#), [Else-Lydia Toverud](#),

**Research in Social and Administrative Pharmacy**

[Volume 6, Issue 4](#) , Pages 345-353, December 2010

## Objectives

The aim of this study was to gain insight on attitudes and experiences regarding ADR detection and reporting among health care providers (HCPs) shortly after the first formal pharmacovigilance plan for ART was introduced.

## Methods

Three focus-group discussions were conducted with 12 HCPs. There were 7 nurses, 3 pharmacists, 1 doctor, and 1 auxiliary staff, all recruited from public hospitals and local health authorities in 2 towns in the Eastern Cape Province, South Africa.

## Results

It was observed that senior HCPs knew that ADRs from ARVs should be reported formally, whereas junior staff did not demonstrate the same knowledge. The participants thought that underreporting from the primary health care level was a major problem. HCPs identified various reasons for underreporting ADRs: problems with filling out the reporting form, lack of training, high workload, lack of feedback, and fears of not being taken seriously. Lack of adequate training in pharmacovigilance led to lack of confidence among the professional nurses in managing ADRs.

## Conclusions

Increased focus on pharmacovigilance with adequate, continuous training, especially for nurses managing down-referred patients in primary health care on identification and management of ADRs, and practical use of the ADR form may be necessary to improve pharmacovigilance practices in the area.

- **THE IMPACT OF HEALTHCARE PROVIDERS' KNOWLEDGE ON APPROPRIATE PRESCRIBING OF ANTIBIOTICS**

Matthias Adorka, Kirk Allen, Martie Lubbe & Jan Serfontein

- Structured questionnaire survey targeting all doctors, nurses and healthcare providers within Health Services Areas abounding and including 5 selected public hospitals in Lesotho was carried out.
- Respondents' knowledge in bacteriology of infections and principles of antibiotic prescribing was tested.
- Relevant data on antibiotic prescriptions were also collected concurrently

- **ANTIBIOTIC USE IN NAMIBIA:PRESCRIBER PRACTICES FOR COMMON COMMUNITY INFECTIONS**

Dawn D Pereko, Marie S Lubbe & Sabiha Y Essack

- Web-based self-administered questionnaire distributed to GP's & specialists in Namibia
- Objective: to determine the dr's behavior and clinical practice in prescribing antibiotics in Namibia.
- Confirmed by responses that first-line choices of dr's are not informed by the Namibia STG and local and regional sensitivity data.

# Patient adherence studies

- **Patient adherence studies aim to determine whether prescribed drugs are administered as recommended and to detect problems that may occur in the process.**
- **With regard to antibiotics, a patient survey in 11 countries across the world showed that 22.3% of patients who received antibiotic medication admitted to not finishing the therapy (Pechère et al., 2007).**
- **The problem of non-adherence is not only relevant for acute complaints, but even more so for chronic diseases.**
- **Due to the increasing number of patients suffering from chronic diseases adherence to medication is becoming increasingly important.**
- **A large number of studies both nationally and internationally have shown that patients' adherence to prescribed drugs in long-term treatment might be as low as 50% (Sabaté et al., 2003)**

- **NAMIBIA ART ADHERENCE ASSESSMENT AND IMPROVEMENT INITIATIVE** (MSH/SPS Namibia)

They make use of both quantitative and qualitative research methodology

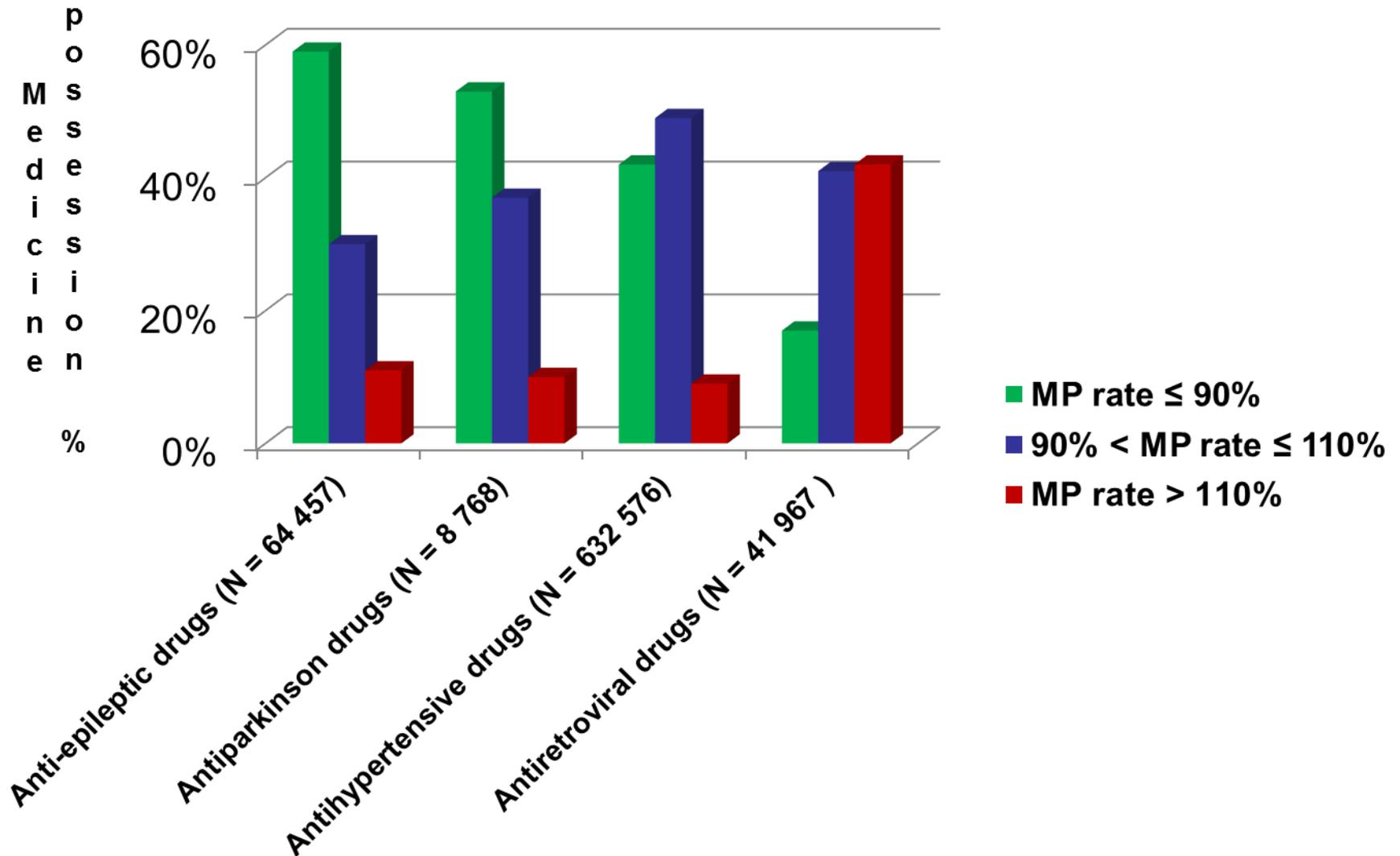
- Key parameters related to adherence (i.e. dispensing-based adherence, appointment-keeping and patient retention on ART) were evaluated using data available on an Electronic Dispensing Tool (EDT) database.
- They also used a multi-method approach that include self-report, pill count and Visual Analogue Scale (VAS) as adherence measurement tools.

- **THE IMPACT OF HIV/AIDS ON COMPLIANCE WITH ANTIDEPRESSANT TREATMENT IN MAJOR DEPRESSIVE DISORDER: A PROSPECTIVE STUDY IN A SOUTH AFRICAN PRIVATE HEALTHCARE COHORT**

FN Slabbert, BH Harvey, CB Brink & MS Lubbe

- Two groups were distinguished in the database: patients with only MDD and patients with both MDD and HIV/AIDS over a six-year period
- Medicine possession ratio was used as proxy to determine compliance with AD medication

# Examples: Medicine possession rates



- **PUBLIC KNOWLEDGE, ATTITUDES AND BEHAVIOUR TOWARDS ANTIBIOTIC USAGE IN WINDHOEK, NAMIBIA**

D Pereko et al.

- Purpose of study was to assess the knowledge, attitudes and behavior of the general population of Namibia accessing care in the private sector regarding antibiotic use.
- A self-administered questionnaire was distributed to patients
- Was possible to make certain recommendations regarding education of the usage of antibiotics to patients, pharmacists and doctors.

# Drug utilization data as a tool in intervention to change prescribing

- **Identify areas for improvement**
- **Provide data for initiating interventions for modifying undesirable patterns of drug use**
- **Effects of interventions to change medicine usage patterns should be monitored and evaluated**
- **Endpoints of measuring the effectiveness of an intervention within a Drug utilization review program can be**
  - **Economic and Financial**
  - **Clinical (effectiveness of treatment) or**
  - **Patient-centred outcomes data (adherence, adverse drug reactions, satisfaction/ quality of health)**

- **PRESCRIBING PATTERNS OF MEDICINE CLASSIFIED AS 'ANTIDEPRESSANTS' IN SOUTH AFRICAN CHILDREN AND ADOLESCENTS**

JR Burger, E van der Westhuizen, MS Lubbe & JHP Serfontein

- Patients 19 years and younger were included in the study, at least 1 antidepressant dispensed.
- Both qualitative and quantitative
- Found that approximately 30% of antidepressants in the study population were prescribed off-label

- **INFLUENCE OF A NEW REFERENCE-BASED PRICING SYSTEM IN SOUTH AFRICA ON THE PREVALENCE AND COST OF ANTIDIABETIC MEDICINE: A PILOT STUDY**

Rianda Steyn, Johanita R Burger, Jan HP Serfontein & Matrha S Lubbe

- Retrospective DUR and basic cost analysis on antidiabetic medicine usage data
- Three time periods (pre-SEP period, interim period and post-SEP period)
- Found a reduction in cost of antidiabetic medicine which indicate that new pricing regulations could have had an influence on pricing

# Examples of DDI studies

- **Saley et al. (1999) found that nearly 18% of prescriptions for psychiatric outpatients in the North West Province, had potential drug-drug interactions and of these, 13.09% with possible severe, suspected outcomes.**
- **Katende-Kyenda *et al.* (2008) found approximately 18 000 potential drug-drug interactions (81 different types of drug-drug interactions) on 43 000 antiretroviral (ARV) prescriptions claimed through a South African medicine claims database during 2004; of these 84% were between ARVs and other drugs and 16% were between ARVs themselves.**
- **They further identified that the implementation of the Prescribed Minimum Benefits has had a possible influence on the decreasing of the number of potential drug-drug interaction between 2004 and 2005 on the PBM data .**
- **This study showed that retrospective drug utilisation studies could be used to identify potential drug-drug interactions and therefore help to improve the optimal therapy for patients infected with HIV.**

# Adverse drug reactions

- Cause significant morbidity and mortality.
- Rank among the top 10 causes of death in the United States of America .
- Adverse drug reactions (ADRs) account further for 3.2–7% of acute hospital admissions .[Pouyanne *et al.*, 2000:1036; Wasserfallen *et al.*, 2001] ,
- About 17% of hospital admissions in patients older than 70 years (Cruikshank, 2003:53).
- These ADRs can cause a longer duration of hospital stay and increase hospital cost.
- In 1999, Moodley *et al.* (1999) reported that 155 of 281 geriatric patients, attending outpatient clinics at Addington Hospital, experienced one or more adverse drug reactions with their medication
- May also lead to non-adherence of patients to their medication

# Development of Prescribing quality indicators

- Another important application of Drug utilization research
- Prescribing quality indicators aims to assess the quality of prescribing.
- Drug utilisation research provides important tools for the development of prescribing quality indicators.
- Prescribing quality indicators can be defined as a

*measurable element of prescribing performance for which there is evidence or consensus that it can be used to assess quality and hence, change the quality of care provided .*

# Use of prescribing quality indicators

- Indicators to describe prescribing vs. indicators to improve prescribing
- Professional indicators and public indicators
- **Health care professionals used:**
  - Benchmarking
  - As an auditing tool
  - To measure the effect of an intervention
- **Policy makers used:**
  - To regulate providers of care
  - Ensure accountability of the quality of care
  - Promote quality improvement, and
  - Encourage cost control

# Domains of Prescribing Quality Focus Indicators

INDICATOR	DEFINITION	EXAMPLES
<b>STRUCTURE</b>	Indicators that assess the quality of organizational factors in health care (e.g. personnel, equipment, practice organization)	Availability of formulary at the practice Details of prescribed medicine available to the prescriber at each consultation
<b>PROCESS</b>	Indicators that measure the quality of processes in health care	Proportion of people prescribed an antibiotic that is not recommended.
<b>OUTCOME</b>	Indicators that measure results achieved in health care	Morbidity and mortality Drug-related hospital admissions Adverse drug reactions during hospitalization

# Content indicators

INDICATOR	DEFINITION	Examples
DRUG ORIENTED	Include information on drugs and drug characteristics alone. They can be used regardless of the indication for which the drug is prescribed	Ratio of drug groups Adherence, Duplications New drugs, Dosage (long -term use) Drug-drug indicators Recommended drug choice
DISEASE ORIENTED	Include information on drugs linked to the diagnosis or health problem (Prescribing quality is one aspect of treatment quality) Concern the effectiveness of the medication in relation to the disease	Need diagnoses and drug information Over/under diagnoses Indicated drug choice Specific adherence Suboptimal drug choice – not prescribing a drug when it is indicated
PATIENT ORIENTED	Include information on drugs linked to individual clinical characteristics of the patient e.g., severity of the disease	Indicated drug regimen for different levels of severity or in relation to other clinical parameters.

# Examples

- **50% of all medicines are prescribed, dispensed, or sold inappropriately, while 50% of patients fail to take them correctly (WHO, 2002).**
- **75% of antibiotics are prescribed inappropriately, even in academic hospitals in developing countries (Brundtland, 1999) .**
- **Nearly 1 in 12 drugs prescribed for elderly patients are inappropriate (Goulding, 2004).**
- **Worldwide an average of only 50% of patients take their medication correctly (Brundtland, 1999).**

# Sources of data on drug use

- **Institutional record systems and databases**
  - Drug utilisation studies
  - Hospital-based medical audits (inpatients)
- **System wide databases**
  - Institutional based reviews (outpatient)
  - Health insurance groups and third-party payers
  - Pharmaceutical organisation
  - Commercial vendors of marketing studies and sales data
- **National databases**
  - Government-sponsored studies
  - Essential drug lists and inventory data
  - Pharmacoepidemiology surveillance systems
- **Field data**
  - Records of drug dispenser, sellers and distributors
  - Drug-taking behaviors of individuals and small groups
- **Experimental data - 'de novo' data collection**
  - Clinical trial results



# Current important limitation of available databases

- **Clinical data - more important confidential issues develop**
- **Informed consent**
- **Legislation regarding privacy of data**
- **Medical record – not computerised**
- **Lack of diagnoses or indication for drug treatment**

# Current important limitation of available databases

- **Diagnoses entered – not updated or not available**
- **Inconsistency regarding classification systems for medication and diagnosis**
- **Representation of claims data**
- **Scope of dispensing data – reconsolidation with inpatient care, OTC medication.**

# THANK YOU



***“Less than one in ten thousand—something like one in fourteen thousand—gets these side effects. Hardly anybody gets these side effects. They’re extremely rare. You should be very proud.”***