guidelines recommendations and positive effect of ACE inhibitors on hypertension control, the use of ACE inhibitors in hypertensive patients suffering from diabetes mellitus was suboptimal at Penang Hospital.

PCV20

DURATION OF ACTION OF ALISKIREN IN HYPERTENSIVE PATIENTS WITH DIABETES – IMPLICATIONS FOR CONTROL OF BLOOD PRESSURE IN REAL-WORLD USE IN IMPERFECTLY ADHERENT PATIENTS

Lowy A, Brede Y
Novartis Pharma AG, Basel, Switzerland

OBJECTIVES: Diabetes increases cardiovascular (CV)/renal risk and thus also increases the importance of optimal control of blood pressure (BP), which is generally poor among hypertensive patients with diabetes. Poor adherence to antihypertensives is common. Electronic monitoring has shown that treatment lapses among hypertensives frequently exceed the duration of action of most antihypertensives, allowing the BP to rise, and reducing these drugs' real-world effectiveness by increasing CV risk. Use of long-acting antihypertensives may improve BP control among subjects who, like most, miss doses occasionally. Aliskiren, a direct renin inhibitor, has been shown in the general hypertensive population to suppress BP well beyond its 24-hour dosing interval. Its BP-lowering effect is almost uninfluenced by a single missed dose, and remains strong after treatment interruptions of a week (longer than almost all dosing errors). This study examines the duration of action of aliskiren among hypertensive patients with diabetes. **METHODS:** BP data from one to 28 days post-withdrawal, from diabetic subjects in six clinical trials, were modeled to estimate the extent to which use of aliskiren will ameliorate the effects of imperfect adherence among diabetic subjects, compared to other antihypertensives. **RESULTS:** Thirty-four diabetic subjects had their BP measured 24 hours after treatment withdrawal (48 hours after the last dose). The mean (95% CI) increase in systolic BP from pre-withdrawal baseline was 0.8 (-3.1 to +4.7) mmHg. Seventy-three diabetic subjects had their BP measured either six or seven days after withdrawal. The mean (95% CI) increase in systolic BP from the pre-withdrawal baseline was 3.4 (+0.8 to 6.1) mmHg. **CONCLUSIONS:** Among diabetics, as in the general hypertensive population, aliskiren retains much of its effect for a week after stopping treatment. Its duration of action in diabetic subjects covers the majority of dosing errors. This may confer advantages over other treatments.

PCV21

CLINICAL EFFICACY OF BISOPROLOL COMPARED TO ATENOLOL IN REDUCING THE IN-CLINIC AND AMBULATORY BLOOD PRESSURE IN HYPERTENSIVE PATIENTS

Rai MK, Goyal R
Cardiff Research Consortium, Capita India Pvt. Ltd, Mumbai, Maharashtra, India

OBJECTIVES: The objective was to evaluate the clinical efficacy of bisoprolol compared to atenolol in reducing the in-clinic and ambulatory blood pressure in patients with mild to moderate hypertension. **METHODS:** Studies were retrieved from Embase, Pubmed, and Cochrane databases using relevant search strategies. Randomised controlled trials which compared bisoprolol with atenolol were included according to pre-specified inclusion/exclusion criteria. The outcomes of interest were reduction in in-clinic systolic/diastolic blood pressure, 24-hour ambulatory BP (ABP), and reduction in heart rate. Two reviewers independently extracted data from the included studies. Data was meta-analysed using RevMan (v5). **RESULTS:** Of the 1056 studies identified, 11 studies met the inclusion criteria. In total, 624 patients were randomised to bisoprolol, and 683 were randomised to atenolol. Seven of the included studies were double-blind, three were single-blind and one was open-label study. The Jadad score of eight studies was ≥3 and were of high quality. The study duration of included studies ranged from 8-weeks to 52-weeks. Results of meta-analysis showed a significantly better reduction of clinical systolic BP with bisoprolol compared to atenolol (WMD: 3.07 (1.79, 4.35, $p<0.00001$). The reduction in clinical diastolic BP was significantly better with bisoprolol compared to atenolol (2.68 (1.88, 3.48, $p<0.00001$). The systolic ABP was significantly reduced with bisoprolol compared to atenolol ($p<0.001$). The reduction in diastolic ABP was more with bisoprolol but was not significantly better. A significantly better reduction in heart rate was achieved with bisoprolol compared to atenolol (1.81 (0.97, 2.65, $p<0.0001$). **CONCLUSIONS:** This review has included the evidence to date with regards to reduction of clinical and ambulatory blood pressure with bisoprolol compared to atenolol. This review concludes that bisoprolol is significantly better than atenolol in effectively reducing the in-clinic BP, ambulatory BP and heart rate in patients with mild to moderate essential hypertension.

PCV22

GEOGRAPHIC VARIATION TRENDS IN CRITICAL LIMB ISCHEMIA PREVALENCE IN THE UNITED STATES

Baser O[1], Wang L[2]
[1]*STATinMED Research/The University of Michigan, Ann Arbor, MI, USA,* [2]*STATinMED Research, Dallas, TX, USA*

OBJECTIVES: To examine the geographic variation trends in the annual prevalence of critical limb ischemia (CLI) in the US elderly population. **METHODS:** Using national medical claims data from 2006 through 2008, all patients who were aged 65 years or older and diagnosed with CLI were identified. The direct standardization method was used to assess year, age, gender, race and diabetes-adjusted prevalence of CLI. The change in prevalence of CLI over the 3 years was assessed and the variation in the prevalence of CLI was tested by state. **RESULTS:** Geographic variation in the prevalence of CLI was obtained for patients over the age of 65 when adjusted by age, gender, race and diabetes status. Although approximately constant prevalence of CLI was reported in Utah (less than 0.15%) and Maryland (greater than 0.30%), a progressively increasing prevalence of CLI was observed in Montana (2006: 0.149%; 2007: 0.163.%; 2008: 0.277%) and Delaware (2006: 0.245%; 2007:0.247%; 2008: 0.330%) while progressively decreasing prevalence of CLI was observed in Arkansas, Colorado, Georgia, Ohio, Virginia, West Virginia, and Washington. The total trend over 3 years followed the pattern of higher rates in eastern states and lower rates in western states. **CONCLUSIONS:** The spatial distribution of CLI prevalence is uneven and strongly suggests a geographic variation of CLI risk areas. Targeted prevention and treatment could help gain better control of CLI in the United States.

PCV23

CLOPIDODGREL AND STATIN PRESCRIBING PATTERNS IN ACS PATIENTS – AN OBSERVATIONAL STUDY USING LINKED SECONDARY AND PRIMARY CARE DATA IN A UK POPULATION 2003-2009

Boggon R[1], Fox KA[2], Begg A[3], Ray K[4], Timmis A[5], Hemingway H[6], Emmas CE[7], Van staa T[1]
[1]*GPRD, London, UK,* [2]*University of Edinburgh, Edinburgh, UK,* [3]*University of Dundee, Dundee, UK,* [4]*St George's University of London,, London , UK,* [5]*Barts and the London School of Medicine and Dentistry,, London, UK,* [6]*University College London, London , UK,* [7]*AstraZeneca UK Ltd, Luton, UK*

OBJECTIVES: To use a novel linkage database to describe prescribing patterns in patients discharged from hospital with acute coronary syndrome (ACS) over a period of changing national guidelines. **METHODS:** Unique identifiers were used to link patients in a hospital registry (Myocardial Ischaemia National Audit Project), with longitudinal primary care data (General Practice Research Database). This retrospective observational study examined post-discharge prescribing patterns for unstable angina (UA), non-ST elevation myocardial infarction (NSTEMI) and ST elevation MI (STEMI). The population comprised patients ≥40 years, hospitalised for ACS from 2003-2009, discharged home, with ≥3 months follow-up. Patients were followed from discharge until death, or censoring. A patient was classified as discontinued if they had no further prescription within the duration of a prescription plus a grace period of 90 days. **RESULTS:** Of the 7,888 linked patients with at least 3 months of follow-up, 865 had a discharge diagnosis of UA, 4108 NSTEMI and 2915 STEMI. Overall 412(48%) UA, 2820(69%) NSTEMI and 1830(63%) STEMI patients were treated with clopidogrel in primary care within 3 months of discharge. The proportion of UA patients treated remained relatively stable over the study period (2003:47%, 2009:38%), in contrast prescribing increased in NSTEMI (2003:41%, 2009: 78%) and STEMI patients (2003:24%, 2009:87%). Statin use was high in all three groups (734(85%) UA, 3609(88%) NSTEMI, 2784(96%) STEMI) and remained so throughout the study period. The median time until discontinuation of medicine was 12 months for clopidogrel and >24 months for statin across all three ACS types. Patterns of discontinuation remained constant across all study years. **CONCLUSIONS:** The proportion of patients with STEMI and NSTEMI treated with clopidogrel increased from 2003 to 2009, in line with national guideline recommendations. However there was no evidence that clinicians differentiated length of therapy by type of ACS.

PCV24

PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMIC ASPECTS OF USE OF ACE INHIBITORS IN SERBIA COMPARED WITH MONTENEGRO IN 2009

Tomic Z[1], Mikov M[1], Sabo A[1], Milijasevic B[1], Sahman M[2], Andric V[3]
[1]*School of Medicine, Novi Sad, Vojvodina, Serbia and Montenegro,* [2]*ALMS, Podgorica, Montenegro, Podgorica, Serbia and Montenegro,* [3]*Republic Institute for Health Insurance of Serbia, Belgrade, Serbia and Montenegro*

OBJECTIVES: The aim of the study was to analyze use of ACE inhibitors in Serbia compared with Montenegro in year 2009. **METHODS:** Data about use of ACE inhibitors in Serbia and in Montenegro in 2009 taken from Republic Institute for Health Insurance from Serbia and from Health Service Fund of Montenegero. **RESULTS:** Use of ACE inhibitors in Serbia in 2009 was 179,26 DDD/1000 inh/day and in Montenegro was 83,32 DDD/1000 inh/day. In Serbia 5.977.289,00€ has been spent for ACE inhibitors and in Montenegro 2.488.464,95€ in the same year. In Serbia on the first place is enalapril with 78,32 DDD/1000 inh/day or 44,43%, on the second place fosinopril with 20,09 DDD/1000 inh/day or 11,40%, while on the third place is ramipril with 19,11 DDD/1000 inh/day or 10,84% of total drug utilization in this subgroup. Amount spent on enalapril was 1.717.416,00€ or 28,73%, on fosinopril 1.116.972,00€ or 18,69%, and on ramipril 470.937,00€ or 7,88% of total finances spent on this subgroup C09 in year 2009. In Montenegro on the first place are lisinopril and hydrochlorothiazide with 19,62 DDD/1000 inh/day or 23,55%, on the second place are fosinopril and hydrochlorothiazide with 12,77 DDD/1000 inh/day or 15,33%, while on the third place is fosinopril with 11,92 DDD/1000 inh/day or 14,31% of total drug utilization inside this subgroup. Money spent on lisinopril and hydrochlorothiazide are 425.547,30€ or 17,10%, on fosinopril and hydrochlorothiazide 762.333,74€ or 30,63%, and on fosinopril 533.307,43€ or 21,43% of total finances spent on this subgroup C09 in the year 2009. **CONCLUSIONS:** Comparing the consumption of ACE inhibitors in Serbia and Montenegro in the year 2009, it becomes clear that the combination of ACE inhibitors with diuretics is most frequently used in Montenegro, while in Serbia the use of this combination is on the the fifth place in this group of drugs.

PCV25

CHARACTERISING PATIENTS WITH A FIRST-TIME ADMISSION FOR ATRIAL FIBRILLATION IN THE UNITED KINGDOM

Jones J[1], Townsend R[2], Jameson K[3], Amber V[4], Evans LM[5]
[1]*Cardiff Research Consortium, Cardiff, UK,* [2]*CRC, Cardiff, UK,* [3]*MSD Ltd, Hoddesdon, UK,* [4]*MSD Ltd, Hertfordshire, UK,* [5]*University Hospital Llandough, Cardiff, UK*

OBJECTIVES: To characterise patients with atrial fibrillation (AF) in a UK secondary care centre. **METHODS:** Eligible patients admitted to Llandough Hospital (Cardiff, UK) as an emergency with AF (ICD10 code: I48X), and discharged between 1/10/2009

and 31/03/2010, were identified through examination of electronic patient records. Exclusion criteria included patients with atrial flutter (AFl), or an ICD10 code indicating prior inpatient attendance for AF since 1995. Patient notes were reviewed manually and an anonymised data collection template completed by the clinician for analysis. **RESULTS:** Of the 126 patients meeting the inclusion criteria, the notes of 7 patients were unobtainable and 8 with a diagnosis of AFl were excluded. The majority of patients were symptomatic at presentation (56%) and less than half were male (41%). Within the study population, the frequency of patients with AF increased with age, peaking at 80-89 years (45% of the study sample). Method of admission was primarily through A&E or GP referral (48% each); with 50% of A&E admissions being for symptomatic AF, compared with 60% of those referred via a GP. Almost half the study population were recorded with "first detected AF" (47%); 67% of whom were symptomatic, compared to 47% being symptomatic in patients recorded as "not first detected AF". The majority of patients were reported to have 1 or 2 of the pre-defined co-morbidities of interest (29% each); one fifth had no co-morbidities. The most common co-morbidities were hypertension (51%), ischaemic heart disease (20%), heart failure (18%), diabetes (16%) and pulmonary disease (15%). **CONCLUSIONS:** Results from this study demonstrate the majority of patients presenting to secondary care with AF have multiple associated co-morbidities, which are known to influence the management and treatment strategy, and long-term complications. Further up-to-date epidemiological studies, which describe the history, management and prognosis of patients with AF, are required.

PCV26

REAL WORLD ADD-ON AND SWITCH PATTERNS FOR PLATELET AGGREGATION INHIBITORS

Löfroth E, Bruce S, Myrén KJ
IMS Health, Stockholm, Sweden

OBJECTIVES: To analyze the add-on and switch patterns for patients who dispensed platelet aggregation inhibitors, excluding heparin (acetylsalicylic acid, clopidogrel, and dipyridamole) in the South-West region of Sweden. **METHODS:** This was a retrospective database study of medication utilization amongst patients from the South-West region of Sweden (1.5 million inhabitants). All patients who dispensed platelet aggregation inhibitors (B01AC), excluding heparin, from 2006 to 2009 were included in the study. A dispatch was classified as new, switch, add-on, or continuation. All dispatches were annotated, at the ATC level, as either new (no other anticoagulant within 105 days), add-on (another anticoagulant dispatched both before and after), switch (another anticoagulant dispatched before, but not after), or continuation (dispatched same ATC-code within 105 days). **RESULTS:** 163 330 patients had at least one B01AC filled prescription. The total number of dispatches for these patients were 3 327 499. 96% of all patients had been dispatched acetylsalicylic acid (ASA), 11% clopidogrel and 6% dipyridamole. ASA was dispatched as a new prescription in 17% of all dispatches, in <0.5% as add-on, <0.5% as switch, and in 83% as continuation. For clopidogrel the distribution was 17% (new), 4% (add-on), 3% (switch), and 77% (continuation). For dipyridamole the distribution was 7%, 18%, 8%, and 68%. **CONCLUSIONS:** Not surprisingly ASA was by far the most common treatment. ASA and Clopidogrel both had first line treatment profiles, of which it was most pronounced for ASA (<1% add-on or switch). Dipyridamole is used more as an add-on or switch therapy with 18% as add-on, 8% as switch, and only 7% as new dispatches.

PCV27

FREQUENCY OF ADVERSE DRUGS EVENTS (ADES) AS POSSIBLE CAUSES OF REQUEST OF DRUGS NOT INCLUDED IN ESSENTIAL MEDICINES LIST IN COLOMBIA

Buendia Rodriguez JA
Universidad de Buenos Aires, Buenos Aires, Argentina

OBJECTIVES: To describe the frequency of adverse drugs events (ADEs) as possible causes of request of drugs not included in essential Medicines list in Colombia **METHODS:** This was a retrospective, descriptive study developed in a private medical insurance company in Bogota, Colombia. Data were obtained from drug request form of drugs not included in a national essential Medicines list. We analyzed the content of the notes to identify the records related to the occurrence of ADEs in the period 2005 to 2008. Information concerning the adverse event and the drug involved was recorded in a data collection instrument developed by the researchers. The pharmacological classification of drugs was performed according to the Anatomical Therapeutic Chemical Classification System (ATC). Univariate descriptive statistical analysis was performed **RESULTS:** A total of 116 cases of ADEs were detected. The level 1 groups of the ATC of drugs with greater frequency of ADEs were the cardiovascular agents (66; 47.15%), nervous system agents (34; 23.7 %) and antineoplastic and immunomodulating agents (21; 14.7 %). The great majority was cases of light severity (89; 62.7 %) and classified as possible (66; 48.4 %). **CONCLUSIONS:** We conclude that our study encourages the private medical insurance companies in developing countries to design pharmacosurveillance programs; recognizing the importance of looking for new sources of report of adverse reactions to diminish the under-notification of ADEs.

PCV28

CONTROL OF HYPERTENSION IN SPAIN: A SYSTEMATIC REVIEW AND META-ANALYSIS OF 76 EPIDEMIOLOGICAL STUDIES ON 341,632 PARTICIPANTS

Catalá-López F[1], Sanfélix-Gimeno G[1], García-Torres C[2], Ridao M[3], Peiró S[1]
[1]*Centro Superior de Investigación en Salud Pública (CSISP), Valencia, Spain,* [2]*Oxford Radcliffe Hospitals NHS Trust, Oxford, UK,* [3]*Instituto Aragonés de Ciencias de la Salud (I+CS), Zaragoza and Centro Superior de Investigación en Salud Pública (CSISP), Valencia, Spain*

OBJECTIVES: Hypertension is a leading global risk factor for the burden of cardiovascular disease. Data about changes in hypertension control are important to set intervention priorities. We conducted a systematic review and meta-analysis of epidemiological studies to determine the control of hypertension in Spain over the last decade. **METHODS:** A search of PubMed/MEDLINE, SCOPUS and IME was performed for epidemiological studies conducted in Spain (since 2000) with data on control rates for hypertension. The primary outcome was the prevalence of uncontrolled hypertension defined as the percentage of patients having systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg. For populations at risk (e.g. patients with diabetes), the definition was SBP ≥ 130 mmHg and/or DBP ≥ 80-85 mmHg. Pooled-prevalence estimates and 95% confidence intervals (95% CI) were determined by random-effects models using the inverse variance method. Heterogeneity was assessed using Cochran's Q and I2 statistics. **RESULTS:** Seventy-six studies evaluating 341,632 patients (79% with hypertension) met the inclusion criteria. Among hypertensive patients, the overall pooled-prevalence of uncontrolled hypertension (≥ 140/90 mmHg) was 67.0% (95% CI: 64.1% to 69.9%), but was 87.6% (95% CI: 86.2 to 89.0%) when the most restricted definition (≥ 130/80-85 mmHg) was used for patients at risk. The test for heterogeneity was significant (P<0.001). Using metaregression analyses, we showed that the prevalence of uncontrolled hypertension did not change significantly over time, but the percentage of patients receiving at least two antihypertensive drugs increased (P=0.032, and 0.001). **CONCLUSIONS:** In Spain, the control of hypertension is far from optimum and does not appear to have improved in recent years despite the increased intensity of therapy. Patients at risk with comorbidities appear to be controlled worse.

PCV29

RECENT IN-HOSPITAL MORTALITY TRENDS AMONG PATIENTS WITH HEART FAILURE IN THE NETHERLANDS

Overbeek JA[1], Penning-Van Beest FJA[1], Herings RMC[2], Agodoa I[3]
[1]*PHARMO Institute for Drug Outcomes Research, Utrecht, The Netherlands,* [2]*Erasmus Medical Centre, Rotterdam, The Netherlands,* [3]*Amgen Inc., Thousand Oaks, CA, USA*

OBJECTIVES: Recent in-hospital mortality data among heart failure (HF) patients in the The Netherlands are lacking. This study described in-hospital mortality rates among HF patients in the The Netherlands from 2005 to 2009. **METHODS:** The PHARMO database network includes, among other things, hospitalization records of approximately 3.2 million residents in the The Netherlands. From this database, all patients with a hospitalization for HF between 2005 and 2008 were selected. The date of the first HF admission was defined as the index date. Patients hospitalized for HF in the 12 months prior to index date were excluded. Patients were followed from index date until end of data collection, death, or a maximum of 12 months, whichever occurred first. Crude mortality rates over time were determined during index HF admission, any HF readmission, and during any all-cause readmission . **RESULTS:** The study included 9786 patients with an index HF admission. Mean (± SD) age was 77 (± 11) years and 52% were female. During index HF admission (mean (±SD) length of stay (LOS):11 (±10) days) 10% of patients died. Hence, 8,850 patients were at risk for readmission. During follow-up, 1,563 (18%) patients were readmitted for HF and 4,542 (51%) patients had an all-cause readmission. In-hospital mortality during HF readmission (mean (±SD) LOS: 11 (±9) days) was also 10%. In-hospital mortality during all-cause readmission (mean (±SD) LOS: 7 (±11) days), was 5%. Mortality rates over time from 2005 to 2009 were stable. Mean (±SD) number of days between hospital (re)admission and death was 10 (±13) days for the index HF admission and 12 (±12) days for both HF readmission and all-cause readmission (12 (±15) days). **CONCLUSIONS:** In most recent years, in-hospital mortality remains unchanged with 10% of HF patients dying during HF admission.

PCV30

HEART FAILURE (RE)ADMISSIONS IN THE NETHERLANDS: RATES, LENGTH OF STAY AND COSTS

Overbeek JA[1], Penning-van Beest FJA[1], Herings RMC[2], Agodoa I[3]
[1]*PHARMO Institute for Drug Outcomes Research, Utrecht, The Netherlands,* [2]*Erasmus Medical Centre, Rotterdam, The Netherlands,* [3]*Amgen Inc., Thousand Oaks, CA, USA*

OBJECTIVES: Hospital admissions are common among heart failure (HF) patients and contribute to the significant clinical and economic burden of HF. This study determined rates, length of stay (LOS) and costs of HF (re)admissions. **METHODS:** The PHARMO database network includes, among other things, hospitalization records of approximately 3.2 million residents in the The Netherlands. From this database, all patients with a primary hospital discharge code for HF between 2005 and 2008 were selected. Date of first HF admission was defined as index date. Patients hospitalized for HF in the 12 months prior to index date were excluded. Patients were followed from index date to end of data collection, death, or a maximum of 12 months, whichever occurred first, in order to assess primary hospitalizations for HF within one year, i.e. HF readmissions . Main outcomes for each identified HF (re)admission were LOS (in days) and costs per (re)admission (amount paid in €). **RESULTS:** The study included 9,786 patients with an index HF admission. Mean (± SD) age was 77 (± 11) years and 52% were female. Mean (± SD) LOS was 11 ± 10 days and mean (± SD) hospitalization costs of index HF admission were €8,650 (± €9,100). During the index HF admission 936 patients died, therefore 8,850 patients were at risk for a HF readmission. Of those patients, 1,563 patients were readmitted for HF within one year. Overall, one-year HF readmission rate was 21.8 per 100 person years. Mean (± SD) LOS of first HF readmission was 10 ± 10 days and mean (± SD) hospitalization costs of first HF readmission were €8,850 (± €8,450). **CONCLUSIONS:** One fifth of patients hospitalized for HF in the The Netherlands have a subsequent HF admission within one year. Overall, costs of index HF admission and first HF readmission are similar.