sus those with 80% adherence. Total expenditures considered expenditures from inpatient admissions, ER visits, and medications. Potential savings was defined as reduction in total expenditures due to increasing adherence. **RESULTS:** Nonadherence resulted in increased all-cause total expenditures in diabetes, cholesterol, and heart by $240 million (M), $150M, and $47M, respectively. Increasing adherence by 2% reduced increases in all-cause expenditure by 11% to 21%. Nonadherence resulted in increased disease-specific hospitalization and ER visit expenditure for depression ($6M), diabetes ($44M), and cholesterol ($5M). However, increases in the disease-specific hospitalization and ER expenditures were offset by lower medication expenditure, thus resulting in overall lower disease-specific expenditure among the nonadherent patients. Overall, increases in medication adherence resulted in savings in all-cause expenditure but not in disease-specific expenditure. **CONCLUSIONS:** Medication nonadherence can be costly to payers. Increasing adherence even by small amounts may result in significant savings.

PHP60
DRUG-RELATED MORBIDITY – MODELING THE COST-OF-ILLNESS IN SWEDEN USING PHARMACISTS' OPINION

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OBJECTIVES: The aim of this study was to estimate prevalence and preventability of drug-related morbidity in Sweden based on pharmacists' expert opinion. Furthermore, the aim was to estimate the cost-of-illness (COI) of drug-related morbidity. **METHODS:** Probabilities of therapeutic outcomes of medication therapy were estimated by an expert panel of pharmacists (N=29) using a two-round delphi-methodology and a conceptual model of drug-related morbidity based on a decision tree. We used an American conceptual model adjusted to the Swedish context. In the model, drug-related morbidity included new medical problems (adverse drug reactions, drug dependence and intoxications by overdose) and therapeutic failures (insufficient effects of medicines and morbidity due to untreated indication). The cost-of-illness analysis included all direct costs applying a health care perspective, using national statistics on costs. **RESULTS:** The expert panel estimated that $61\pm14\%$ (mean $\pm$ SD) of all patients visiting health care suffered from drug-related morbidity, of which $29\pm8\%$ suffered from new medical problems, $17\pm6\%$ from therapeutic failures, and $14\pm7\%$ from a combination of both types. Of patients with drug-related morbidity, $44\pm18\%$ suffered from preventable drug-related morbidity. Participants estimated that 7-39% of patients with drug-related morbidity do not require further attention, but a majority requires health care resources due to the drug-related morbidity. The direct costs were calculated to EUR 575 (2009 value) per patient, which corresponds to an annual cost of EUR 4 billion to the Swedish health care system. The largest component in the COI of drug-related morbidity was hospitalizations, with 50% of the total cost. Advanced specialist care represented 20%, and prolonged hospital stay 11% of the resulting costs. **CONCLUSIONS:** Drug-related morbidity is perceived frequent and often preventable. The estimated health care costs for this morbidity are extensive, and comparable in magnitude to the cost of dispensed medicines in Sweden. Effective and cost-efficient methods to reduce the drug-related morbidity are needed.

PHP61
MODELING PHARMACEUTICAL COSTS IN PRIMARY HEALTH CARE ACCORDING TO CHRONIC CONDITIONS

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OBJECTIVES: Controlling pharmaceutical costs has been the subject of research and analysis in many studies in health economics which have shown that the chronic conditions of patients are an important factor. The present work models pharmaceutical expenditure by different health districts and gender according to the characteristics of chronic conditions. **METHODS:** An analysis was made of pharmaceutical expenditure between November 2008 and October 2009 of four health districts of the Autonomous Valencian Government, with an assigned population of 625,246. Those who had followed treatments for chronic conditions were identified associating the pharmaceutical groups (ATC codes) with 24 chronic conditions, according to electronic prescription data. Multivariate regression analysis was used, where the pharmaceutical expenditure in primary health care was explained through the gender, pharmaceutical co-payment status and the number of chronic conditions, varying from 1 to 8 or more. **RESULTS:** The percentage of patients with chronic conditions obtained was of 27.82%, who constituted 58.2% of the total pharmaceutical cost. Pharmaceutical co-payment status was excluded from the model due to its high correlation with the number of chronic conditions. The goodness of fit obtained for explaining the expenditure of the whole population was of 57.2%. The models obtained by health district explained between 56.5 and 60.6%, improving in the models obtained solely for the male population, where they reached 62% for one of the districts studied. Men's pharmaceutical expenditure was the 68.31% of women's. However, the number of chronic conditions has a greater impact on men's pharmaceutical expenditure than women's. **CONCLUSIONS:** Although for the whole population the proposed model explained the 57.2% of the pharmaceutical expenditure, differences can be observed between models obtained for each district or for gender. These models may be more suitable than the general model for cost management and establishing incentives for general practitioners in the different districts.

PHP62
ESTABLISH DRUGS OPTIMAL PURCHASE MODEL

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OBJECTIVES: Taipei Medical University Shuang-Ho Hospital officially opened on July 1, 2008. Due to limited revenue during the initial period, hospital emphasized more on cost control. With the great demand of medication from the growing numbers of outpatients visits and inpatients, pharmacy aim to establish an optimal purchase model to minimize drug inventory management cost. **METHODS:** Economic Order Quantity (EOQ) model were applied to find out the best quantity and frequency on medication purchase order. We analyzed the high-cost medications in which the top 50% of cumulative drug cost in year 2010, and intravenous antineoplastic drugs were excluded. **RESULTS:** The study evaluate drug cost, labor cost and inventory cost. Forty-six high-cost medications were selected to determine EOQ model in this study. The optimal frequency to order each drug estimated by EOQ model was three to ten times per month. The estimated cost of inventory management reduced substantially when order more frequently within 10 times a month. However, after considering the practicability in real practice, the order frequency was adjusted to one to four times per month. The best estimated quantity for each drug was also adjusted by previous fluctuation of purchase orders during 2010. Therefore, the estimated inventory management cost in year 2011 could reduce 500,000 to 700,000 NTD **CONCLUSIONS:** Our inventory management currently purchase drug twice a month. In order to optimize inventory turnover rate, without increasing pharmacists work loading and management cost, we recommend adjusting quantity and frequency of ordering medication based on our finding to achieve the minimal and rational cost on inventory management.

PHP63
SAVINGS ON PHARMACEUTICAL EXPENDITURE IN GREEK NHS HOSPITALS UNDER THE SHADOW OF THE INTERNATIONAL MONETARY FUND (IMF)

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Due to the financial crisis, Greece was forced by the International Monetary Fund and the European Community (Troika) to implement cost containment measures in the health care sector. **OBJECTIVES:** The objective of the study is to present the measures taken in order to control and reduce the pharmaceutical expenditure in all NHS hospitals and evaluate the respective savings emerging in 2010. **METHODS:** The data derive from the Ministry of Health and Social Solidarity (MoH) database, covering all NHS & IKA hospitals operating in the 7 Regional Health Authorities (RHA) of Greece. Data compare the NHS hospital pharmaceutical expenditure between 2009 and 2010. **RESULTS:** Numerous cost-containment measures have been gradually implemented in all NHS hospitals according to the IMF and MoH guidance, targeting at: 1)creation of NHS database network (esy.net); 2)transfer of the pharmaceutical pricing regulation from the Ministry of commerce to the MoH; 3)unification of the NHS electronic coding system, for ordering and prescribing of pharmaceuticals; 4)hospital packsize; 5)electronic patients files; and 6)increase in the use/penetration of generics & off patent medicines. Although the above measures are still not fully implemented, they reduced hospital pharmaceutical expenditure by 10.51%, from €1.466 million in 2009 to €1.312 million in 2010. At regional level, savings ranged from 8% in the 2nd RHA (covering Pireaus & islands) up to 16% in 6th RHA (Peloponnese & Western Greece). Moreover, in the 1st RHA covering the highest share of NHS hospitals of pharmaceutical expenditure was reduced by 15%. **CONCLUSIONS:** The new cost containment measures implemented in Greek NHS hospitals started presenting results by fulfilling the savings imposed by IMF & Troika). The same picture is presented in the overall HC sector, hospitals & social security funds. The goal of €350million savings by the NHS hospitals seems to be able to be achieved by the end of 2011.

PHP64
REORGANISATION OF HOSPITAL EMERGENCY SERVICES: A BUSINESS CASE FOR QUALITY IMPROVEMENT

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OBJECTIVES: In Switzerland, emergency care has no gatekeeping system and emergency wards are increasingly overcrowded by walk-in patients. This leads to inefficient use of spezialised resources. Treatment costs are paid by public sources and, beyond some co-payment, reimbursed by health care insurances via tariffs. Given the problems above, a public hospital (Stadtspital Waid; Zurich; catchment population 180'000 people) reorganised its emergency service in 2008. A nurse led triage system and a General Practitioner-led emergency service was implemented beside the conventional emergency ward. To better understand the impact, we assessed quality of service provision and total treatment costs. **METHODS:** From the public payer perspective, we compared annual treatment costs for ambulatory emergency care in 2007 with 2009. In a pre-post study, all consecutive ambulatory emergency patients were included during one month in each year. Treatment costs (CHF) were calculated (e.g. nursing time multiplied with wages) and extrapolated to one year. Waiting times and patient satisfaction were used as indicators for service quality. Clinical outcome was not directly measured. **RESULTS:** The annual number of ambulatory patients increased from n=10'440 (2007) to n=16'035 (2009). Service provision improved with reduced waiting times (mean: 120 min vs. 60 min), persistently high patient satisfaction and more efficient resource use (additional diagnostic testing: 71% vs. 56%). Comparison of the annual local budget spent for

treatment of 16,035 patients in 2009 (7,150,000 CHF; new service) with 2007 (7,184,000 CHF; old service, adjusted to 16,035 patients) showed slightly reduced costs (-34,000 CHF; 95%-CI: +60,000 to -127,000). **CONCLUSIONS:** The cost reduction of 0.5% is a conservative estimate as wages have increased since 2007. The reorganisation has the potential to be a dominant intervention: While quality of service provision improved, treatment costs slightly decreased against the secular trend of increase. Data has to be confirmed in follow-up measurements for decision makers.

PHP65

PHARMACEUTICAL EXPENDITURE IN PORTUGAL – POLICIES AND IMPACT

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OBJECTIVES: The Stability and Growth Pact approved by the Portuguese Government in 2010 limits the expenditure growth in 1% for reimbursed pharmaceuticals in outpatient sector. The Memorandum of Understanding signed in May 2011 between the Government and the International Authorities subsequently has increased the requirements to reduce public expenditure. Considering the pricing and reimbursement changes, this study aims to: 1) analyze public expenditure trends on medicines, and 2) identify the main factors and impacts. **METHODS:** We have analyzed the database sales and prescription data from Portuguese community pharmacies, and performed simulations to measure the impact of policy measures. The statistical analysis of monthly data by product was performed with SAS. **RESULTS:** The NHS expenditure in outpatient medicines has increased 5.6% in 2010. The legislation approved in June 2009, that established generics reimbursement at 100% for some pensioners (withdrawn in June 2010), was responsible for more 26.8 million euros of NHS spending in 2010. Nevertheless 117.1 million euros were explained by new molecules reimbursed in the last three years. After July 2010 and due to the 1% VAT increase, the expenditure had increased 7.5 million euros. The Health Subsystems (special security schemes for certain professions) had also contributed positively: in December about 7.4 million euros were transferred from the 'ADSE' (civil servants subsystem) for NHS. At the end of 2010, the Government adopted further measures to control public expenditure, such as 6% prices deduction and several reductions in pharmaceuticals reimbursement levels. Immediately the NHS medicines expenditure decreased 21.2% in the four first months of 2011. In opposition the hospital market is growing 3.5%. **CONCLUSIONS:** Besides price and reimbursement administrative reductions, with limited impact in the short run, it would be important to consider measures, that should be assessed on a periodic basis to identify the best strategies to promote rationality and efficiency in the outpatient and hospital sector.

PHP66

IMPACT OF TYPE OF DRUG INSURANCE ON THE USE OF HEALTH CARE SERVICES AMONG USERS OF ANTIDEPRESSANTS

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OBJECTIVES: To compare the use of health care services between patients with private and public drug insurance among users of anti-depressants. **METHODS:** A matched retrospective cohort study was conducted using databases for Quebec residents with private (reMed database) or public (RAMQ database) drug insurance. The study included 194 reMed and 1923 RAMQ patients aged 18 to 64 years who filled at least one prescription of an antidepressant between December 2007 and September 2009. Patients were matched on age, sex and date of 1st filled prescription of an antidepressant. The primary outcomes were the number of outpatients medical visits, emergency department (ED) visit (yes/no) and hospitalization (yes/no) for all causes over one year. The secondary outcome was the average antidepressant cost per patient per month. Linear or logistic regression was used to compare the outcomes between patients with private and public drug insurance, while adjusting for potential confounders. **RESULTS:** Patients with private drug insurance (21.3% males) had 8.1 outpatient medical visits on average, 17.5% had an ED visit and 8.8% were hospitalized over one year. Corresponding figures were 6.6, 20.0% and 8.5% for patients with public drug insurance (23.6% males). Patients with private drug insurance were found to have more outpatient medical visits than patients with public drug insurance (adjusted mean difference= 1.2; 95%CI: 0.2 to 2.3), but were not more likely to have an ED visit (adjusted OR= 0.7; 95% CI: 0.5 to 1.1) or a hospitalization (OR=0.9; 95%CI: 0.5-1.6). Average cost per patient per month for antidepressants was $48.50 (95%CI: 44.97-52.02) and $33.73 (95%CI: 32.94-34.51) for patients with private and public drug insurance, respectively. **CONCLUSIONS:** Little differences were found in the use of health care services between users of antidepressants with private and public drug insurance, while important differences were observed for the cost of antidepressants.

PHP67

TENDERING FOR OUTPATIENT PRESCRIPTION PHARMACEUTICALS: WHAT CAN BE LEARNED FROM CURRENT PRACTICES IN EUROPE?

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OBJECTIVES: To explore the current status (2010) of tendering programs for outpatient pharmaceuticals in the European countries and how these programs operate. **METHODS:** A survey was designed to assess the features of tendering programs in European countries. All 27 countries of the European Union plus Norway were included in the study. The survey was sent to national representatives of authorities and organizations and to academic researchers with expertise in the domain. **RESULTS:** Nineteen of the 28 countries have responded to the questionnaire (68%). Seven countries have adopted tendering programs for pharmaceuticals in ambulatory care. Tendering was more popular in countries with a mature generic medicines market (54%) than in countries with a developing generic medicines market (12.5%). Authorities with financial interest for possible savings issued the tenders and the lowest price/best offer was amongst the criteria to award the tender in most cases. The frequency varied from only once to once every two weeks and the number of winners was between one and four. The objectives of achieving cost savings were achieved in the short term but results on long term are still unclear. **CONCLUSIONS:** Tendering programs can achieve savings in the short term, but the effects in the long term are still unclear. It can be concluded that the policy can work, but the features of the programs such as the legal framework, the criteria to grant the tender, the number of winners, the reward of the winner and the frequency, have to be well-thought-out.

PHP68

ASSESSMENT OF THE NHS HOSPITALS' PRODUCTIVITY IN THE REGIONAL HEALTH AUTHORITY OF THESSALY IN GREECE

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OBJECTIVES: To assess the performance in seven homogenous specialty clinics across all NHS hospitals in the Regional Health Authority of Thessaly (RHAT), over the period 2002-2006. **METHODS:** Data Envelopment Analysis by using the Malmquist Productivity Index and its decompositions have been applied in order to measure the technical efficiency and productivity. Clinics were considered to transform inputs labour (medical and nursing staff) and capital (hospital beds) into health services, approximated by the number of in-patient discharges and in-patient days, used as outputs. The model is output oriented and assumes variable return to scale. Data were collected from hospitals' records. **RESULTS:** Overall productivity progressed in all clinics, led by technical change rather than technical efficiency. Over the whole period the size of the clinics influences the overall effects on hospital performance and the maximum level of outputs produced has not been achieved using the given labour and capital inputs, except orthopaedic clinics. The highest productivity changes were achieved by the gynecology (22.5%), the urology (15.7%) and the paediatric clinics (15.4%). All clinics experienced high technological change level, except general medicine clinics which drops by 6.5%. The highest technological changes were experienced by gynecology clinics (48.4%), the paediatrics (26.2%) and ophthalmology (22.1%). **CONCLUSIONS:** Homogeneity in assessing hospitals' performance provides evidence on the efficiency and productivity gains among clinics and suggests improvements in those which appear inefficient. The difficult economic situation Greece is facing nowadays makes the assessment of NHS hospitals' performance a priority in the decision making.

PHP69

CAN WE INCREASE HOSPITAL REVENUE WITH DIFFERENT NEUROMUSCULAR BLOCKERS? AN ANALYSIS OF SAVING COST FOR HOSPITAL BUDGET WITH TIME SAVING EFFECT OF DIFFERENT NEUROMUSCULAR BLOCKERS IN SHORT OPERATIONS

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OBJECTIVES: Muscle relaxants are used in anesthesia to obtain adequate muscle relaxation. Our aim is obtaining improvement in hospital budget by selecting adequate neuromuscular blocking agents for short-term (under 60 minutes)pediatric operations for hospital managements. **METHODS:** There is a basic investigation of the duration to recovery time of atracurium and rocuronium administrations during anesthesia induction in ASA I-II children. In order to evaluate the effect on hospital budget, direct expenses were used. **RESULTS:** The mean time to reach TOF75 in recovery with rocuronium and atracurium were calculated 38 and 51 minutes, respectively. In atracurium group, time to reach TOF75 was 51 minutes, but operation time was 46 minutes(as rocuronium groups)and patients needed an additional 5 minutes for recovery. During additional minutes, patients were kept in the operation room(OR), thus preparation for the next patient was delayed. After extubation of patients, to determine the period of preparation of an OR for the next patient, a questionnaire was administered. This preparation was determined to be 14 minutes. These means, in the rocuronium and atrocurium groups one needs 60 minutes (46+14) and 65 minutes (51+14), respectively from the start of an operation to the start of next operation. In a pediatric surgery department, lower abdominal and urogenital surgery unit income with rocuronium or atracurium are the same but, rocuronium brings extra time for an average of 15 operations lasting shorter than 1 hour. **CONCLUSIONS:** Study showed that if a hospital works with 100% performance and has no other problems (shortage of bed,personnel,etc), such a hospital may perform, in a month, an extra 15 pediatric surgical operations less than 1 hour can, by using rocuronium. Thus rocuronium may lead an additional income of US$ 2436 per month for one OR. In other words, in short operations, using rocuronium rather than atracurium may lead to savings which is 30-35% of total cost.

PHP70

VALUE BASED PRICING (VBP): IS THIS THE WAY FORWARD FOR THE UK NHS?

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