

Joint educational course  
and scientific meeting



 **EuroDURG**

The European branch of the  
Special Interest Group for Drug  
Utilization Research (SIGDUR)

# ***Better public health through pharmacoepidemiology and quality use of medicine***

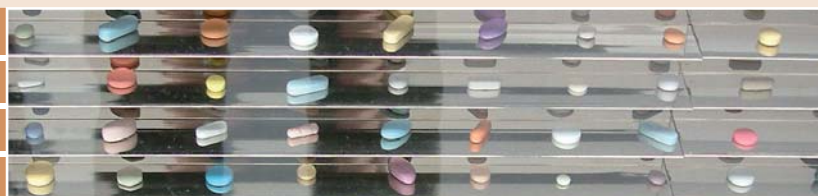
***Wednesday November 30  
– Saturday December 03 2011***



***Hof Van Liere  
University of Antwerp, Belgium***



## ***Program & Abstract Book***



# PROGRAM AT A GLANCE

| WEDNESDAY 30-11-2011 |                                                                                                                                                                                                                                           | THURSDAY 01-12-2011                                                                                |                                                                                                          | FRIDAY 02-12-2011                                                                                        |                                                                                           | SATURDAY 03-12-2011                                                                                                |                                                                                 |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| 09.00-10.30          | The introductory educational sessions of Wednesday afternoon require registration to the standard program <b>PLUS</b> .<br>The standard program starts on Wednesday evening (with guided tour in Hof Van Liere followed by welcome drink) | ADVANCED EDUCATIONAL SESSIONS                                                                      |                                                                                                          | SCIENTIFIC PROGRAM PARTII                                                                                |                                                                                           | SCIENTIFIC PROGRAM PART IV                                                                                         |                                                                                 |
|                      |                                                                                                                                                                                                                                           | Room: <b>Dürer</b><br><b>T1A – ES</b><br>Measurement units of expenditure                          | Room: <b>Tassis</b><br><b>T1B – ES</b><br>Prescribing quality indicators advanced                        | Aula: <b>B004</b><br><b>F1 – KL</b><br>Innovation management and DU                                      |                                                                                           | Room: <b>Dürer</b><br><b>S1A – KL+Abstracts</b><br>Generics in DUR                                                 | Room: <b>Tassis</b><br><b>S1B – KL+Abstracts</b><br>Interventions to improve DU |
|                      |                                                                                                                                                                                                                                           | Coffee break                                                                                       |                                                                                                          | Coffee break                                                                                             |                                                                                           | Coffee break                                                                                                       |                                                                                 |
|                      |                                                                                                                                                                                                                                           | Room: <b>Dürer</b><br><b>T2A – ES</b><br>Using P-EPI tools to evaluate the impact of interventions | Room: <b>Tassis</b><br><b>T2B – ES</b><br>Biostatistical methods in DUR                                  | Room: <b>Prentenkabinet</b><br><b>F2A – KL+Abstracts</b><br>Adherence in DUR                             | Aula: <b>B004</b><br><b>F2B – KL+Abstracts</b><br>Validation studies of data & indicators | Room: <b>Tassis</b><br><b>S2 – KL</b><br>The future of quality use of medicine: From measurement to implementation | Closing remarks                                                                 |
| 12.30-13.30          |                                                                                                                                                                                                                                           | Lunch                                                                                              |                                                                                                          | Lunch (at Aula Rector Dhanis)                                                                            |                                                                                           |                                                                                                                    |                                                                                 |
| 13.30-14.15          | DUR as a tool for health policy                                                                                                                                                                                                           | INTRODUCTORY EDUCATIONAL SESSIONS                                                                  |                                                                                                          | SCIENTIFIC PROGRAM PARTIII                                                                               |                                                                                           |                                                                                                                    |                                                                                 |
|                      |                                                                                                                                                                                                                                           | Room: <b>Tassis</b><br>Welcome<br><b>W1 – ES</b>                                                   | Room : <b>Tassis</b><br><b>T3 – KL</b><br>Better public health through P-EPI and quality use of medicine | Aula: Rector Dhanis<br><b>F3</b><br>Poster presentation                                                  |                                                                                           | Legend                                                                                                             |                                                                                 |
|                      |                                                                                                                                                                                                                                           | Room: <b>Tassis</b><br><b>W2 – ES</b><br>Classification systems & measurement units of utilization | Room: <b>Tassis</b><br><b>T4 – WS</b><br>Towards better health outcome through DU CNC                    | Aula: <b>B001</b><br><b>F4 – KL</b><br>DUR in benefit-risk evaluation                                    |                                                                                           | ES                                                                                                                 | educational session                                                             |
|                      |                                                                                                                                                                                                                                           | Coffee break                                                                                       | Room: <b>Prentenkabinet and Scaldis</b><br>CNC poster walk                                               | Coffee break                                                                                             |                                                                                           | KL                                                                                                                 | key lecture                                                                     |
| 14.15-15.45          |                                                                                                                                                                                                                                           | Room: <b>Tassis</b><br><b>W3 – ES</b><br>Quality indicators and feedback to prescribers            |                                                                                                          | Room: <b>See color code</b><br>CNC selected topic discussions<br>Round table: Suggestions for the future |                                                                                           | WS                                                                                                                 | workshop                                                                        |
| 15.45-16.15          |                                                                                                                                                                                                                                           | Guided tour in Hof Van Liere followed by welcome drink                                             |                                                                                                          | Reception at Antwerp Town hall followed by dinner at the University Club                                 |                                                                                           | DU(R) drug utilization (research)<br>P-EPI pharmaco-epidemiology<br>CNC cross national comparison                  |                                                                                 |
| 16.15-17.45          |                                                                                                                                                                                                                                           |                                                                                                    |                                                                                                          | EuroDURG party with walking dinner at Felixpakhuis                                                       |                                                                                           |                                                                                                                    |                                                                                 |

Dear attendee!

It is with great pleasure and excitement that we welcome you in the historical heart of Antwerp to the EuroDURG/ISPE “Better public health through pharmaco-epidemiology and quality use of medicine” meeting.

An attractive educational and scientific program lies ahead, linking drug utilization research to health policy. We have prepared a mix of educational sessions, workshops, interactive sessions and key lectures, with international expert speakers from the health policy and scientific field. After the intensive immersion in the current state-of-art of drug utilization research during the day, an equally appealing social program awaits you at night.

Extending you a warm welcome and wishing you an unforgettable time in Antwerp

The local organizers

Monique Elseviers  
Yoleen Van Camp

The scientific committee

Björn Wettermark  
Morten Andersen  
Alison Bourke  
Monique Elseviers  
Brian Godman  
Flora Haaijer-Ruskamp  
Aukje Mantel-Teeuwisse  
Frank May  
Elisabetta Poluzzi  
Gisbert Selke  
Hanne Strøm  
Robert Vander Stichele  
Vera Vlahović-Palčevski

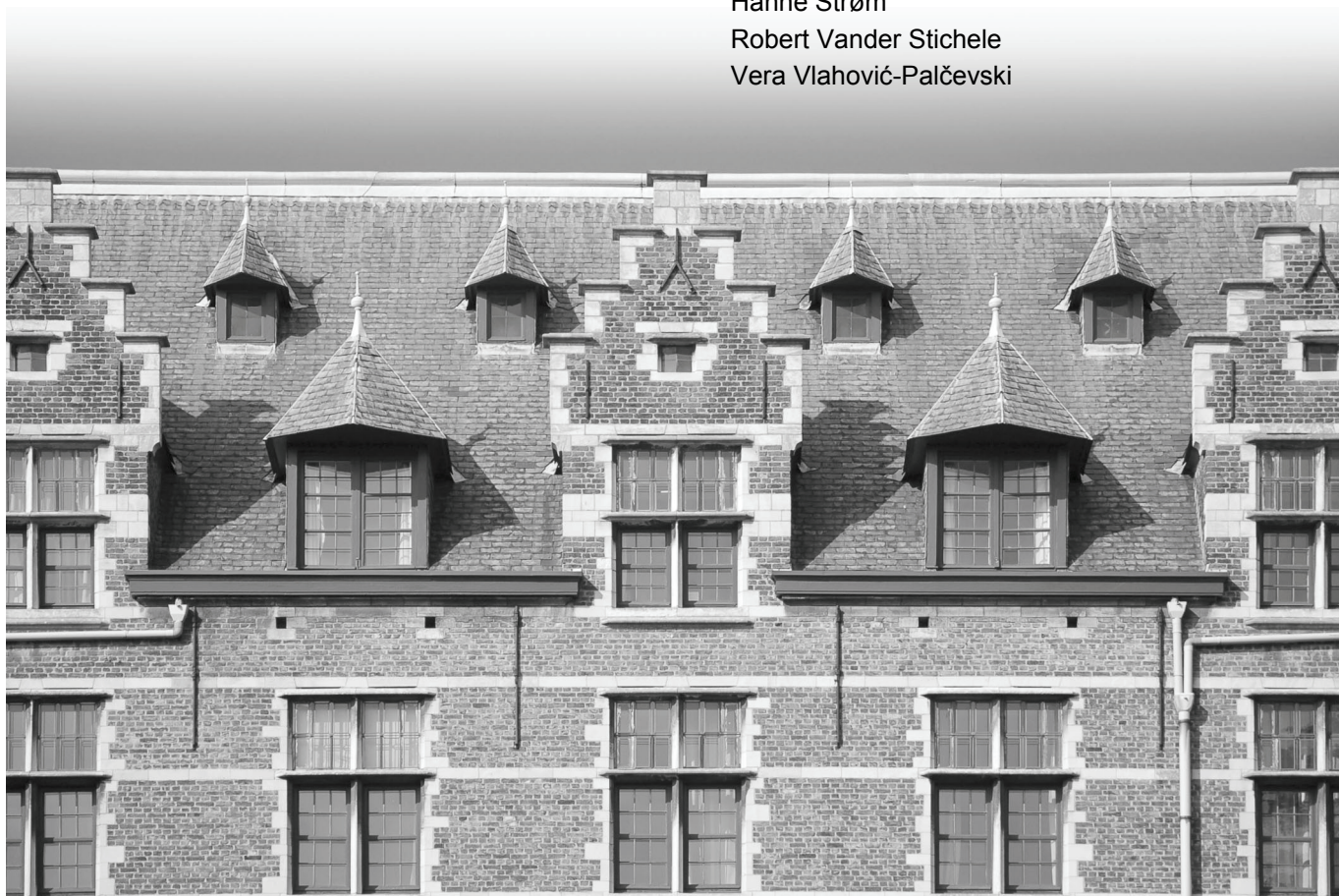




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## **EuroDURG/ISPE meeting**

**“Better public health through pharmaco-epidemiology and quality use of medicine”**

**November 30, 2011 – December 3, 2011**

### **List of Sponsors**

- **Associazione DURG Italia**
- **Cegedim Strategic Data**
- **ISPE**
- **RIZIV-INAMI National Institute for Health and Disability Insurance  
(Rijksinstituut voor ziekte- en invaliditeitsverzekering)**
- **University of Antwerp**
- **University Medical Center Groningen**
- **University of Ghent, Heymans Institute of Pharmacology**
- **University of Stockholm, Karolinska Institutet**
- **WHO Collaborating Centre for Drug Statistics Methodology; Norwegian Institute  
of Public Health**
- **WHO Collaborating Centre for Pharmacoepidemiology & Pharmaceutical Policy  
Analysis, Utrecht University**
- **WHO Europe**

## WEDNESDAY 30-11-2011

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### **13.30 – 14.15** W1 – EDUCATIONAL SESSION Drug utilization research as a tool for health policy

**Room: Tassis** Chair: Björn Wettermark

*Aim: To give an overview of pharmacoepidemiology and drug utilization research in health policy and to explain the skills needed and the expected outcome from the different course sessions.*

**Introduction** Definitions of research fields and methodological framework

Robert Vander Stichele (Be)

**13.30 – 13.35** Welcome to Antwerp and to the EuroDURG/ISPE meeting

Monique Elseviers (Be)

**13.35 – 14.00** What is drug utilization research and why is it important in policymaking?

Robert Vander Stichele (Be)

**14.00 – 14.15** The skills needed in DUR – Expected course outcomes

Björn Wettermark (Se)

### **14.15 – 15.45** W2 – EDUCATIONAL SESSION Classification systems and measurement units of utilization

**Room: Tassis** Chair: Hanne Strøm

*Aim: To give an overview of classification systems for medicinal products. To describe the Anatomical Therapeutic Chemical (ATC) classification system and the unit of measurement (DDD), and how to use this methodology.*

**14.15 – 14.45** Overview of classification systems with focus on ATC

Hanne Strøm (No)

**14.45 – 15.15** The concept of the Defined Daily Dose (DDD)

Hege Salvesen Blix (No)

**15.15 – 15.45** Application of ATC/DDD in health policy and drug utilization

Solveig Sakshaug (No)

### **16.15 – 17.45** W3 – EDUCATIONAL SESSION Quality indicators and their use for improving prescribing – An introduction

**Room: Tassis** Chair: Flora Haaijer-Ruskamp – Co-chair: Morten Andersen

*Aim: To provide an overview of existing prescribing quality indicators and their use in quality improvement programs (educational session).*

**16.00 – 16.30** Prescribing quality indicators

– Overview of available prescribing quality indicators and their characteristics

Flora Haaijer-Ruskamp (NI)

**16.30 – 16.45** Practicing with PQI indicators – Interactive session with participants

Flora Haaijer-Ruskamp (NI)

**16.45 – 17.15** Use of quality indicators in practice

Janus Laust Thomsen (Dk)

**17.15 – 17.45** Practicing with feedback – Interactive session with participants

Janus Laust Thomsen (Dk)

## THURSDAY 01-12-2011

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### 09.00 – 10.30 T1A – ADVANCED EDUCATIONAL SESSION Exploring units of expenditure in drug utilization studies

**Room: Dürer** Chair: **Brian Godman** – Co-chair: **Sabine Vogler**

**Aim:** To demystify the many different units of expenditure that can be used in national and cross national drug utilisation studies, which include ex-factory sales, reimbursed expenditure including wholesaler and pharmacy payments as well as total expenditure including patient copayments.

09.00 – 09.10 Introduction

Brian Godman (UK)

09.10 – 09.40 Explaining the components of pharmaceutical expenditure

– Overview of different policies across Europe

Sabine Vogler (Austria)

09.40 – 10.10 Measuring and comparing pharmaceutical expenditures

– Considerations based on national and European experiences

Hanna Koskinen (Fi)

10.10 – 10.30 General questions and conclusions for the future

Brian Godman (UK)

### 09.00 – 10.30 T1B – ADVANCED EDUCATIONAL SESSION Prescribing quality indicators – Advanced session

**Room: Tassis** Chair: **Morten Andersen** – Co-chair: **Flora Haaijer-Ruskamp**

**Aim:** To present recent developments in PQI, provide a deeper knowledge on indicators and enable participants to implement this in their own context.

09.00 – 09.30 Beyond the hitlist – Towards more tightly linked and action-oriented indicators

Petra Denig (NI)

09.30 – 09.50 International quality indicators for outpatient antibiotic use – ESAC drug-specific indicators

Samuel Coenen (Be)

09.50 – 10.10 ESAC disease-specific indicators

Niels Adriaenssens (Be)

10.10 – 10.30 How do we select the most relevant measures of prescribing quality?

Morten Andersen (Dk)

### 11.00 – 12.30 T2A – ADVANCED EDUCATIONAL SESSION Using pharmaco-epidemiological tools to evaluate the impact of interventions

**Room: Dürer** Chair: **Frank May** – Co-chair: **Björn Wettermark**

**Aim:** To explore and analyse various methodological issues in evaluating the effects of interventions using drug utilization data.

11.00 – 11.30 Overview of available study designs to analyse the impact of interventions

Soko Setoguchi (USA)

11.30 – 12.20 Presentations of three recent examples of evaluations including discussion with the audience on their pros and cons

1. A cluster randomized controlled trial to evaluate the effects of an educational activity to change the prescribing of antibiotics in nursing homes.

Eva Pettersson (Se)

2. The influence that electronic prescribing has on medication errors and preventable adverse drug events – An interrupted time-series study

Peter Mol (NI)

3. A register-based before and after study to assess the impact of restricted reimbursement on the use of statins in Finland

Maarit Korhonen (Fi)

12.20 – 12.30 Summary and conclusions, key learnings

### 11.00 – 12.30 T2B – ADVANCED EDUCATIONAL SESSION Biostatistical methods in drug utilization research

**Room: Tassis** Chair: **Robert Vander Stichele** – Co-chair: **Aukje Mantel-Teeuwisse**

**Aim:** Three eminent statisticians will focus on common methodological problems when dealing with large sets of longitudinal drug consumption data. How to present and analyse data over time? How to deal with precision and

*accuracy in populations of millions of drug consumers? How to disentangle multiple levels in the data (prescriptions, prescribers or patients, institutions)?*

- 11.00 – 11.30 Time series analysis**  
**Douglas Steinke (UK)**
- 11.30 – 12.00 Accuracy and precision in high volume data sets**  
**Max Petzold (Se)**
- 12.00 – 12.30 Multilevel analysis in drug utilization data**  
**Geert Molenberghs (Be)**

**13.30 – 14.15 T3 – KEY LECTURE Better public health through pharmaco-epidemiology and quality use of medicine**

**Room: Tassis** Chair: **Björn Wettermark** – Co-chair: **Frank May**

***Aim:** To set the scene of the conference and illustrate the importance of drug utilization research in healthcare policymaking to improve the use of medicines in the society.*

- 13.30 – 13.40 Welcome**  
**Monique Elseviers (Be)**  
**History of the meeting**  
**Robert Vander Stichele (Be)**  
**The connection with pharmaco-epidemiology and ISPE**  
**Frank May (Australia)**
- 13.40 – 14.15 Key lecture: Better public health through pharmacoepidemiology and quality use of medicine**  
**Barbro Westerholm (Se)**

**14.15 – 17.45 T4 – WORKSHOP Towards better health outcome through cross national comparison of drug utilization**

**Room: Tassis** Chair: **Monique Elseviers** – Co-chair: **Vera Vlahović-Palčevski**

***Aim:** To demonstrate the possibilities and limitations of European cross national comparison (CNC) studies and associated health policy initiatives and to discuss future methodology in this field.*

- 14.15 – 14.45 Introduction**  
**Room: Tassis**
- State-of-the-art of cross national comparison (CNC) studies
  - Studies assessing the impact of health policy initiatives
  - Initiatives to evaluate difference in DU in relation to health outcome
  - Key opportunities and challenges for the future
- Björn Wettermark (Se)**

**14.45 – 15.45 CNC Poster walk** (combined with coffee break)

**Room: Prentenkabinet and Scaldis**

**16.15 – 17.30 Discussion rounds on CNC methodology**

**Room: See color code**

1. What methodology can be used to test the validity of CNC data?  
**Monique Elseviers (Be) – Jesper Hallas (Dk)**
2. Should we establish a common classification system for health policy initiatives when undertaking CNCs? If so, what should be the system to use in future studies?  
**Brian Godman (UK) – Flora Haaijer-Ruskamp (NI)**
3. How can the linkage between CNC and health outcome be made at the international level?  
**Frank May (Australia) – Alison Bourke (UK)**
4. How can we proceed to install a system of CNC on a regular and standardized base?  
**Morten Andersen (Dk) – Hanne Strøm (No)**
5. Does CN benchmarking have an additional educational value?  
**Vera Vlahović-Palčevski (Hr) – Eric Van Ganse (Fr)**
6. Cross national comparisons to evaluate the impact of safety-related regulatory action across EU member states  
**Peter Mol (NI) – Ulf Bergman (Se)**
7. What therapeutic area should we focus on for the future?  
**Björn Wettermark (Se) – Jolanta Gulbinovic (Lt)**

**17.30 – 18.15 Round table: Advantages and disadvantages of CNC for future health policy**

**Room: Tassis** **Robert Vander Stichele (Be)**(discussion leader)

Panel: **Jesper Hallas (Dk) – Flora Haaijer-Ruskamp (NI) – Alison Bourke (UK)**  
**– Hanne Strøm (No) – Eric Van Ganse (Fr)– Ulf Bergman (Se) – Jolanta Gulbinovic (Lt)**

## FRIDAY 02-12-2011

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### **09.00 – 10.30** F1 – KEY LECTURE Innovation management and drug utilization

**Aula: B004** Chair: Björn Wettermark

*Aim: To explore how pharmacoepidemiology and drug utilization may be valuable tools to improve the entry of new medicines in healthcare systems.*

- 09.00 – 09.20** Rational use of new medicines – A challenge for health policy  
Ken Paterson (UK)
- 09.20 – 09.40** Horizon scanning and forecasting drug utilization and expenditure  
Björn Wettermark (Se)
- 09.40 – 10.00** Monitoring the appropriateness of the prescribing of new drugs  
Petra Denig (NI)
- 10.00 – 10.20** Disease-based registries to monitor utilization and outcome  
Eric Van Ganse (Fr)
- 10.20 – 10.30** Summary and conclusions

### **11.00 – 12.30** F2A – KEY LECTURE AND SELECTED ABSTRACTS Adherence in drug utilization research

**Room: Prentenkabinet** Chair: Monique Elseviers – Co-chair: Eric Van Ganse

*Aim: This session with selected abstracts on Adherence will start with a key lecture on the use of large databases for adherence studies and the link between efficacy and effectiveness.*

- 11.00 – 11.30** The use of large databases for adherence studies and the link between efficacy and effectiveness  
Bernard Vrijens (Be)
- 11.30 – 12.30** Oral presentation of selected abstracts
- 11.30 – 11.45** F2A01 Drug utilisation of antidepressants in General Practice: choice of drugs and adherence in an Italian region  
Elisabetta Poluzzi (It)
- 11.45 – 12.00** F2A02 Are refill adherence measures associated with glycemic control in patients with diabetes? Looking at different measures and cutpoints for non-adherence  
Jaco Voorham (NI)
- 12.00 – 12.15** F2A03 Experience with adherence to anti-diabetic medication in Zagreb, Croatia  
Josip Čulig (Hr)
- 12.15 – 12.30** F2A04 Nurse-led education and counseling to enhance adherence to phosphate binders  
Yoleen Van Camp (Be)

### **11.00 – 12.30** F2B – KEY LECTURE AND SELECTED ABSTRACTS Validation studies of prescription data and indicators

**Aula: B004** Chair: Morten Andersen – Co-chair: Alison Bourke

*Aim: To present important issues of data validity in pharmacoepidemiology, in particular to what degree dispensing data reflects actual drug use, possible biases and limitations. Additionally to present results from studies that compare different data sources or assess the validity of quality indicators.*

- 11.00 – 11.30** Validity of data sources in pharmacoepidemiology  
Jesper Hallas (Dk)
- 11.30 – 12.30** Oral presentation of selected abstracts
- 11.30 – 11.45** F2B01 Predictors of antipsychotic prescription in a Northern Italian District (Bologna)  
Carlo Piccinni (It)
- 11.45 – 12.00** F2B02 Dosage form data used for estimating pediatric antibiotic use  
Maria Matuz (Hu)
- 12.00 – 12.15** F2B03 Drug treatment in patients with newly diagnosed unprovoked seizures/epilepsy  
Linnea Karlsson (Se)
- 12.15 – 12.30** F2B04 Prevalence and incidence of end-stage renal disease (CKD5) in patients with diabetes mellitus type 1 and 2 in Flanders, Belgium: a case-population study  
Gert Verpooten (Be)

**13.15 – 14.45 F3 – POSTER SESSION****Aula: Rector Dhanis**

**Aim:** To attend a guided poster walk, visiting selected posters with a short presentation by the author and a guided discussion about the content.

**15.00 – 15.45 F4 – KEY LECTURE Drug utilization research in benefit-risk evaluation****Aula: B001** Chair: **Robert Vander Stichele** – Co-chair: **Ken Paterson**

**Aim:** To describe the potential contribution of Drug Utilisation research to Pharmacovigilance, Pharmacoepidemiology, risk management and the overall benefit-risk evaluation of medicines.

**15.00 – 15.45 Measuring drug utilization – Importance in pivotal aspects of Pharmaco-epidemiology**  
**Xavier Kurz (Be)**

**16.15 – 17.45 F5A – WORKSHOP Drug utilization data in pharmacovigilance and risk management – A new dimension to the analysis of risk at the population level****Aula: B002** Chair: **Elisabetta Poluzzi** – Co-chair: **Ulf Bergman** – Co-chair: **Cosimo Zaccaria**  
– Co-chair: **Giampiero Mazzaglia**

**Aim:** To define the possible roles of drug utilisation data in the interpretation of pharmacovigilance signals and in the initiatives for risk management.

**16.15 – 16.30 Introduction – The role of drug utilization data in pharmacovigilance from the Regulatory Agency perspective**  
**Xavier Kurz (Be)**

**16.30 – 16.45 Introduction to group work – Invitation to discuss different approaches to use drug utilization data in pharmacovigilance. Three main focuses:**

1. Interpretation of differences among countries and time-trends in spontaneous reports
2. Calculation of the reporting rate
3. Assessment of the level of risk in the population (risk management)

**16.45 – 17.15 Group work – Exploration of the approaches cited above by taking into account the following elements:**

1. On the basis of drugs of interest (e.g., drugs used only by reimbursed prescriptions, drug with multiple ways of supply) and countries involved in the analysis (different quality of DU data), a specific source of data (or more than one) will be needed (e.g., sales data, hospital data).
2. Indicators to be used in the analysis of ADR/DU will be proposed (e.g., minimal rate, incidence, prospective risk);
3. Limitations of each type of source and indicator should be acknowledged

**17.15 – 17.45 Discussion – Each group will present the strategies developed during the work session and will propose possible application to emergent safety issues.**

**16.15 – 17.45 F5B – WORKSHOP Epidemiological measures of drug use in patient identity databases****Aula: B003** Chair: **Morten Andersen (Dk)** – Co-chair: **Maarit Korhonen (Fi)**

**Aim:** To give participants an understanding of epidemiological measures of drug use and their interpretation in different contexts (workshop).

**16.15 – 16.30 Incidence and prevalence of drug use – A brief overview**

- Definitions of epidemiological measures of drug use
- How can they be estimated from dispensing data
- The relation between incidence, prevalence and duration
- The waiting time distribution
- Dynamic pharmacoepidemiologic model of drug use

**Jesper Hallas (Dk)**  
**Morten Andersen (Dk)**

**16.30 – 17.15 Group work**

Selected examples on incidence and prevalence of drug use and traditional aggregated DDD-based consumption figures are presented with a series of questions on prescribing behaviour, prescribing quality, public health relevance, and dynamics of the drug user population.

- Which measures should be preferred for different questions
- How are the measures interpreted
- How do they contribute to our understanding of drug utilisation patterns

**17.15 – 17.45 Presentation of answers and discussion**

## SATURDAY 03-12-2011

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### **09.00 – 10.30** **S1A – KEY LECTURE AND SELECTED ABSTRACTS** Drug utilization research studies and generics

**Room: Dürer** Chair: **Brian Godman** – Co-chair: **Saskia van der Erf**

***Aim:** To potentially seek further ways to enhance the utilization of generics at increasingly lower costs as all health authorities and health insurance agencies across Europe try to maintain the European ideals of comprehensive and equitable healthcare in the face of growing pressure on resources.*

**09.00 – 09.05** Introduction

**Brian Godman (UK)**

**09.05 – 09.40** Drug utilization research studies and generics

**Steven Simoens (Be)**

**09.40 – 10.30** Oral presentation of selected abstracts

**09.40 – 09.55** **S1A01** Prescribing of Generics in Germany at a Glance

**Ingrid Schubert (De)**

**09.55 – 10.10** **S1A02** Multiple initiatives continue to enhance the prescribing efficiency for the PPIs and statins in Scotland

**Iain Bishop (UK)**

**10.10 – 10.25** **S1A03** Explaining the reasons why French patients are being prescribed more originator statins than generic

**Catherine Sermet (Fr)**

**10.25 – 10.40** **S1A04** The Impacts of Drug Price Reducing Policy on Utilisation of Generic and Branded Angiotensin-converting Enzyme Inhibitors and Angiotensin Receptor Blockers for Treating Hypertensive Outpatients in Southern Taiwan

**Li-Chia Chen (UK)**

### **09.00 – 10.30** **S1B – KEY LECTURE AND SELECTED ABSTRACTS** Interventions to improve drug utilization

**Room: Tassis** Chair: **Frank May** – Co-chair: **Flora Haaijer-Ruskamp**

***Aim:** To give an overview of how pharmacoepidemiology and drug utilization research has contributed to the current knowledge on the effectiveness of interventions and discuss examples of ongoing studies in the field.*

**09.00 – 09.20** State-of-the-art in research on the impact of interventions

**SokoSetoguchi (USA)**

**09.20 – 10.20** Oral presentation of selected abstracts

**09.20 – 09.35** **S1B01** Six-month impact evaluation of a prescribing improvement intervention for cardiovascular disease management in Australian general practice

**Magnolia Cardona-Morrell (Au)**

**09.35 – 10.50** **S1B02** Impact of safety-related regulatory action on patterns of drug use in ambulatory care in The Netherlands.

**Peter Mol (NI)**

**10.50 – 11.05** **S1B03** Interrupted time series analysis of the impact of antibiotic sales restrictions in Chile, Colombia and Venezuela

**Veronika J. Wirtz (Mx)**

**11.05 – 10.20** **S1B04** Analysis of the impact of progressive delisting phlebotonics on prescription rates: a times-series analysis for France 1999-2009

**Catherine Sermet (Fr)**

**10.20 – 10.30** Summary: What have the studies added to the scientific body

**11.00 – 12.25 S2 – KEY LECTURE The future of quality use of medicines – From measurements to implementation**

**Room: Tassis** Chair: **Aukje Mantel-Teeuwisse** – Co-chair: **Robert Vander Stichele**

**Aim:** *To provide a historical overview of drug utilization research and its aims. To make participants realize that thinking before doing is important in drug utilization research to obtain the best results for public health. To show best practices how drug utilization can add to improvement of quality of drug use.*

**11.00 – 11.05** Introduction

**11.05 – 11.45** Quality thinking, learning and doing  
**Bert Leufkens (NI)**

**11.45 – 12.00** The Swedish model of financial incentives and self-assessment (tbc)  
**Björn Wettermark (Se)**

**12.00 – 12.15** Academic detailing – Changing knowing into doing  
**Frank May (Australia)**

**12.15 – 12.25** Wrap up and future outlooks  
**Bert Leufkens (NI)**

## SOCIAL PROGRAM

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### WEDNESDAY

**Welcome drink and guided tour at the historical Hof Van Liere**

- Welcome drink at Hof Van Liere at 18.00
- Guided tour for 30 minutes at Hof Van Liere starting at 17.30, 18.00 and 18.30

### THURSDAY

**Dinner at the University Club at Hof Van Liere at 19.30**

### FRIDAY

**EuroDURG party with walking dinner at Felixpakhuis at 20.00**

**with the possibility to first visit the extraordinary building of the new MAS museum \***

(\*Assembly at Hof Van Liere at 19.15 or at the MAS museum at 19.30)



## **ABSTRACTS OF ORAL PRESENTATIONS**

- **F2A Friday 02-12-2011 11.30 – 12.00 Adherence in drug utilization research (4)**
- **F2B Friday 02-12-2011 11.30 – 12.00 Validation studies of prescription data and indicators (4)**
- **S1A Saturday 03-12-2011 09.40 – 10.30 Drug utilization research studies and generics (4)**
- **S1B Saturday 03-12-2011 09.20 – 10.20 Interventions to improve drug utilization (4)**

## Abstract F2A01 (1041)

### Drug utilisation of antidepressants in General Practice: choice of drugs and adherence in an Italian region

*Elisabetta Poluzzi\*, Elisa Sangiorgi, Carlo Piccinni, Massimo Clo*

**Objective** Authoritative guidelines for the treatment of major depression recommend a continuous drug treatment for at least 6 months to reduce the risk of relapse, and make aware physicians and patients on the latency of 4-6 week for clinical improvement. Concerning minor disorders, no differences between drug treatment and psychotherapy was never demonstrated. Our study aim was to describe antidepressant (AD) use in Emilia Romagna Region (Italy) and to evaluate the adherence to treatment.

**Methods** Reimbursed prescriptions of AD were retrieved from the Emilia-Romagna Regional Health Authority Database (about 4,000,000 inhabitants). Only patients aged  $\geq 18$  received AD in April–June 2009 without AD prescriptions in January–March 2009 were selected. They were followed throughout 6 months starting from their recruitment and only those received monotherapy were considered for the analysis. Adherence was calculated for each patient by Medication Possession Ratio on 180 days (MPR180). A subject was defined adherent when MPR180 was  $\geq 80\%$  provided that all intervals between consecutive prescriptions were  $< 3$  months.

**Results** Our cohort included 46,945 subjects (69% female, increased use with increasing age). Seventy-three percent of patients received SSRIs, 9.2% SNRIs and 8.6% tricyclics. In 37% of subjects, only 1 prescription was retrieved. Only 21.3% (10,003 subjects) resulted adherent to their therapy, whereas 5% reached the threshold of MPR180 but intervals between prescriptions exceeded 3 months. The adherence slightly decreased with increasing age. Patients received SSRIs and newer SNRIs resulted more adherent than patients prescribed older drugs.

**Conclusions** Among naïve patients, only 1/5 of patients resulted adherent to antidepressive treatment for at least 6 months. Younger age and newer drugs facilitated adherence. As in the past years, lack of adherence to antidepressants represents a signal of inappropriateness due to probably both the choice to use drugs for minor depressive disorders and the scarce communication between patient and physician.

## Abstract F2A02 (1021)

### Are refill adherence measures associated with glycemic control in patients with diabetes? Looking at different measures and cutpoints for non-adherence

*Jaco Voorham\*, Henk-Jan Bezemer, Flora Haaijer-Ruskamp, Petra Denig*

**Objectives** Although there are many initiatives to improve medication adherence, practical measures to identify clinically relevant non-adherence are lacking. The aim of this study is to examine the association between various measures of non-adherence to oral antidiabetics (OAD) on HbA1c and glucose levels.

**Methods** The study population consisted of 3 year cohorts of in total 43,330 patients diagnosed with type 2 diabetes at the beginning of each year. Gaps between refills were identified, and medication possession ratios (MPR) were calculated per year for mono-users of either metformin or SU-derivatives. Regression analyses were conducted to assess associations between non-adherence classes and HbA1c/glucose levels, adjusting for baseline levels, age, diabetes duration, sex, and other treatment changes. Thus, having an MPR of less than Y% (using cutpoints for classes ranging from  $\leq 50\%$  to  $\leq 90\%$ ) was compared with  $> 90\%$  adherence; and having a largest gap of at least X weeks (ranging from  $\geq 1$  to  $\geq 10$  weeks) was compared with having no gaps of  $\geq 1$  week.

**Results** For metformin users, we included 4,127 patients of whom 3,281 (79.5%) had an MPR of  $> 90\%$ . For SU-derivatives, we included 1,422 patients of whom 1,150 (80.9%) had an MPR of  $> 90\%$ . For the largest gap method, the number of patients was slightly higher (4,610 for metformin and 1,568 for SU-derivatives). There were inconsistent associations between gap-classes and HbA1c/glucose levels. For MPR-based non-adherence classes, there was a positive association between  $\leq 70\%$  adherence to SU-derivatives and HbA1c levels, but this was not seen for metformin.

**Conclusions** The lack of clear associations between the non-adherence measures, even at the lowest cutpoint, and changes in HbA1c or glucose levels suggests that these measures are not sensitive. Alternative explanations regarding remaining selection bias or confounding need to be explored.

**Abstract F2A03 (1037)****Experience with adherence to anti-diabetic medication in Zagreb, Croatia***Josip Čulig\*, Leppée M, Boskovic J, Mestrovic A, Vrca-Bacic V.*

**Objectives** The study addressed medication adherence in general, adherence to anti-diabetic therapy, and relations between these two groups.

**Methods** The study was designed as a cross-sectional survey by use of a self-administered questionnaire. Diabetic patients were compared with total study population.

**Results** The study included 635 individuals collecting or buying drugs for the treatment of chronic diseases, with special reference to subjects taking anti-diabetic agents. The majority of subjects treated for diabetes reported on forgetfulness as the main reason for medication non-adherence (n=74; 61.7%). The second and third most common reasons were being absent from home and drug shortage (n=55; 45.8%). Analysis of reasons for medication non-adherence according to age groups in the group of subjects treated for diabetes indicated forgetfulness as the leading reason (62.7%) in the oldest and largest age group (66+; n=37) as well as in all other age groups. In the 66+ age group, the second leading reason for medication non-adherence was drug shortage (42.4%) followed by taking a number of drugs several times a day (40.7%) and absence from home (37.3%). Forgetfulness was leading reason (61.9%) in 56-65 age group, followed by absence from home and drug shortage on second and third place (47.6%). Comparison of total study population and subjects treated for diabetes according to age groups (adherent, non-adherent and all together) yielded no statistically significant difference.

**Conclusions** There was no difference in medication adherence between general patient population and patients receiving anti-diabetic therapy and there was no correlation between medication adherence and age. Common barriers to adherence, such as forgetfulness are under the patient's control, so that attention to them is a necessary and important step in improving adherence. The reason related to the absence from home and the reason of shortage of drug could also be related to forgetfulness.

**Abstract F2A04 (2003)****Nurse-led education and counseling to enhance adherence to phosphate binders***Yoleen P. Van Camp\*, Sofie A. Huybrechts, Bart Van Rompaey and Monique M. Elseviers*

**Objectives** To investigate whether nurse-led education and counseling enhance phosphate binder adherence in chronic dialysis patients. One in two chronic dialysis patients experience difficulties in adhering to phosphate binders. The reasons for non-adherence are multifactorial and accordingly, require a multifaceted strategy. So far, investigations have been confined primarily to single interventions to promote adherence. This study examines the effect of a multifaceted approach.

**Methods** The design was interventional. Adherence to phosphate binders was blindly and electronically monitored for 17 consecutive weeks with the Medication Event Monitoring System (MEMS®). After 4 weeks baseline monitoring, the effects of the intervention were studied for an additional 13 weeks. In week 5, the study nurse gave all 41 participating patients education on phosphate binders. Thereafter, the study nurse gave bi-weekly personalised counseling to enhance adherence to phosphate binders. The evolution of adherence over time was assessed and compared with historical control data. Secondary outcome variables included serum values of phosphate, calcium and PTH and phosphate binder knowledge.

**Results** In week 1, mean adherence was 83% in this study (intervention group), compared with 86% in the historical control group. In the intervention group, mean adherence increased from 83-94% after 13 weeks. By contrast, in the historical control group, mean adherence declined from 86-76%. In the intervention group, serum phosphate values decreased from 4.9 to 4.3 mg/dL and phosphate binder knowledge increased from a mean score of 53-75%.

**Conclusions** Combining education and reinforced counseling holds promise in enhancing phosphate binder adherence. Large-scaled and long-term field studies are indicated to determine which nurse-led practices lead to an integral and sustained medication adherence management.

## Abstract F2B01 (1045)

### Predictors of antipsychotic prescription in a Northern Italian District (Bologna)

*Carlo Piccinni\**, E. Poluzzi, I. Tarricone, A. Piazza, A. Koci, D. Berardi and F. De Ponti  
mailto:\*carlo.piccinni@unibo.it

**Objectives** The extreme variety in Antipsychotics (AP) risk/benefit profiles, drug combinations, available formulations, and individual's characteristics call for specific analyses of physicians' prescription attitudes. Our aim was to investigate the possible predictors of AP therapeutic regimens in a sample of psychiatric patients .

**Methods** A record-linkage analysis by using both clinical records and administrative databases of the Local Health Authority of Bologna (853,319 inhabitants) was performed. Patients cared by the Community Mental Health Centers (CMHCs) with at least one AP prescription (ATC: N05A-Antipsychotics, except for N05AN01-Lithium) in January-June 2010 were selected. Prescription data were classified by formulations (depot or regular) and therapeutic strategies (monotherapy or polypharmacy). A logistic regression to identify predictors of depot use and polypharmacy regimen was performed by SPSS v.13.0.

**Results** A study cohort of 6,074 subjects was selected. Schizophrenic-like disorders represented the main reported diagnostic category (41.7%), followed by Major Depressive disorder (18.9%), Personality disorders (13.3%) and Bipolar disorders (11.0%). Depot preparations were used in 17.5% of patients and polypharmacy in 25.3%. Statistically significant predictors ( $p<0.001$ ) for the use of depot vs. regular formulation were: duration of disease  $>10$  years ( $OR=3.40$ ), diagnosis of schizophrenic-like disorder (range 2.08-5.26), non-Italian nationality (2.06), high frequency of visits at CMHCs (1.92), age $>64$  (1.48), female gender (1.29). Among predictors of a polypharmacy regimen, diagnosis of schizophrenic-like disorder (range 1.35-1.85), high frequency of visits at CMHCs (4.90) and hospitalisation  $>15$  days (2.32) were significant ( $p<0.001$ ).

**Conclusion** Our findings indicate that depot formulations and polypharmacy strategies were mainly used in patients with the most severe psychoses and frequent CMHC visits. Polypharmacy was also found associated with hospitalisation, whereas depot prescribing was distinctly more frequent for chronic patients, women, elderly people and non-Italians. Attention must be paid to the issue of inequality in mental illness treatment and addressing disparities in AP formulations with clinical audit.

## Abstract F2B02 (1028)

### Dosage form data used for estimating pediatric antibiotic use

*Maria Matuz\**, Ria Benko, Monique Elseviers, Edit Hajdu, Peter Doro, Reka Viola, Gyongyver Soos

**Objectives** To report a simple method - applicable to aggregated data expressed in defined daily doses (DDDs) - for estimating the rate of pediatric antibiotic use.

**Methods** Firstly, Hungarian patient-level prescription data (representative sample data from 20 pharmacies in the Southern Great Plain region, 2007) on dispensed antibiotics were used to test (linear-regression) the association between the share of liquid oral antibacterial products (as % of DDDs of all oral antibacterials) and the rate of antibiotic prescriptions indicated for children (as % of all dispensed antibacterial prescriptions). Then, results were applied to the aggregated regional-level antibiotic use data expressed in DDDs in order to estimate the rate of pediatric antibiotic prescriptions (total regional coverage,  $n=455$  pharmacies).

**Results** In the patient-level sample data 36.1% of antibiotic prescriptions were ordered for children and an association was found between the share of liquid oral dosage forms and the rate of pediatric antibiotic prescriptions ( $R=0.884$ ;  $p<0.001$ ). Applying this linkage to the aggregated regional-level data expressed in DDDs the estimated rate of pediatric antibiotic prescriptions was 34.6% (95% confidence interval: 19.7–60.0).

**Conclusions** Associations between the use of liquid oral antibacterials and childhood could help to estimate the rate of pediatric antibiotic use in aggregated data available in DDD format. With this method, by using a simple, easily available drug characteristics data (dosage form data) one can obtain patient related information such as rate of pediatric use.

**Abstract F2B03 (1048)****Drug treatment in patients with newly diagnosed unprovoked seizures/epilepsy***Linnéa Karlsson\*, Björn Wettermark, Torbjörn Tomson***Objectives** To study the drug treatment in patients with newly diagnosed unprovoked seizures/epilepsy.**Methods** Clinical data from the Stockholm Incidence Registry of Epilepsy was cross-linked with drug dispensing data from the Swedish Prescribed Drug Register in order to analyze drug treatment in patients with newly diagnosed unprovoked seizures between 2006 and 2008. The analyses focused on choice of antiepileptic drugs (AED), time to initiation, switching, persistence of use and concomitant use of other drugs.**Results** In total 367 patients were prospectively followed. Nearly 50% had other medications prescribed at index date. Within one year, 71.4% had a dispensed prescription of an AED and 97.9% were initiated on monotherapy. Carbamazepine, valproate and lamotrigine were the three most commonly initially prescribed AEDs in monotherapy. These represented almost 75% of the proportion of all prescribed AEDs in this study population. Clinically important potential drug-drug interactions were found in 3.8% of all patients.**Conclusions** A high proportion received treatment within one year and the choice of first AED were consistent to current treatment guidelines. Many patients use other medications and several of them are related to known comorbidities. Drug-drug interactions between the first AED and other prescribed medications were not very common, which indicates that prescribers are well aware of the risk for interactions**Abstract F2B04 (1036)****Prevalence and incidence of end-stage renal disease (CKD5) in patients with diabetes mellitus type 1 and 2 in Flanders, Belgium: a case-population study***Gert Verpoeten\*, Stefaan G.J. Van Oevelen, Hans Augustijn, André De Swaef***Introduction** The risk for CKD5 in diabetics is highly dependent on the subpopulation studied. In study populations with pre-existing renal involvement, prevalences as high as 40% are described. Objective: This study determines the 2005 prevalence and the 2002-2005 mean annual incidence of CKD5 among diabetics and non-diabetics in Flanders, Belgium.**Methods** Data were extracted from 3 databases: (1) the national inhabitant registry; (2) the Belgian ambulatory prescription database, Pharmanet, provided the number of treated diabetics; (3) the registry of the NBVN provided the number of patients on CKD5.**Results** There were 6078600 inhabitants in Flanders, of whom 210023 treated diabetics. The prevalence of diabetes mellitus was 3455/100000 in the general population, with a peak prevalence of 13304/100000 persons aged 75-79 years. 4149 inhabitants needed dialysis, representing a prevalence of 68/100.000 persons and a mean annual incidence of 18/100000. Only 1156 (28%) of the prevalent CKD5 patients were diabetics, of whom 240 (6%) type 1 and 916 (22%) type 2. Prevalence of CKD5 among treated diabetics was 550/100000 and the mean annual incidence was 149/100000 treated diabetics. The relative risk for a diabetic in comparison with a non-diabetic to enter CKD5 was 11 (10.1-11.5) in the prevalent and 12 (10.2-13.3) in the incident population. The risk was much lower among the elderly: 14 (50-59 yrs) vs. 4 (70-79 yrs) among prevalent CKD5 patients. More importantly, the absolute risk for a diabetic and a non-diabetic to enter CKD5 was 550/100000 vs. 50/100000, respectively.**Conclusion** In this population-based study, we found a low absolute risk among diabetics for CKD5 although the relative risk was 11-fold greater than for non-diabetics. Younger diabetics were at increased risk of evolution to CKD5 than elderly type 2 diabetic patients. This low absolute risk might have consequences regarding the cost-effectiveness of expensive 'renoprotective' therapies.

**Abstract S1A02 (1057)**

**Multiple initiatives continue to enhance the prescribing efficiency for the PPIs and statins in Scotland**

*Marion Bennie, Brian Godman, Iain Bishop\*, Stephen Campbell*

**Objectives** Assess whether plethora of initiatives introduced in Scotland continue enhancing prescribing efficiency for Proton Pump Inhibitors (PPIs) and statins. Secondly, whether the combined impact of the Quality and Outcome Framework (QoF) targets and recent studies have enhanced prescribing of higher strength statins.

**Methodology** Retrospective observational study of the utilisation of PPIs (A02BC) and statins (C10AA) from 2001 to 2010 using DDDs (2010) and DDDs/ TID. Reimbursed expenditure in GB£s and Euros (1£=1.15€ 4 August 2011). Reforms taken from previous publications and updated.

**Results** PPI utilisation steadily increased to 100.2 DDD/ TID in 2010. Omeprazole (98% generic) drove increase in recent years, with utilisation of other PPIs stable. Expenditure/ DDD on generic omeprazole continued falling to £0.094 in 2010, 91% below 2001 originator prices. PPI expenditure/ 1000 inhabitants in 2010 was GB£5481 (€6301), 56% below 2001 levels despite 3 fold increase in utilisation. Simvastatin (98% generic) dominated statin utilisation with stabilisation of other statins. Increasingly higher strengths at 85% of simvastatin DDDs in 2010, leading to DDD/TID of 142.8 in 2010. Low prices for generic simvastatin (£0.042/ DDD in 2010 - 97% below 2002 originator prices) led to reimbursed expenditure for statins up only 7% in 2010 compared with 2001, at GB£11420/ 1000 inhabitants (€13113) despite 6.2 fold increase in utilisation.

**Conclusion** Reforms maintained prescribing efficiency for PPIs and statins in recent years. Utilisation of higher strength statins should improve outcomes. We believe QoF targets helped reinforce and enhance utilisation of higher strength tablets versus average prescribed doses in other countries.

**Abstract S1A03 (1040)****Explaining the reasons why French patients are being prescribed more originator statins than generic***Cathérine Sermet\*, Sylvain Pichetti, Christine Sorasith*

**Objectives** In France, reimbursements by Public Health Insurance for statins represented €1.28 billion in 2008, which was the second most reimbursed therapeutic class after Proton Pump Inhibitors. Five molecules are available on the French pharmaceutical market: three of them are available in generic (simvastatin [since May 2005], pravastatin [July 2006] and fluvastatin [April 2008]) while two are only available in original brand form (atorvastatin and rosuvastatin). Contrary to what can be observed in other countries like Germany, the market shares of the originator (atorvastatin: 38% and rosuvastatin: 18%) are more important than the market shares of the statins that are available in generics (pravastatin: 14%, simvastatin : 12% and fluvastatin : 6%). This study aims at analysing the reasons for French patients are being prescribed more originator statins than generic ones.

**Methods** Prescription data were collected from an 850 French physicians sample surveyed by the IMS-Health Permanent Survey on Medical Prescription in 2010. We selected patients with at least one statin prescription in 2010. We conducted a multilevel analysis in an attempt to study both patients' explanatory factors (age, sex, patient's profile [severity of the disease treated by the statin], and socio-economic status of the patient) and physician's explanatory factors (age, sex, location, number of patients, traditional solo general practice vs. group practice).

**Results** Originator statins tend to be more prescribed to younger patients, to male patients and to patients affected by more complex diseases. Physicians working in group practice tend to prescribe more generic statins than physicians that work according to traditional solo general practice. Furthermore, physicians with more patients tend to prescribe more generic statins than physicians with few patients.

**Abstract S1A04 (1055)****The Impacts of Drug Price Reducing Policy on Utilisation of Generic and Branded Angiotensin-converting Enzyme Inhibitors and Angiotensin Receptor Blockers for Treating Hypertensive Outpatients in Southern Taiwan***Li-Chia Chen\*, Wen-Yi Chang, Hsueh-Er Chan, Jin-Song Wu*

**Objectives** Taiwan National Health Insurance (NHI) implemented an irregular, universal drug price rescaling policy to cut the unit price for drug reimbursement. This case study aims to explore the impacts of this policy on the utilization and cost of angiotensin converting enzyme inhibitors (ACEIs) and angiotensin receptor blockers (ARBs).

**Methods** This study used a regional, longitudinal medical claim database constituting of the entire 3.26 million beneficiaries from the Kaoping Division of NHI in southern Taiwan. Prescriptions of ACEIs and ARBs for hypertensive adult outpatients from 2006 to 2008 were extracted to calculate two outcome variables - monthly total number of Defined Daily Dose (DDD) and total cost for each drug, and then stratified by branded and generic drugs. A segmented time-series analysis was conducted to test the impacts of two policy time points (November 2006 and September 2007) by using the auto-regressive integrated moving-average model in STATA 9.0.

**Findings** The trend of total cost for each drug generally consisted with the trend of total DDD number, except for enalapril and fosinopril. The costs and DDDs of ARBs were significantly increasing ( $p < 0.001$ ) but those for ACEIs were decreasing. The policy interventions did not change the trend of cost and DDDs for the six currently available ARBs, instead, the costs and DDDs of generic ARBs increased steadily and significantly. For the 10 existing ACEIs, the trends of total cost for fosinopril and enalapril significantly decreased, and lisinopril significantly increased after the interventions. However, only fosinopril showed a generic substitution in DDDs; the DDDs of both branded and generic enalapril significantly decreased, and DDDs of generic lisinopril significantly increased.

**Conclusions** The two policy interventions enormously decreased utilisation and cost of several ACEIs, yet did not impact on ARBs. Further studies will need to explore whether the policy provoked sifting between ACEIs and ARBs.

### Abstract S1B01 (1033)

#### Six-month impact evaluation of a prescribing improvement intervention for cardiovascular disease management in Australian general practice

*Magnolia Cardona-Morrell\**, M. Williamson, J. Elliott, J. Gunn, N. Stocks, J. Emery, H. Parsons, M. Petrocco, R. Paton

**Objective** Evaluate a quality improvement initiative in GP practices to improve prescribing patterns for hypertensive (HT) and chronic heart failure (CHF) patients.

**Methods** Cluster randomised controlled trial with GP Practices as the unit of randomisation and analysis. Intervention included installation of standard extraction software tool, facilitated clinical meeting with periodic feedback from automated prescribing indicator reports, computerised reminders, written materials, and GP/practice incentives. Clinical indicators for active patients were compared with current practice guidelines at baseline and six-month intervals after the intervention.

**Results** 524 GPs from 165 practices (81% urban) across Australia delivered baseline data on 116,319 HT patients and 7,596 CHF patients. 157 of these practices also delivered data at six months. Withdrawal of 23 GPs from 11 practices was evenly distributed by group allocation. Preliminary cross-sectional analysis six months post-intervention shows 60% achievement of blood pressure control, over 65% prescribing of ACE inhibitors for CHF patients, and over 80% adoption of ACE inhibitors or A2RAs prescribing for patients with diabetes and proteinuria. Scope for improvement was identified in ~30% prescribing of beta-blockers in CHF, and 25% CHF patients were prescribed a drug that could exacerbate the disease. Comparative analysis of intervention and control groups showed only minor and not statistically significant differences between baseline and six-month follow-up. Analysis of the 12-month data after sufficient exposure to the intervention may better reflect prescribing changes over time.

**Conclusions** Incorporating quality improvement initiatives using data extracted from GP desktop software is feasible in routine primary care practice in Australia; however, it requires a significant injection of funds, substantial data cleaning effort and several follow-up data points over longer periods to confirm if changes in prescribing behaviour occur.

### Abstract S1B02 (1020)

#### Impact of safety-related regulatory action on patterns of drug use in ambulatory care in The Netherlands

*S. Piening, K.C. Reber, J.E. Wieringa, S.M. J.M. Straus, P.A. de Graeff, F.M. Haaijer-Ruskamp and Peter Mol\**

**Background** Effect of Direct Healthcare Provider Communications (DHPCs) informing healthcare providers of serious drug safety issues is questioned. As safety issues emerge at different stages in the drug's lifecycle, where use may be increasing, stable or decreasing, these underlying drug use patterns may affect impact of DHPCs.

**Objective** To evaluate the impact of DHPCs on drug utilization in ambulatory care in The Netherlands in relation to pre-existing patterns of use.

**Methods** In this longitudinal study patterns of use (new users = no previous drug use in 6 months) for the period 2000-2008 of all drugs used in ambulatory care in the Netherlands for which a DHPC was issued were assessed. Dispensing data were obtained from the Dutch Foundation for Pharmaceutical Statistics (SFK), comprising data of 90% of the Dutch population. Impact of DHPCs on short-term patterns of use (12 months before and after the DHPC) was evaluated with regression models. Presence of structural changes with interrupted time series analyses; i.e. ARIMA models were developed for each drug taking seasonal periodicities and underlying trends into account.

**Results** The short-term prescription level after a DHPC was lower in 28 (48%) of 58 cases. Twenty (34.5%) DHPCs resulted in structural (longer-term) changes in use (-43.3% [95%CI: -12.34%; -74.26 %]). Structural changes were observed for 8 of 13 (62%), 8 of 29 (28%) and 4 of 16 (25%) drugs with decreased, unchanged and increased pre-existing patterns of use, respectively ( $\chi^2=5.46$ ;  $p=0.065$ ). All, but two DHPCs leading to structural changes also had a lower level of use in the short term.

**Conclusion** Half of all drugs had lower levels of use in the year following the DHPC. However, only a third of DHPCs showed a structural (longer-term), albeit in those cases substantial, effect on use. This effect was not clearly related with pre-existing drug use patterns.

**Abstract S1B03 (1031)****Interrupted time series analysis of the impact of antibiotic sales restrictions in Chile, Colombia and Venezuela***Juan José Herrera Patino, Yared Santa-Ana Téllez, Veronika Wirtz\**

**Objective** To analyze the impact of antibiotic sales restrictions in Chile, Colombia and Venezuela on volume sold in the retail sector.

**Method** Using retail data, quarterly sales volume of enteral and parenteral antibiotics by therapeutic group was analyzed according to the Anatomic Therapeutic Chemical classification (ATC) code J01 between 1997 and 2007 for three countries in Latin America restricting sales of antibiotics: Chile and Colombia which implemented restrictions on all antibiotics and Venezuela which implements restrictions to only three therapeutic groups (marcolides, quinolones and 2nd and 3rd generation cefalosporines). Changes were studied with respect to total consumption and by therapeutic group. Kilograms of sale of each antibiotic were converted into defined daily doses per thousand inhabitants (DDD) according to the ATC. The impact of regulation was estimated at the retail level and trend changes using interrupted time series with control groups which were countries that did not implement sales restriction in the time period studied (Brazil, Mexico and Peru).

**Results** The major change in the level of overall consumption of antibiotics occurred in Chile (-3.0 DDD), with the biggest decrease in the therapeutic groups of penicillins (-1.94 DDD) and sulfonamides (-0.69 DDD). In Colombia the change in overall consumption was not significant (-0.13 DDD) nor by therapeutic group. In Venezuela even though the consumption level changes by treatment group was significant, consumption increased instead of the expected decrease in the therapeutic groups affected by the regulation: Penicilinas (0.609 DDD), Macrolidos (0.279 DDD), Quinolonas (0.153 DDD) y Cefalosporinas 3ª generación (0.032 DDD).

**Conclusion** The sales restrictions of antibiotics in these three countries had different impact on the sales volume. Qualitative research is warranted to analyze the underlying causes for the different effects to optimize design and implementation of policies restricting sales of antibiotics.

**Abstract S1B04 (1039)****Analysis of the impact of progressive delisting phlebotonics on prescription rates: a times-series analysis for France 1999-2009***Cathérine Sermet\*, Sylvain Pichetti, Christine Sorasith*

**Objectives** After a comprehensive review of the therapeutic advantage of all drugs reimbursed by the French Public Health Insurance, a large number of drugs were removed from the list of reimbursable drugs. Among them, phlebotonics (ATC class C05AC and other not classified in the ATC) had first their reimbursement rate reduced from 35% to 15% in March 2006 before being totally excluded from the reimbursement list in January 2008. A previous research using vignettes showed that physicians could possibly substitute NSAID to phlebotonics in the case of the delisting of the latter, which could have a negative impact on public health. The aim of our study is to evaluate the impact of this measure on phlebotonic class drugs prescription and on the prescription of possible substitute drugs.

**Methods** Prescription data were taken from a 850 French physicians sample surveyed by the IMS-Health Permanent Survey on Medical Prescription from 1998 to 2010. We selected patients with at least one diagnosis of venous insufficiency (ICD 10 code I80-I87). We performed linear segmented regression to determine changes in the level and slope of the prescription rates of each therapeutic class included in the study.

**Results** Following the reduction of the reimbursement, the prescription rate for phlebotonics declined significantly (about one third of the regular consumers had no prescription any more), and the decline became more obvious after the phlebotonics were totally excluded from the reimbursement. The prescription rates for possible substitute such as NSAID will be analysed. The results of this second phase of the study are not yet available.

**Conclusions** Further delisting should take into account the possibility of negative impact on public health and potential savings.

**ABSTRACTS OF THURSDAY CNC POSTER WALK**

- **T4 CNC poster walk Thursday 01-12-2011 14.45 – 15.45 (12)**

**Abstract CNC01 (1016)****Essential to review health policy initiatives when comparing utilisation patterns across countries?**

Marion Bennie; Brian Godman (UK)\*; *Iain Bishop*; Kristina Garuoliene; Marija Kalaba; Stephen Campbell; Vera Vlahovic-Palcevski; Lars Gustafsson

**Objectives** Previous research has highlighted considerable differences in utilisation of statins across Europe. However, limited explanations for differences. Objective: Assess their utilisation across Europe between 2001 and 2007 alongside health policy and other interventions to provide explanations for differences seen.

**Methods** Retrospective analysis of the influence of different demand side measures on subsequent utilisation of statins in over 20 European countries/ regions. Only administrative databases used, with utilisation computed in DDDs (ATC/ DDD version 2010). Demand side reforms broken down by 4Es (Education, engineering, economics and enforcement) and validated with the payers in each country. Main outcome measure is differences in DDD/ TIDs from 2001 to 2007 alongside a description of the health policy initiatives. The analysis principally took place between 2001 to 2007.

**Results** (a) There was increased utilisation of statins in all countries; varying between 2 and over 5 fold between 2001 and 2007. However overall utilisation rates (DDDs/ TID) in 2007 varied considerably - from 0.8 in Lithuania to 3.28 in Serbia, 12.3 in Estonia, 28.5 in Croatia, 93.6 in England and 116.8 in Scotland. (b) Reasons for very low utilisation in some Central and Eastern European countries include high patient co-payments and prescribing restrictions, e.g. in Lithuania statins initially restricted to secondary prevention and only for 6 months. High utilisation of statins in UK helped by quality targets linked with financial incentives, combined with recent studies encouraging prescribing higher strength statins. As a result, considerable shift in prescribing to 40mg and 80mg simvastatin vs. 10 and 20mgs; similar change for atorvastatin. (c) Similar wide variation with PPI utilisation across Europe.

**Conclusions** Substantial differences in utilisation patterns between countries make it mandatory in future CNC studies to always record potential reasons driving the differences. Otherwise, there may be tendencies for readers to dismiss the outliers.

**Abstract CNC02 (1034)****Views on pharmaceutical access and governance in Australia, Canada and the United Kingdom (UK).**

*HYH Chan\**, SA Hollingworth, KJ Steadman, LM Nissen

**Objectives** Qualitative studies examining pharmaceutical access and governance are few. This study examined the issues regarding pharmaceutical issues in Australia, Canada and pre-2010 United Kingdom (UK).

**Methods** This was a qualitative study where pharmacists, academics, professional bodies and pharmacy-stakeholders in each country were interviewed. Questions were centred around perceived and experienced strengths, weaknesses and potentials for improvement in relation to pharmaceutical access and governance. Equity, quality, efficiency and sustainability of pharmaceuticals were discussed. Interviews were thematically analysed using Leximancer□ to generate concept maps. These were compared within and between each country.

**Results** All three countries have a government-subsidised pharmaceutical program for citizens. All interviewees reported pharmaceutical accessibility to be "good" or "excellent" for their own country. Due to the structure and geographical organisation of their country's pharmaceutical program, Canada and the UK reported inequitable access to expensive pharmaceuticals depending on place of residence. Rural regions in Australia experience delayed access to certain medications due to geographical distance; however inequity is not a problem. Unlike Canada and the UK, Australia has a national program that does not differ between jurisdictions/states. For pharmaceutical governance, all interviewees were confident in their government's efforts. The down-scheduling of prescription medications to over-the-counter products was seen as an act by the government to decrease the pharmaceutical expenditure whilst maintaining optimal access for citizens. Besides conventional requirements for governance, cost-effectiveness appears to be the biggest consideration for all three countries due to limited resources.

**Conclusions** Each country differs in its pharmaceutical program and governance and has various strengths and weaknesses specific to the circumstances of its country. Pharmaceutical coverage is deemed as being somewhat fragmented in Canada and the UK; this was not the case for Australia. All interviewees were satisfied with the current status and operation of pharmaceutical governance in their country.

### Abstract CNC03 (1043)

#### **Pro-arrhythmic risk of antipsychotics: the importance of combining the FDA Adverse Event Reporting System with drug utilization data**

*Emanuel Raschi\*, Elisabetta Poluzzi, Brian Godman, Ariola Koci, Kristina Garuoliene, Marija Kalaba, Jurij Furst, Ott Laius, Ugo Moretti, Bjorn Wettermark, Miriam Sturkenboom, Fabrizio De Ponti*

**Objective** This pilot study, carried out as part of the ARITMO project, evaluates the pro-arrhythmic risk of antipsychotics (APs) by analyzing the FDA Adverse Even Reporting System (FDA\_AERS) and drug utilization data from across Europe.

**Methods** Spontaneous reports of QT prolongation and Torsades de Pointes (TdP) associated with APs were retrieved in the FDA\_AERS (2004-2010 period). A disproportionality signal was defined by a Reporting Odds Ratio (ROR) significantly >1 and cases ≥3. The Arizona\_CERT website was used to identify unexpected signals ([www.azcert.org](http://www.azcert.org)). Consumption data were provided from administrative databases across Europe in collaboration with EuroDURG and previous CNC projects. Data were expressed as mean defined daily doses per 1000 inhabitants per day (DID) for the period 2006-2010.

**Results** APs were reported in 1,467 cases of TdP/QT prolongation. Among 25 APs (≥0.05 DID in at least one Country), unexpected signals were found for 10: amisulpride (cases=28; ROR=35.9), aripiprazole (57; 2.2), bromperidol (7;162.3) chlorprothixene (4; 14.4), flupentixol (3; 13.6); fluphenazine (8; 10.8), levomepromazine (6; 8.3), olanzapine (216; 6.4), promazine (3; 28.1) and zuclopenthixol (8; 28.2). To date, the total use of APs varied from 4.4 DID (Lithuania) to 18.5 DID (Serbia) and those with unexpected signals from 54% (Slovenia) to 23% (Serbia). Use of each AP varied only slightly among countries, except for fluphenazine (4.02 DID in Serbia; 0.06 DID in Sweden). Olanzapine peaked 2.4 (Slovenia), amisulpride 0.77 (France), zuclopenthixol 0.73 (Sweden), aripiprazole 0.45 (Slovenia and Sweden).

**Conclusions** Differences in drug use among countries imply different levels of risk. Among unexpected signals, aripiprazole should be closely monitored by regulators, considering its increasing use in many countries; the case of fluphenazine represents a specific concern for Serbia to date. The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 241679 – the ARITMO project.

### Abstract CNC04 (2016)

#### **Recent policies to enhance renin-angiotensin prescribing efficiency in Europe; implications for the future**

*Luka Vončina, Brian Godman\*, Vera Vlahović-Palčevski, Stephen Campbell, Marion Bennie, Iain Bishop*

**Objectives** Renin-angiotensin (RA) drugs (ACEIs and ARBs) are accepted treatments for hypertension and CHF. Coughing can occur with ACEIs leading to development of ARBs. Trials showed though discontinuation from coughing in only a minority (2 - 3% ACEIs). ARB prescribing restrictions in Austria as higher costs than ACEIs moderated utilisation. Other demand side measures in Spain (Catalonia) also moderated ARB utilisation. Objective: Document the influence of reforms on ACEI and ARB utilisation in other European countries (Croatia, Portugal, and Sweden) vs. Austria and Spain (Catalonia) using 4 Es (education, engineering, economics and enforcement).

**Methods** Retrospective observational DU study documenting the influence of reforms on utilisation of ACEIs alone/ combination (C09AA01 to 16, C09BA01 to 15, C09BB02 to 12) and ARBs alone/ combination (C09CA01 to 08, C09DA01 to 07, C09DB01 to 04) from 2001 to 2007 using DDDs. Years chosen to mirror published studies. Only administrative databases used. Utilisation patterns and reforms validated with data providers.

**Results** (a) RA drug utilisation increased in all countries - 70% to 160%, (b) Prescribing restrictions in Croatia greater influence moderating ARB utilisation than Austria enhanced by educational and other activities, (c) Similar moderation of ARB utilisation in Scotland vs. Austria and Croatia helped by intense demand side activities (3 of 4 Es) especially prescribing targets, (d) moderation of ARBs in recent years in Sweden mirroring Spain (Catalonia) with again 3 of 4 Es, (e) growing ARB utilisation in Portugal with limited demand side measures resulted in rising expenditure (Euro/1000 inhabitants/ year) vs. stabilisation in other EU countries despite increased utilisation.

**Conclusions** Multiple demand side reforms essential to moderate ARB utilisation, with Croatia and Scotland providing examples to other European countries. Findings in Portugal confirms growing utilisation of patented products if only limited demand side initiatives.

**Abstract CNC05 (2024)****Repeated medical visits in asthma patients and their correlates: comparison between five European countries***Laurent Laforest, Marie-Sophie Schwalm, Marion Dufour, Eric Van Ganse\**

**Objectives** Asthma remains a major public health issue in Western countries. The frequency and the characteristics of asthma patients with repeated visits in primary care have been little investigated. Objectives: To assess the frequency of repeated asthma patients' visits to general practitioners (GPs) in five European countries (France, United-Kingdom, Germany, Belgium and Italy) and to investigate the correlates of this outcome for each country.

**Methods** A study was conducted using GPs prescription databases in the five countries (Cegedim-Strategic-Data and THIN database). Patients aged 16-40 with at least 2 prescriptions of any respiratory drugs (R03), occurring at different terms in 2007, were included. For each country, patients with at least 10 visits in 2008 were compared to others.

**Preliminary results** 7,608 patients were recruited in France (mean age 29 yrs, 56% women) and 46,150 in the United-Kingdom (mean age 29 yrs, 54% women). Mean number of visits to GPs in 2008 was 48 (SD=4.8) in France and 6.3 (SD=6.6) in the United Kingdom. Corresponding percentages of patients with 10 visits to GPs or more in 2008 were 12% and 21% respectively. In both countries, repeated visits to GPs in 2008 were significantly associated with female gender, receiving respiratory therapy, being prescribed oral corticosteroids, antibiotics and short acting-beta agonists. All tests were statistically significant ( $p<0.0001$ ).

**Conclusions** Significant proportions of patients with repeated visits were noted, possibly in association with repeated exacerbations. These findings request further understanding. Similar analyses will be extended to Italy, Belgium and Germany.

**Abstract CNC06 (2026)****LDL-C goal attainment according to prescribed lipid-lowering therapy: results from the LIPIDE European survey***Gaëlle Desamericq, Laurent Laforest, Marie-Sophie Schwalm, Philippe Moulin, Emilie Michel<sup>2</sup>, Caroline Eteve<sup>2</sup>, Gabriel Coffin, Cecile Ritleng and Eric Van Ganse\**

**Background** LDL-Cholesterol is a critical outcome for cardiovascular prevention. Attainment of LDL-C therapeutic objectives (TO) remains inadequate in Western countries, despite efficient lipid lowering therapy (LLT).

**Objectives** To compare LDL-C TO achievement according to prescribed LLT in patients supervised in primary care.

**Methods** Prescription databases from five European countries were used (Cegedim- France, Belgium, Germany, Italy and THIN database for the United Kingdom). Patients with at least one LLT prescription and documented blood lipid measure recorded in 2007 in the database were included. At least 3 months of unchanged therapy preceding lipid measure were required. European guidelines were used as a reference for LDL-C goals.

**Results** A total of 151,169 patients were included (mean age 67, 45% women). The use of statins as monotherapy was prevalent (90.5%), notably simvastatin (53%) and atorvastatin (23%). Other LLT classes (fibrates, niacin, ezetimibe) and LLT associations were marginal. Overall, TO attainment rate averaged 63%, with salient differences according to therapy ( $p<0.0001$ ). Compared to Simvastatin, the probability of achieving LDL-C TO under atorvastatin and rosuvastatin were  $OR=1.09$ ,  $95\%CI=[1.06-1.13]$  and  $OR=1.16$ ,  $95\%CI=[1.10-1.21]$ , respectively. Lower risks were observed for pravastatin ( $OR=0.45$ ,  $95\%CI=0.43-0.47$ ), fluvastatin ( $OR=0.39$ ,  $95\%CI=[0.36-0.43]$ ), lovastatin ( $OR=0.36$ ,  $95\%CI=0.29-0.45$ ) and fibrate ( $OR=0.35$ ,  $95\%CI=[0.33-0.37]$ ). When each statin was studied separately, TO achievement tended to be moderately improved by a higher titration of statin, with noticeable baseline differences between the various molecules.

**Conclusions** This study highlighted differences in the LDL-C target achievement according to LLT, notably with statin lipid-lowering potency.

### Abstract CNC07 (2041)

#### Comparing policies in Brazil and Europe to enhance prescribing efficiency; impact and future possibilities

*Claudia Garcia Serpa Osorio-de-Castro, Elaine Silva Miranda, Cláudia Du Bocage Santos Pinto, Rachel Magarinos-Torres, Brian Godman\*, Lars L Gustafsson*

**Objectives** Assess the influence of different reforms in Brazil and Europe to enhance prescribing efficiency.

**Methods** Searched databases included: SciELO, Lilacs, Scopus, Pubmed/Medline, Web of Science. Search terms included “medicamentos genéricos / generic drugs”, “políticas públicas / public policies”, “preços de medicamentos / generic prices”, “uso de genéricos / generic utilisation”, “políticas de uso de medicamentos / demand-side reforms”, “uso de medicamentos / drug utilisation”. Legislation in Brazil was separated according to the bills and classified by: general policy, prescribing and dispensing (including clinical protocols), procurement, drug regulation and rational use (RUM). European results based on published studies.

**Results** (a) Brazil - A number of reforms have been enacted between 1990 and 2010. These include 72 general policy Bills such as National Medicines and Generics policies; 36 bills involving supply side regulations (1994 to 2010) including procurement and price regulations; 77 Bills involving marketing of medicines and clinical research; 31 Bills involving demand side measures including the development of an Essential Drug Lists (EDLs) as well as guidelines for high cost medicines; and 35 Norms to enhance the rational use of medicines. A Generics Policy has been in operation since 1999. In Brazil, only products that are bioequivalent have “generic” status. Multisource generics not bioequivalent are called “similar” products. Generics are reimbursed at 40% of the originator product price, alongside quality standards for reimbursed multisource products. However, concerns with utilisation of EDLs in practice and prices of generics/ multisource products.(b) Europe - Countries with extensive demand-side measures and low prices for generics have appreciably enhanced their prescribing efficiency in recent years.

**Conclusions** There are differences in market authorisation, pricing and utilisation of generics in Brazil and Europe. However, studying the influence of different policies including EDL utilisation through CNC and other methodologies provides future guidance.

### Abstract CNC08 (2045)

#### Antiepileptic drug consumption in Catalonia, Norway and Denmark: 2007-2009.

*Mònica Sabaté Gallego, María Ester Santander Paredes, Concetta Rafaniello, Pili Ferrer, Elena Ballarin, Anna Coma, Corinne Zara, Luisa Ibáñez\**

**Objectives** Antiepileptic drugs (AEDs) are the cornerstone of epilepsy treatment. They are also used in other disorders. In the last few decades new AEDs have been marketed. Aim: to describe out-patient AED consumption in the general population of three European settings.

**Methods** Consumption data of AEDs were obtained from national drug consumption providers, between 2007-2009. Defined daily doses/1000inh/day (DID), by age were calculated.

**Results** Total AEDs use increased progressively between 2007-2009: Catalonia (12-13.5DID), Denmark (12-13.5DID) and Norway (11-13DID). The consumption was higher among age groups 50-59, and 60-69 in Denmark and Norway;  $\geq 70$  in Catalonia. The ATC group “Other antiepileptics” (N03AX) was the most widely used in the three settings and it increased during the study period. Pregabalin was the most consumed drug in Catalonia (1.4-2.3DID), and lamotrigine in Norway and Denmark (2.46-3.05DID and 2.78-3.28DID respectively). Gabapentin and valproic acid in Catalonia, pregabalin and carbamazepine in Norway and oxcarbazepine and valproic acid in Denmark were the next most consumed drugs. Within N03AX, gabapentin was most consumed in those  $\geq 80$  in Catalonia and Denmark, while in Norway, it was more consumed in 60-69. Pregabalin consumption in Catalonia was mainly in 70-79, whereas in Norway and Denmark, it was between 50-59 year old patients.

**Conclusions** Total AEDs consumption was similarly increased from 2007 to 2009 in the three countries. N03AX had the highest consumption. Lamotrigine and pregabalin were the most used drugs. Gabapentin and pregabalin were mainly used in older age groups in Catalonia.

**Abstract CNC09 (2048)****Are hospital medicines prices influenced by discounts and rebates?**

*Vogler Sabine\*, Zimmermann Nina, Leopold Christine, Habl Claudia, Mazag Jan*

**Objectives** To understand the role of discounts/rebates impacting medicines prices in hospitals

**Methods** Qualitative survey with competent authorities and hospital pharmacists about purchasing strategies for hospital medicines with all EU Member States and two further European countries (Norway, Turkey) Price survey (study visits) of 12 active ingredients in 25 hospitals in Austria, the Netherlands, Norway, Portugal, Slovakia

**Results** Of a total of 27 European countries, 25 countries reported about the practice of discounts and/or rebates (ex-post price reductions). The range of the discounts varied among the countries and with regard to the products. Apart from Italy with mandatory discounts to the NHS, discounts were always commercial and as such usually kept confidential. Free-cost medicines (i.e. medicines provided without payment) were reported to be a practice in six countries, whereas it is legally forbidden in another six countries. In four of the five case study countries (Austria, Netherlands, Portugal, Slovakia) discounts were granted in individual negotiations between suppliers and hospitals for some of the surveyed products (e.g., for cardiovascular medicines where generics were available; however no discounts for all oncology medicines of the sample). In Norway, discounts played no role since medicines were tendered centrally. In Austria and Slovakia medicines were provided cost-free to some/all hospitals (only in the indication of cardiovascular treatment). In Portugal, unit prices of nearly € 0.00 were surveyed for a few cardiovascular medicines attributable to rebates.

**Conclusions** In the in-patient sector, confidential discounts, and, to a lesser extent, rebates and cost-free medicines are common in some countries. Discounts are more likely to be provided where there are (off-patent) therapeutic alternatives available. Large discounts and cost-free provision appear to be a practice for “strategic products” which account for high volume and expenditure in the out-patient sector.

**Abstract CNC10 (2050)****Impact of medicines price reductions in Greece and Spain on other European countries applying external price referencing**

*Sabine Vogler\*, Nina Zimmermann, Christine Leopold, Bettina Schmickl, Friederike Windisch*

**Objectives** To assess if price reductions in Greece and Spain in reaction to the financial crisis had an impact on the prices in other European countries which refer to them (external price referencing/EPR)

**Methods** Pharmaceutical policy analysis including a price survey of 3 medicines in 15 European countries from January 2010 to January 2011

**Results** While there were decreases in the ex-factory prices of the selected medicines in Greece and Spain, they were seldom “translated” in lower prices in other European countries which refer to them. In the months following the price cuts in these two countries, the ex-factory prices of Olanzapin and Trastuzumab remained stable in Austria, Belgium, Bulgaria, France, Hungary and Slovakia, while for Abacavir prices went down in Bulgaria, Ireland and Slovakia. There were even increases in the ex-factory prices for some or all of the three selected products in Finland, Romania and the Czech Republic. Ireland had reductions in the ex-factory prices for two medicines which is attributable to their price cuts to manage the financial crisis. At the level of wholesale and pharmacy retail prices, more changes, in particular increases, were observed which were mainly a consequence to increases in the VAT rates on medicines in several European countries during 2010.

**Conclusions** We identified two major reasons for the low impact of the price reductions in reference countries on the EPR countries: 1. Missing regular price reviews which would allow learning about the price reductions. 2. Some price reductions were hidden, in particular the price decreases on original products in Spain, which were implemented as discounts and are not reflected in the price databases. It is recommended to assess the potential full savings which European EPR countries would achieve in case of regular price reviews and/or transparency about discounts.

#### Abstract CNC11 (1002)

##### **Do rheumatoid arthritis patients have equal access to treatment with new medicines? Tumour Necrosis Factor - alpha inhibitors use in four European countries.**

*J.M. Hoebert\*, A. K. Mantel-Teeuwisse, L. van Dijk, J.W.J. Bijlsma, H.G.M. Leufkens*

**Objectives** To explore the use of the biological tumour necrosis factor alpha (TNFalpha) inhibitors used in the treatment of rheumatoid arthritis as a proxy of access to treatment with new medicines. In addition, characteristics both related to clinical and health care systems will be assessed to explore possible differences in international utilisation.

**Methods** Data from four European countries were included: Ireland, the Netherlands, Norway and Portugal. Annual utilisation rates of TNFalpha inhibitors (2003-2007) were expressed as defined daily doses (DDDs)/1000 inhabitants/day. Qualitative data such as country characteristics, national health policy characteristics, guidelines were obtained from literature. In addition, interviews were held with leading rheumatologists of each country to put obtained results into (cultural) context.

**Results** Utilisation of TNFalpha inhibitors varied widely from 0.32 (Portugal) to 1.89 (Norway) DDDs/1000 inhabitants/day (2007). An association between health expenditures per capita and the degree of utilization of TNFalpha inhibitors was found ( $R^2 = 0.81$ ). When the use of TNFalpha inhibitors became more established, the association seemed stronger. Differences in health expenditure were nevertheless not the only determinant of usage. Causes of intercountry variation were manifold including differences in guidelines, reimbursement regulations and access to rheumatologists.

**Conclusions** The prospects of patients receiving TNFalpha inhibitor treatment depend on the country where they are living. In case uniformity of management and treatment would be considered to provide health benefits, the extent and the causes of variation should feature prominently on future public health agendas.

#### Abstract CNC12 (1046)

##### **Use of non-steroidal anti-inflammatory drugs (NSAIDs) in Europe: the SOS project**

*René Schade\*, Vera E. Valkhoff, Silvana Romio, Martijn J. Schuemie, Federica Nicotra, Giovanni Corrao, Silvia Lucchi, Marco Villa, Gino Picelli, Tania Schink, Edeltraut Garbe, Huub Straatman, Ron Herings, Miriam C J M Sturkenboom, on behalf of the SOS project consortium*

**Objectives** To compare the use of NSAIDs among four European countries at the population level as part of the Safety Of Non-Steroidal Anti-Inflammatory Drugs (SOS) project.

**Methods** Patients from the following seven databases from four European countries were included: GePaRD (Germany); THIN (United Kingdom); IPCI and PHARMO-RLS (Netherlands); Pédianet, OSSIFF, and SISR-Lombardy (Italy). The overall study period was from 1999 to 2008 with later starting years for some databases according to data availability. Prevalence of NSAID use was calculated by dividing the number of exposed individuals by the person-time of observation during respective time periods. Analyses were stratified by database, age, sex, and calendar year. The SOS project is funded by the European Commission.

**Results** The combined source population of seven databases from four European countries included 35 million patients and generated 170 million person-years of observation. There were 13 million patients who were exposed to at least one of 49 different NSAIDs during observational time. For most databases, prevalence of NSAID use was relatively stable across calendar years and between 5 and 15% across age categories for adults. Overall, prevalence of NSAID use increased with age and was higher in females. Diclofenac and ibuprofen were the most frequently used NSAIDs with prevalence rates of around 5% in adults for most databases. In Italy, nimesulide was used in around 5% of elderly patients.

**Conclusions** The SOS project provides data from different European countries on a large number of patients who used NSAIDs. Heterogeneity of NSAID exposure allows for studying the use and safety of many of these drugs at the population level.

## ABSTRACTS OF FRIDAY POSTER WALK

- **F3 poster walk 1 Friday 02-12-2011 13.15 – 14.00**
  - **A** Adherence (6)
  - **B** Interventions health policy (8)
  - **C** Interventions 2 (8)
  - **D** Adherence to guidelines (6)
  - **E** DUR Neurosystem (7)
  - **F** DUR Infectious diseases (6)
- **F3 poster walk 2 Friday 02-12-2011 14.00 – 14.45**
  - **G** DUR Other therapeutic area (9)
  - **H** DUR Elderly (9)
  - **I** General DUR (10)
  - **J** Generics (7)
  - **K** Cancer and safety (8)

## A Adherence

### Abstract A01 (1014)

#### Refill-adherence rates of anti-epileptic and antiparkinson drugs in the private health care sector of South Africa

*Martie Lubbe\**, Van Zyl T, Van der Merwe S, Serfontein JHP, Rakumakoe DM, Du Plessis JM, Bekker HE

**Objectives** To investigate the refill-based adherence rates of anti-epileptic and antiparkinson drugs.

**Methods** A retrospective drug utilisation review was performed on medicine claims data of a pharmacy benefit management company in South Africa. Refill-based adherence rates were calculated for 64 457 anti-epileptic and 8 768 antiparkinson drugs that were prescribed more than once during a four-year period (1 Jan. 2005 to Dec. 2008). The refill-based adherence rate was calculated per trade name by using the following equation: Refill-Adherence rate = (total number of days of anti-epileptic drugs supplied – days supplied at the last refill) / (date last claimed – date first claimed) X 100%. [RSA Rand (R)/€ = 8.19215 (2005); 9.63633 (2006); 9.95563 (2007) and 13.3999 (2008)].

**Results** Only 30.5% (n = 19 635) of anti-epileptic drugs and 36.8% (n = 3225) of antiparkinson drugs had refill-adherence rates between 90% and 110%. The majority of anti-epileptic drugs (58.9%; n = 37 962) had refill-adherence rates below 90% that accounted for 39.2% (n = R 57 599 838) of the total cost of all anti-epileptic drugs (N = R146 863 755). The majority of antiparkinson drugs (53.50%, n = 4 691) had also unacceptably low refill-adherence rates below 90%, that accounted for 41.62% (n = R16 398 512.00) of the total cost (N = R39 402 898.20) of all antiparkinson drugs. In general the lowest average refill-based adherence rates were obtained with anti-epileptic drugs containing phenobarbitone and vitamin B1 (52.0% ± 37.8); phenobarbitone (63.5% ± 47.2); primidone metabolites (69.7% ± 47.2%); clonazepam (77.8% ± 184.8) and carbamazepine (80.9% ± 151.1). Biperidien, carbidopa/levodopa, and levodopa/benserazide containing antiparkinson products had on average unacceptable low refill-adherence rates (< 90%).

**Conclusions** It seems that the refill-adherence rate of antiparkinson and ant-epileptic drugs is not very favourable in the private health care sector of South Africa.

### Abstract A02 (1058)

#### Discontinuation of antiepileptic drugs in pregnancy; a study in The Health Improvement Network (THIN)

*Shuk-Li Man\**, Irene Petersen, Mary Thompson, Irwin Nazareth

**Objectives** A number of women of childbearing age take antiepileptic drugs (AEDs). Many of these women face a dilemma on whether to continue their medication in pregnancy. The objective of this study was to examine patterns in AED prescribing and to determine whether pregnancy is a major determinant for discontinuation.

**Methods** We identified 138,773 pregnancies in women aged 13-55 years in THIN database. In 717 pregnancies, AEDs were prescribed in the three months before pregnancy and time to the last consecutive AED prescription before delivery was estimated. A non-pregnant group prescribed AEDs was identified for comparison. Cox's regression was used to compare the likelihood of discontinuing AEDs between pregnant and non-pregnant women. The analysis was stratified by common indications for AEDs; epilepsy, bipolar disorder and depression.

**Results** Amongst women with epilepsy, discontinuation of AEDs was slightly higher in pregnant than non-pregnant women (Hazard Ratio (HR): 1.53, 95% confidence interval (CI): 1.29-1.80). Of 581 pregnant women, 459 (79.0%) continued treatment into pregnancy and 369 (63.5%) to the end of the second trimester. Of 1162 non-pregnant women, 1001 (86.1%) and 845 (72.7%) continued for comparable time periods. In contrast, amongst women with bipolar disorder, those pregnant were more than twice as likely to discontinue treatment compared to non-pregnant women (HR: 2.47, 95% CI: 1.77-3.44). In 77 pregnant women, 41 (53.2%) continued into pregnancy and only 15 (19.5%) to the end of the second trimester. In 154 non-pregnant women, 110 (71.4%) and 83 (53.9%) continued for comparable periods.

**Conclusions** Pregnancy is a determinant for the discontinuation of AEDs during pregnancy, especially in women with bipolar disorder or depression despite the severe consequences associated with untreated mental health problems.

**Abstract A03 (2025)****Ratio “inhaled corticosteroids to total anti-asthma drugs”, and asthma-related hospital admissions***Laurent Laforest, Jennifer Martin, Idir Licaj, Gilles Devouassoux, Gérard Chatte, Eric Van Ganse\**

**Background** The inadequate use of inhaled corticosteroids (ICS) remains an issue in asthma. The ratio of ICS units to total anti-asthma medications dispensed (ICS/R03 ratio) may be useful to assess the risk of severe exacerbations, leading to asthma-related hospitalisations (ARHs). We tested this hypothesis using claims data.

**Objectives** To verify in claims databases whether patients with a higher ICS/R03 ratio experience fewer ARHs.

**Methods** A random sample of patients aged 16-40, with regular use of respiratory drugs in 2005 was selected from the French national claims database (EGB). Three groups were defined according to the value of ICS/R03 ratio in 2007: 0% ("non users"), <50% ("inadequate users") and ≥50% ("adequate users"). ARHs in 2007 and 2008 were compared between the 3 groups.

**Results** Among 1812 patients (mean age=32 year-old, 54.2% females), non users, inadequate users and adequate users were 17%, 37% and 46%, respectively. ARH rate was 0.9% in 2007 (0.7% in 2008). Patients with ARH in 2007 were more numerous ( $p=0.0006$ ) among inadequate users (2.10%), compared with adequate users (0.24%) and non users (0.32%). Differences were also observed in mean ARH-induced costs: 2.16 €, 48.30 € and 3.70 € for non users, inadequate, and adequate users ( $p=0.0005$ ). Conversely, no conclusive results were obtained with the number of quarters containing ≥ one dispensing of ICS, nor with the proportion of days covered by ICS in 2007.

**Conclusions** Patients with ICS/R03 ratio ≥50% experience fewer ARHs than inadequate users, suggesting improved asthma control. ICS/R03 ratio may help identify asthma patients at risk of ARHs in administrative databases. The differences observed between different markers of exposure will be discussed.

**Abstract A04 (2027)****Persistence with first-line glaucoma therapy***Eric Van Ganse\*, Laurent Laforest, Idir Licaj, Nathalie Texier, Stephane Schuck, Jean Paul Renard*

**Background** Glaucoma is a preventable cause of blindness, provided that therapy is used regularly. Hence, a good knowledge of patients' adherence to therapy is critical to improve disease management. Early persistence to first-line glaucoma therapy is poorly documented.

**Objectives** To verify in claims databases to what extent first-line glaucoma therapy is interrupted within the 12 months following initiation and how this interruption varies with different drug classes.

**Methods** A sample of patients newly-treated with glaucoma therapy between 2005 and 2008 was selected from the French national claims database (EGB). Glaucoma therapy was identified with the Anatomical Therapeutic Chemical classification. Twelve-month persistence was defined for a given patient by the presence of the first-line drug class (≥ 1 dispensing) between 12th and 24th months following initiation. Twelve-month persistence was compared between patients according to the first-line drug classes, and between prostaglandins.

**Preliminary results** Among 8673 patients initiated with glaucoma therapy (mean age=65 year-old, 60% females), 7953 (92%) received a treatment in monotherapy. The most common drug classes in monotherapy were prostaglandins (27%), beta blockers (20%), sympathomimetics (19%) oral carbonic anhydrase inhibitors (10%) and topical carbonic anhydrase inhibitors (9%). Latanoprost was prevalent among prostaglandins (71%). Overall, 12-month persistence to first-line therapy was low (32%), with salient differences between drug classes ( $p<0.0001$ ). Percentages of persistent patients varied from 59% with prostaglandins to 4% for parasympathomimetics users (36% for beta-blocker users). Among first-line prostaglandin users, those who received latanoprost had a significantly better persistence, compared with bimatoprost and travoprost ( $p<0.0001$ ).

**Conclusions** Our findings confirm the low early persistence of first-line therapy, with a significant better persistence for prostaglandins, notably latanoprost. The adjunction of any potential second-line drug classes within the 12 months following initiation of therapy will be also documented for each drug class among persistent and non persistent patients.

## Abstract A05 (2028)

### Typology of asthma patients who stop using controller therapy:

*Laurent Laforest, Cécile Ritleng, Céline Pribil, Abdelkader El Hasnaoui, Stéphane Schuck, Osman Liesl M, Eric Van Ganse\**

**Background** Several studies have illustrated inadequate adherence to inhaled controllers in asthma, notably spontaneous cessation of use by patients when they feel better. The characteristics of such patients were investigated.

**Methods** Asthma patients receiving inhaled anti-inflammatory therapy and supervised by GPs from the THALES network were included in the study. Patients reported in a questionnaire their recent symptoms (Asthma Control Test), beliefs and behaviour toward inhaled therapy during the past 3 months.

**Results** 204 patients were included (mean age: 53.8 SD=19.6, females: 59.3%). About 40% of patients were inadequately controlled and 12% had a course of oral corticosteroids during the past 3 months. During that period, 31.5% of patients interrupted their controller therapy as their asthma improved ('sometimes' or more often). Compared to patients who did not interrupt their controller, these patients were younger ( $p=0.007$ ) and they did not use their controller more often when an exacerbation occurred ( $p=0.70$ ). In addition, they were more likely to forget to use their controller ( $p<0.0001$ ), to interrupt it when feeling worse ( $p=0.0005$ ), and to believe that constant use of respiratory therapy was unhealthy ( $p=0.002$ ). Conversely, no association was observed with gender, smoking status, asthma control, nor with the type of controller therapy.

**Conclusions** Our data suggest that cessation of use of controllers is associated with other improper behaviours or beliefs regarding inhaled controllers. Education is needed to change patients' perceptions and behaviours towards anti-inflammatory therapy.

## Abstract A06 (2047)

### Lack of adherence to oral bisphosphonates in Italian patients: prevalence and predictors

*Carlo Piccinni\*, C. Suzzi, E. Poluzzi, A. Puccini, F.Lapi, G. Mazzaglia and A.Vaccheri*

**Objectives** Poor adherence to oral bisphosphonates reduces medication efficacy, so raising the healthcare expenditure because of the hospitalization grew. The aim of this study was to estimate the proportion of non-adherent subjects and to define the predictors of non-adherence to bisphosphonates.

**Methods** A retrospective cohort study has been conducted using administrative data repository of 13 regional units which were federated in the Italian BEST (Bisphosphonate-Effectiveness-Safety-Trade-off) database. that accounts for 18 million inhabitants. An inception cohort of patients with at least 2 prescriptions of oral bisphosphonates through 2003-2007 were selected. Exclusion criteria were age<40, Paget's disease and cancer. Adherence was measured for each patient over the observation period by Medication Possession Ratio (MPR). That is, a subject was defined adherent when MPR was  $\geq 80\%$  in each year. For each individual, co-morbidity was measured by computing the Chronic Disease Score (CDS). The primary outcome of the study was the lack of adherence. A multivariable logistic regression model was performed by SAS 9.2.

**Results** Among 216,302 users of oral bisphosphonates, 168,244 (78%) were non-adherent. The following variables were identified as positive determinants for a high degree of adherence: weekly formulation (OR=0.78; 95%CI=0.74-0.82), fixed combination with colecalciferol (0.80; 0.76-0.83), and femur fractures (0.47; 0.37-0.59). On the contrary, these co-medications were predictors of non-adherence: NSAIDs (1.14; 1.10-1.19), PPI (1.17; 1.14-1.21), antiepileptics (1.13; 1.10-1.17), antidepressants (1.17, 1.13-1.20), and antithrombotics (1.13; 1.10-1.16). Furthermore, hospitalisation for any reasons (1.16; 1.13-1.19) and any modification in comprehensive drug regimen (1.27; 1.21-1.32 and 1.24; 1.21-1.28 according to CDS increase and decrease, respectively) were identified as determinants of non-adherence.

**Conclusion** This study demonstrated a worrying lack of adherence to oral bisphosphonates, besides identifying its related determinants. Based on these results, measures to improve the degree of adherence and the consequent efficacy of oral bisphosphonates among osteoporotic patients, should be implemented.

**B Interventions health policy****Abstract B01 (1019)****Statin use in cardio- and cerebrovascular secondary prevention: the impact of a regional decree in Lazio, Italy**

*Ursula Kirchmayer\**, Lisa Bauleo, Mirko Di Martino, Giovanna Cappai, Nera Agabiti, Danilo Fusco, Massimo Arcà, Marina Davoli

**Background** In July 2009, the Lazio health authority issued a decree on statin use in primary and secondary prevention, aiming to improve the cost-benefit relationship. Particularly, high-potency agents (atorvastatin, rosuvastatin) should be limited to specific cases, while simvastatin and pravastatin are first-choice. Objectives This study aimed at analysing the prevalence of statin use in patients with cardio- or cerebrovascular disease before and after the decree, and estimating the impact of the intervention comparing statin prescribing before and after.

**Methods** From the Hospital Information System, two cohorts of patients discharged after cardio- or cerebrovascular disease were selected: pre-decree, considered as not-exposed (July 2008 - May 2009) and post-decree, considered as exposed (July 2009 - May 2010). Study outcome was statin use, by active agent (high-potency vs others), defined by minimum one prescription during the first month after discharge.

**Results** The pre-decree cohort was composed by 5778 patients (65.4% males, 23.9% 80+ years), 73.3% of whom had not been treated with statins during the six months before admission. Among these patients, 53.9% received statins after discharge, mostly high-potency agents (92.4%). Among patients treated with statins before, 69.1% received statins after discharge, most of the remaining on the same agent (79.0%), with high-potency statins used by 88.7%. In the post-decree cohort (5945 patients, 64.1% males, 24.7% 80+ years) 76.4% were naïve to statins. Statin use after discharge was significantly lower among both, statin naïve patients (24.1%) and previous statin users (42.5%) than before the decree ( $p$ -values < 0.001). Nevertheless, statin choice was similar to the pre-decree cohort: among statin naïve patients 91.7% received high-potency agents; previous statin users mostly remained on the same active agent (80.9%), and 87.7% took high-potency statins.

**Conclusions** The decree on statin prescribing in the Lazio region abated statin use in secondary prevention, but high-potency agents remained predominant.

**Abstract B02 (1023)****Psychotropic Utilization in Portugal Mainland**

*Mafalda Ribeirinho\**, Mariana Gaspar, Cláudia Furtado

**Objectives** Analyze psychotropic utilization and expenditure trends, identify utilization patterns within each different subgroup and implement a statistical model in order to determine this data behaviour as a direct consequence of the changes that occurred due to policy measures in the pharmaceutical sector.

**Methods** Data collection refers to psychotropic prescribed and dispensed in ambulatory care to the population covered by the NHS, from 2000 to 2009. Main outcome measure was the Defined Daily Dose /1000 inhabitants / day (DID). An intervention model was adjusted to the utilization dataset and dummy variables were used representing the intervention of policy measures in order to determine their effects on the time series.

**Results** Psychotropic utilization has been increasing over the last ten years reaching 186 DID in 2009 and growing 52%. Concerning total expenditure, the augments accounted 119% and can be addressed not only to a higher utilization, but also to the use of new drugs with no marketed generic.. Patient's expenditure was constant over the years but NHS expenditure suffered a 213% growth as a result of special reimbursement enlargement in Antipsychotics and Antidepressants drugs when prescribed by non specialists as until 2001. This was statistical significant ( $p < 0,03$ ) when performing the intervention model. The model also established the behaviour observed in the time series as a direct consequence of a set of policy changes, e.g., price reduction; reimbursement levels? changes and generic price reduction.

**Conclusions** It was clear from the intervention model that the policy measures regarding reimbursement and prices were associated with changes in expenditure trend. The increase in utilization, expressed in DID, of antipsychotic and antidepressants was also observed in most European countries. Several factors may be behind this result such as the introduction of new therapeutic indications, a longer use, a better diagnose or simply an improve in accessibility.

### Abstract B03 (1032)

#### Financial Impact of Judicious and Appropriate Use of Medicines in Primary Care

Louise Lor, Fred Wu, Stephen Morrell, Ye-qin Zuo, Rebecca Oyomopito, Mark Bartlett\*

**Background** 'NPS' works with health professionals, consumers, Government and industry to improve the health of the Australian population through Quality Use of Medicines. 'NPS' develops and implements national programs, targeting primary care, consistent with the Australian 'National Medicines Policy'. Objectives: To assess the impact of 'NPS' programs on expenditure by the Australian Pharmaceutical Benefit Scheme (PBS), between 2008 and 2010, on glitazones and bisphosphonates.

**Methods** Design- Time-series aggregate study of the relationship between general practitioner (GP) participation in 'NPS' programs and PBS expenditure on the utilisation of glitazones and bisphosphonates. Interventions- 'NPS' interventions aimed at GPs included educational visits, case studies, clinical audits, and group discussions. Key, evidence-based, messages aimed at influencing prescribing practice for glitazones and bisphosphonates were: consider glitazones only when a combination of metformin and a sulfonylurea is not suitable; in managing people with osteoporosis, it may be reasonable to stop bisphosphonates after 3-5 years and monitor. Outcome measure- Changes in PBS expenditure for glitazones and bisphosphonates attributable to 'NPS' programs. Statistical analysis- Interrupted time series modelling was used to assess the association between GP participation in 'NPS' programs and PBS expenditure on glitazones and bisphosphonates, controlling for underlying trend, seasonality, medicine price changes, national and international warnings and other potential confounders.

**Results** Approximately 43% (N~9000) of Australian GPs participated in one or more of the 'NPS' program activities. GP participation in the 'NPS' program was a significant negative predictor of expenditure changes ( $p < .0001$  to  $0.01$ ). Changes in GP prescribing practice for Glitazones, attributable to the 'NPS' program, are associated with a relative decrease in expenditure of 17% in 2008-09 and 28% in 2009-10. A similar relative decrease was found for bisphosphonates.

**Conclusions** Comprehensive programs in primary care can reduce both inappropriate prescribing and costs to subsidised pharmaceutical schemes.

### Abstract B04 (1042)

#### Utilization of oral antidiabetic medications between 1993 and 2010 in Hungary

Péter Doró, Ria Benkó, Andrea Bor, Mária Matuz\*, Réka Viola, Gyöngyvér Soós

**Objectives** The aim of this study was to analyze the changes in the utilization of oral antidiabetic medications (OAD) between 1993 and 2010 in Hungary, to assess its concordance with therapeutic guidelines, and to reveal the effect of reimbursement policy changes.

**Methods** Crude national drug utilization data were obtained from IMS PharmMIS Consulting Company regarding the years between 1993 and 2004, and from the administrative drug dispensing database of the Hungarian National Health Fund Administration regarding the years between 2005 and 2010. Data were analyzed according to the ATC/DDD (WHO) methodology. Data were expressed as defined daily doses per 1000 inhabitants per day (DDD/TID).

**Results** The utilization of oral antidiabetic drugs was 24.414 DDD/TID in 1993, peaking in 2006 with 50.676 DDD/TID, after which a small decline was noticed. The share of oral antidiabetic drugs from the total antidiabetic drug use continuously decreased, from nearly 80% in 1993 to less than 70% in 2010. Of the biguanides buformin was used at the beginning of the study period, which almost disappeared by 2010, and its place was taken over by metformin. Of the sulfonylureas at the beginning glibenclamide was used, but its utilization gradually decreased, diminishing by 2009, and gliclazide and glimepiride became the widely used sulfonylureas. The use of acarbose peaked in 2007 with 3.802 DDD/TID. The use of glinides and DPP-4 inhibitors remained marginal. The use of rosiglitazone started to rise after the introduction of its combination with metformin, reaching 1.875 DDD/TID in 2008, but its use was ended after suspension of marketing authorization in 2010.

**Conclusions** During the study period the use of OADs doubled, and the structure of OAD use considerably changed, in accordance with the changes in therapeutic guidelines. Changes in reimbursement policy were made to favor the prescribing in harmony with the therapeutic guidelines.

**Abstract B05 (2019)****Differences in the influence of prescribing restrictions; implications for health policy interventions and resource savings**

Brian B Godman, Solveig Sakshaug, Christian Berg\*, Thomas Burkhardt, Luka Voncina, Vera Vlahović-Palčevski, Björn Wettermark

**Background and objectives** Prescribing restrictions have switched prescribing to generics. However their nature and follow-up varies, e.g. in Norway, physicians just write the rationale for atorvastatin in patient's notes. In Austria, patented statins only reimbursed if patients not achieving target lipid levels with generic statins. In Croatia, physicians from the Institute from Health Insurance visit GPs suspected of abusing ARB regulations with the potential for fines. Objectives: Principally assess the influence of different prescribing restrictions on utilisation patterns of statins and PPIs; compare with published studies for ACEIs/ ARBs.

**Methods** Principally observational study of the influence of prescribing restrictions on utilisation of different statins (C10AA) with a focus on atorvastatin + rosuvastatin, and PPIs (A02BC) including esomeprazole, on a DDD basis (2010 DDDs) before and after prescribing restrictions in Norway using the Norwegian Drug Wholesales Statistics from 2001 to 2009. No impact analysis as difficult to fully disassociate health policy interventions from other circumstances. Comparison with published findings on influence of prescribing restrictions on statin utilisation in Austria and Finland and ARB prescribing among European countries.

**Results** Appreciable differences in subsequent utilisation of patented statins between 3 countries: 66% reduction in atorvastatin utilisation in Austria in 2007 vs. 2003 (year before restrictions), 59% reduction (atorvastatin and rosuvastatin) in Finland 1.2 years after restrictions, and 44% reduction in Norway in 2008 vs. 2004 (full year before restrictions). Utilisation of esomeprazole also fell in Norway after restrictions but to a lesser extent than statins, and rose in 2009 vs. 2008 (restrictions introduced in February 2007). Prescribing restrictions also limited ARB prescribing in Austria and Croatia but greater influence in Croatia with more aggressive follow-up.

**Conclusions** Prescribing restrictions have influenced utilisation across classes. However, care needed when planning further reforms as their nature and follow-up can appreciably influence outcomes.

**Abstract B06 (2049)****Use of bisphosphonates for the treatment of postmenopausal osteoporosis in Hungary between 2003 and 2009**

Andrea Bor, Péter Doró, Ria Benkó, Mária Matuz\*, Réka Viola, Gyöngyvér Soós

**Objectives** The objective of this study was to examine the utilization pattern of bisphosphonates between 2003 and 2009, and to reveal the effect of changes in reimbursement policy.

**Methods** A retrospective analysis was done between 2003 and 2009, regarding consumption of bisphosphonates, registered in the indication of postmenopausal osteoporosis (alendronic-, ibandronic-, risedronic-, zolendronic-acid). Source of our crude data came from the administrative database of the Hungarian National Health Fund Administration, covering the entire population. Data were analyzed according to the ATC/DDD (WHO) methodology; results were expressed as defined daily doses/1000 inhabitants/day (DDD/TID).

**Results** Bisphosphonate use was 5.02 DDD/TID in 2003, after a steady increase it peaked in 2006 with 8.63 DDD/TID. In 2007 it dropped to 7.48 DDD/TID, after which a small increase was noted. The most widely used bisphosphonate was alendronic acid, which use was 4.51 DDD/TID in 2003, and 5.58 DDD/TID in 2005, and remained nearly constant during the following years. The use of risendronic acid was only 0.51 DDD/TID in 2003, peaked with 2.50 DDD/TID in 2006, and almost dropped to half in 2007. Ibandronic acid became available in 2006, and its use reached 1.08 DDD/TID in 2009. The use of zolendronic acid remained marginal. In 2006 the combination of alendronic acid with vitamin D, and the combination of risendronic acid with vitamin D and calcium were introduced. These combination took 11.3% of the total bisphosphonate use in 2006, and their use increased to 45.5% in 2010.

**Conclusions** The utilization of bisphosphonates showed a rapidly increasing trend between 2003 and 2006, but changes in the reimbursement policy (reduced reimbursement rate) in 2007 resulted in a decreased use. The combination of bisphosphonates with vitamin D becoming popular, by 2010 nearly half of the bisphosphonate use was with the combination products.

#### Abstract B07 (2056)

##### The impact of reference pricing on clozapine and olanzapine medication costs

*Hanna Koskinen\*, Mikkola Hennamari, Saastamoinen Leena K, Martikainen Jaana E*

**Background** Reference pricing was adopted in Finland in April 2009. Objective The aim of this study is to assess the impact of reference pricing on clozapine and olanzapine drug costs in Finland during the first year after its launch.

**Methods** A retrospective analysis was performed from January 2006 to March 2010 using the Finnish national register on reimbursed drug purchases. In the register, there were 402,869 purchases of clozapine and 380,680 purchases of olanzapine. Segmented regression analysis of interrupted time-series was used to examine changes in the cost of one day of treatment (daily cost) measured as cost per Defined Daily Doses 39 months before and 12 months after the introduction of reference pricing.

**Results** At baseline, the daily cost of clozapine was approximately €2.30 and before the reference pricing there was no significant month-to-month trend. Immediately after reference pricing was implemented the level of daily cost decreased by €0.47 ( $p < .0001$ ). At the end of the study period the average daily cost of clozapine was approximately €1.50, while it would have been approximately €2.14 without reference pricing. For olanzapine, the baseline daily cost was approximately €4.92. Contrary to clozapine, the trend of the cost was statistically significantly downward even before reference pricing, and this trend accelerated after the reference pricing. Immediately after reference pricing was implemented the level of daily cost decreased by €1.72 ( $p < .0001$ ). At the end of the study period the average daily cost of olanzapine was approximately €1.57, while it would have been approximately €4.64 without reference pricing.

**Conclusions** Reference pricing had a significant impact on antipsychotic medication costs. The intensity of the impact, however, differed between the two drug classes. This can be explained by differences in stages of product life and in used volumes.

#### Abstract B08 (1001)

##### Reimbursement restriction moderately decreases benzodiazepine use in general practice

*Joëlle Hoeber\*, P.C. Souverein, A.K. Mantel-Teeuwisse, H.G.M. Leufkens, L. van Dijk*

**Objectives** On January 1st 2009, benzodiazepines were excluded from the Dutch positive reimbursement list when used as anxiolytic, hypnotic or sedative, to limit misuse and for cost savings. This study aims to assess the impact of this reimbursement restriction on benzodiazepine use in patients newly diagnosed with anxiety or sleeping disorder in general practice.

**Methods** Diagnoses and prescription data were derived from the electronic medical records based Netherlands Information Network of General Practice (LINH). Patients aged 18 years and older with an incident diagnosis of sleeping disturbance (ICPC code: P06) or anxiety (P74, P01) between January 2008 and December 2009 were identified. Incidence of these diagnoses, benzodiazepine use and initiation of SSRI treatment was compared between 2008 and 2009.

**Results** Incidence of anxiety and sleeping disorders decreased by almost 10% and 12%, respectively. The proportion of patients being prescribed a benzodiazepine following a diagnosis was lower in 2009 compared to 2008 for both anxiety (30.0% vs. 33.7%,  $p < 0.05$ ) and sleeping disorder (59.1% vs. 67.0%,  $p < 0.05$ ) as was the proportion of patients with more than 1 benzodiazepine prescription for both anxiety (36.4% vs. 42.6%,  $p < 0.05$ ) and sleeping disorder (35.0% vs. 42.6%,  $p < 0.05$ ). An increase in the use of alternative treatment for anxiety with SSRIs was not found.

**Conclusions** The reimbursement restriction has led to a moderate decrease in the number of incident diagnoses and initiation of benzodiazepine use in patients being newly diagnosed with anxiety or sleeping disorder. A shift to alternative treatment of anxiety with SSRIs has not been observed.

**C Interventions 2****Abstract C01 (1012)**

**To evaluate the impact of clinical guidelines and the intervention of a pharmacist in influencing the switch from intravenous to oral antibiotics in medical and surgical patients.**

*Murphy P, Shah M, Lynch D, Cryan B and Stephen Byrne\**

Switching patients from intravenous (IV) to oral antibiotics has economic and patient benefits. Studies have demonstrated the efficacy and safety of such switching policies. The aim of this study was to evaluate the impact of clinical guidelines and the intervention of a clinical pharmacist on the switch of antibiotics from the IV to oral route. An audit of the switch from IV to oral antibiotics in two ward at Cork University Hospital was conducted before (Phase I) and after (Phase II) the distribution of guidelines. Additionally, the clinical pharmacist met with members of both medical and surgical teams to review their antibiotic prescribing on the study wards, as per the guidelines (Phase III). The distribution of guidelines and the active intervention of the pharmacist led to a significant reduction in the duration of potentially inappropriate IV antibiotic therapy from means of 2.4, 3.4 and 8 days in Phase I to means of 0.1, 0.2 and 1.8 days in Phase III ( $p=0.01$ ). The total duration of IV therapy also reduced in Phase III (from means of 7 days for patients on one IV antibiotic and 8 days for patients on two/three IV antibiotics in Phase I to means of 3.5 days for patients on one or two IV antibiotics and 1.5 days for those on a third IV antibiotic ( $p>0.05$ ). A statistically significant increase in the number of patients switched to oral antibiotics in Phases II and III (from 65.2% in Phase I to 92.9% in Phase III on the surgical ward) ( $p<0.001$ ). The estimated cost savings on IV antibiotic therapy (drug and non-drug) were calculated with the introduction of guidelines and the active promotion by clinical pharmacists to be  $>€10,000$ . When these estimates were extrapolated to the entire hospital, the benefits of such interventions could be in the order of approx. €500,000pa.

**Abstract C02 (1013)**

**Analysis of the 'Disposal of Unused Medicines Properly' campaign for the Midlands Regional Health Service Executive, Ireland**

*Griffin Y, Murray P and Stephen Byrne\**

**Introduction** Disposal of unused medicines in the community poses a number of problems including environmental risks, economic waste and most alarmingly the threat of abuse of unused medicines and poisonings.

**Methods** This study comprised an analysis of the 'Disposal of Unused Medicines Properly' (D.U.M.P.) campaign for the Midlands HSE area which comprises counties Offaly, Laois, Longford and Westmeath. The quantity, nature and cost of returns was analysed. This information was then contrasted with data from the National Suicide Research Foundation to identify whether the campaign would be successful in reducing the means of poisoning used in suicide and deliberate self-harm.

**Results** A total of 7308 returns were made to 74 pharmacies during the study period (September 2005 to May 2006). The most frequently returned therapeutic class were analgesics (9.9%), followed by psycholeptics (6.6%) and drugs for obstructive airways disease (6.3%). In terms of individual drug returns, morphine ranked the highest (1.88%), followed by warfarin (1.74%) and aspirin (1.55%). Family members of patients returned unused medicines more frequently than patients or others. A total of 6791 medicines were calculated to have a cost price of €230,631. This was extrapolated to a cost of €4,313,858 for the Republic of Ireland as a whole.

**Conclusions** The study illustrates that disposal of unused medicines is a worthwhile initiative for a number of reasons. It could reduce the economic burden of medicines on the state by highlighting over-prescribing and encouraging those dispensing medicines to check if the medicines are actually needed. It also reduces the amount of pharmaceutical waste entering waterways. The effect of D.U.M.P. campaigns on suicide and deliberate self-harm, though difficult to quantify, is clearly a positive one as large quantities of potent medicines are being removed from the home reducing overdose potential.

### Abstract C03 (1053)

#### The influence of different initiatives to enhance prescribing efficiency for CV drugs, PPIs and atypical antipsychotics in Scotland: implications for the future

*Marion Bennie\**, *Iain Bishop*, *B. Godman*

**Background and objectives** No analysis of measures to enhance atypical antipsychotic prescribing efficiency following generic risperidone (late 2008). Recognised management of schizophrenia is more complex. Consequently, therapeutic substitution unlikely versus statins and PPIs. No reason why oral risperidone cannot generally be prescribed first line or following switching. Objectives: (a) document influence of reforms to enhance atypical prescribing efficiency, (b) contrast with other classes, (c) suggest potential rationales if differences.

**Methods** Retrospective observational DU study documenting influence of reforms on atypical antipsychotic utilisation (N05AH03 and 04, N05AL05, N05AX08, 11, 12 and 13) from 2005 to 2010 (2011 DDDs). Clozapine not included as reserved for resistant patients. Demand side measures collated under the 4 Es.

**Results** (a) Atypical antipsychotic utilisation increased by 50% to 5.1 DDD/ TID in 2010. Risperidone decreased from 21% of total atypical antipsychotics in 2005 to 16% (DDD basis) in 2010, although IM LA risperidone (patent protected) increased from 4% to 6.5% of total risperidone, (b) Newer atypicals (quetiapine, aripiprazole and paliperidone) increased from 17.5% to 32% of total atypical antipsychotics, (c) Oral risperidone typically generic after availability (93% - DDD basis), (d) Expenditure/ DDD for oral generic risperidone fell to £0.47 (€0.54) by 2010, 84% below pre-patent loss prices, limiting increase in expenditure to 42% (£6121/ 1000 inhabitants/ year in 2010 - €7039), (e) Demand side measures included formularies (education) and prescribing targets for oral vs. patented dispersible risperidone (engineering). This compares with (a) PPI utilisation increasing 2.9 fold between 2001 and 2010 (102 DDD/ TID, €6303); expenditure decreasing by 56% driven by increasing generic omeprazole, (b) statin utilisation increasing 6.2 fold between 2001 and 2010 (142.8 DDD/ TID, €13133); expenditure only by 6% driven by increasing generic simvastatin.

**Conclusions** Demand side measures appreciably lower influence for anti-psychotics. Further analyses taking place to enhance future prescribing efficiency.

### Abstract C04 (2021)

#### Interdisciplinary team effort leads to guideline and rationalization of opioid use.

*M. Juul-Larsen*, *A. Schou Olesen*, *M. Siersbæk*, *M. Ohrt*, *B. Klindt Poulsen*, *Hanne Plet\**, *K. Dencker Christensen*, *N. Bruensgaard*

**Objectives** Use of opioids varies remarkably between various regions of Denmark. The use is especially high in the North Region (NR). In particular use of "none-recommended" opioids constitutes a problem. The aim was to develop and implement a cross sectional guideline on "how-to-use" opioids. It was anticipated that the guideline would help reduce overall use of opioids and "none-recommended" opioids in the primary and secondary health care system in NR.

**Methods** Drug formularies (DF) in the primary and secondary health care system in NR were streamlined. . An interdisciplinary group developed an "easy-to-use" guideline, to assist when pre-scribing opioids. The guideline complies with DF. . The guideline was distributed to all doctors in NR during January-March 2010, and was made available online. . Ward lists in hospital units were adjusted to recommendations in the guideline. . A press release on development and implementation was made to increase focus. . Hospital staff meetings were conducted introducing the guideline and emphasising importance of correct treatment of pain and use of opioids. . Use of opioids is currently monitored.

**Results** Development of a guideline on "how-to-use" opioids" . A cross sectional implementation strategy insuring same message to all doctors in NR. . Preliminary results in secondary health care system might imply changes in the use of opioids. A 17 % reduction of the total use of opioids (DDD) was observed comparing October-December 2009 to April-June 2010. Use of opioids shifted toward a higher use of recommended opioids. For example use of oxycodone ("none-recommended") decreased 42 % (DDD) in the same period.

**Conclusion** The study showed that interdisciplinary team effort, led to implementation of the guideline. It substantiates that it is possible to influence use of opioids, and hopefully in the future it will result in a rational prescription pattern.

**Abstract C05 (2022)****Experiences and preferences of healthcare professionals with regard to Direct Healthcare Professional Communications.**

*Sigrid Piening, Flora M. Haaijer-Ruskamp, Pieter A. de Graeff, Sabine M.J.M. Straus, and Peter Mol\**

**Objective** Effectiveness of Direct Healthcare Professional Communications (DHPCs) or 'Dear Doctor' letters, to inform Healthcare Professionals (HCPs) of new drug safety concerns is questioned. Communication of safety-related regulatory action to prevent safety issues from occurring may be improved when more is known about HCPs preferences. To explore HCPs experiences and preferences for improvement of communication of safety-related regulatory action comparing the views of general practitioners, internists, community pharmacists and hospital pharmacists.

**Methods** An anonymous, pilot-tested mail questionnaire was sent to a representative sample of Dutch HCPs (n=3488) (Dec '09-Jan '10). Questions were posed on perception of drug safety and DHPCs, familiarity with and action taken following DHPCs, satisfaction with DHPCs and preferences for alternative communication methods. Descriptive statistics (chi-squares and ANOVA) were used to determine differences between HCP groups.

**Results** Thirty-four percent (1164) of HCPs responded (ranging from 24% of internists to 46% of community pharmacists). Respondents considered drug safety information important for their profession (mean 4.67; SD0.56, scale of 1-5). Sixteen percent (from 5% of hospital pharmacists to 28% of general practitioners) had never seen a DHPC ( $p > 0.001$ ). HCPs undertook action following 29% of received DHPCs (from 23% by internists to 37% by community pharmacists ( $p < 0.001$ )). Overall, respondents rated their satisfaction with DHPCs with a 6.9 (SD1.86, scale of 1-10;  $p < 0.001$ ). Respondents preferred e-mail (7.6; SD2.3, scale of 1-10), medical journals (7.5 SD2.0) and electronic prescribing systems (7.1; SD2.7) as alternative information channels, preferably issued by the Dutch regulatory authorities (8.1; SD1.5), the Dutch Pharmacovigilance Center (Lareb) (8.1; SD1.7), or own professional bodies (8.0; SD1.7).

**Conclusion** Although safety information of drugs is considered important, HCPs reported to undertake action in a minority of DHPCs issued. Pharmacists seem more involved with and responsive to safety issues than physicians. Alternatives should be developed using electronic methods and medical journals.

**Abstract C06 (2031)****Impact of community pharmacists' interviews on patients' asthma control and perception of therapy and disease: results in patients with inadequate control at inclusion**

*Laurent Laforest, Eric Van Ganse\*, Melanie Broquet, Cecile Rittleng, Gilles Devouassoux, Genevieve Chamba, French Council of Pharmacists*

**Background** Pharmacists' educational interventions may improve asthma management, even though long-term benefits on symptoms are not yet fully documented. A study was conducted in community-pharmacies to assess the impact of a pharmacy-based educational intervention on patients' control of asthma over a 12-month period. Perceived ability to influence the course of asthma (Locus of Control), self-declared adherence to inhaled corticosteroids (ICS), understanding of asthma therapy and medical resource use were also investigated (during the study period).

**Methods** Consecutive asthma patients (aged 18-50) were recruited by randomized community-pharmacies into intervention or Reference groups. A self-questionnaire comprising Asthma Control Test was completed by patients at inclusion and 12 months later. ACT was also assessed 4 and 8 months after inclusion. Patients in the Intervention group received at inclusion an educational training from the pharmacist. The present analyses were conducted only in inadequately controlled patients at inclusion.

**Results** Among patients included in Intervention and Reference groups (125+28), 98 (76+22) had an inadequate control at inclusion (mean age 35, females: 72%). After training, percentages of patients with adequately controlled asthma significantly increased in the Intervention group from 0% (inclusion) to 43%, 49% and 49% at 4th, 8th, and 12th months (0%, 32%, 14% and 27% in the Reference group). Parallel improvements were observed after intervention in Locus of Control ( $p = 0.0006$ ) and on patients' understanding of therapy. In contrast, patients' overall adherence to ICS remained inadequate, despite fewer declared interruptions of therapy after intervention ( $p = 0.03$ ).

**Conclusion** After pharmaceutical intervention, a sustained improvement of asthma control was obtained over a 12-month period, in parallel with a better understanding of therapy and enhanced Locus of Control. A wider participation of pharmacists in patients' training should be fostered.

### Abstract C07 (2061)

#### **Trends in antidepressant prescribing in children in the United Kingdom, a study in The Health Improvement Network (THIN)**

*Linda Wijlaars\*, Irwin Nazareth, Irene Petersen,*

**Objectives** To determine trends in the incidence of antidepressant prescriptions for children issued by general practitioners (GPs) following the contra-indication of certain selective serotonin reuptake inhibitors (SSRIs) as they could increase the risk of suicidal behaviour in children (Committee for Safety of Medicines (CSM) advice, December 2003).

**Methods** We identified 1,502,753 children up to the age of 18 years who were registered with their GP for at least one year in The Health Improvement Network (THIN) UK primary care database. Trends in incidence of antidepressant prescribing were examined between 1995 and 2010 using interrupted time-series analysis.

**Results** Overall, 25,473 (2%) children had been prescribed antidepressants and SSRIs were prescribed to 16,925 (1%) children. Rates of SSRI prescribing in children and adolescents increased up to 2002; then rates dropped abruptly. This was particularly the case for paroxetine. On the other hand, rates for non-contra-indicated fluoxetine did not change, though rates did show a small dip around 2004. After 2005, prescription rates for individual SSRIs slightly increased again, with the exception of citalopram which saw a sharp increase and paroxetine which was prescribed only sporadically after this time. For tricyclic antidepressants, there was a steady decline over the entire study period. However, there was a small increase in prescription rates of amitriptyline between 2006 and 2010.

**Conclusions** Rates of SSRI prescriptions showed a significant drop around the time of the CSM advice. This could indicate caution on the part of GPs in prescribing antidepressants to children. However, after 2005 rates for all SSRIs, except paroxetine, were increasing again. This suggests GPs deemed the benefits of SSRIs more important than the risks, which is in line with results from observational studies that found no increased risk of suicidal behaviour with SSRIs.

### Abstract C08 (1044)

#### **Time trends in use of antiparkinsonian drugs among patients with Parkinson's disease in the United Kingdom: a population-based analysis**

*René Schade\*, Jeanne Dieleman, Miriam Sturkenboom*

**Objectives** To describe time trends in the prescription of antiparkinsonian drugs among patients with Parkinson's disease at the population level. To study effects of regulatory actions concerning valvular heart disease with use of pergolide or cabergoline on prescribing rates.

**Methods** We identified a cohort of Parkinson's disease patients using data from UK's THIN database. The study period was from 1997 until 2008. Patients were followed from first Parkinson's disease diagnosis, one year after registration with a practice or start of the study period, whichever occurred latest. Prescription rates were calculated as the number of prescriptions per person-time of follow-up.

**Results** The cohort included 13,155 Parkinson's disease patients and generated 45,705 patient-years of follow-up. Half of the patients (n=6443) had incident Parkinson's disease (20,868 patient-years). The overall number of prescriptions for antiparkinsonian drugs per patient-year increased from 13.9 in 1997 to 21.0 in 2008. Levodopa was the most frequently prescribed antiparkinsonian drug. Prescription rates increased for amantadine, apomorphine, levodopa, pramipexole, ropinirole, rasagiline, and rotigotine. In contrast, prescription rates decreased for bromocriptine, pergolide, selegiline, and anticholinergic drugs. Prescription rates for cabergoline increased between 1997 and 2003 and decreased thereafter. The greatest absolute increase occurred for levodopa, pramipexole, and ropinirole. For incident Parkinson's disease patients, the overall prescription rate for antiparkinsonian drugs per patient-year was 10.0 in 1997 and 18.5 in 2008, with stable prescription rates for selegiline but otherwise similar trends over calendar years as in the entire Parkinson's disease cohort.

**Conclusions** There was an increase in overall use of antiparkinsonian drugs among Parkinson's disease patients in the United Kingdom between 1997 and 2008. In particular, use of levodopa, pramipexole, and ropinirole increased. UK health care professionals may have incorporated regulatory actions concerning pergolide and cabergoline into clinical practice.

**D Adherence to guidelines****Abstract D01 (1050)****Disease-specific antibiotic prescribing quality indicator assessment in a Flemish out-of-hours service centre**

*Philippe Ryckebosch, Niels Adriaenssens\*, Jef Goris; Veronique Verhoeven, Samuel Coenen*

**Objectives** Antibiotic use is increasingly recognised as the main driver for antimicrobial resistance, and the largest volumes of antibiotic prescriptions for systemic use are prescribed in primary care. If we want to improve antibiotic use, we have to be able to measure its quality. Recently, the European Surveillance of Antimicrobial Consumption (ESAC; [www.esac.ua.ac.be](http://www.esac.ua.ac.be)) project published a set of disease-specific antibiotic prescribing quality indicators (APQI) to assess the quality of antibiotic prescribing in primary care (BMJ Qual Saf 2011; online.) What is the quality of antibiotic prescribing in the general practitioners' (GPs) out-of-hours service centre in Deurne-Borgerhout, Belgium (HDB) when applying these APQI?

**Method** Data linking International Classification of Primary Care (ICPC) labelled diagnoses with ATC labelled antibiotic prescriptions were extracted from the electronic medical record, HWP Mailer, which is used mandatorily by every GP working in HDB. The values of each of the 21 APQI (3 indicators for each of 7 indications (ICPC codes H71, R74, R75, R76, R78, R81 and U71)) were calculated and compared with the proposed ranges of acceptable use (target).

**Results** Only for U71 (cystitis/other urinary infection) the percentage of patients prescribed an antibiotic (indicator a) reached the target. Within the subgroup of patients prescribed an antibiotic the percentage of those prescribed the recommended antibiotic (indicator b) and those prescribed a quinolone (indicator c), reached the target in none and four (H71 (acute otitis media/myringitis); R74 (acute upper respiratory infection); R75 (acute/chronic sinusitis); R76 (acute tonsillitis)) of the indications, respectively. For R78 (acute bronchitis/bronchiolitis) and R81 (pneumonia) none of the three indicators reached the target.

**Conclusions** Assessment of the ESAC APQI revealed suboptimal quality of antibiotic prescribing in a Flemish out-of-hours service centre (HDB). In particular, the use of recommended antibiotics offers a huge opportunity for quality improvement.

**Abstract D02 (1054)****Adherence to guidelines for drug-treatment of children with asthma in Swedish Primary care - potential for improvement?**

*Maria Ingemansson\*, Björn Wettermark, Eva Wikström Jonsson, Marina Jonsson, Gunilla Hedlin, Anna Kiessling*

**Objectives** Asthma is a common chronic disease among Swedish children. To identify areas for improvement regarding drug-treatment is therefore crucial. The aim of this study was to explore prescription- and dispensing-patterns of anti-asthmatic drugs to children with asthma in relation to the evidence-based guidelines.

**Methods** All children visiting 14 primary health care centres [PHC] in Stockholm who had their first prescription of anti-asthmatic drugs dispensed during a defined period of one year were followed regarding their purchases of anti-asthmatic drugs during 24 consecutive months. The children were divided in two age-groups: 0-6 years and 7-16 years. Outcome measurements were: what level of care initiates the treatment, to what extent the children were initiated on the different drugs recommended in the guidelines, the amount and frequency of drugs dispensed over time and if the dosage-texts on the prescriptions contained adequate information.

**Results** 42% of the younger and 72% of the older children initiated their treatment at a PHC. 64% of the younger children were initiated on inhaled short-acting bronchodilating beta-2-agonists [SABA] and inhaled corticosteroids [ICS] in combination. 50% of the older children were initiated on SABA in mono-therapy. 35% of the younger and 54% of the older children had only one prescription of anti-asthmatics dispensed during two years. Depending on type of drug prescribed, in 39- 46% of the dosage-texts the indication was stated and in 13-33% the mechanism of action was stated.

**Conclusions** There is a need for improvement in adherence to guidelines in important areas. Asthma, especially among children 7-16 years, is a chronic disease and should be treated with continuous medication with anti-inflammatory drugs. However, this was not the case in this study. An improvement of the dosage-texts could enhance the possibility for the children to be treated according to the guidelines.

### Abstract D03 (2013)

#### **Systematic appraisal of dementia guidelines on the management of behavioural and psychological symptoms of dementia**

*Majda Azermaj\*, Mirko Petrovic, Monique Elseviers, Jolyce Bourgeois, Luc Van Bortel, Robert Vander Stichele*

**Introduction** Within the treatment of dementia, management of behavioural and psychological symptoms (BPSD) is an important but complex component. Our study goal was to appraise the quality of existing dementia guidelines; to extract practice recommendations for BPSD from selected guidelines; to select key practice recommendations for which there was agreement among guidelines.

**Methods** We conducted a systematic search in MEDLINE and guideline organization databases supplemented by hand search of Web sites. Quality assessment was performed by 2 independent reviewers using the Appraisal of Guidelines Research & Evaluation instrument (AGREE). Specific practice recommendations (SPRs) for BPSD were extracted and compared for their level of evidence and strength. We developed a systematic approach to determine for which recommendations agreement was found.

**Results** Fifteen guidelines were eligible for quality appraisal by AGREE of which 5 were selected for recommendation extraction. We extracted 18 SPRs on management of BPSD, but variation in grading systems (none using GRADE) complicated interpretation, comparison and generalisability of recommendations among guidelines. By introducing a posteriori defined criteria, we determined a level of agreement for each SPR, and selected key practice recommendations for which there was agreement. For most non-pharmacological interventions no agreement among SPRs for BPSD was found. Pharmacological SPRs were recommended as second-line treatment, with guidance for timely discontinuation.

**Conclusion** More primary evidence and guidelines for management of BPSD are needed. Valid methods to deal with absence of agreement among guidelines in the appraisal of the level of evidence and strength of practice recommendations should be further explored.

### Abstract D04 (2012)

#### **Pregabalin is not used in accordance with national recommendations in Sweden - analysis of dosage and treatment order 2007-2010**

*Catrin Furster, Lena Gustafsson, Anna Lindhé, Tove Tevell, Bo Palaszewski, Mikael Hoffmann\**

**Objectives** To investigate whether pregabalin is used according to national guidelines where pregabalin is recommended only after the patient has tried other specific drugs, i.e. antiepileptic (N03, including gabapentin) or antidepressant (N06A) drugs.

**Methods** Data from the Swedish Prescribed Drug Register was analysed for the total population of Sweden during 2007-2010. Incident pregabalin patients were defined using a 12-month wash-out period. Alternative drug use during the wash-out period was investigated. All patients who were dispensed pregabalin from a pharmacy during the first and third tertial any given year, and collected  $\geq 100$  defined daily dose (DDD) during the same year, were defined as regular users. Regular users using  $\geq 730$  DDD were defined as high dose users.

**Results** Among incident patients in 2010 ( $n=23,608$ ) 42.9% had not used antiepileptic (N03, including gabapentin) or antidepressant (N06A) drugs during the previous 12-month period. This was an increase from 38.1% in 2007. Regular users of pregabalin used more than one DDD (300 mg) daily during 2007-2010. The general daily dose increased over time. Male regular users used higher doses than women in 2010 (457 and 368 DDD respectively). High dose users were more common among men than among women (15.7% vs. 8.7%) in 2010. The fraction of high dose users increased from 8.3% in 2007 to 11.6% in 2010.

**Conclusions** The use of pregabalin in the majority of patients in Sweden does not follow the correct order of treatment according to national guidelines. The dosages and the fraction of high dose users have both increased during the years 2007 to 2010. There are several alternative possible explanations for this increase in dosage, for instance accumulation of long-time users over time in a growing market, shift in patient groups treated, and/or substance dependence/abuse.

**Abstract D05 (2054)****Compliance to National Guidelines for pharmaceutical treatment of sleeping disorders among elderly incident patients in Sweden.**

*Kerstin Björkman Lundberg, Philip Johansson, Maj Carlsson\*, Anna Lemar, Lena Alsén-Melin, Helene Manger, Ulrika Whiss, Andrej Leimanis and Mikael Hoffmann*

**Objectives** National guidelines for treatment of sleeping disorders among elderly state that zopiclone should be the first choice and that other hypnotics, such as long acting benzodiazepines and propiomazine, should be avoided. The objective of this study was to investigate choice and volume (DDD) of substance among incident users 75 years and older (75+) of hypnotics (N05C) in Sweden and compare between different county councils and with incident users below 75 years of age.

**Methods** Data from the Swedish Prescribed Drug register covering all dispensed prescriptions in Sweden was analyzed for incident users of hypnotics (15-44, 45-64, 65-74 and 75+ years of age). Incident users were defined as people who filled a prescription (index date) of a hypnotic (N05C) during the period December 2009 - November 2010 and had not filled any prescription for a hypnotic during a wash-out period of 24 months before the index date.

**Results** Among incident patients 75+ (n= 38,620) zopiclone (52.9%), zolpidem (25.4%), and propiomazine (10.4%) were the most frequently used hypnotics. There were however differences between different county councils in Sweden, with zopiclone ranging from 30 % to 68 %. The incidence for recommended and appropriate hypnotics increased with increasing age, whereas the incidence of inappropriate hypnotics did not. The prescribed volume of inappropriate hypnotics was generally larger than the prescribed volume of recommended hypnotics.

**Conclusions** The compliance to current guidelines on choice of hypnotics for the elderly is fairly good, although there is considerable variation between county councils. There are tendencies towards larger mean volumes of inappropriate hypnotics, although further studies are needed to confirm these findings. Another aspect of quality in treatment with sleeping agents is to which extent incident users continue their treatment and for how long. This is an issue for further research.

**Abstract D06 (2058)****Use of Z-hypnotics – Is clinical practice in accordance with recommendations?**

*Christian.Berg\*, Solveig Sakshaug, Marte Handal, Svetlana Skurtveit*

**Objective** Z-hypnotics (zopiclone and zolpidem) constituted 84 % of total sales in number of DDDs of hypnotics (N05CB/CF) in Norway in 2009. Aim is to study use of z-hypnotics with focus on long-term use. According to recommendations, duration of z-hypnotic use should be limited to 2 - 4 weeks. Are the recommendations followed?

**Methods** Data from the Norwegian Prescription Database were used to measure the number of users and new users of z-hypnotics by gender and age. New users were measured in period 2007 - 2009 and defined as individuals with no z-hypnotic dispensed the preceding three years. Individuals having at least one annual dispensing of z-hypnotic each year in the period 2005-2008 were defined as long-term users. Long term exposure was calculated as average and median annual number of defined daily doses (DDD) dispensed per user.

**Results** The number of individuals having a z-hypnotic dispensed increased in the period 2005-2007. From 2007-2009 the number has been stable. 7 % of the Norwegian population had a z-hypnotic dispensed in 2009. Women accounted for two out of three users and prevalence of use increased strongly with age. Number of new users declined slightly in the period 2007-2009. 55% of the users of z-hypnotic in 2005 filled a new prescription each year the following three years. Average amount dispensed per long term user increased over time and was 273 DDDs in 2008.

**Conclusion** The use of z-hypnotics has increased over time but has been stable in the period 2007-2009. In this study duration of z-hypnotic treatment often seems to be much longer than recommended. Many individuals had z-hypnotics dispensed for a long period of time (4 years) and in amounts indicating use during at least 2/3 of the year, and the amount dispensed increased over time.

**E DUR Neurosystem**

**Abstract E01 (2006)**

**A pharmacoepidemiological study of anti-migraine prescribing in South Africa**

*Ilse Truter\**

**Objectives** Migraine affects primarily the young adult population and is responsible for many lost working days each year since it affects mostly the economically active sector of the community. The primary aim of the study was to determine the prescribing patterns of anti-migraine agents and to compare the results with previous South African studies.

**Methods** A retrospective drug utilisation consumption study was conducted on 2009 data obtained from a medical aid administrator. The database contained 2292652 records (procedures, consultations and medication). All medication records for anti-migraine agents were extracted and analysed.

**Results** A total of 1463 products were prescribed to 752 patients at a cost of R178862. The average cost was R122.26 (SD = R109.69) per product. The average age of patients was 41.32 (SD = 14.56) years, with 69.55% of patients between 30 and 59 years of age. Two-thirds of patients (67.29%) were female. Patients were prescribed an average of 1.95 (SD = 2.04) products over the year (females 2.07 products, males 1.70 products). The Lorenz curve was used to illustrate skewness in prescribing. Clonidine was the most often prescribed active ingredient (56.05%), followed by rizatriptan (17.22%). The selective 5HT<sub>1</sub>-receptor agonists (triptans) accounted for 27.75% of prescriptions for anti-migraine agents, compared to 18.94% in 2008 and 25.50% in 2004. Prescribing patterns of triptans changed as new active ingredients became available on the market and their cost also fluctuated.

**Conclusions** Studies on the pharmacoepidemiology of migraine will greatly enhance the understanding of this disease state in South Africa.

**Abstract E02 (2007)**

**Pharmacotherapeutic treatment of attention-deficit/hyperactivity disorder in children and adolescents**

*J Regnart, JA McCartney and Ilse Truter\**

**Objectives** The ideal treatment of Attention-Deficit/Hyperactivity Disorder is highly debated. Opposition to pharmacological treatments has resulted in the popular use of non-pharmacological measures which are not necessarily efficacious for ADHD. The primary aim of the study was to evaluate the treatment of children and adolescents diagnosed with ADHD in South Africa.

**Methods** The study consisted of a drug utilisation review (DUR) and questionnaire-based surveys. The DUR was conducted using a 2008 medical aid administrator database. The primary study population constituted 21 650 prescriptions dispensed to 7 202 patients. Questionnaires were distributed to the parents/caregivers of children diagnosed with ADHD. The response rate was 20.81%.

**Results** The average age of DUR patients 11.60±3.01 years. Male patients represented 74.09% (5 336: n = 7 202) of patients. Methylphenidate was the most commonly prescribed of the two drugs indicated for the treatment of ADHD (85.89%). A prescribing bias by practitioners in different parts of South Africa was identified. Drug holidays were identified during March and December 2008. The average age of patients in the questionnaire was 10.67±2.83 years, with a male patient majority (86.11%). Methylphenidate was the most commonly used prescription treatment (93.75%). Drug holiday use was reported in 56.25% of patients. Most participants reported supplement use (83.33%), but 86.67% of these did not find them useful.

**Conclusions** ADHD is a poorly understood disorder which affects people in all spheres of life. ADHD treatment should be individualised and based on scientifically proven effectiveness. Further studies need to be conducted on the treatment of ADHD.

**Abstract E03 (2009)****Effect of early versus delayed levodopa/carbidopa treatment in Parkinson's disease***R Gaida, NT Kubashe and Ilse Truter\**

**Objectives** Levodopa/carbidopa is the 'gold standard' treatment for Parkinson's disease. However, after four to five years of treatment, efficacy is believed to decline and patients start to experience motor fluctuations and dyskinesias. The study aimed to explore the effect early versus late levodopa/carbidopa initiation has in Parkinson's disease. The aim was achieved by determining treatment initiation following the diagnoses and the side effects experienced after treatment initiation.

**Methods** The methodology consisted of a semi-structured questionnaire survey and a review of patients' medical files. The study population consisted of 15 patients in a Parkinson's disease support group in Port Elizabeth, South Africa who were diagnosed with Parkinson's disease by a neurologist and who were on levodopa/carbidopa therapy at the time of the study.

**Results** More than 40% of patients (seven patients) experienced dyskinesia of which six patients had been on levodopa/carbidopa therapy longer than 10 years and one patient had their initiation delayed and had been on levodopa/carbidopa less than five years. The 'wearing off' phenomenon was experienced by only one patient who had been on levodopa/carbidopa for seven years. In this patient, levodopa/carbidopa was initiated immediately after diagnosis was confirmed. 'On-off' phenomenon occurred in 53.3% of patients. All patients had been on levodopa/carbidopa longer than five years. Freezing episodes presented in 26.7% of patients.

**Conclusions** No relationship between the initiation of levodopa/carbidopa therapy and the onset of side effects was found. However, it was found that after five years, patients did experience side effects associated with levodopa/carbidopa treatment.

**Abstract E04 (2038)****Potential abuse of combination analgesics: A database analysis***Ilse Truter\* and BC Knoesen*

**Objectives** Medicine abuse is defined as the recurrent use of a medicine in a non-medical manner for non-medicinal purposes. The potential for abuse of combination (polycomponent) analgesics is high. The primary aim was to detect the potential abuse of combination analgesics using a medicine claims database.

**Methods** An analysis of the South African combination analgesic market was made. Thereafter, a retrospective, exposure-cohort drug utilisation study was conducted on a medicine claims database of a medical aid administrator. The medicine file contained 1357717 records for 2007.

**Results** From the analysis of the combination analgesics available, it was found that there were 21 Schedule 5 (prescription-only) tablet formulations (trade names) containing the following identical active ingredients: 320 mg paracetamol, 8 mg codeine phosphate, 32 mg caffeine and 50 mg meprobamate. From the database study, a total of 145372 analgesics were prescribed (36.82% were available without a prescription). Combination analgesics accounted for 30.21% of all analgesics prescribed (92181 products at a cost of R2784484). Analgesics were often prescribed on an acute basis in excessive quantities, for example 200 tablets. Combination analgesic tablets and capsules were also often dispensed to children in large quantities. For example, 10 prescriptions for 100 tablets of an over-the-counter combination analgesic and eight prescriptions for 100 capsules of a prescription-only combination analgesic, were dispensed to children under seven years, while a syrup (a more suitable dosage form) was available. There was furthermore concern about the quantities of analgesics prescribed to specific families and it was clear that if the medical aid benefit of one family member was exhausted, the analgesic was claimed under another family member's name. A number of prescribers were identified who were over-prescribing specific analgesics.

**Conclusions** A medical aid database can be used to detect analgesic abuse and guidelines to control abuse and cost were proposed.

## Abstract E05 (2039)

### Complementary and Alternative Medicine for Attention Deficit/Hyperactivity Disorder in the Eastern Cape, South Africa

Sanmari Snyman and Ilse Truter\*

**Objectives** There is growing interest among patients, medical practitioners, health care administrators and third-party payers in Complementary and Alternative Medicine (CAM) for ADHD. There are remarkably few systematic studies on the prevalence of CAM use in ADHD in South Africa. The primary aim of the study was to investigate the treatment and care of children and adolescents diagnosed with Attention Deficit/Hyperactivity Disorder (ADHD) in the Eastern Cape, South Africa with a focus on the use of Complementary and Alternative Medicine (CAM).

**Methods** A questionnaire survey was conducted in 2006. Questionnaires were distributed by the responsible pharmacists of 54 pharmacies to parents of children and adolescents diagnosed with ADHD. Fifty-one questionnaires were returned.

**Results** The majority of patients were male (73.58%). The average age of patients was 10.27 (SD=2.54) years. Almost all patients (96.08%) were using methylphenidate, with only two patients using atomoxetine. One specific trade name product of methylphenidate was prescribed to 74.51% of patients. Most parents (66.67%) have tried CAM for their children's ADHD, but only 21.57% of children were still using these therapies as they were of the opinion that no significant difference in behaviour was observed. Natural products (for example, a combination product of evening primrose oil and omega 3 fatty acids, a herbal yeast supplement, and a formulation containing only evening primrose oil) were the most often used, followed by diet modifications and behavioural therapy. The children and adolescents used the alternative treatments on average for 20.65 (SD=25.26) months (range: 2 months to 8 years and 4 months).

**Conclusions** There is a place for CAM in the treatment of ADHD, but in combination with pharmacological treatment. More studies should be conducted in South Africa to determine the extent of use, and the effectiveness, of CAM for ADHD.

## Abstract E06 (2062)

### Pregnancy and prescribed psychotropic medicine

Irene Petersen\*, Ruth Gilbert, Stephen Evans, Irwin Nazareth

**Objectives** Since the thalidomide scandal in the 1960's women and health care professionals have been cautious about using medicines in pregnancy. However, women with chronic conditions face a dilemma during pregnancy about whether the advantages of continued treatment outweigh the risks to the fetus. Our objectives was to determine the rates of prescribing of antidepressants, antipsychotics, anxiolytics and hypnotics before and after onset of pregnancy using data from the Health Improvement Network (THIN) UK primary care database.

**Methods** From a cohort of 140,413 pregnant women with a live birth between 1994 and 2009 we identified women who were prescribed one or more psychotropic medication before they became pregnant. We examined the time to last prescription during pregnancy using Kaplan-Meier analysis.

**Results** In total 9,703/140,413 (7%) women were prescribed one or more psychotropic medication within three months before pregnancy. Most women received antidepressants (8,353 (6%)) followed by anxiolytics (1,145 (0.8%)), hypnotics (1,104 (0.8%)) and antipsychotics (268 (0.2%)). More than half of the women had their last prescription in the three months before pregnancy and less than 12% of the women on hypnotics and anxiolytics continued receiving further prescriptions once the pregnancy was known (approximately six weeks after last menstrual period). Around 25% of the women on antipsychotics and antidepressants received further prescriptions after this point. By the start of third trimester only 6% were further prescribed anxiolytics and hypnotics while 11% received further antidepressants and 15% antipsychotics. Women on antidepressants who received additional two psychotropic medications before pregnancy were twice as likely to continue antidepressant treatment after the pregnancy was known.

**Conclusions** More than three-quarters of women on psychotropic medication do not receive further prescriptions once the pregnancy is likely to be known. However, women on several psychotropic medications are much more likely to continue treatment with antidepressants during pregnancy.

**Abstract E07 (2042)****Regional differences of antidepressant consumption in Hungary***Reka Viola\*, Maria Matuz, Ria Benko, Peter Doro, Gyogyver Soos*

**Objectives** To analyse the regional differences of antidepressants consumption in Hungary (2006), furthermore to investigate the relationship between antidepressant sales and trends in suicide rates and their possible determinants (e.g. indicators of psychiatric service, socio-economic factors).

**Methods** Utilisation data were based on regional (19 counties and the capital city) sales of antidepressant from wholesalers to pharmacies and hospitals (the source of data: IMS Health Hungary) and were expressed in DDD/1000 inhabitants/day. After the testing of normality (one-sample Kolmogorov-Smirnov test), the association between the regional antidepressant consumption and the suicide rate and possible determinants (number of outpatient clinic; number of outpatient clinic attendances; new referral/10000 inhabitants; number of psychiatric ward admissions; unemployment rate; GDP/inhabitant) was measured with the Pearson correlation.

**Results** No significant differences were found between counties regarding the structure of their antidepressant utilisation, however there were significant quantitative differences between certain counties. The central-eastern regions were the most prominent antidepressant consumers (Bekes county: 28.98 DDD/1000 inhabitants/day), the north-eastern proved to be lowest consumers (Borsod-Abaúj-Zemplén county: 19.01 DDD/1000 inhabitants/day). While the suicide rate was found about three times higher in the central and south-east part of Hungary than in the west, the correlation between antidepressant consumption and suicide rate did not prove to be statistically significant ( $r=0.211$ ;  $p<0.05$ ). There were only two determinants showing significant association with the antidepressant consumption: the number of outpatient clinic attendances ( $r=0.584$ ;  $p<0.05$ ) and the GDP/inhabitant ( $r=0.547$ ;  $p<0.05$ ).

**Conclusion** More detailed studies are required to identify other determinants of the large interregional differences in antidepressant consumption and suicide rate in Hungary.

**F DUR Infectious diseases**

**Abstract F01 (1004)**

**Antibiotic use in children is associated with drug use of parents.**

*Josta de Jong\**, Jens HJ Bos, Tjalling W de Vries, Lolkje TW de Jong - van den Berg

**Objective** Antibiotic drugs are frequently used by children for viral infections. Health believes and concern of parents could have great influence on the use of drugs in children. We investigated if the use of antibiotics in children is associated with the drug use of their parents.

**Patients and Methods** Of the children registered in the prescription database IADB.nl we selected individuals who did not use antibiotics till their fifth birthday and children who used at least 1 antibiotic prescription in every year during this time window. Of these two groups we selected the parents. We compared the use of antibiotic drugs as well as other drug groups between the two groups of parents.

**Results** Parents of children with recurrent antibiotic use also use more antibiotics themselves than parents of children who did not use antibiotics. They use also more drug groups chronically than parents of children who don't use antibiotics. (11.3 (mothers) and 13.1% (fathers) against resp. 6.2 and 9.5%;  $p < 0.001$ ). Mothers use drugs against acid related disorders, NSAIDs, analgesics, anxiolytics, hypnotics, antidepressants, drugs against asthma and antihistamines more often. Fathers use more drugs against acid related disorders, cardiovascular drugs, NSAIDs and asthma-drugs.

**Conclusions** Parents of children who use antibiotic drugs recurrently use more medication than the parents of children who use no antibiotic drugs. Parents' drug use behaviour may influence the drug use of children and is a factor physicians and pharmacists should take into account.

**Abstract F02 (1011)**

**Variability in intensive care unit's antibiotic consumption in Hungary**

*Ria Benko\**, Maria Matuz, Zoltan Peto, Edit Hajdu, Reka Viola, Peter Doro, Gyongyver Soos

**Objectives** The aim of this work was to study the use of systemic antibacterials and its possible determinants in Hungarian adult intensive care units (ICUs).

**Methods** Hospital pharmacy departments were contacted to provide package level dispensing data for their corresponding ICU for year 2006. Crude data was converted into DDDs and finally expressed as DDD per 100 patient-days. Antibiotics were ranked by volume of DDDs and the agents responsible for 90% of total use (DU90%) were noted. To explore differences and relationships between antibiotic use and antibiotic policy elements or ICU characteristics, the analysis of variances or the Pearson-correlation analysis was performed.

**Results** Valid data were obtained for 44 ICUs. Antibiotic use varied by six-fold (from 27.9 to 167.8 DDD per 100 patient-days). In total, 11-34 different antibacterials per ICUs were used, of which 5-15 were in the DU90% segment. The proportional use of parenteral agents ranged from 46.2 to 98.3 %. The mean of overall antibiotic use was highest for penicillins with beta-lactamase inhibitors, followed by quinolones and third generation cephalosporins. Out of the studied factors only the ICU category (i.e. level of care) showed significant association with total antibacterial use.

**Conclusions** The striking differences in total antibiotic use and the extensive use of the oral agents in some ICUs may indicate room for improvement. As none of the antibiotic policy elements were accompanied by lower antibiotic use in the pooled analysis it suggests that - beside the ICU category - other, unrevealed factors determine antibiotic use.

**Abstract F03 (1018)****Is there a difference in antibiotic use between urban and rural communities in Serbia?**

*Milica Paut Kusturica\**, Ana Sabo, Bojan Stanimirov, Nebojsa Pavlovic, Maja Stojancevic

**Objectives** The continuing spread of antimicrobial resistance, due to uncontrolled and excessive antibiotic use, is a major public health problem worldwide. The main aim of this study is to make an inventory of the antimicrobials in the home pharmacies of the urban and rural populations in South Backa District, Serbia.

**Methods** This study was performed in 6 months period (February - July 2010) on a sample of 208 households (108 in urban and 100 in rural communities) in South Backa District, Serbia. The families were chosen randomly and the data were collected by checking the inventory of antibiotics in the home pharmacies.

**Results** The total number of drug items present in 208 households was 2221, with an average of 10.7 per household. According to ATC classification, 51% of rural and 65,8% of urban households, surveyed in this study, had at least one item belonging to J01 class stored at home. A total number of 89 items belonging to J01 class were present in the surveyed rural families which constitutes 8.9% of total stored drugs. In urban families, the number of antimicrobial agents in home pharmacies was 113 and it constitutes 9.3% of total drugs stored. The average number of antibacterial drug items per household was 0.9 (range: 0-4) in rural and 1.0 (range: 0-6) in urban families. The most frequent antibacterial agent both in rural and urban households was amoxicillin (20.1%), followed by cefalexin (14.8%) and amoxicillin+clavulanic acid (14.2%).

**Conclusions** According to this study, antibiotics are widely stocked among both rural and urban communities in South Backa District, Serbia. We suggest that the greater use of antibiotics in urban families is due to greater availability of health facilities and higher intention of younger people, that mostly live in urban communities, for self-medication.

**Abstract F04 (1027)****A disease transmission model to evaluate the potential impact of a new protease inhibitor on the public health burden of hepatitis C viral infection in France**

*Michel Rotily\**, Maneesha Mehra, Shola Adeyemi, Xavier Lannuzel, Anne Anceau

**Objectives** Hepatitis C Virus (HCV) chronic infection is a leading cause of advanced liver disease(ALD)such as cirrhosis and hepatocellular carcinoma. HCV genotype 1(HCV-G1) is the most commonly found in Western countries and the least amenable to the usual standard combination therapy (40-50% of all patients are cured). As it is anticipated that a new protease inhibitor (PI) will be marketed soon, we developed an empirically calibrated model to evaluate the potential epidemiological impact of this new option compared to the standard regimen in the French adult population.

**Methods** The model captures the key factors influencing HCV transmission and successful treatment, and forecasts the impact of changes in HCV screening and treatment on the incidence, prevalence of HCV-G 1 infections, ALD and mortality. Using available epidemiological data and results of clinical trials, it makes projections up to 30 years from the introduction of a new treatment.

**Results** Prevalence and incidence of HCV-G1 are projected to be reduced with the new treatment by 20.9% and 24.7%, respectively, corresponding to an average annual difference of 21714 prevalent cases [95% CI : 12526-30903] and 217 new cases [95% CI : 119-315]. HCV-G1 related ALD would decline by 10.9% during the same period, with an annual average of 5825 cases avoided [95% CI: 1145-10505]. ALD associated mortality within the period under investigation would drop by 9.7% (7497 avoided deaths), with an average of 250 annual saved lives [95% CI: 38-462].

**Conclusions** The model predicts the impact a new PI would have on HCV morbi-mortality and the reduction of transmission in France. Applying these data to economical models could bring substantial help for defining a more efficient public health policy relating to prevention, screening and access to treatment.

#### Abstract F05 (1052)

##### Utilization of antibiotics for systemic use at the Surgical Clinic in Gracanica, Kosovo

*Sonja Bulajic\*, Snezana Hadzistevec, Dragan Milovanovic*

**Objectives** In our work we analyzed utilization of antibiotics for systemic use at the Surgical Clinic of the Clinical Hospital Center in Gracanica (Kosovo) during 2007, 2008 and October 2008. We compared the results of our analysis with the results of the similar researches in Serbia.

**Methods** Data on antibiotic utilization were delivered on the basis of drug dispensing records from the Central Hospital Pharmacy during the two-year period. Data for October 2008 were obtained from the patient medical records. Antibiotics were distributed inside the ATC/DDD system in accordance with WHO guidelines and their utilization was expressed as number of defined daily doses per 100 patient-days (DDDs/100 PD). Overall use of antibiotics was 123.37 DDDs/100 PD in 2007, 125.09 DDDs/100 PD in 2008, and in October 2008 was 80.38 DDDs/100 PD.

**Results** Three most utilized antibiotics in 2007 were cefuroxime 24.26 DDDs/100 PD (19.66 % of total antibiotics' use), ceftriaxone 16.65 DDDs/100 PD (13.49 %), and cephalexin 15.78 DDDs/100 PD (12.79 %). In 2008 the most utilized were ceftriaxone 23.23 DDDs/100 PD (18.57 %), cefuroxime 22.53 DDDs/100 PD (18.01 %), and co-trimoxazole 19.55 DDDs/100 PD (15.63 %). More than half of all patients (55.5 %) hospitalized during October 2008 received antibiotics. The most used antibiotics in October 2008 were ceftriaxone 32.40 DDDs/100 PD (40.31 %), cefuroxime 19.13 DDDs/100 PD (23.80 %) and amikacin 12.01 DDDs/100 PD (14.94 %).

**Conclusion** The results of our research were mainly in accordance with the results of similar researches in our country. The choice of antibiotics used for surgical prophylaxis in the most of the cases was in accordance with international guidelines. We consider that because of the high correlation between duration of hospitalization and applied antibiotic therapy, clear indications for antibiotic use in postoperative period should be set up.

#### Abstract F06 (2055)

##### First- and second-line treatment with antibiotics of women with uncomplicated lower urinary tract infection in Sweden 2009 - a nation-wide population-based register study

*Magnus Olsson, Cecilia Nordqvist and Mikael Hoffmann\**

**Objectives** To estimate what antibiotic is used for treatment of women for the first episode of uncomplicated lower UTI, and to what extent drug rotation is utilised in recurrent UTI.

**Methods** Data was collected from the Swedish Prescribed Drug Register. Incident users were defined as women 18-79 years of age that during 2009 had at least one dispensed antibiotic in a strength and number of doses appropriate for a short-term treatment of UTI with a wash-out period of 6 months. The antibiotics were narrow- spectrum antibiotics (J01CA08 pivmecillinam and J01XE01 nitrofurantoin), quinolones (J01MA02 ciprofloxacin and J01MA06 norfloxacin) and J01EA01 trimethoprim. The individuals were followed for at least 6 months from their first dispensation in order to catch recurrent prescriptions. In addition, diabetes mellitus was operationally defined as at least one dispensation of any anti-diabetic drug (A10) since July 2005. Recurrent UTI was defined as another dispensation of UTI-antibiotic within 6 months.

**Results** UTI-treatment occurred in 8.2% (n=283,521) of Swedish women 18-79 year in 2009. Narrow-spectrum antibiotics, pivmecillinam and nitrofurantoin, were chosen as first-line therapy in 76.5% of women with diabetes and 79.6% without diabetes. The corresponding figures for quinolones were 9.0% and 7.2% respectively, and for trimethoprim 14.5% and 13.2%. Recurrence occurred in 35.1% among women with diabetes and 27.5% without diabetes. In 65.5 % of the recurrent infections another antibiotic than the first one was prescribed. The most common choice of antibiotic in case of recurrence was a narrow-spectrum antibiotic, 72.7% for diabetics and 74.8% of non-diabetics.

**Conclusions** Treatment of UTI corresponds well to the Swedish guidelines. Drug rotation was utilised in two-third of recurrent uncomplicated UTI.

**G DUR Other therapeutic area****Abstract G01 (1007)****Prescribing Patterns of Gastro-intestinal Medication in South Africa: A Geographical Approach***Martie Lubbe\**

**Objective** The objective of this study was to determine the prescribing patterns of gastro-intestinal medication in different geographical areas in the private health care sector of South Africa.

**Method** A retrospective drug utilisation review was conducted on data obtained from a medicine claims database of a pharmacy benefit management company for 2007 and 2008. For the purpose of this study gastro-intestinal disease was redefined as diseases of the gastro-intestinal tract caused by pathogens that spread via contaminated drinking water and poor sanitation. Gastro-intestinal medication included the following pharmacological groups according to the MIMS®-classification: antivertigo and anti-emetic agents (group 1.8), antispasmodics (group 12.3), antidiarrhoeals (group 12.7), minerals and electrolytes (group 20.4, selected according to specified NAPPI-codes) and antimicrobials (group 18). Antimicrobials had to be prescribed in combination with one of the specified gastro-intestinal medication groups in order to be classified as a gastro-intestinal medication.

**Results** In 2007 and 2008 respectively, 428864 and 340921 gastro-intestinal medication items were prescribed. The most prescribed gastro-intestinal medication pharmacological groups in 2007 and 2008 were beta-lactam anti-microbials (with proportion percentages of 22.77% and 20.85% in 2007 and 2008 respectively), antivertigo and anti-emetic agents, antispasmodics, antidiarrhoeals and quinolone antimicrobials. Minerals and electrolytes represented only a small proportion (2.99% and 2.56% in 2007 and 2008 respectively) of the prescribed gastro-intestinal medication in South Africa. In the Free State and Western Cape antivertigo and anti-emetic agents were the most prescribed gastro-intestinal medication pharmacological group, while in other provinces it was beta-lactam antimicrobials.

**Conclusions** Based on the prescribing patterns of gastro-intestinal disease medications the treatment of gastro-intestinal disease in this section of the private health care sector of South Africa, does not fully comply with the Standard Treatment Guidelines with regard to the use of antimicrobials and electrolyte replacement therapy.

**Abstract G02 (1015)****Identifying South African patients with metabolic syndrome using medicine claims data***Burger J, Martie Lubbe\*, Serfontein J*

**Objective** The prevalence of metabolic syndrome in the private health care sector from South Africa is uncertain due to a paucity of information. The country has adopted the ICD-10 as a diagnosis coding standard. This code, however, do not provide for the diagnosis of metabolic syndrome. The American Heart Association/National Heart, Lung and Blood Institute (AHA/NHLBI) criteria for diagnosis in adults consider pharmacological treatment for elevated blood pressure, hyperglycaemia, low HDL cholesterol and high triglyceride levels as equivalent to an abnormal measured level of risk factors. The aim was to estimate crude prevalence based on medicine treatment.

**Methods** A retrospective, quantitative drug utilization review was conducted using national medicine claims data for 974 497 patients obtained from a South African Pharmaceutical Benefit Management company for the period of Jan 1, 2008 to Dec 31, 2008. Metabolic syndrome was defined as patients receiving one or more agents from each of antidiabetics, antihypertensives, and hipolipidaemics.

**Results** 1.2% of patients received antidiabetics, 10.9% received antihypertensives and 2.2% received hipolipidaemics. 1.9% of patients received antidiabetics in combination with antihypertensives, 0.3% received antidiabetics in combination with hipolipidaemics and 3.7% received antihypertensives in combination with hipolipidaemics. 17 866 (1.8%) of patients fulfilled criteria for metabolic syndrome diagnosis (female:male ratio 1:1.2). 2 patients (0.01%) were younger than 16 years, vs. 53 (0.3%) aged 16-30 years, 992 (5.6%) aged 31-45 years, 5 768 (32.3%) aged 46-60 years, 7 641 (42.8%) aged 61-75 years and 3 410 (19.1%) older than 75 years.

**Conclusions** In the absence of population-based prevalence data, medicine claims databases can provide access to a large study population with geographic and demographic diversity. Our results show that metabolic syndrome was prevalent among private health care patients in South Africa (in particular men); progressively increasing with age to peak in those aged 61-75 years.

### Abstract G03 (1026)

#### New medicines for the treatment of diabetes in Belgium

*Kristien De Bruyn\**

**Objectives - Methods** During the last 10 years several new medicines for the treatment of diabetes has been introduced. In the present contribution an analysis is made of shifts following the appearance of new medicines. The data used are gathered by IPhEB (Institute for Pharmaco-Epidemiology in Belgium) on reimbursed medicines in its Ifstat database.

**Results - Conclusions** Long acting insulins became available in Belgium in 2004 and they almost immediately largely replaced intermediate acting insulins. Since long acting insulins are more expensive, this switch made costs increase. With respect to oral antidiabetes medicines, the events were more numerous. 1998 and 1999 : important increase of the use of sulfonylureas by 6 millions of DDD per year, which corresponds to a growth of 8% in 1998 and of 7 % in 1999. 2002 : first glinide (repaglinide) causing a decreasing use of sulfonylureas (with 4 mio DDD, i.e. -5%). 2003 : first thiazolidinedione (rosiglitazone) folowed by new reduction of sulfonylureas (with 3,4 mio DDD, i.e. -4%). 2009 : first DPP4(sitagliptin) and )(sitagliptin) and increasing use of metformin, but a decreasing use of sulfonylureas and of thiazolidinediones. These switches occurred in a global context of an increasing number of patients to which these medicines are prescribed, with a stable average number of DDD per patient and per year for oral diabetes medicines (365 DDD), but an increasing average dose of insulin (from 428 DDD in 2006 to 456 DDD in 2010).

### Abstract G04 (1035)

#### The evolution of hypertension treatment in Belgium

*Michael Wolf, André De Swaef, Joos Tielemans, Hilde G. Heuten, Gert Verpooten\**

**Introduction** Arterial hypertension is an important cardiovascular risk factor for which antihypertensives are widely prescribed.

**Objectives** To study the number of patients treated for hypertension and the evolution in usage of different classes of antihypertensives.

**Methods** Data from 1997 to 2009 were extracted from Pharmanet, a nation-wide database of prescriptions of reimbursed medication in Belgium.

**Results** In 2009, 25% of women and 20% of men in the total population were prescribed at least one antihypertensive. Prescription rates rose with age but already 25% of the population aged between 41 and 60 years were treated. The highest rate was observed in octogenarians, of whom 78% took antihypertensive medication. In all age groups more women were treated than men. From 1997 to 2009, a rise in absolute prescription rate was observed for all antihypertensive classes. Diuretics and beta-blockers remain by far the most frequently delivered drugs with stable prescription rates of 30% over this period. The largest rise is observed for ARBs, which were only sporadically prescribed in 1997 and now account for 10,5% of delivered antihypertensive drugs. A small rise is also noted for ACE-inhibitors (12,3% in 1997 vs 15,6% in 2009). Their success comes at the expense of calcium antagonists, of which the delivered amount declined from 19,8% in 1997 to 14,1% in 2009. Vasodilators, alpha-blockers and central antihypertensives are also clearly less frequently prescribed (combined 5% in 1997, 2,1% in 2009). A progressive rise in the prescription of fixed combination products is observed (from 15% in 1997 to 21% in 2009), and can probably be attributed to their growing availability but also to the recent guidelines that promote their usage.

**Conclusion** Above the age of 60 years, the majority of Belgian population is treated with antihypertensives. There is growing tendency for the use of fixed combination products.

**Abstract G05 (2005)****Hormone replacement therapy in South Africa and the impact of the women's health initiative study***Ilse Truter\**

**Objectives** A study to determine the impact of the Women's Health Initiative (WHI) study on the prescribing of hormone replacement therapy (HRT) from 2002 to 2005 in South Africa found that the discontinuation rate for HRT following publication of the WHI study increased from 3.47% to 7.54%, while the initiation rate decreased from 15.34% to 9.10%. The primary aim of this follow-up study was to determine the prescribing patterns of HRT to establish if major changes have taken place since the last study.

**Methods** A retrospective, cross-sectional drug utilisation study was conducted. Prescription data of a medical aid administrator were retrospectively analysed for 2008 and 2009. A total of 33556 HRT products were prescribed to 3605 patients over the two years.

**Results** The average age of patients was 50.78 (SD=12.51) years in 2008 and 50.21 (SD=12.41) years in 2009. Patients received an average of 5.80 (SD=4.09) products during 2008 and 6.50 (SD=4.85) products during 2009. Oestrogens (ATC code G03C, excluding tibolone) were the most frequently prescribed (71.83% in 2008/2009 compared to 72.28% in 2005), followed by progestogens and oestrogens in combination (20.09% in 2008/2009 and 20.39% in 2005). Progestogens accounted for 3.49% of prescribing frequency in 2008/2009 compared to 2.20% in 2005.

**Conclusions** No major differences in the prescribing of HRT since 2005 could therefore be detected. Adverse effects linked to HRT use may be affected by time after onset of menopause when HRT was started. A longitudinal study over several years which include diagnoses is recommended to be conducted in South Africa.

**Abstract G06 (2023)****Which aspects of new glucose lowering drugs do different stakeholders value? A qualitative study.***AH Arnardottir, FM Haaijer-Ruskamp, SM Straus, PA de Graeff, MH Monster-Simons, S Piening, and Peter Mol\**

Regulatory authorities approve a new drug based on clinical trials taking a decision on results obtained on a population level. In daily practice drugs are used by individual patients that may differ from the trial population with different expectations than regulators and health care professionals (HCPs) Objective: Identify key values of new drugs to treat type 2 diabetes that are considered important by regulators, HCPs and patients.

**Methods** In this qualitative study open interviews are conducted with a purposeful sample of stakeholders in diabetes care; 7 patients, 3 nurse practitioners (NPs), 5 general practitioners (GP), 4 internists and 3 regulators. Interviews last 45-60 minutes, are recorded and transcribed verbatim. A content analysis based on Grounded Theory is performed by two authors.

**Results** Up to now 19 respondents have been interviewed. Preliminary analyses show that patients find ease of use, avoidance of hypoglycemia and inducement of weight loss important drug characteristics. The patients (n=6) were more concerned with short-term risks (glycaemic control, adverse events) than long-term risks (cardiovascular, neuropathy). NPs (n=2) valued ease of use, inducement of weight loss but also long-term prevention of disease-related complications. GPs (n=5) were conservative and not willing to take risks, preferring long-term experience with a drug. They valued ease of use and weight loss, but the latter through lifestyle change and not drug-induced. Internists (n=4) considered it important that the drug stops progression of insulin resistance and induces weight loss. Regulators (n=2) considered hard endpoints, risk of hypoglycemia and gastrointestinal complications important. Slowing disease progression was considered less important than demonstrated HbA1c control.

**Conclusion** Different stakeholders value different aspects of drugs for type 2 diabetes treatment. They especially valued the need for demonstrated various long-term effects differently, although most agreed drugs should be easy to use and cause few short-term inconveniences.

### Abstract G07 (2030)

#### Dispensed asthma therapy and medical resource utilisation in asthma patients: results from the L777 observational study

*Laurent Laforest, Alain Rauss, Samy Boutouaba-Combe, Cecile Ritleng, Veronique Ambrosi, and Eric Van Ganse.*

**Background** Asthma remains a major public health concern, given its impact on patients' quality of life and the costs involved. The medical resource utilisation of asthma patients was described.

**Methods** The social security claims database from the French Rhone-Alpes Region was used. A random sample of patients aged under 40 with at least 3 prescriptions of a respiratory drug (R03, ATC classification) in 2006 was pre-selected.

**Preliminary results** In 2007, 60% of the 3,261 patients (mean age=24, 52% females) were dispensed inhaled corticosteroids (ICS). About 45% received at least one prescription of combined ICS-long acting beta agonists and 20% were dispensed ICS (not combined with LABA). The median number of prescriptions dispensed in 2007 among the 1,958 patients who received ICS (combined or not) was 3.0 (25%-75% percentiles: 1.0-6.0). Percentages of patients who received isolated long-acting beta agonists (not combined with ICS) and short-acting beta agonists at least once were 8% and 55%, respectively. Median number of dispensed short-acting beta agonists among users was 2.0 (25%-75% percentiles: 1.0-4.0). Overall 59% of patients received at least one prescription of antibiotics.

**Conclusions** Preliminary results suggest an inadequate use of ICS by asthma patients. Other components of medical-resource use: medical visits and hospital admissions, absenteeism and induced costs with their correlates will also be investigated and methodological issues related to the use of the database will be discussed.

### Abstract G08 (2032)

#### Comparing different quality measures for diabetes treatment action on performance ranking of general practitioners

*Jaco Voorham\*, Petra Denig, Ronald P Stolk, Bruce HR Wolffenbuttel, Flora M Haaijer-Ruskamp, on behalf of GIANTT*

**Objectives** Measures of treatment action in insufficiently controlled patients have been advocated as clinically meaningful quality measures. However, these measures have also been criticised for being too strict. They apply a dichotomous all-or-nothing approach to quality assessment, and often rely on measuring only prompt reactions. We aimed to investigate the impact of an alternative continuous measure, and different follow-up periods on performance ranking of general practitioners (GPs).

**Methods** Cohort study of 13,742 diabetes patients managed by 149 GPs in 2009. Patient characteristics, risk factor levels and prescriptions were collected from electronic medical records using a Dutch GP-database (GIANTT). Quality measures assessed treatment start or intensification as: (1) percentage of all patients above a threshold HbA1c or systolic blood pressure (SBP) level (dichotomous measure); (2) area under the curve of intensification rate for increasing levels of HbA1c/SBP (continuous AUC-based measure). We compared GP rankings on these measures. Additionally, we compared rankings using different follow-up periods for treatment intensification. A shift of >1 quintile rank was considered poor agreement.

**Results** In 43% of patients with HbA1c $\geq$ 7% and 23% with SBP $\geq$ 140mmHg, treatment intensification occurred within 26 weeks. Comparing dichotomous with continuous AUC-based rankings, around 10% of GPs shifted >1 quintile for most treatment intensifications, except starting glucose-regulating treatment (27% shift). Comparing rankings using different follow-up periods showed shifts of around 12%, except the dichotomous measure for starting antihypertensive treatment (21% shift) and the AUC-based measure for antihypertensive treatment intensification (26% shift).

**Conclusions** Using a continuous instead of dichotomous measure had limited impact on rankings of GPs. Although such measures are believed to give fairer assessment of clinical practice, there is little additional value when trying to identify GPs with high or low performance. Follow-up periods for intensification affected rankings for antihypertensive treatment and should therefore be clearly specified for these quality measures.

**Abstract G09 (2059)****Antihypertensive treatment and control in a primary care population of 21,167 patients**

*Miriam Qvarnström\**, Björn Wettermark, Charlotta Ljungman, Ramin Zarrinkoub, Jan Hasselström, Karin Manhem, Anders Sundström, Thomas Kahan

**Objectives** To assess drug prescribing patterns in hypertension and the proportion of patients reaching blood pressure targets in a large primary healthcare setting.

**Methods** This retrospective observational study was based on data from electronic patient records at 24 primary health care centers southwest of Stockholm, Sweden, covering a population of 330,000. Data on age, gender, concurrent diseases, prescribed drugs, and blood pressures were extracted for all patients ≥30 years with a diagnosis of hypertension (ICD-codes I10, I13, and I15) who visited the centers in 2005 or 2006. Outcome was assessed as the proportion of patients with the last recorded blood pressure value <140/90 mm Hg during the study period (with diabetes <130/80 mm Hg). All results were adjusted for age and co-morbidity.

**Results** We identified 21,167 patients. Only 27% had a blood pressure <140/90 mm Hg; <130/80 mm Hg was seen in 7% of patients with diabetes, and in 6% of those without diabetes. The number of patients on 0, 1, 2, 3, 4 or 5 antihypertensive drugs were 2,010 (11%), 6,189 (33%), 6,238 (34%), 3,132 (17%), 878 (5%), and 55 (<1%), respectively. The proportion reaching blood pressure targets was low, independent of the number of drugs: 23, 29, 28, 26, 23, and 20%, respectively.

**Conclusions** Only 27% of Swedish hypertensive patients in primary care reach a blood pressure <140/90 mm Hg. The number of prescribed drugs increase with age. Only 29% of patients given monotherapy had a blood pressure <140/90 mm Hg. Beta blockers and diuretics were the most common drug classes prescribed, independent of co-morbidity. Women more often received diuretics and less often ACE inhibitors and calcium channel blockers than men. More frequent use of drug combinations can improve pressure control and may have effects on outcome.

## H DUR Elderly

### Abstract H01 (1051)

#### Medication and Dietary Supplement Use Among The Older Population of Ireland: The Irish Longitudinal Study on Ageing

*Jure Peklar\*, Kathryn Savva, Mitja Kos, Martin Henman, Kathleen Bennett, Hilary Cronin and Rose Anne Kenny*

**Objectives** Polypharmacy is becoming more common in the older population. Older people are also major users of dietary supplements, which have potentially dangerous interactions with other medications. Here we estimate the prevalence of dietary supplement use and the extent to which dietary supplement use in the older population contributes to polypharmacy.

**Methods** Data arose from the first wave of the Irish Longitudinal Study on Ageing (TILDA), which included data on medication and dietary supplement use of 8165 community-dwelling participants aged 50 and over representative of the Irish population. Medication and dietary supplement use was compared across the sexes and age groups (50-64, 65+ years).

**Results** Among those aged 50-64, 60.7% of women and 52.4% of men reported medicine or dietary supplement use, compared to 84.4% of women and 80.9% of men in the 65+ age group. Women were more likely to use dietary supplements compared to men. Of those aged 50-64, 20.7% of women and 7.3% of men reported dietary supplement use. In those aged 65+ this increased to 26.9% of women and 14.1% of men. Polypharmacy was more common in older people. Of those aged 50-64 taking at least one medication or supplement, 19.2% of women and 19.5% of men reported polypharmacy, compared to 37.3% of women and 38.1% of men in the 65+ group. Of those aged 50-64 reporting polypharmacy, 12.2% of women and 7.3% of men were taking supplements, compared to 9.5% of women and 5.6% of men aged 65+.

**Conclusions** In the community-dwelling older population of Ireland, women are greater users of medicines and dietary supplements than men and usage increases with age. However, polypharmacy is equally common across genders, with supplements contributing to polypharmacy more in women and in the younger groups.

### Abstract H02 (2001)

#### Chronic benzodiazepine use in nursing home residents: indications and dosages.

*Jolyce Bourgeois\*, Elseviers M, Petrovic M, Van Bortel L, Vander Stichele R*

**Objectives** International guidelines discourage the chronic use of benzodiazepines and related Z drugs (BZD/Z). Moreover, older adults need dose reductions, but specific recommendations are hard to find. The aim of this study was to describe the prevalence of benzodiazepine use in Belgian nursing homes with attention to indications and dosages and to investigate adherence to recommendations for dose reductions in older adults.

**Methods** The medication charts from a representative sample of 1730 residents of 76 nursing homes in Belgium (the 2006 PHEBE Study) were analysed for prevalence of use of BZD/Z, indication and dosages. The ATC classification was used to differentiate BZD/Z. Based on a review of authoritative international sources, we extracted for each benzodiazepine and for each indication a daily dosage recommended not to exceed in older adults for comparison with observed actual dosages.

**Results** Chronic use of BZD/Z was observed in 50,1% of the residents, with multiple use in 7,6%. Among the chronic users, using only one BZD/Z, the leading indication was "insomnia" (59%) followed by "anxiety" (17%) and "unrest" (10%). For insomnia, physicians prescribed mostly (46%) hypnotics (N05CD), but also anxiolytics (N05BA) and Z-drugs (N05CF), each in 27% of the cases. For anxiety, physicians prescribed predominantly anxiolytics (96,8%) and only 2 hypnotics (lormetazepam and triazolam). In the chronic prescriptions of BZD/Zs for insomnia, the actual daily dose exceeded the geriatric upper limit: lormetazepam in 95%, zolpidem in 82%, zopiclone in 78% and lorazepam in 35% of the prescriptions. In anxiety, daily doses also exceeded the limit, but not to the same extend.

**Conclusion** As insomnia is the predominant indication of BZD/Z use in nursing homes and the average dosages for this indication are twice the recommended dosages, more efforts must be made to reduce this chronic use and to diminish dosages in the geriatric population.

**Abstract H03 (2002)****Antidepressants in Belgian nursing homes: indication and dosages.***Jolyce Bourgeois\*, Elseviers M, Petrovic M, Van Bortel L, Vander Stichele R*

**Objectives** Depression in nursing home is often underrecognised and undertreated in older adults. The aim for this study was to describe the prevalence of antidepressant (AD) use in Belgian nursing homes with attention to indications and dosages and to investigate 'undertreatment' of depression in terms of underdosing.

**Methods** The medication charts from a representative sample of 1730 residents from 76 nursing homes in Belgium (2006 PHEBE Study) were analysed. The ATC classification was used to differentiate the ADs. Information on indications was retrospectively obtained from the general practitioner. Minimal effective doses (MED) of ADs to treat depression were obtained from DiPiro JT., et al 2008 (Pharmacotherapy: A pathophysiologic approach)

**Results** Chronic AD use was present in 39,5 % of the Belgian nursing home residents. The physician labelled 35.7% of the residents as depressed. Of these patients, 81,0% were treated with an AD, predominantly a Selective Serotonine Reuptake Inhibitor (68,0%) or venlafaxine (11,5%). Among the 12% patients treated with an AD and not labelled as depressed (n=202), 4/10 had "depression" as indication on the prescription (SSRI), 4/10 "insomnia" (Trazodone), 1/10 "anxiety", 1/10 "neuropathic pain" (TCA) and 3/20 "multiple indications". We compared actual daily dosages with minimal effective daily doses for the indication depression, and saw 96% of the trazodone prescriptions (n=26), and 100% of the TCA prescriptions (n=4) under their MED. When an SSRI (n=344) and venlafaxine (n=57) were used, respectively 10% and 6% were under their MED.

**Conclusion** Most of the diagnosed depressions were treated with an AD, most often an SSRI or Venlafaxine. Underdosing in this indication with these medication was not present. Low dosing for depression was seen with Trazodone and Amitryptiline. These classes were not often used for depression but more often for other indications; trazodone for insomnia and TCAs for neuropathic pain.

**Abstract H04 (2010)****Antipsychotic prescribing to the elderly: a two-year comparative analysis***Ilse Truter\**

**Objectives** Antipsychotic medicines are commonly prescribed to elderly patients. These patients are at an increased risk of adverse drug events because of age-related pharmacodynamic and pharmacokinetic changes. The primary aim of the study was to determine antipsychotic prescribing patterns and cost to patients aged 60 years and older in a private health care sector primary care patient population in 2008 and 2009.

**Methods** A retrospective, exposure-cohort drug utilisation study was conducted on prescription data of a pharmacy group in South Africa for 2008 and 2009. No diagnoses were available. All records for antipsychotics (MIMS category 1.5) for patients 60 years and older were extracted for analysis.

**Results** A total of 1 800 patients in 2008 and 3 086 patients in 2009 received 7 877 and 14 538 antipsychotic products at a sales value of R2 785 896 and R4 928 127, respectively. The average cost per antipsychotic product was R353.67 in 2008 and R338.98 in 2009. Most patients were female (61.78% in 2008 and 57.87% in 2009). Tablets were the preferred dosage form. Risperidone (37.55% in 2008, and 38.20% in 2009), quetiapine (27.56% and 28.88%) and olanzapine (10.91% and 10.24%) together accounted for more than 75% of antipsychotics prescribed to the elderly. A high percentage of atypical antipsychotics (84.23% in 2008 and 85.14% in 2009) were prescribed. Differences were observed between 2008 and 2009 with respect to the prescribing frequency of the atypical antipsychotics ( $\chi^2 = 32.624$ ; d.f. = 6;  $p < 0.0001$ ).

**Conclusions** Prescribing patterns were similar in both years. The dosages and duration of treatment of antipsychotics should be investigated in relation to the diagnoses for which they are prescribed. It is recommended that diagnoses be included in databases and also that qualitative studies be conducted to determine possible side effects experienced by patients.

## Abstract H05 (2011)

### Assessment of antipsychotic prescribing in Belgian nursing homes

*Majda Azermani\*, Monique Elseviers, Mirko Petrovic, Luc Van Bortel, Robert Vander Stichele*

**Objectives** Given the potential adverse effects of antipsychotics, high use in nursing homes creates concern. Our study goal was to explore the use of antipsychotics in relation to resident characteristics, and to assess the appropriateness of antipsychotic prescribing in Belgian nursing homes.

**Methods** Data were used from a cross-sectional study (Prescribing in Homes for the Elderly; PHEBE) conducted in 76 nursing homes in Belgium. Antipsychotics were classified into typical and atypical, using the anatomical therapeutic and chemical classification. Ten inappropriate antipsychotic prescribing indicators were selected from the updated Beers criteria (2003), Bergen District Nursing Home Study (BEDNURS) indicators, and Screening Tool of Older People's Prescriptions criteria (STOPP).

**Results** The residents' mean age was 84.8 years, 78.1% of whom were female. The prevalence of antipsychotic utilization was 32.9%. Antipsychotics were mainly indicated for dementia-related agitation, and psychosis with/without dementia. Higher use of antipsychotics was found for dementia (OR: 3.27; 95% CI: 2.61-4.09), insomnia (OR: 1.38; 95% CI: 1.10-1.73), depression (OR: 1.30; 95% CI: 1.03-1.65), and age <80 years (OR: 1.79; 95% CI: 1.38-2.33). Inappropriate antipsychotic prescribing indicators scoring the highest among users were: long-term use (92.6%), use despite risk of falling (45.6%), combined use with other psychotropics (31.8%), and duplicate use (15.1%). Inappropriate prescribing was associated with depression (OR: 3.41) and insomnia (OR: 2.17).

**Conclusion** The indicator-driven analysis of antipsychotic prescribing quality revealed a need for improvement, with the main prescribing problems relating to duration and combination of therapies. Risks/benefits of offlabel use need to be evaluated more consciously at the start of therapy, and at periodic re-evaluations.

## Abstract H06 (2012)

### Antipsychotic drug use in nursing home residents with Parkinson's disease

*Majda Azermani\*, Monique Elseviers, Mirko Petrovic, Luc Van Bortel, Robert Vander Stichele*

**Introduction** Guidelines caution against chronic use of antipsychotics, typical antipsychotics in particular, for older adults with Parkinson's disease (PD). Our study goal was to determine the prevalence of antipsychotic utilisation in Belgian nursing home residents with PD, with attention to drug choice and resident characteristics.

**Methods** Prescribing in Homes for the Elderly in Belgium (PHEBE, 2006) was a cross-sectional study conducted in 76 nursing homes investigating drug utilisation in general. Antipsychotic drugs were categorised into typical and atypical with the ATC classification.

**Results** Parkinson's disease was diagnosed by the GP in 8.3% (n=144) of the residents (n=1730). Among residents with PD, mean age (84 years range 60-101), prevalence of dementia (46%), the number of different drugs chronically used (8 drugs range 1-17), the prevalence of antipsychotic use (n=41, 29%), and the proportion of typical (36%, mainly haloperidol) and atypical agents (64%, mainly risperidone) did not differ significantly from the nursing home population. In residents with PD using antipsychotics, insomnia was present in 65% and dementia in 62% vs. resp. 41% and 42% among non-users (resp. p=0.009 and p=0.026).

**Conclusion** Prevalence and drug choice of antipsychotics in nursing home residents with PD was comparable with the general antipsychotic use among nursing home residents, indicating that GPs did not take PD as a risk factor into consideration. Drug Utilisation Review efforts are needed to reduce the high prevalence and the proportion of typical antipsychotic users in older adults with PD

**Abstract H07 (2014)****Geriatric utilisation of psychotropics in Belgian nursing homes***Majda Azermaj\*, Monique Elseviers, Mirko Petrovic, Luc Van Bortel, Robert Vander Stichele*

**Objective** To determine the prevalence of psychotropic drug use in Belgian nursing homes, in relation to residents' and institutional characteristics.

**Methods** The PHEBE project (Prescribing in Homes for the Elderly in Belgium, 2005) was a cross-sectional study, investigating drug use in 76 nursing homes. Psychotropics were categorised into antidepressants, antipsychotics, benzodiazepines and anti-dementia drugs using the ATC classification.

**Results** Residents' mean age ( $n=1730$ ) was 85 (SD: 8) years and 78% were female. The overall prevalence of psychotropic drug use among nursing home residents was 79%. Benzodiazepines were used by 54% and antipsychotics by 33% of all residents. Residents received a higher number of antipsychotics ( $p<0.001$ ) but fewer antidepressants (and other medicines) with increasing severity of dementia. Antidepressants were prescribed in 40% of which 2/3 was indicated for depression and 1/3 for insomnia. Anti-dementia drugs were used by 8%. Institutional characteristics showed no relationship with psychotropic drug use, except for a lower use when medication was dispensed by a hospital pharmacist ( $p=0.001$ ).

**Conclusion** As in other European countries, the prevalence of psychotropic utilisation in Belgian nursing homes is exceedingly high, with excessive duplicate use. Guidelines, education and clinical practice recommendations focusing on initiation, reassessment and withdrawal of psychotropic therapy, are needed

**Abstract H08 (2036)****Medications with antimuscarinic activity in elderly hospitalised patients***Martin Wawruch\*, Macugova A, Kostkova L, Luha J, Dukat A, Murin J, Drobna V, Kuzelova M*

**Objectives** Medications with antimuscarinic effects may commonly cause adverse drug reactions such as dry mouth, urinary retention, constipation, blurred vision, tachyarrhythmia, drowsiness and cognitive impairment. Age-related decline in cholinergic neurotransmission contribute to the increased sensitivity of older patients to antimuscarinic effects. Therefore the aim of the present study was to evaluate the use of medications with antimuscarinic activity in elderly hospitalised patients and to identify factors which increase the probability of use of such drugs.

**Methods** The study was carried out on a sample of 1,636 elderly patients ( $\geq 65$  years) hospitalised in three municipal hospitals. To identify the medications with antimuscarinic properties, two recently published lists of Rudolph et al. (2008) and Han et al. (2008) were applied. The most important factors influencing the use of medications with antimuscarinic activity were evaluated using the binary logistic regression model.

**Results** Hospitalisation led to a significant increase in the use of medications with antimuscarinic activity. The prevalence of users of such drugs at the time of hospital admission and discharge was 10.5% and 14.2%, respectively ( $p<0.001$ ). A higher total number of prescribed medications was found in the group of users compared to non-users, at both hospital admission ( $7.2\pm 3.5$  vs.  $5.7\pm 3.1$ ;  $p<0.001$ ) and discharge ( $8.7\pm 3.1$  vs.  $7.5\pm 2.9$ ;  $p<0.001$ ). Depression, Parkinson's disease, epilepsy, constipation, urinary incontinence and retention, immobilisation and gastroduodenal ulcer disease were found to be the risk factors for the use of medications with antimuscarinic activity.

**Conclusions** Physicians should be aware of the greater risk of adverse outcomes from the use of drugs with antimuscarinic activity. Caution should be exercised in their use after careful consideration of the risk/benefit in individual patients. This study was supported by grant VEGA 1/0135/09. Han L et al. J Am Geriatr Soc 2008; 56: 2203-2210. Rudolph JL et al. Arch Intern Med 2008; 168: 508-513

## Abstract H09 (2040)

### Alzheimer's disease: A pharmacoepidemiological study

*Ilse Truter\**

**Objectives** Alzheimer's disease is an irreversible progressive disease that affects cognitive, behavioural and functional abilities. The prevalence of Alzheimer's disease is increasing as the world's population is aging. The primary aim of the study was to determine the prescribing patterns and cost of drugs for Alzheimer's disease in a private health care sector patient population.

**Methods** A retrospective, exposure-cohort pharmacoepidemiological study was conducted. Data were obtained from a South African private pharmacy group for 2008. The database consisted of 1578346 medicine records.

**Results** A total of 588 patients (326 females and 262 males) received 2623 medicine items for Alzheimer's disease at a cost of R1563701.18 (average cost per item R596.15). The average age of patients was 75.54 (SD=10.48) years, with 78.40% of patients between 70 and 89 years of age. Donepezil was the most frequently prescribed active ingredient (37.09%), followed by galantamine (36.94%). Donepezil accounted for 39.50% of the cost of Alzheimer medication. No notable differences in prescribing patterns were observed over the 12 month period. The average cost per prescription was R634.76 for donepezil, and R551.35 for memantine. Only 5.27% of patients were prescribed more than one active ingredient for Alzheimer's disease during the year (mostly donepezil or galantamine, together with memantine). Average Prescribed Daily Doses (PDDs) of all active ingredients were generally lower than their respective Defined Daily Doses (DDDs). The average PDD for donepezil was 7.45 mg (DDD=7.5 mg), for galantamine was 13.56 mg (DDD=16 mg), for memantine was 17.46 mg (DDD=20 mg) and for rivastigmine was 6.89 mg (DDD=9 mg).

**Conclusions** The results were similar to those of previous South African studies. Treatment outcomes could not be measured and it is recommended that qualitative studies be undertaken to determine the cost-effectiveness of the different treatment options according to family members and caretakers.

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### Abstract I01 (1008)

#### **AlterMED: Attitude, knowledge and use of alternative medicine**

*Danny Van heusden\*, Adriaenssens J, Van Rompaey B, Elseviers M*

**Objectives** The effectiveness and efficacy of complementary and alternative medicine (CAM) remains a matter of debate, with many people either all for or all against it. We investigated attitude, knowledge and use of CAM as a segment of the available therapeutic arsenal in our society, with attention for the associated personal characteristics of CAM users.

**Methods** This study used a cross-sectional survey method with a convenience sampling from the general population. The primary data was collected through a structured questionnaire, including personal characteristics and data on knowledge, use and satisfaction about 7 well known CAM. The attitude towards CAM was questioned using a set of 14 statements about CAM scored on a 10-point scale from complete disagreement to complete agreement.

**Results** The study population included 3065 respondents. Half of them had a rather neutral attitude towards CAM, with 34% being clearly proponent and 16% opponent. Two thirds (68.2%) of the population ever used CAM, with a mean of 1.6 therapies. The majority of users was satisfied with the results of the therapy. Homeopathy (95.2%), acupuncture (93.6%) and herbal medicine (85.1%) were most known. Homeopathy (46.1%) was also most used, followed by herbal medicine (27.4%) and osteopathy (26.8%). Women used significantly more CAM than men. In the active population (30-60 years), particularly in parents with children, CAM use almost doubled compared to young adults and elderly. Furthermore, catholic religion, higher degree of education, chronic illness and working in healthcare revealed to have a positive influence on CAM use.

**Conclusions** Most of the investigated CAMs were well known in Belgium. Two thirds of respondents ever used CAM, mainly as an alternative form of medication (homeopathy, herbal products). The higher use in women, with children, and in patients with a chronic disease points to CAM use mainly as complementary to traditional pharmacotherapy.

### Abstract I02 (1017)

#### **Demographic factors influence the amount and structure of drugs in Serbian families**

*Milica Paut Kusturica\*, Ana Sabo, Zdenko Tomic, Nebojsa Pavlovic, Maja Stojancevic*

**Objectives** The amount and structure of drugs in home pharmacies have been studied extensively, but there is little information about how demographic factors influence the amount and structure of drugs in families. The aim of the study is to compare the content of home pharmacies in urban and rural communities on the territory of South Backa District, Serbia.

**Methods** This survey was conducted from February to July 2010 on a sample of 208 families (108 in urban and 100 in rural communities) on the territory of South Backa District, Serbia. The family were chosen randomly and the data were collected by checking the inventory of medicines.

**Results** The average number of packets in home pharmacies per a family in urban communities was slightly higher (11.1 packets) than in rural communities (10.3 packets). The number of packets of medicines with expiry date was also higher in urban communities (14.1%) than in rural (6.3%). The most frequently present ATC categories of medicines in urban communities were A (23.3%), C (16.3%) and R (15.1%), while in rural communities were C (35.2%) and N (24.7%).

**Conclusions** There are differences in quantity and structure of medicines in home pharmacies in rural and urban communities on the territory of South Backa District, Serbia. The greater use of medicines in urban families is possibly due to greater availability of health facilities, especially pharmacies. Different types of medicines in home pharmacies suggest there are specific disorders in rural population, which mostly consists of older people.

### Abstract I03 (1022)

#### Sources of drug information and their influence on the prescribing behaviour of doctors in a teaching hospital in Ibadan, Nigeria

*Majeed Odesanya\**, Kazeem Oshikoya, Ibrahim Oreagba, Olayinka Adeyemi

**Objectives** This study aimed to determine the sources of drug information for doctors working in a teaching hospital in Nigeria and to assess the self-reported impact of the sources on their prescribing behaviour.

**Methods** A total of 163 doctors working at the University College Hospital (UCH), Ibadan in Nigeria were evaluated with a questionnaire for their demographics and sources of drug information. For doctors who relied on drug promotion, they were asked to self-report and self-rate their opinion on extent of interactions with pharmaceutical companies as well as how such interactions had impacted on their prescribing behaviour. Apart from the demographics, each question was evaluated with a typical five-level Likert item. Data analyses were with simple descriptive statistics.

**Results** Of the 400 doctors working at UCH, only 40.8% participated in the study. Drug information was sourced from colleagues (161, 98.8%), reference books (158, 96.9%), pharmaceutical sales representatives-PSRs (152, 93.2%), promotion materials (151, 92.6%), scientific papers/journals/internet (149, 91.4%), and drug promotion forum/product launches (144, 88.3%). Each source was highly utilized but there was no wide variation in their pattern of use. According to the self-report of over a half of the respondents, PSRs was an accurate and reliable drug information resource; PSRs increased their awareness of the promoted drugs; and their prescribing behaviours were influenced by information from PSRs.

**Conclusion** Respondents tend to rely on a broad range of drug information resources which include potentially inappropriate resources such as PSRs. Since this study was based on self-report, the influence of drug information resources reported by the respondents on their prescribing behaviour may have been underestimated. Measures should be taken to minimize interactions between PSRs and the respondents.

### Abstract I04 (1024)

#### Influence of health care system in transition on utilization of prescription medications– results of Estonian Health Interview Survey 1996 and 2006

*Ülle Helena Meren\**, Liidia Smirnova, Eliis Henrikson, Daisy Volmer, Raul-Allan Kiivet

**Objectives** The aim of the study was to assess utilization of prescription medications in Estonia comparatively in 1996 and 2006.

**Methods** The study is based on Estonian Health Interview Survey 1996 and 2006, the descriptive cross-sectional studies assessed various aspects of health behaviour and utilization of health care services and medications. The study populations were respectively 4711 (average age 49±22) in 1996 and 6434 (average age 51±20) in 2006.

**Results** Within last four weeks prior to the study 31% of the respondents in 1996 and 50% in 2006 reported utilization of prescription medications. More women than men used prescription medications in both survey years ( $p<0.01$ ). Considerable increase in use of medications was identified in age groups 16-30 (10% in 1996 and 23% in 2006) and 65+ (53% in 1996 and 75% in 2006). Of prescription medications utilization has increased twice for hypertension medications (14% in 1996 and 26% in 2006) and diabetes and asthma medications (both 2% in 1996 and 4% in 2006). Consumption has decreased for analgesics (27% in 1996 and 18% in 2006), antibiotics (6% in 1996 and 4% in 2006) and sedatives (11% in 1996 and 4% in 2006). Polypharmacotherapy was identified with half of the respondents reported use of prescription medications.

**Conclusions** The utilization of prescription medications has increased rapidly within the 10 years, commonly in younger and older population. The increase could be influenced by improved access and larger selection of medications. Decrease in consumption of some groups of medications could be explained with better awareness in rational prescribing and rational use of prescription medications.

**Abstract 105 (1030)****Gender and drug utilization - a systematic analysis of gender differences in drug utilization in Sweden***Desirée Loikas\**, Wettermark B, von Euler M, Bergman U, Ringbäck Weitoft G, Schenck-Gustafsson K**Objectives** To systematically describe and analyse sex differences in drug utilization in the Swedish population.**Methods** Data from the Swedish Prescribed Drug register, with complete coverage for the entire Swedish populations (9 million inhabitants) purchases of prescribed drugs, were used to analyse the proportions of men and women purchasing drugs from different pharmacological (ATC) groups in 2010. The measure used was period prevalence in number of patients per 1000 individuals (PAT/TIN). Gender differences were calculated in both absolute and relative values.**Results** During 2010, 2.8 million men and 3.6 million women (60% and 76% of all men and women in Sweden, respectively) purchased at least one prescribed drug. Pharmacological groups with the largest gender difference in absolute values with a higher use in women were antibiotics (266 PAT/TIN among women and 191 PAT/TIN among men), and peripheral analgesics (132 PAT/TIN among women and 78 PAT/TIN among men), while ACE-inhibitors (61 PAT/TIN among women and 78 PAT/TIN among men) and lipid modifying agents (81 PAT/TIN among women and 98 PAT/TIN among men) were used to a larger extent by men. Large relative differences with a higher use in women were seen for antimycotics (19 PAT/TIN among women and 3 PAT/TIN among men) and bisphosphonates (19 PAT/TIN among women and 3 PAT/TIN among men). The largest relative differences with a higher use in men were seen for drugs used in alcohol dependence (1 PAT/TIN among women and 4 PAT/TIN among men) and antigout preparations (6 PAT/TIN among women and 12 PAT/TIN among men).**Conclusions** There are differences in drug utilization between men and women in Sweden. Differences in incidence or prevalence of disease may explain some of the observed differences while other differences are difficult to explain based on medical grounds.**Abstract 106 (1038)****Estonia: availability of data for drug utilisation research***Ly Rootslane\**, Ott Laius, Alar Irs

Drug utilisation studies have been carried out in Estonia for over 20 years. Many of them have included international comparisons and were done in co-operation with international colleagues. Estonia is looking forward to further international collaboration in drug utilisation and we commit to provide timely and reliable nation-wide data. The purpose of this poster is to describe the available data sources.

- Total drug consumption data Total drug consumption data on national level from 1994 onwards are available from State Agency of Medicines (SAM) based on the quarterly wholesale reports. ATC classification and DDD methodology is used. Annual data are published at the website [www.ravimiamet.ee](http://www.ravimiamet.ee) Since early 2011 data are also available in the Health Statistics and Health Research database which in addition contains information about characteristics of population, morbidity, use of healthcare resources and reasons for treatment and health behavior ([http://pxweb.tai.ee/esf/pxweb2008/Database\\_en/Medicines/Medicines/Medicines.asp](http://pxweb.tai.ee/esf/pxweb2008/Database_en/Medicines/Medicines/Medicines.asp))
- More specific data on wholesale level are available on request - consumption on package level, hospital and outpatient sales etc.
- Pharmacy claims based data on prescription medicines Estonian Health Insurance Fund (EHIF) has linkable databases of health services use and purchases of prescription pharmaceuticals. The data available on medicines dates back to year 2001. EHIF publish the high level summary of dispensed prescriptions on their website <http://www.haigekassa.ee/kindlustatule/soodusravimid/statistika/>
- Electronic prescription In 2010 the digital prescription was introduced in Estonia and the data about prescribed and dispensed medicines is automatically stored into EHIF database. The data contains information about the prescriber, the patient, the drug, the diagnosis and the dispensing pharmacy, if the drug was dispensed. Multitude of data for drug utilisation and pharmaco-epidemiological research are available on wholesale and prescription level from Estonia and we are open for joint projects that address issues of interest in our health care perspective.

#### Abstract I07 (1047)

##### Analysis of medical waste in Vienna

*Sabine Vogler\*, Zuidberg Christel, Leopold Christine*

**Objective** To analyze medical waste in Vienna and to explore about the dimension of wasted medicines

**Methods** A sample of medical waste was collected by staff of the Waste Department of the City of Vienna in all districts of Vienna from 12 October to 24 November 2009: We acquired this sample, manually separated each item of medical waste and analyzed it with regard to its content.

**Results** A total of 152 packs was included in the analysis, thereof 74% prescription-only medicines and 26% OTC products. 14.5% of the packs had content, varying from one tablet in a blister to up to 56 tablets. The most common pharmaceutical form was the oral one (86%). The leading therapeutic groups of this sample were the cardiovascular system (24% of all packs), the musculo-skeletal system (18%) and alimentary tract and metabolism (18%). Out of the total of 152 packs, 5% were expired, 85% were not expired yet, and the remaining 10% of packs had no visible expiry date. 13% of the non-expired packs still contained medicines. Analyzed per therapeutic group, 14% of the packs and 21% of the blisters of cardiovascular medicines had content; for the musculo-skeletal system and the alimentary tract and metabolism the percentages were 27% (packs) / 52% (blisters) and 7% (packs) and 52% (blisters).

**Conclusions** Every seventh pack, which was expired, contained medicines: This outcome challenges speculations disseminated in local media about the high relevance of medicines which end up in waste unused. To better explore the dimension of wasted medicines, further research (e.g. of the medicines returned to pharmacies) would be required.

#### Abstract I08 (2017)

##### Care needed when undertaking drug utilisation studies using commercial and administrative databases?

*Kristina Garuoliene, Brian B Godman, Jolanta Gulbinovic\*, Morten Andersen Bjorn Wettermark*

**Background and Objectives** EuroMedStat studies highlighted greater utilisation of statins among commercial (IMS) vs. administrative databases up to +55%; median + 15%. ESAC study showed greater utilisation of antibiotics in commercial database in Spain than administrative database. Recent pan-EU studies shown low utilisation of PPIs and statins in Lithuania and other Central and Eastern countries (2001 to 2007/8), with statin utilisation in Lithuania lower than SoftDent database (commercial database). Objective: Ascertain the extent of differences between commercial and administrative databases across four classes.

**Methods** Observational drug utilisation study of all patients dispensed a reimbursed prescription for PPI (A02BC), statins (C10AA), ACE inhibitor/ Angiotensin Receptor Blocker (C09AA, C09CA), and SSRIs/ newer antidepressants venlafaxine, mirtazepine, reboxetine and duloxetine (N06AB and N06AX) in the Lithuanian Compulsory Health Insurance database (NHIF) between 2004 and 2009. Utilisation converted to 2010 DDDs. Comparison with Soft Dent database (2005 2007 - statins only) and IMS database (2004 to 2009 - all).

**Results** Appreciable differences in utilisation rates for some classes. (a) PPIs - 5 to 7 fold increase in IMS vs. administrative databases, (b) Statins - 3 to 6 fold increase in commercial (IMS and Soft Dent) vs. administrative databases, (c) ACEIs/ ARBs - limited difference; NHIF database 76% to 90% of IMS utilisation, (d) Anti-depressants - Limited difference; NHIF database 71% (2004) to 88% (2009) of IMS utilisation. Differences in utilisation for PPIs and statins may be due to prescribing restrictions, e.g. statins initially only reimbursed for 6 months post AMI with first prescription via a cardiologist. Currently no prescribing restrictions for ACEIs although 20% co-payment. Limited differences with anti-depressants may reflect general low utilisation in Lithuania.

**Conclusions** Some differences appreciably larger than EuroMedStat project. Consequently, knowledge of the content of each database and associated reforms should become routine for CNC studies to avoid false impressions.

**Abstract 109 (2037)****Phelophepa Health Care Train: An Epidemiological Overview of the Western Cape in 2009***Ilse Truter\**

**Objectives** The Phelophepa Health Care train is the only primary health care train in the world. Phelophepa is an innovative initiative that attempts to make a positive difference to primary health care in rural South Africa. The primary aim of this study was to determine the epidemiological and prescribing statistics on Phelophepa during the period that the train was stationed in the Western Cape in 2009.

**Methods** Phelophepa visited seven stations during the eight weeks that it was stationed in the Western Cape (between 6 April and 5 June 2009). Data were collected by workers and students on the train.

**Results** A total of 4 026 prescriptions were dispensed by the pharmacy on Phelophepa during the eight weeks. The average number of items per prescription was 3.51. The average cost per prescription was R65.48 (average cost of R18.64 per item). Patients only paid R5.00 per prescription. There was an increase in the number of pulmonary diseases/infections as well as ophthalmic conditions (especially dry eyes). Common problems experienced during the outreach to schools were ear infections and chest infections. Common conditions identified in Caledon, for example, were musculoskeletal problems, genitourinary conditions, fungal infections and eye disorders. Medication is prescribed mainly by nurses and includes those listed in the Primary Health Care Essential Drugs List.

**Conclusions** The statistics compiled by Phelophepa is a useful source of epidemiological data about rural South Africa. It is recommended that more studies be conducted to detect epidemiological differences between regions visited, as well as changes over time.

**Abstract 110 (2060)****A comparison between prescribing in thin data and dispensing in England***M Thompson, H Dattani, Alison Bourke\*, S MacLachlan; D Lloyd, Dip Epi, S Faulding*

**Background** In database analyses, prescription records do not always equate to drug exposure. Prescriptions may not be redeemed at a pharmacy. Additionally, under-recording is possible.

**Objectives** To determine in The Health Improvement Network (THIN), the annual redemption rate of prescriptions by comparing counts of issued vs redeemed prescriptions by practice.

**Methods** Issued prescriptions were obtained from THIN primary care data and redeemed prescriptions from Prescription Services, part of the NHS Business Services Authority, over 5 years. Mean annual redemption rates were calculated as redeemed/issued over the same period. Percentage of practices with mean annual redemption rate greater than 100% (=under-recording) was calculated. The analysis was repeated excluding British National Formulary (BNF) chapters 14 and 15 for vaccinations and anaesthetic agents which are rarely entered as individual prescriptions in primary care.

**Results** Across all drug classes, the mean annual redemption rate from 145 consenting practices for each year was 99.6% in 2004, 99.4% in 2005, 98.5% in 2006, 98.3% in 2007 and 98.5% in 2008. When excluding BNF chapters 14 and 15, the results were as follows: 2004, 98.1%; 2005, 97.8%; 2006, 97.2%; 2007, 97.0%; 2008, 97.4%. Proportion of practices with >100% redemption rate fell over time from 37% in 2004 to 14% in 2008. When excluding BNF chapters 14 and 15, the percentages were considerably lower falling from 7.6% to 2.1% over the same period.

**Conclusions** Although the mean redemption rate of prescriptions was close to 100% this is a combination of unredeemed and under-recorded prescribing; the downward trend in redemption rate could indicate improved recording of prescribing or reduced patient redemption of prescriptions. The proportion of practices with >100% redemption rate was reduced by the exclusion of vaccinations/anaesthetic agents. Future analyses will focus on specific drug classes, out of hours prescriptions, and practice demographic factors.

**J Generics**

**Abstract J01 (1010)**

**Potential impact of policy regulation and generic competition on sales of cholesterol lowering medication, antidepressants and acid blocking agents in Belgium**

*Jessica Fraeyman\*, Van Hal G, De Loof H, Remmen R, De Meyer G and Beutels Ph*

**Background** Pharmaceutical expenditures are increasing as a proportion of health expenditures in most rich countries. Antidepressants, acid blocking agents and cholesterol lowering medication are major contributors to medicine sales around the globe.

**Methods** We aimed to document the possible impact of policy regulations and generic market penetration on the evolution of sales volume and average cost per unit (Defined Daily Doses and packages) of antidepressants, acid blocking agents and cholesterol lowering medication. We extracted data from the IMS health database regarding the public price and sales volume of the antidepressants (selective serotonin reuptake inhibitors (SSRI's), monoamine oxidase inhibitors (MAOI's) and tricyclic and remaining antidepressants (TCA's)), acid blocking agents (proton pump inhibitors (PPI's) and H2 receptor antagonists) and cholesterol lowering medication (statins and fibrates) in Belgium between 1995 and 2009. We describe these sales data in relation to various national policy measures which were systematically searched in official records.

**Results** Our analysis suggests that particular policy regulations have had immediate impact on sales figures and expenditures on pharmaceuticals in Belgium: changes in reimbursement conditions, a public tender and entry of generic competitors in a reference pricing system. However, possible sustainable effects seem to be counteracted by other mechanisms such as marketing strategies, prescribing behaviour, brand loyalty and the entry of pseudo-generics. It is likely that demand-side measures have a more sustainable impact on expenditure.

**Conclusion** Compared with other European countries, generic penetration in Belgium remains low. Alternative policy regulations aimed at enlarging the generic market and influencing pharmaceutical expenditures deserve consideration. This should include policies aiming to influence physicians' prescribing and a shared responsibility of pharmacists, physicians and patients towards expenditures

**Abstract J02 (1049)**

**Differences in cardiovascular drugs prescribing indicators between practices**

*Claudia Furtado\**

**Objective** In Portugal a considerable potential for savings can be obtained if prescribing patterns are improved. Besides the establishment of performance objectives to GPs working in Family Health Units (FHU) there are no incentives to good prescribing for doctors working in primary care centres, hospitals or private care. The aim of this study is to describe prescribing patterns by type of prescriber and explore possible reasons for variation. Methodology Data measured by the DDD refers to Cardiovascular Drugs prescribed and dispensed in NHS outpatient care in 2009. We applied three quality indicators: Percentage of generic; Prescribing of ACE-Inhibitors as a percentage of ARA and ACE-inhibitors; Percentage of low cost statins compared with all statins, including rosuvastatin and atorvastatin.

**Results** In primary care, generic prescribing account for 31% of consumption while in private care is only 25%. Prescribing of ACE-Inhibitors by doctors working in hospitals account for 61% of consumption, while in primary care is 51% and in private care is 47%. Primary care physicians have the higher percentage of low cost statins (70%) while in hospital care (59%) the proportion was much lower. Physicians working in hospitals where either Rosuvastatin or Atorvastatin were introduced for inpatient use, at competitive prices, were the ones that had a higher prescribing of these statins for outpatient use ( $p < 0,05$ ). Doctors working in FHU tend to choose least expensive drugs (generic, low-cost statins and ACE Inhibitors) compared with doctors that work in primary care but do not have incentives regarding prescribing patterns (all statistics performed were statistically significant at  $p < 0,05$ ).

**Conclusions** Quality improvement in prescribing cannot be focused only in one group of doctors or type of care. Two areas need further investigation: use of incentives to good prescribing and the introduction of drugs to inpatient use that have a major effect on outpatient use.

**Abstract J03 (1056)****The utilisation of dopaminergic drugs in Croatia 2000 to 2010***Ljiljana Sovic Brkicic\*, Luka Voncina, Slavica Sovic, Brian Godman, Maja Relja*

**Introduction** Several studies have shown that levodopa is the most commonly used drug to treat patients with Parkinson's disease (PD), followed by dopamine agonists, MAO-B inhibitors and COMT inhibitors. However, the utilisation of levodopa continues to increase despite appreciable increases in the utilisation of newer dopamine agonists and COMT inhibitors.

**Objectives** Analyse utilisation of drugs to treat PD in Croatia 2000-2010 alongside reimbursed expenditure. In addition, assess the potential rationale for any changes in utilisation and expenditure patterns to guide future activities.

**Methodology** Retrospective analysis of the utilisation of drugs in ambulatory care to treat PD (N04BA, N04BB, N04BC and N04BD) in DDDs and DDDs/ TID (2011 DDDs) using Croatian Institute for Health Insurance (HZZO) database from 2000-2010. Biperiden (N04AA) is not typically prescribed in PD; consequently, not included in the study. Only reimbursed costs included as the analysis is from the Health Insurance perspective, and measured in Croatian kuna (HRK). Details of the reforms and initiatives documented with the help of the co-authors.

**Results** Drug utilisation increased by 218% from 0.78 DDDs/TID in 2000 to 2.48 in 2010. Levodopa increased from 0.59 to 1.09, dopamine agonists from 0.05 to 0.88, and MAO-Bs from 0.15 to 0.44, whilst utilisation of COMT inhibitors remained stable after 2005 at 0.07 DDDs/ TID. Increased utilisation of dopamine agonists and MAO-Bs including rasagiline increased reimbursed expenditure by 366% during the study period.

**Conclusion** The consumption of PD drugs increased in Croatia during the study period in line with expectations, with again increased utilisation of levodopa alongside newer drugs. Further analysis is currently taking place regarding the rationale behind greater increases in expenditure than utilization, with a view to implementing possible additional measures as resource pressures grow.

**Abstract J04 (2004)****Changes in the prescription of recommended drugs for acute myocardial infarction in Estonia in 2001 vs 2007***Toomas Marandi\*, Blöndal M, Ainla T, Eha J*

**Introduction** Current acute myocardial infarction (AMI) guidelines recommend the use of platelet aggregation inhibitors, beta-blockers, angiotensin converting enzyme inhibitors (ACEI) or angiotensin II receptor blockers (ARB) and statins for in-hospital and long-term treatment. The objective of the study was to evaluate the changes in the prescription of these drugs in Estonian hospitals in 2001 vs 2007.

**Patients and Methods** We performed a retrospective cross-sectional study including random samples of hospitalized AMI cases. Chi-square test and logistic regression was used to study the changes in the prescription of the drugs.

**Results** Final analysis included 423 cases in 2001 and 687 cases in 2007. The prescription rates of studied drugs for in-hospital and for out-patient use were significantly higher in 2007 (Table 1). Compared to 2001, in 2007 more patients were prescribed drugs from all five drug (sub)groups during hospitalization (3.3% vs 18.5%,  $p<0.001$ ) and for out-patient use (3.8% vs 22.2%  $p<0.001$ ). In multivariate analysis, <75-year-old patients, those with ST-segment elevation AMI, and those hospitalized into a tertiary care hospital were more likely to be prescribed drugs from all five drug (sub)groups.

**Conclusions** The prescription of recommended drugs for AMI has increased in Estonia, still only a fifth of the patients are prescribed drugs from all five (sub)groups. Table 1. Prescription rates of recommended drugs in Estonia

| Year | n   | Aspirin | Clopidogrel/Ticlopidine | Beta-blockers | ACEI/ARB | Statins |
|------|-----|---------|-------------------------|---------------|----------|---------|
| 2001 | 423 | 87.7    | 8.5                     | 77.8          | 53.7     | 16.1    |
| 2007 | 687 | 90.1    | 34.8                    | 80.1          | 68.3     | 48.5    |
| P    |     | 0.212   | <0.001                  | 0.363         | <0.001   | <0.001  |

During hospitalization

| n   | Aspirin | Clopidogrel/Ticlopidine | Beta-blockers | ACEI/ARB | Statins |
|-----|---------|-------------------------|---------------|----------|---------|
| 423 | 82.6    | 9.9                     | 70.1          | 52.6     | 23.5    |
| 687 | 88.5    | 41.1                    | 80.4          | 73.7     | 57.6    |
| P   | 0.013   | <0.001                  | 0.001         | <0.001   | <0.001  |

Out-patient use

## Abstract J05 (2008)

### Analysis of originator versus generic prescribing of proton pump inhibitors

*Ilse Truter\**

**Objectives** Generic prescribing is important in South Africa. Many medical aid schemes will only reimburse the cost of the generic product, and a co-payment is required if a patient wants to use the originator product. The primary aim of this study was to investigate originator versus generic prescribing focussing on proton pump inhibitors (PPIs).

**Methods** Prescription data were obtained from a private medical aid administrator in South Africa. The data covered 2010 and included medication, procedures and devices (a total of 2126264 records). For the purpose of this study, only PPI medicine items were extracted and analysed (MIMS category 12.4.4). Basic descriptive statistics were calculated.

**Results** A total of 20537 PPIs were prescribed (only 18.56% on the chronic option of the medical aid schemes). Five different PPI active ingredients were prescribed to 7060 patients (50.88% female patients). Omeprazole was the most often prescribed PPI, accounting for half of all PPI prescribing (50.78%), followed by esomeprazole (19.83%) and lansoprazole (18.04%). Eight different trade names of omeprazole were prescribed (one generic product accounted for 56.00% of all omeprazole prescriptions and 56.08% of the cost of omeprazole prescriptions). The originator product only accounted for 1.75% of omeprazole prescribing frequency and 3.07% of prescribing cost. Only one trade name of esomeprazole was prescribed (no generic equivalents) and nine trade names of lansoprazole (the originator accounted for 1.43% of prescribing frequency and 2.51% of cost). On average, esomeprazole had the highest average cost of R308.97, followed by rabeprazole (R236.58). Both these products do not have generic equivalents on the South African market.

**Conclusions** Further studies that include dosage forms and prescribed daily doses (PDDs) should be conducted alongside cost analyses. A clear difference between the prescribing and cost of originator versus generic prescribing was detected in this study.

## Abstract J06 (2018)

### Multiple demand side measures needed to enhance prescribing of generics: experiences from Abu Dhabi

*Mohammed Abuelkhair, Brian Godman\*, Shajahan Abdu, Sahar Fahmy, Lars L Gustafsson*

**Background and Objectives** Potential savings from generics will be reduced if there are only limited demand side measures combating industry pressures once multiple sourced products are available. Health Authority Abu Dhabi (HAAD) recently introduced the 'Unified Prescription Form' (March 2009) mandating INN prescribing alongside a comprehensive Generic Drug Policy (August 2009). However, currently limited demand side measures directing physician prescribing to generics. Objective: Document the outcome of recent generic policies in HAAD and suggest potential reforms to achieve desired results based on experiences of other countries.

**Methods** One year (12 months up to end September 2009 vs. 12 months up to end September 2010) pre and post policy analysis of the impact of the two generics policy in HAAD on utilisation patterns for PPIs (A02BC), statins (C10AA) and ezetimibe (C10AX09) in ambulatory care. Changes in utilisation measured by converting dispensed packages (IMS data) to 2011 DDDs. Expenditure data provided by IMS. Findings compared with recently published Pan-EU CNC studies for PPIs and statins. Results: a) PPI utilisation increased by 8.4% (DDD basis). Single sourced esomeprazole and pantoprazole increased by 33% and 27% respectively versus 10% reduction for multiple sourced omeprazole - increasing overall expenditure by 11.5%. b) Statin utilisation increased by 14%; atorvastatin/ rosuvastatin by 14% (87.5% of total statins in 2010) and simvastatin by 13% (7% total statins in 2010). Utilisation of ezetimibe also increased. Total expenditure on statins and ezetimibe increased by 11%. Changes in utilisation patterns and expenditure post policies mirror those among Western European countries with currently limited intensity of demand measures.

**Conclusions** Anticipated efficiency savings from various initiatives surrounding generics have not materialised in HAAD. Future policies under consideration include those based on successful experiences among Western European countries, e.g. education, formularies, benchmarking and incentive schemes.

**Abstract J07 (2057)****Reference pricing, originator drugs and consumer's choice**

Haula Taru, Hanna Koskinen\*, Valtonen Hannu

**Objectives** Generic reference pricing of medicines was introduced in Finland in April 2009. The system restricts the amount of reimbursement paid to a consumer, thus creating a financial incentive for the consumer to accept the switch to a reference priced product. The aim of this study was to assess the impact of reference pricing on consumer's choice, and to analyze the factors associated with the choice of an originator drug priced higher than the reference price.

**Methods** The data used in this study was collected from the Social Insurance Institute's prescription register. Data covers the records of the purchases in five active ingredient groups (atorvastatin, simvastatin, risperidone, olanzapine, and quetiapine) by a sample population from January 2008 to August 2010. Logistic regression analysis and logistic multilevel regression analysis were used to examine the factors associated with a consumer's originator drug choice.

**Results** After the introduction of reference pricing the use of originator drugs declined but some of the consumers chose originator drugs even when priced higher than reference price. Earlier originator drug using habit was found to be an important factor explaining the probability of choosing over reference priced originator drugs. In some active ingredient groups' higher age, higher income and female sex increased the probability of originator drug choice. The right to special reimbursement mainly lowered the probability.

**Conclusions** In earlier studies it has been shown that some of the consumers have prejudices on generic products and they want to stick with doctor's choice of medicine. The results of our study also indicate that doctor's primary decision of the prescribed medicine probably has a big influence on some consumers' choices and that decision has an important role in promoting the use of cheaper, generic products.

**K Cancer and safety****Abstract K01 (1003)****ADR Monitoring of Antihypertensive Drugs at Indian Community Pharmacy: A Success Story***S.Parimalakrishnan\*, Praveen Kumar Tavva. NVR, Mohanta. GP, Manna. PK*

Hypertension is one of the leading factors responsible for Cardio Vascular Deaths worldwide. The prevalence of hypertension is reported to be around 30% in India. The successful drug therapy is available for management of hypertension. Like other medicines the antihypertensive medicines too have adverse effects. In the present study an attempt has been to document the occurrence of ADRs due to these drugs at community pharmacy setting. In a prospective open labeled study comprising 10 community pharmacies at Chidambaram, India, the data on ADRs were collected in a standardized manner interviewing the patients when they visited the pharmacy for filling prescriptions over period of 12 months: from June 2010 to May 2011. During the study a total of 1487 prescriptions were reviewed and same number of patients were interviewed for collecting data. The collected ADRs reports were analyzed using descriptive statistic tool. 61.4% of the patients were found to have experienced adverse effects of drugs. The reported ADRs were graded in four point scale (definite - %, probable - %, possible - % and doubtful - %) using Naranjao's causality scale. Though Indian Community Pharmacists are reported often as traders, they are one of the most underutilized health professionals. The study has shown that the community pharmacists can be effectively utilized for ADRs monitoring on a routine basis. The monitoring of ADRs and their effective management is a reasonable possibility in community pharmacy practice which would improve the quality of life of hypertension patients. The patients too have expressed their interest to know more about the drugs they have been prescribed. The Indian Community Pharmacists can actively participate in routine ADRs monitoring of their patients promoting a safe and better care.

**Abstract K02 (1025)****Potentially inappropriate medications and adverse drug effects in French patients with Alzheimer's disease or other dementia: MIDA study.***Prouet-Proux M, Marie-Laure Laroche\*, Crépin S, Merle L, Charmes JP, Alix E, Rainfray M, Doucet J, Terrat C, Lahlou A and the MIDA Group.*

**Objective** To assess the prevalence of potentially inappropriate medications (PIM) in patients with Alzheimer's disease (AD) or other dementia, and evaluate the prevalence of adverse drug reactions (ADR) related to PIM.

**Methods** The MIDA study is a multicentre cross-sectional study carried out in 6 French regions. Patients with AD or other dementia, on cholinesterase inhibitor and/or on memantine treatment were recruited according to the place in France where they were staying: 60% from their various places of residence, 30% from nursing homes and 10% from long-term care units. Data registered were socio-demographic characteristics, dementia (diagnostic, treatment), medical history, drugs used and ADR. Drugs were classified using the consensual French PIM list. Two independent pharmacovigilance experts assessed ADR.

**Results** 558 patients aged 84.4±5.0 years [74-99] were recruited; 75.8% suffered from AD and 65.7% from cardio-vascular (CV) disorders. Patients used 6.6±2.8 drugs; CNS medications: 29.8%, CV system: 28.0% and digestive and metabolic system: 20.8%. The repartition of anti-dementia drugs was: 28.3% memantine, 28.3% donepezil, 17.7% rivastigmine, 12.7% galantamine and 19.0% association. The prevalence of PIM use in patients with dementia was 29.2%. The prevalence of ADR was 18.1% and the prevalence of ADR related to PIM was 1.4%. Anti-dementia medications were involved in 37.5% of the cases, and PIM in 14%.

**Conclusions** The quality of prescription in the elderly with dementia is an important challenge. One third of French patients with dementia used PIM; in a previous population-based study, half of French subjects aged ≥75 years used PIM. The prevalence of ADR is twice that shown in another study in the French population with dementia (PEIMA study, 5%). However, PIM are seldom involved in ADR occurrence (14%), as we previously showed in another study in the French elderly (6%). So, special attention should be paid when prescribing and overseeing anti-dementia drugs.

**Abstract K03 (1029)****Consumption and costs of cancer drugs in terms of patient and state***Miroslava Snopkova\*, Binder Rastislav, Lagin Adela, Foltan Viliam*

**Objectives** The increasing cost of health care in general, and cancer care in particular, raises questions related to its effects on our economy and the citizens of our society. The incidence of malignant tumors in both gross and standardized expression of the degree. Given the degressive evolution of the population, and thus increase the number of people in older age groups, as well as the increase in life expectancy is actually further increase the incidence of malignant tumors. Burden in health-care system is due to the continuing rises in health expenditure, drug costs compose of this expenditure about 30 percent, from that oncology drugs are 20.47 % (Public Health insurance).

**Results** In Slovakia in the period 2006-2010 under the ATC classification has the largest average share of the total cost of medicines from public health insurance group C (19.08%) (cardiovascular system). ATC group L (antineoplastic and immunomodulating agents) has the second largest average share of public health insurance (18.20%), in addition to seeing accumulation in the share of public health insurance for cancer drugs of 4.74%. The average value per year spent on cancer drugs from public health insurance represent 18.2%. Average cost in the group of cancer drugs have been under the ATC classification: L01 - 110 607 545 EUR, L02 - 16 029 106 EUR, L03 - 34 751 778 EUR, L04 - 36 468 315 EUR.

**Conclusions** Over the last five years there has been an increase in public health insurance for cancer drugs. Rising incidence of cancer, aging population has a tendency to spend more money on pharmaceuticals for their chronic health problems and health maintenance. Using brand medications leads to a rising cost. The aim is to reduce consumption and cost of drugs, but not at the expense of the quality of patient therapy.

**Abstract K04 (2015)****Comparative study between the medicine treatment cost of multiple sclerosis and rheumatoid arthritis before and after treatment with biological drugs***Roux, I., Martie Lubbe\*, Burger, JR., Lamprecht, JC*

**Objectives** To investigate the medicine treatment cost of multiple sclerosis (MS) and rheumatoid arthritis (RA) before and after treatment with biological drugs in the private health care sector of South Africa.

**Methods** A quantitative retrospective drug utilization review was performed on medicine claims data of a pharmacy benefit management company (PBM). Data for a four-year period (1 Jan 2005 to 31 Dec 2008) were used to determine the medicine treatment cost of 172 MS and 141 RA patients before and after treatment with biological drugs. MS patients received the biological drugs Interferon beta-1a and interferon beta-1b and RA received infliximab, adalimumab and etanercept during the study period. [RSA Rand (R)/€ = 8.19215 (2005); 9.63633 (2006); 9.95563 (2007) and 13.3999 (2008)]

**Results** Biological drugs represented 81.43% of the total medicine treatment cost of RA patients (R25 432 294.04) and 91.79% of the total medicine treatment cost of MS patients (R33 686 999.39). Other medication (excl. biological drugs) prescribed to MS patients before starting with biological items represented 2.44% (R822, 220.75) of the total medicine treatment cost of MS patients and those prescribed after treatment with biological represented 1.13% (R379, 800.98). The other medication prescribed to RA patients before starting with biological items represented 8.86% (n = R2 254 330.44) of their total medicine treatment cost; those prescribed after treatment with biological drugs, represented 3.91% (n = R992 533.62). The number of prescriptions for other medication (excl. biological drugs) for both RA and MS patients, decreased from the period before to the period after treatment with biological drugs.

**Conclusions** Although biological drugs used in the treatment of MS and RA are very expensive, it seems that number of other medication prescribed to these patients decreased after treatment with biological drugs, which may influence the medicine treatment cost of these patients.

#### Abstract K05 (2029)

##### **TYSEDMUS: national cohort of multiple sclerosis patients treated with natalizumab using the French EDMUS (European Database for Multiple Sclerosis) network**

*Sandra Vukusic, Nadine Passante, Laura Zanetti, Cécile Ritleng, Laurent Laforest, Eric Van Ganse\*, Fanny Rocher, Michel Clanet, Anne Castot, and Christian Confavreux, for the TYSEDMUS group*

Background Natalizumab, a monoclonal antibody, has shown efficacy in reducing the relapse rate and delaying disability progression in MS patients. However, severe opportunistic infections and infusion reactions have been observed in clinical trials. Furthermore, its high cost requires a rational use. In this context, the benefit/risk ratio (BRR) of natalizumab must be studied in real life settings. 1. The main objective of the TYSEDMUS study is to characterize the safety profile of natalizumab in real life settings. Secondary objectives are to describe the clinical evolution of patients, the utilisation patterns of the treatment, and to compare the occurrence of malignancies and serious infections in the natalizumab-exposed population versus a non-exposed one. 2. TYSEDMUS is a multicentric observational cohort study promoted by AFSSAPS (French Medicines Agency) and involving French neurologists prescribing natalizumab. It aimed at including all patients exposed at least once to natalizumab. A comparison group of non-exposed patients, never treated with natalizumab, but receiving or not other immuno-active therapies, will be extracted from the EDMUS databases. Patients' characteristics under natalizumab (including clinical evolution), utilization patterns of natalizumab and occurrence of adverse events will be described. Incidence rates of adverse events of special interest will be provided with two-sided confidence intervals. Kaplan-Meier analysis will be used to estimate the time interval to the occurrence of adverse events. Comparison of the occurrence of serious infections and malignancies between patients treated or not with natalizumab will be done by Log-rank tests and Cox proportional hazards models/ Poisson regression. 3. The follow-up duration is planned to be at least five years. Study methodology and descriptive results in the first patients will be presented. On April 1st 2008, more than 1000 patients have been starting natalizumab in France. 4. The TYSEDMUS study should allow to evaluate the BRR of natalizumab and monitor its use in everyday medical practice.

#### Abstract K06 (2034)

##### **PEIMA study: Prevalence of adverse drug effects in French patients with dementia.**

*Marie-Laure Laroche\*, Perrault-Pochat MC, Ingrand I, Merle L, Kreft-Jais C and the French Pharmacovigilance Centres Network.*

**Objective** To assess the adverse drug reactions (ADR) occurring in patients with Alzheimer's disease (AD) or other dementia in France.

**Methods** A one-day cross sectional multicentre study was conducted (15/2/2010-15/5/2010) by the network of the 31 French regional pharmacovigilance centres. After randomization, patients with AD or other dementia were included in memory consultation units, nursing homes, and in acute- intermediate- and long care- geriatric units. Socio-demographic and medical data were registered. ADR were assessed by an ad-hoc committee.

**Results** The study included 1332 subjects; 61.3% with AD. The mean number of drugs was  $6.3 \pm 3.1$ . Anti-dementia drugs were given to 66.4% of the patients. The prevalence of ADR was 5.0% (95% CI: 3.9-6.2). No significant difference between at home and institutionalized patients was detected. The most frequent ADR involved the gastro-intestinal tract (23.2%) and the central nervous system (17.4%). 31.9% of the ADR were judged serious and 47.8% avoidable. The drugs most often involved were anti-dementia drugs (29.0%), cardiovascular drugs (29.0%) and psychotropic drugs (26.0%: anxiolytics, hypnotics, antidepressants, neuroleptics).

**Conclusion** AD and other dementia have been declared a French public health priority and an assessment program has been set up from 2008 to 2012. One of the key measures is the evaluation of iatrogenesis in this population. Even though the ADR of acetylcholinesterase inhibitors and memantine are well known, and the drugs inducing memory loss clearly identified, the ADR occurring in patients with cognitive impairment are less well known. The PEIMA study is the first survey conducted over the whole French territory demonstrating that the pattern of iatrogenesis in patients with dementia, whatever its cause, is similar to that expected in the general population. However, special attention is required when prescribing psychotropic and anti-dementia drugs, as they are frequently used and induce half of the ADR in this population.

**Abstract K07 (2035)****Quality of prescription in the elderly in France: a population-based study from the National Insurance Healthcare system.**

*Marie-Laure Laroche\**, *Bienvenu B*, *Gutton S*, *Colvez A*, *Guéguen R*, *Merle L*

**Objective** To assess the prevalence of potentially inappropriate medications (PIM) in the elderly aged 75 years and over in France, using the consensual French PIM list and the National Insurance Healthcare system database.

**Methods** Within the permanent 1/97th random sample of the French National Insurance Healthcare system database (Echantillon Généraliste des Bénéficiaires, EGB) involving 530,000 beneficiaries, the list of the drugs reimbursed to patients aged 75 years and over was extracted (1/3/2007-29/2/2008). Drugs were classified as inappropriate using the French consensual PIM list which identifies 3 categories: drugs with i) an unfavourable benefit/risk balance, ii) a questionable efficacy, iii) both an unfavourable benefit/risk balance and a questionable efficacy. A PIM user was defined as a person benefiting from at least one PIM reimbursement during the study period. Inter-region variability was also estimated using logistic regression.

**Results** During the study period, 53.6% (IC95%:53.0-54.1) of the 35,259 elderly aged 75 years and over used at least one PIM. The three main drug groups identified were; cerebral vasodilators (19.4%; mainly ginkgo-biloba), drugs with antimuscarinic properties (19.3%; mainly antihistamines) and long half-life benzodiazepines (17.8%, mainly bromazepam). A disparity of PIM prescription between French regions was observed. In 14 out of 22 regions, the risk of PIM prescription was significantly elevated. However, according to the drug groups, this geographical variation was different.

**Conclusions** The prevalence of PIM prescription in French elderly remains high and preoccupying. An effort by medical doctors to avoid prescribing cerebral vasodilators, drugs with antimuscarinic properties and long half-life benzodiazepines is desirable. The recent accessibility to the National Insurance Healthcare database allows the creation of local indicators to manage regional public health policy, closer to the needs of the patients.

**Abstract K08 (2051)****Analyses of natalizumab prescriptions and discontinuations in multiple sclerosis patients of an Italian region.**

*C.Sacripanti*, *Carlo Piccinni\**, *A.Puccini*, *E.Poluzzi* and *N.Montanaro*<sup>1</sup>

**Objectives** The risk of PML associated with natalizumab increases with the number of infusions and in particular after two years of treatment (EMA, January 2011). However, to date, no evidence of the best duration treatment are available. The aim of the study is to analyse the actual natalizumab therapy duration and any cause of discontinuation in patients of Emilia-Romagna region.

**Methods** From Italian Tysabri Registry, natalizumab prescriptions through Jan2007-Jun2010 and referred to Emilia-Romagna patients were selected. Discontinuation therapy was defined when drug prescription was not been renewed after 30 days from latest one. The permanent stopping of treatment was defined as "event" and the probability of discontinuation was analyzed by the Kaplan-Meier survival curve. Finally, causes of drug interruption were described.

**Results** Among 198 patients with at least 1 natalizumab prescription, 27% discontinued the drug, with a median therapy length of 12 months (max 35, min 1). The remaining 73% were on treatment at the end of the follow-up with a median therapy length of 16 months (max 40, min 1). The interruption frequency during the first two years of therapy was low, while in the third year the rate of withdrawal increased and this difference is statistically significant ( $p < 0.0001$ ). Discontinuation causes, available for 79% of patients, were the following: 41% for concluded cycle of therapy, 31% for adverse events, 14% for lack of treatment effectiveness, 5% for pregnancy and remaining 9% for other causes.

**Conclusions** Our data confirmed that the risk of discontinuation therapy was greater after two years of treatment. This analyses provides information about actual use of natalizumab and about risk management approach of clinicians. In our opinion, it's very important continue to collect information about natalizumab therapy because its risk-benefit profile is still unclear



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