

tions to improve limited HL. **METHODS:** Systematic review with electronic database searches (MEDLINE, EMBASE, PsycINFO, CINAHL and COCHRANE-Library; from 1980 through January 2008), screening of selected books and reference lists, and expert contacts. We included observational and interventional studies that reported HL of participants as one outcome measure. We included populations at high risk for low HL as well as patients with 1) diabetes mellitus, or 2) hyperlipidemia. Studies were screened for eligibility, unclear cases were discussed in a consensus meeting. We performed data extraction and quality assessment; results were checked by a second reviewer. **RESULTS:** We retrieved 2340 papers and included 10 studies for the final analysis. On the health care system level, the additional spending due to low HL corresponds to 3% to 5% of the total health care costs (3 studies with data of more than 50,000 persons from U.S. and Swiss settings). The prevalence of limited HL is considerable (range: 34% to 59%; 4 studies; 110,000 nationally representative persons). Three U.S. studies (data of 3600 persons) report the additional costs of limited HL on the patient level (additional expenditures per year per person with limited HL compared to a reference group with adequate HL; range: US \$143 to 7798). One systematic review reported cost-effectiveness data of patient self management programs for diabetes and showed inconclusive results. **CONCLUSIONS:** The costs of limited HL for the health care system may be substantial, but few studies were retrieved, and the results are heterogeneous.

#### HEALTH CARE USE & POLICY STUDIES— Diagnosis Related Group

PHP6

##### CLINICAL AND ECONOMIC OUTCOME OF MECHANICALLY VENTILATED PATIENTS UNDER DRG 483 IN SPAIN: A POPULATION-BASED STUDY

Bouza C, Lopez T, Muñoz R

Carlos III Health Institute, Madrid, Spain

**OBJECTIVES:** To analyze the costs and discharge status for patients with prolonged mechanical ventilation undergoing tracheostomy (DRG code 483) in Spain and to examine the impact of age in terms of hospital outcome. **METHODS:** From the 2004 National Hospital Discharge Database records for all patients aged >16 years undergoing mechanical ventilation were retrieved. Demographic characteristics, clinical outcomes and hospital-resources utilization were examined. An exploratory logistic regression analysis and a multiple linear regression analysis were performed to identify factors associated with in-hospital mortality and LOS respectively. To depict the amount of resources spent to procure a given level of desired outcome (hospital survival) we also determined the cost per survivor based in the average National Health Service Charges for DRG 483 (€49,365.37). **RESULTS:** From a total of 33,416 cases undergoing mechanical ventilation during 2004, 4,277 cases (13%) with a final DRG code of 483 were selected and eligible for analysis. Median age was 65 yr (p25:50; p75:73); 67% were men and 54% surgical patients. According to Charlson index, 56% of cases had no associated comorbidity. Overall in-hospital mortality was 41%. Total costs of hospitalizations exceeded € 211 million. An inverse relationship between survival rate and age was consistently observed after adjusting by other clinical variables, and this resulted in an age-related increased cost per survivor (€58,588 in patients aged <45 yrs; €75,1531 in those aged 45–64 yrs; 99,720 in 65–74 yrs and €12,5903 in those older than 74 yrs). **CONCLUSIONS:** Patients who require tracheostomy for prolonged mechanical ventilation have high resource utilization and relatively poor outcomes. Age has a significant impact on outcomes in

patients under DRG 483 both from clinical and economic perspectives. These analyses will help inform health care decision-making and resource planning in the face of an ageing population.

PHP7

##### COMPARING THE ACTUAL HOSPITAL COST OF A PATIENT WITH OESOPHAGEAL CANCER TO NORMATIVE DRG REIMBURSEMENT

Varga S<sup>1</sup>, Bogár L<sup>1</sup>, Sebestyén A<sup>2</sup>, Kriszbacher I<sup>1</sup>, Vas G<sup>1</sup>, Boncz I<sup>1</sup>

<sup>1</sup>University of Pecs, Pecs, Hungary, <sup>2</sup>National Health Insurance Fund Administration, Pecs, Hungary

**OBJECTIVES:** In the Hungarian DRG system it can frequently occur that real costs exceed the amount of reimbursements. Our goal was to compare the difference between the real clinical cost and the normative DRG reimbursement in a single patient case. **METHODS:** Data derive from the financial database of the National Health Insurance Fund Administration (NHIFA) and the clinical database of the University of Pecs. We made an outlay of the patient's variable costs for drugs, infusions, nutritive products, transfusions, laboratory diagnostics and imaging procedures used. The results we obtained were compared to standards calculated by the NHIFA for the surgical treatment of oesophageal cancer. The case was grouped to DRG code number 9540 which had 13.2 weight-number. **RESULTS:** The weight-number of medication components in this DRG category was 1.68 (12.7% of the total 13.2 weight-number). The real medication cost was HUF 3,960,000 which represented 39.6 weight-number. This exceeded the DRG medication reimbursement 23.6 times and was 3 times more than the total reimbursement. In this way just the medication cost was 300% of the total DRG financing. The excess cost was generated by increased drug usage due to the patient's severe septic complications. The main elements of medications were a four-day activated protenine-C treatment representing 53.5% of total drug expenditure, IgM enriched polyclonal antibody therapy (28.4%) and 5 different antibiotics (7.24%). The treatment of severe sepsis made up 89.1% of total medication cost. As an excess, 27.6 weight-number was reimbursed topping the 13.2 weight-number for the original DRG. **CONCLUSIONS:** There was a significant gap between real hospital costs and health insurance reimbursement. On the basis of this analysis, the NHIFA found our demand for extra finance justified and reimbursed our institution with the extra cost applied for. Our case significantly contributed to regulation changes dealing with extra financing for outlayer patient's costs in the DRG system.

PHP8

##### ADVERSE DRUG REACTIONS IN GERMANY: COST ANALYSIS OF INTERNAL MEDICINE HOSPITALIZATIONS

Rottenkolber D<sup>1</sup>, Rottenkolber M<sup>2</sup>, Schmiel S<sup>3</sup>, Szymanski J<sup>3</sup>, Hasford J<sup>2</sup>

<sup>1</sup>Munich Center of Health Sciences, Munich, Germany,

<sup>2</sup>Ludwig-Maximilians-Universität, Munich, Germany, <sup>3</sup>University of Witten/Herdecke, HELIOS Klinikum Wuppertal, Wuppertal, Germany

**OBJECTIVES:** German hospital reimbursement changed significantly as a result of the introduction of Diagnosis Related Groups (DRG) in the year 2004. Based on this development no current data on the direct costs of adverse drug reactions (ADR) leading to hospital admissions in departments of internal medicine is available. The objective of our project is to quantify the ADR-related economic burden of the respective ADRs in Germany. **METHODS:** A total of 1242 patient records of ADRs leading to internal medicine hospitalization were surveyed in 4 regional pharmacovigilance centres in Germany within the years

2006 and 2007. The WHO-Adverse Reaction Terminology record entries were re-coded in International Classification of Diseases (ICD-10-GM Version 2008) format and afterwards assigned to the matching DRG (G-DRG 2008) including supplementary and additional fees. **RESULTS:** Incidence of internal hospitalization was estimated to approximately 3.25%. Mean age of patients was 71.3 years (SD 14.5). Average inpatient length of stay in the group was 9.3 days (SD 7.0) and is therefore 2.3 days higher than average length of stay in German internal wards (7.0 days in the year 2006). Most frequent ADRs are gastrointestinal bleeding ( $n = 205$ ), hypoglycemia ( $n = 201$ ), and bradycardia ( $n = 61$ ). Average treatment costs of a single ADR were estimated to be approximately €2044 based on a state-wide base-rate of €2800. **CONCLUSIONS:** Before the introduction of the DRG system, direct medical costs of ADR-treatment in Germany were €400 million in the year 2002 (Schneeweiss et al., *Eur J Clin Pharmacol* 2002;58:285–91. This equals—given an ADR-incidence of 2.1%—case-related costs of €3,700 per person. Our results provide an informative basis, that this former person-related amount seems to be too high against the background of DRG introduction. Considering the apparently higher incidence rate of 3.25%, the present total costs are approximately the same.

#### HEALTH CARE USE & POLICY STUDIES— Drug/Device/Diagnostic Use & Policy

##### DELAY OF DECISION-MAKING ON PHARMACEUTICAL REIMBURSEMENT IN NORMAL PROCEDURE IN HUNGARY

Nagy Z<sup>1</sup>, Molnár MP<sup>2</sup>, Sebestyén A<sup>3</sup>, Kriszbacher I<sup>4</sup>, Vas G<sup>4</sup>, Boncz I<sup>4</sup>

<sup>1</sup>Health Insurance Supervisory Authority, Budapest, Hungary, <sup>2</sup>National Health Insurance Fund Administration (OEP), Budapest, Hungary,

<sup>3</sup>National Health Insurance Fund Administration, Pecs, Hungary,

<sup>4</sup>University of Pecs, Pecs, Hungary

**OBJECTIVES:** On the May 1, 2004 Hungary—together with many European countries—joined the European Union which resulted in several changes in the Hungarian legislation. In the coverage policy of pharmaceuticals, the Directive 89/105/EEC of the Council of the European Communities on Transparency was implemented in Hungary, in order to provide regulation on decision on drug prices. The aim of our study is to calculate the average delay of decision-making on pharmaceutical reimbursement. **METHODS:** The data derive from the drug reimbursement database of the National Health Insurance Fund Administration (OEP) of Hungary covering the 3 year period of 2005–2007. We calculated the delay as the time between the submission of application by the manufacturer and the first day of reimbursement of drug. Our analysis covered drugs submitted within the frame of normal procedure, drugs submitted in the simplified procedure were omitted. **RESULTS:** Between 2005–2007, the total number of applications was 172, 161, 140; while the average delay was 217, 255, 166 days respectively. Most of the application represented new (innovative) drugs (70, 75, 65 pieces) or new indications of drugs already reimbursed in other indication (27, 28, 27 pieces). Between 2005–2007 the average delay for new (innovative) drugs was 258, 222, 166 days, while for new indications it was 194, 319, 203 days respectively. **CONCLUSIONS:** The introduction of EU transparency directive provided a strong regulatory framework for decision-making process on drug reimbursement. In the normal procedure we found significant differences in time delay of decision according to submission categories. However, in 2007 the average delay significantly decreased compared to previous years.

##### PHARMACY AND HOSPITAL MARKET PERFORMANCE INDICATORS IN FINLAND 1995–2007

Jormanainen V, Kannisto H, Mäntyranta T

Centre for Pharmacotherapy Development, Helsinki, Finland

**OBJECTIVES:** In 2006, pharmaceuticals were sold in Finland approximately €2.4 billion (a 1.6% reduction from 2005). However, pharmacy and hospital markets may have performed in different ways. The objective is to develop descriptive performance indicators for pharmaceutical market dynamics in Finland. **METHODS:** Total numbers of marketers (M), active substances (S), trade names (T) and packages (P) (1995–2007) were extracted from the market database SLD Pharma (Finnish Pharmaceutical Data Ltd.). We restricted data only to numbers that were associated with a marketing authorisation and positive annual wholesale figures. Total number and indicator (S/M, T/M, P/M, T/S, P/T, P/S) analyses were segmented by markets (pharmacy, hospital) and calendar year. We compared figures in 2007 to base year 1995. **RESULTS:** In 2007 pharmacy market, the total number of marketers was 38% (26% in hospital market), active substances 15% (18%), trade names 44% (28%), and packages 26% (12%) higher than in 1995. Compared to 1995, the pharmacy market S/M indicator in 2007 was 0.83 (0.93 in hospital market), whereas T/M was 1.04 (1.02), P/M was 0.91 (0.89), T/S was 1.25 (1.09), P/T was 0.88 (0.87), and P/S was 1.10 (0.95). **CONCLUSIONS:** In Finland 1995–2007 numbers of marketers, trade names (products) and sales packages increased more in the pharmacy market. Pharmacy market indicators (S/M –17%, T/S +25%, P/S +10%) suggest an increase in competition, and may partly be explained by generic substitution that was introduced in Finland on 1 April 2003.

PHP10

PHP11

