± 109) ($P = 0.025$). Mean nursing home costs amounted to €3243 (±2700) per patient during the final month of life. Mean nursing home costs per patient of €3822 (±3232) for patients receiving usual care were higher than costs of €2456 (±2117) for patients receiving palliative care ($P = 0.068$). **CONCLUSIONS:** This study suggests that palliative care models in acute hospital wards and in nursing homes need to be supported because such care models appear to be less expensive than usual care and because such care models are likely to better reflect the needs of terminal patients.

PHP47

EFFICIENCY IN DRUG PRESCRIPTION MEASURED BY THE APPLICATION OF ADJUSTED CLINICAL GROUPS IN THIRTEEN SPANISH PRIMARY CARE CENTRES

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OBJECTIVES: To measure the efficiency of pharmacy resources utilization in 13 Primary Care centres by the retrospective application of Adjusted Clinical Groups (ACG) in a usual clinical practice setting. **METHODS:** Retrospective study carried out on the basis of the clinical records from all the attended patients along the year 2008. Main variables: age, sex, case-mix/episodes, visits, pharmacy costs, 13 centres, physician and service (Family Medicine or Paediatrics). ACG grouper (Starfield and Weiner, Johns Hopkins University, n = 106) classifies each patient in a unique category of similar resource consumption. A Receiver Operating Characteristics (ROC-area under the curve) analysis was done to assess the predictive value of the model. The Efficiency Index (EI) was obtained as the quotient between the observed and the expected pharmacy costs according to ACG distribution (indirect standardization). The statistical package SPSS was used ($P < 0.05$). **RESULTS:** A total of 227,235 patients were included. Average number of episodes 4.5 ± 3.2 and visits 8.1 ± 8.2; mean age: 44.1 ± 23.7 years; and 55.6% of males. Intensity of utilization: 77.4%. Costs of drug prescription: €70.6 millions (47.6% of the total costs). Mean cost was €310.8 ± 681.2. ROC curve analysis for episodes: 0.588 (p = 0.001); sensibility: 37.3%, specificity: 73.1% and intra-class correlation coefficient C: 0.732 ($P < 0.001$). The EI for each centre was analyzed, $P < 0.0001$. Furthermore, differences between family physicians and paediatricians were observed (range: 0.55–1.46), $P < 0.001$. **CONCLUSIONS:** Results show a wide variability in the costs of pharmacy within centres and physicians. ACG provide an adjusted approximation to efficiency in pharmacy costs. Efficiency must not be considered as an isolated dimension of quality. The determination of the EI could lead to a better knowledge of the prescription profile from individual physicians and/or primary care teams.

PHP48

ECONOMIC EVALUATION OF HEALTH CARE INTERVENTIONS DURING MORE THAN 25 YEARS IN SPAIN (1983–2008)

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OBJECTIVES: Economic evaluation has been promoted as a tool to guide decision-making processes regarding health care resources' allocation and in the adoption of health care technologies. We analyzed the evolution and the main characteristics of economic evaluations of health care interventions done during the period 1983–2008 in Spain. **METHODS:** Observational descriptive study. We performed a systematic review in the main bibliographic databases (PubMed/MEDLINE, SCOPUS, ISI Web of Knowledge, CRD, IME, IBECS) and manually through Internet in journals and public reports. There were predefined inclusion and exclusion criteria, and a set of variables to analyze the characteristics of the selected reports. **RESULTS:** In total, 477 studies fulfilled inclusion criteria. Some of the studies characteristics were: cost-effectivenes analysis (62.5%), decision analysis techniques (34.0%), heath care system perspective (42.1%), therapeutic interventions (70.0%) and non explicit financing (44.0%). The geographical distribution for Spanish regions of the first authors was: Catalonia (29.3%), Community of Madrid (23.7%), Andalusia (6.7%) and Region of Valencia (6.3%). a total of 50.9% of the principal authors were employed at hospital centers. The most commonly disease conditions were: cardiovascular diseases (15.7%), infectious and parasitic diseases (15.3%) and malignant neoplasms (13.2%). a total of 82.2% of the reports provided recommendations guide for decision making. **CONCLUSIONS:** An increasing number of studies was observed. Identified reports combined heterogeneity in the quality of the information brought with regard to analysis methods, data sources, type of interventions, or disease conditions. It is suggested to do more efforts for improving the quantity and quality of reports in public health interventions.

PHP49

INFLUENCE OF THE CHRONIC DISEASE IN HEALTH RESOURCES USE: ECONOMICS CONSECUENCES AND RISK STRATIFICATION

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OBJECTIVES: The Chronic disease are ones of high prevalence, duration and slow progression, its cure could not be predicted clearly or will never be. In general, are related to lifestyles and population that is older. To determine the direct sanitary cost depending on chronic comorbidity grade (risk) in patients attended in a primary care setting (PC). **METHODS:** Retrospective multicentre design. Patients over 14 years were included, pertaining at 6 PC teams that demand assistance during year 2008. Main measures: sociodemographics, risk/casuistic/comorbidity, Charlson index (severity) and direct cost models. The chronic comorbidity was classified beginning from Adjusted Clinical Groups. It was obtained the Resources Utilization Bands (RUB) per patient (rank: 1- healthy user to 5- high morbidity). The complexity/comorbidity was grouped in 10 categories (6 expert forum). Fixed/semi fixed cost were considered (functioning: salary, services, purchases) and variable (tests, referrals, drugs). Explanation power calculation: determination coefficient (R^2). It was made an ANOVA analysis for the correction (age, sex, comorbidity) of the models (procedure: Bonferroni). SPSSWIN program; $P < 0.05$. **RESULTS:** A total of 69,653 patients, age-average: 47.6 ± 18.8 years; women: 54.1%; high morbidity: 4.8%; chronic disease: 3.8 ± 2.3 and total cost: €51.3 million (fixed cost: 12.3%). The 35.4% (n = 24,670; CI: 34.5–36.3%) showed ≥5 chronic disease. Binary correlations: comorbidity-BUR: 0.716; cost-comorbidity: 0.596; age-comorbidity: 0.429; $P < 0,001$. Osseo-muscular illness (38.1%), mental (31.6%) and cardiovascular (30.4%) were the same frequencies, $P < 0.001$. The unitary average of the cost corrected was of €736.74 ± €921.97, with comorbidity ranks between: 1 = 309.62; 5 = 842.99; 10 = €2,354.05, respectively, $P < 0.001$. Predictive model (R^2): age = 25.7%; age-sex = 26.5%; age-sex-comorbidity = 60.3%, of the cost. Women showed more comorbidity. **CONCLUSIONS:** Chronic comorbidity is associated with a sanitary cost increase. The number of comorbidities explains the major part of the cost. Patient knowledge of risk/complexity enable us doing different strategies of preventive/cure intervention. **KEY WORDS:** comorbidity, cost, resource use, risk.

PHP50

FRAGMENTED HEALTH CARE SYSTEM—SOLVING THE JIGSAW PUZZLE

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OBJECTIVES: Austria's health insurance system is divided into 13 sickness funds. Each fund has its own fee structure with individual names and codes for every procedure performed in an outpatient setting. Outpatient setting includes general practitioners, specialists, ambulatories and institutes. Each sickness fund has general contracts for GPs and specialists while each institute has its own contract. These contracts partly include procedures that are not comparable with any procedures of other sickness funds. Some sickness funds pay physicians and institutes different fees for same procedures. Moreover, the payment depends on the number of procedures performed by a physician or institute within a certain period of time. In order to evaluate procedure data, the so called meta-fee-structure, a set of pre-defined, standardized procedures that are mapped by individual fee-structures, was developed. **METHODS:** Given data with frequencies and costs of procedures for every sickness fund we are going to propose methods for examining and compare these data: Comparing the cumulative costs, frequencies, the average rates for procedures and the rates for different institutes and physicians paid by different sickness funds. All methods are then applied on real data in the field of radiology. **RESULTS:** By using this process with real world data it is possible to show the potential of these methods, lacks in data quality and the limitations of the meta-fee structure. Furthermore it is possible to point out proposals where procedure costs should be examined more closely and maybe health care costs could be reduced. **CONCLUSIONS:** Due to the heterogeneous health care system of Austria there is a wide variety of issues to be addressed when analyzing data. Although the proposed methods are very general they have to be adapted to the actual problems. Knowledge about data origin is crucial when choosing methods to get high quality results.

PHP51

ROUTINE REPLACEMENT OF PERIPHERAL INTRAVENOUS CATHETER VERSUS CLINICALLY INDICATED REPLACEMENT: A COST COMPARISON STUDY FROM THE PUBLIC PAYER PERSPECTIVE

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OBJECTIVES: IV catheterization is the most common invasive procedure among hospitalized patients and the widest practiced to prevent complications is routine replacement of the catheter (RCC) in fixed intervals. a meta-analysis (Webster 2008) showed no significant differences in terms of efficacy from RCC and replacement only when clinically indicated (RCI). This study aims to compare costs and consequences of RCC versus RCI from the public payer perspective. **METHODS:** Efficacy data was obtained from Webster 2008 which showed no clinical benefits of RCC over RCI. Data from the Brazilian Hospital Information System (SIH/DATASUS) from January 1–December 31, 2009 was used to define the annual number of admissions of adult patients in public hospitals wards, assuming RCC as the current practice (no ICU patients included). The mean length of stay (LOS) and the mean time to replacement (TTR) were used to calculate the number of replacements in each scenario. Resource utilization was estimated through published data and unit costs were obtained from Brazilian official price lists. **RESULTS:** A total of 8,985,758 hospitalizations were identified in the database in 2009 with mean LOS of 5.53 days (132.66 hours). According to a published randomized clinical trial included in Webster 2008, mean TTR for RCC and RCI was 66.5 and 90.6 hours, respectively, resulting in average 1.99 and 1.46 replacements per hospitalization in each setting. The estimated cost of replacement was 2.54BRL (nursing time and medical supplies). For all admissions, the total cost for RCC and RCI was 45,556,510BRL and 33,438,277BRL. The estimated

savings were 12,118,232BRL/year for the public health care system or 1,348BRL/year per 1,000 admissions. **CONCLUSIONS:** RCI has shown similar efficacy when compared to RCC with fewer costs. The cost difference was mild in magnitude but when extrapolated to a large-scale perspective these results reinforce the need of evidence-based decision making and rational resource allocation.

PHP52

HIGH AND INTENSIVE UTILIZERS IN HEALTH CARE—A STRATEGIC CHALLENGE FOR MEDICAL SUPPLY IN THE COMPULSORY HEALTH INSURANCE

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OBJECTIVES: In Germany, the financing mechanism aggravates the cost issue of so called high-utilizers. So far, there were no care management concepts as the mostly multimorbid, complex medical conditions were judged as individual, non-influenceable cases. We developed a method to reveal issues in treatment and care of this special insurance population to increase efficiency. **METHODS:** The most critical challenge for insurance companies lies in the identification of relevant insured, in order to specifically target the high effort of control and management. In this project we analyzed the secondary data of the members of a German insurance company in the course of four years. Based on this we first differentiated high-utilizers from average-utilizers. In the following we deflected by which means existing care management concepts could be complemented. Based on the longterm data observation we developed a prognostic model to predict future high-utilizers. **RESULTS:** High-utilizers were defined as the 5% most expensive insurance-members, who generated 50% of total spending. We distinguished high-utilizers who caused the main costs in one specific care sector (pharmaceuticals and hospital) and patients who caused costs in multiple sectors (transsectoral). In addition, ultra high-utilizers were considered separately due to their extreme cost provocation. While it is possible to manage the first two groups by a combination or extension of existing cost reduction measures and care approaches such as disease management programs, ultra high-utilizers should be addressed by an individual and specifically developed case management. **CONCLUSIONS:** This segment of insured demands a stringent, integrated approach in order to efficiently employ the available financial resources. This study aims to explain a practical system for the controlling and management of expenses caused by high-utilizers based on our conclusion that the early identification and the specific management of high-utilizers in health care holds high financial potential and targeted programs are promising for care optimization.

PHP53

COST ANALYSIS OF ANKARA UNIVERSITY SCHOOL OF MEDICINE HOSPITALS

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OBJECTIVES: The purpose of this study was to determine the unit cost of the main production centers of Ankara University Faculty of Medicine Hospitals in 2008. **METHODS:** Expenses and costs of the two hospitals of Ankara University (Ibni Sina and Cebeci Hospitals) were obtained from the Hospital Information System and Revolving Fund distributed to the main production centers by using a step-down allocation method with five allocation steps. Unit costs were calculated in the last step. To determine the cost for outpatient and inpatient units, the data from the fifth allocation including the number of outpatients and inpatients as well as the number of inpatient days was used. **RESULTS:** The total cost of Ibni Sina Hospital (a 931-bed facility) and Cebeci Hospital (a 1153-bed facility) were calculated as €55,137,708.41 and €49,709,800.84 respectively. In Ibni Sina Hospital, among outpatient units, Dept. of Hematology had the highest, while the Aphaeresis Unit had the lowest cost. As to the inpatient unit costs, Dept. of Internal Diseases had the highest, and Dept. of Ear, Nose and Throat had the lowest cost. In Cebeci Hospital, Dept. of Algology had the highest outpatient unit cost, and Consultation-Liaison Psychiatry had the lowest outpatient unit cost. In terms of number of inpatients, Dept. of Pediatrics had the highest, while the Aphaeresis Unit had the lowest unit cost. Nuclear Medicine Department had the highest cost, while the Aphaeresis Unit had the lowest clinic unit cost with respect to inpatient hospital days. **CONCLUSIONS:** The results of this study show that the unit costs of outpatient clinics are higher in the departments of internal medicine compared to the departments of surgery whereas the reverse is true for inpatient clinics. Being aware of unit costs in a large-size hospital would improve strategic decision-making process including effective financial management, health care service planning and human resources management.

PHP54

BUDGET IMPACT OF ORPHAN DRUGS IN DENMARK COMPARED TO OTHER EUROPEAN COUNTRIES

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OBJECTIVES: Budget impact (BI) of orphan drugs (ODs) has increased over the past 10 years as more ODs entered the market since the introduction of the EU Regulation on Orphan Medicinal Products. The aim of this study is to determine the BI of ODs in a selection of countries where a large number of authorized ODs are reimbursed. **METHODS:** Public data on OD expenditure in Denmark was collected. The BI was calculated per product for the period 2005–2009. Subgroup analyses were performed for different types of treatment setting and ATC classes. The results of Denmark were compared to data collected for France (total OD costs for 2002–2009 specified per treatment setting) and for Belgium (budget estimates per product for 2008). **RESULTS:** Total BI of ODs in Denmark increased from 20.3M€ for 13 reimbursed ODs out of 22 (59%) authorized ODs in 2005 to €58.3M for 41 out of 60 (68%) authorized ODs in 2009. Highest costs were for oncology drugs (57%–67% of total BI in 2005–2009) and for metabolism drugs (19%–30% in 2005–2009). Outpatient drugs accounted for 0.01% (2005) to 1.55% (2009) of total BI of ODs. In France, 34 ODs were reimbursed in 2008 and the BI increased from €71M in 2002 to €496M in 2008. In 2008, the BI represented 1.8% of the total value of drugs sold. The situation in Belgium is comparable as the total BI of ODs was €66.2M in 2008 representing 2% of total reimbursed drug costs. **CONCLUSIONS:** Although cost per patient is relatively high, total BI for a country is still modest as a result of lower volumes used. The results show a consistent picture for OD expenditure across different health care systems. Budget restrictions are not widely used for ODs but this might change when the anticipated increase in BI of ODs becomes more apparent.

PHP55

INVESTIGATING THE IMPACT OF R&D INVESTMENT AND POLICY ON INNOVATIVE PERFORMANCE IN EUROPE

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OBJECTIVES: At the 2000 Lisbon Summit, the European Council set the quantitative target to increase R&D investment in all EU countries to 3% GDP by 2010. Today, there is growing emphasis on innovation in R&D, particularly in the development of pharmaceuticals, with the European Innovation Scoreboard (EIS) publishing annual ranking of the 27 EU member states to track and benchmark innovation performance. This work aims to explore the potential relationship between R&D investment and EIS innovation performance. In addition, the impact of national or regional innovation plans/policy will be considered. **METHODS:** The EIS innovation performance results for 2009 (based on data from 2005) were identified as the primary measure of innovation performance. The EIS includes 7 dimensions to accommodate the diversity of innovation processes and models that occur in varying national contexts. Eurostat data were used to identify the R&D investment in 2005. In order to identify the importance of R&D investment (%GDP) to EIS position, a simple quantitative linear regression was conducted. Supplementary qualitative literature searches were conducted to identify national and regional innovation plans and policies. **RESULTS:** The simple linear regression revealed a significant ($P < 0.00005$) relationship between R&D investment and position within the EIS innovation performance, with R&D investment explaining 72% of the scoreboard results. However, other dimensions have a noteworthy effect on innovation performance, since although the UK was identified as an innovation leader (along with Denmark, Finland, Germany, and Sweden), the UK ranks only 8th in terms of %GDP R&D investment. In this case, the presence of a national plan for innovation, alongside other factors, has led to high innovative performance. **CONCLUSIONS:** Although R&D has a significant effect on innovation performance, other dimensions also have a noteworthy effect. For example, the presence of national plans for innovation may aid a country in gaining innovation leader status.

PHP56

SERVICES FOR WHICH PHARMACISTS MAY LEVY A FEE: PHARMACIST INITIATED THERAPY (PIT)

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OBJECTIVES: The primary aim was to determine the extent of provision of Pharmacist Initiated Therapy (PIT) services in pharmacies in South Africa and the time it takes to provide this service. **METHODS:** A national research project was undertaken during 2008 by the South African Pharmacy Council on the services for which a pharmacist may levy a fee. The focus of this study is on one component of the larger study, namely the PIT service. **RESULTS:** A total of 369 pharmacies provided PIT services, and 3133 PIT services (cases) were measured. The majority were delivered by community (retail) pharmacies (95.79%). The PIT service was divided into three phases: Phase I (pre-administration procedure), Phase II (preparation and labelling of the prescribed medicine) and Phase III (provision of information and instructions to the patient to ensure the safe and effective use of medicine). Phase I was performed in 98.21% of cases, Phase II in 97.19% of cases and Phase III in 91.67% of cases. Pharmacists mostly delivered all three phases themselves (over 70% of cases). The weighted average time it took for a PIT service to be delivered was 199.02 seconds (just under 3.5 minutes) (SEM = 5.57 seconds). The weighted average time in community pharmacies was slightly less (192.82 seconds) compared to 312.15 seconds in private institutional pharmacies. The time taken was dependent on the number of items dispensed. The weighted average time taken was 160.76 seconds if there was 1 item dispensed, 220.31 seconds for more than 1 and equal to 2 items dispensed, and 327.19 seconds if more than 2 items were dispensed. a pharmacist may currently