

care health plan; patients were followed until death, disenrollment from the health plan, or 12/31/2008. Health care costs in the 24 months prior to death/end of follow-up were calculated, divided into 4-month periods to assess trends over time. Chi-square statistics were used to compare patients who died vs. those alive at the end of the study on health care costs, comorbidity, clinical, and demographic characteristics. **RESULTS:** 260 CRPC patients died, with 2304 patients alive at the end of the study (mean age 73.99 vs. 72.63 years,  $p=0.035$ ). 2 years prior to death/end of follow-up, comorbidity scores were similar and mean total costs per 4-month period were not significantly different for patients who died vs. those alive (\$8,292 vs. \$6,809,  $p=0.060$ ). Health care costs increased prior to death, with the sharpest increase in the last 4-months of life with mean costs roughly tripling (from \$15,185 to \$44,203). For patients who did not die, mean total costs increased by one-third in each 4-month period, from \$6,809 to \$13,170 at the end of follow-up. **CONCLUSIONS:** Although costs were initially similar for CRPC patients who died compared to patients alive at study end, patients who died had significantly larger increases in costs over the 2-year period, with the sharpest increase in the last year prior to death.

## PCN40

## HEALTH CARE UTILIZATION AND COSTS OF RESECTED SQUAMOUS CELL CARCINOMA OF THE HEAD AND NECK (SCCHN) IN AN INCIDENT COHORT OF PATIENTS IN THE UNITED KINGDOM

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**OBJECTIVES:** 7,538 new cases of SCCHN were diagnosed in 2006 and 2,594 deaths reported in 2007 in the UK. For patients with resectable SCCHN surgical resection followed by postoperative radiation therapy remains a common treatment approach. For locoregional disease control chemotherapy is also an important treatment component. **METHODS:** This retrospective analysis was based on inpatient and outpatient records extracted from Hospital Episode Statistic database. SCCHN patients with resection of oral cavity, pharynx or larynx between 2003-07-01 and 2008-03-31 were followed for at least one year (max. of 5 years) from the surgery date. **RESULTS:** There were 38,460 patients diagnosed with SCCHN in the dataset. 11,403 patients met the inclusion criteria for the study. Mean age was 63.2 years and 69.8% were male. Mean length of follow-up was 31.0 months. In the first year, mean length of hospitalization was 21.6 days and mean number of outpatient visits was 4.2. Mean number of reconstructive and secondary surgeries per patient was 0.32 and 0.14, respectively in the first year. Mean number of radiotherapy and chemotherapy sessions per patient was both 0.45 in the first year. Total costs of post-operative healthcare utilization in the patient cohort was £249.4 million over 5 years with 90% (£225.5 million) occurring within the first year. Mean cost was £19,778 for the first year and £1477, £847, £653 and £455 for years 2-5. Inpatient care costs accounted for 96% of total costs with hospitalization contributing to 85% of these costs. **CONCLUSIONS:** Given limited outpatient data in the HES, radiotherapy and chemotherapy utilization and costs in the outpatient setting are likely to be underestimated. However, results still indicate that treatment of resected SCCHN in the UK is associated with significant healthcare utilization and costs. This suggests the need for new therapies that could improve outcomes and reduce the economic burden.

## PCN41

## FINANCIAL BURDEN AMONG PATIENTS WITH MAJOR CANCERS: FINDINGS FROM THE UNITED STATES MEDICAL EXPENDITURE PANEL SURVEY, 1996-2007

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**OBJECTIVES:** Out-of-pocket (OOP) medical expenditures of families may pose a financial burden, particularly to the seriously ill. The objective of this study was to analyze financial burden among patients with three common cancers: breast cancer (BC), colorectal cancer (CRC), and lung cancer (LC). **METHODS:** This study included respondents in the US Medical Expenditure Panel Survey who had 1+ BC (ICD-9-CM 174.xx), CRC (ICD-9-CM 153.xx, 154.xx), or LC (ICD-9-CM 162.xx) diagnosis between 1996 and 2007. Matched comparison cohorts (without cancer) were constructed for each cancer type, based on age, payor, sex, race and region. All years of data were pooled and weighted to create nationally representative average annual estimates reported in 2009 USD. OOP family medical expenditures (not including premiums), and family income were analyzed. Families were defined as having a high OOP burden if their OOP expenditures exceeded 10% of annual family income (5% if low income). **RESULTS:** 1,849 patients with cancer were identified (1,083 BC, 467 CRC, 299 LC). Total OOP expenditures averaged \$3,400 - \$4,400 for cancer patients versus \$2,100 - \$2,700 for controls. Overall, 31-37% of cancer patients had high OOP burden (31% BC, 37% CRC, 35% LC), compared to about a quarter of matched comparison patients. Among those under age 65, 16-30% of privately insured had high burden. Among those 65+, more Medicare-only patients had high burden (48-53%) compared to those with Medicare plus other insurance (29-36%). **CONCLUSIONS:** Over a third of cancer patients have OOP expenditures greater than 5-10% of their household income. Privately insured patients appear least likely to have high burden while publicly insured appear most likely. To ensure that cancer patients can adequately access needed medical care, exploration of how US health reform or other policy options could reduce this financial burden is warranted.

## PCN42

## COSTS OF HOSPITAL EVENTS IN PATIENTS WITH METASTATIC COLORECTAL CANCER

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**OBJECTIVES:** Monoclonal antibodies improve treatment outcomes in patients with metastatic colorectal cancer (mCRC); they have distinct and known safety profiles that may be associated with toxicities requiring hospitalization, which likely further impact cost of patient care. The objective of this study was to determine hospital costs of these events. **METHODS:** From the PHARMO Record Linkage System, including drug dispensing and hospitalization records of approximately 3.2 million residents in The Netherlands, all patients with a primary or secondary hospital discharge code for CRC and distant metastasis between 2000 and 2008 were defined as patients with mCRC. The first discharge diagnosis defining metastases served as the index date. Patients were followed from index date until end of data collection, death, or end of study period, whichever occurred first. Main outcomes for each identified event were length of stay (days) and costs per hospital admission (€). All results are presented descriptively. **RESULTS:** Among 2,964 patients with mCRC identified, 271 hospital events occurred during a median follow-up of 24 months. The longest mean ( $\pm$  SD) lengths of stay per hospital admission were for stroke (16 ( $\pm$  33) days) and arterial thromboembolism (ATE) (14 ( $\pm$  21) days), followed by wound healing complications (WHC), acute myocardial infarction (AMI), congestive heart failure (CHF), and neutropenia (all 9 days with SD 5 to 15). Highest mean ( $\pm$  SD) costs per admission were observed for stroke (€13,500 ( $\pm$  €28,800)), ATE (€13,300 ( $\pm$  €18,800)), and WHC (€10,800 ( $\pm$  €20,500)), followed by AMI (€9,000 ( $\pm$  €7,300)), neutropenia (€7,900 ( $\pm$  €4,400)), and CHF (€7,700 ( $\pm$  €6,300)). Lowest mean ( $\pm$  SD) costs were for dermatological toxicity (€5,400 ( $\pm$  €5,200)) and hypertension (€4,100 ( $\pm$  €2,800)). **CONCLUSIONS:** Inpatient costs for events in patients with mCRC are considerable and vary greatly. Such data are valuable to the pharmaco-economic evaluations of newer treatments in patients with mCRC.

## PCN43

## STUDY ON MEDICAL EXPENDITURE AND PAYMENT PATTERNS OF INSURED PATIENTS WITH CANCER IN CHINA

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**OBJECTIVES:** To study the medical expenditure of insured patients with cancer and its influence factors, to analyze the utilization of pharmaceuticals, treatment-seeking behavior and the relationship between the medical expenditure and payment patterns of medical insurance. **METHODS:** This study involved 5351 cancer cases in 3 municipalities (Beijing, Shanghai, Chongqing) and 5 province-capital cities (Shenyang, Fuzhou, Jinan, Zhengzhou, Xining). The actual claim data of their medical expenditure and medical care utilization in 2008 were collected. Descriptive analysis and multivariate linear regression analysis were applied. **RESULTS:** 1) Outpatient's annual medical expenditure per head was US\$802 and inpatient's annual medical expenditure per head was US\$6200. Although the basic medical insurance (BMI) fund covered about 70% of the expenditure, the patients' economic burden is still heavy. 2) Western medicine cost accounted for 44% to 60% of the inpatients' medical expenditure in various cities. Cytotoxic drug usage accounted for over 80% of the anti-tumor drugs. 3) The proportion of the patients who sought outpatient and inpatient treatment in the third level hospitals was 81% and 74%, respectively. 4) Multivariate linear regression analysis showed that the main influence factors of inpatients' medical expenditure include medical insurance payment pattern, hospital level, category of cancer, gender, length of stay in hospital, and medical insurance type. When all factors other than payment pattern were set to be control parameters, inpatient's annual medical expenditure per head under flat rate payment was US\$348 lower than that under fee-for-service. **CONCLUSIONS:** Medical expenditure causes heavy burden for cancer patients and the BMI fund. Flat rate payment has proved to be more effective in expenditure control compared with fee-for-service. To keep the fund safe and running effectively, it is necessary to adjust present payment patterns and set rational payment standard to encourage medical care providers to control the expenditure actively.

## PCN46

## HEALTH CARE EXPENDITURES, DISABILITY DAYS, AND RESOURCE UTILIZATION ASSOCIATED WITH CANCER IN EMPLOYER SETTINGS IN THE UNITED STATES

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**OBJECTIVES:** To assess healthcare expenditures, disability days, and resource utilization in persons with cancer that were employed within large and small organizations in the United States. **METHODS:** This retrospective database analysis utilized 2007 Agency for Healthcare Research and Quality (AHRQ) Medical Expenditure Panel Survey (MEPS) public-use data. Inclusion criteria included age  $\geq 18$  years, any diagnosis of malignant neoplasms (including both new cases and those continuing treatment), and employment within either large or small organizations ( $\geq 500$  or  $< 500$  employees, respectively). Regression analyses were performed via gamma or negative binomial generalized linear models for outcomes of total direct healthcare expenditures, number of disability days, and summed resource utilization (outpatient visits, emergency department visits, hospitalizations) after controlling for predominant cancer types and other factors including demographics (age, sex, race, education, region, income, residence), insurance coverage, employer size, perceived health status, secondary malignancies, and the D'Hoore-Charlson Comorbidity Index. To provide national estimates, all results were weighted and used standard errors (SE) calculated via Taylor-series approaches. **RESULTS:** Overall, 3.86 million employed adults in the US had new or continued cases of cancer in 2007, averaging 54.0 (SE=0.9) years of age, 9.3 (SE=1.8) disability days, and \$15,365 (SE=2921) in expenditures. Most were employed within

small organizations (84.0%, n=3,243,961). Regression analyses indicated that increased expenditures were associated with large organizations ( $\exp(b)=2.00$ ,  $p=0.025$ ) and prostate cancer ( $\exp(b)=1.88$ ,  $p=0.039$ ). Increased disability days were associated with melanoma ( $\exp(b)=3.57$ ,  $p=0.039$ ) and cancer of the uterus ( $\exp(b)=4.90$ ,  $p=0.006$ ). Higher resource utilization was associated with breast cancer ( $\exp(b)=1.76$ ,  $p=0.011$ ) and cancer of the uterus ( $\exp(b)=1.85$ ,  $p=0.025$ ). **CONCLUSIONS:** Cancer is associated with a substantial burden in the workplace, as 3.86 million persons were diagnosed with new cases or had continued treatment while being employed in large or small organizations in 2007. Healthcare expenditures summed to \$59.3 billion, while 35.8 million total disability days were incurred.

**PCN47**  
**ACUTE LYMPHOCYTIC LEUKEMIA-RELATED INPATIENT CARE AMONG PEDIATRIC PATIENTS IN THE UNITED STATES**

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**OBJECTIVES:** Acute lymphocytic leukemia (ALL) is most common in children. Due to advances in therapy options, the number of long term survivors of pediatric ALL continues to increase. However, although prognosis has improved significantly over time, ALL likely continues to impose a significant economic burden on society. This study sought to assess recent trends in pediatric ALL hospitalization and aspects of related care. **METHODS:** Data for pediatric (<20 years) hospitalizations with a primary diagnosis of ALL (ICD-9-CM codes 204.0x) from the 1997, 2000, 2003, and 2006 HCUP Kids' Inpatient Databases were analyzed. Weighted estimates of the number of hospitalizations for ALL and associated resource-based outcomes (i.e., total charges, length of stay [LOS], and stem cell transplant procedures) were derived. **RESULTS:** Between 1997 and 2006, the rate of pediatric ALL-related hospitalizations (per 100,000 2010 US pediatric population) increased slightly then leveled off, from 6.10/100,000 in 1997 to 6.61/100,000 in 2000, 6.60/100,000 in 2003, and 6.62/100,000 in 2006. Mean LOS remained consistent until an increase in 2006 (12.1 days in 1997, 12.4 days in 2000 and 2003, to 13.6 days in 2006). Similarly, the proportion of ALL hospitalizations with evidence of stem cell transplant remained roughly unchanged at ~60% until a sharp increase in 2006 to 64.9%. Finally, mean costs (2010 USD) for ALL-related stays have increased nearly 31%, from \$43,247 (1997) to \$56,517 (2006). **CONCLUSIONS:** We examined rates of pediatric ALL-related hospitalizations and documented aspects of inpatient ALL care, and observed a slight increase in the rate of hospitalizations over time. An increase in LOS was seen in 2006, with a commensurate increase in total costs, possibly owing to a marked increase in the rate of stem cell transplant. These findings may be used to support access strategies (e.g., economic modeling efforts) for current ALL therapies, as well as for those in the developmental stage.

**PCN48**  
**IMPACT ON HOSPITAL OUTPATIENT VISIT COSTS BY INITIATING PALONOSETRON VERSUS OTHER 5-HYDROXYTRYPTAMINE<sub>2</sub> RECEPTOR ANTAGONISTS FOR PREVENTION OF CHEMOTHERAPY INDUCED NAUSEA AND VOMITING (CINV) AMONG PATIENTS WITH CANCER**

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**OBJECTIVES:** To assess the average total daily CINV-related hospital outpatient visit cost (CINV-OC) among patients with cancer treated with any chemotherapy (CT) and initiated on anti-emetic prophylaxis with palonosetron versus other 5-HT<sub>3</sub> receptor antagonists (5-HT<sub>3</sub> RAs) in a hospital outpatient setting. **METHODS:** Patients with a cancer diagnosis initiating CT and palonosetron (Group 1) and other 5-HT<sub>3</sub>-RAs (Group 2) for the first time (index date) between April 1, 2007-March 31, 2009 were identified from the Premier Perspective database. Key inclusion criteria were patients aged ≥ 18 years and no nausea and/or vomiting and CT and anti-emetic medication use in the 6-month pre-index date period. A multivariate GLM model estimating the average daily CINV-OC in the follow up period (first of eight CT cycles or six months post-index date) was developed after adjusting for baseline differences in several demographic and clinical variables. **RESULTS:** Of 9,144 identified patients, 1,775 (19.4%) initiated palonosetron. Versus group 2 patients, group 1 patients were significantly younger [61.2 (SD: 13.0) vs. 62.8 (13.1) years;  $p<0.0001$ ], comprised more females [52.5% vs. 41.1%;  $p<0.0001$ ], less African American patients [8.6% vs. 13.2%;  $p<0.0001$ ] and more Hispanic patients [6.0% vs. 4.1%;  $p<0.0001$ ], and a lower percent of patients received LEC and MinEC combined (14.3% vs. 31.8%;  $p<0.0001$ ). In the follow-up period, unadjusted average daily CINV-OC among group 1 patients was significantly lower versus group 2 patients [\$1,047.9 (SD: \$1,444.5) vs. \$1,339.1 (SD: \$2,040.0);  $p=0.0014$ ]. After controlling for potential confounders, the regression model predicted a 12.0% decrease in the average CINV-OC;  $p=0.0076$  in favor of group 1 patients versus group 2 patients. **CONCLUSIONS:** In this retrospective hospital outpatient study, patients with cancer treated with CT and initiated on palonosetron anti-emetic prophylaxis were more likely to experience a significantly lower average daily CINV-OC versus those initiated with other 5-HT<sub>3</sub>-RAs.

**PCN49**  
**THE RELATIONSHIP OF AGE AND SEX WITH COST OF TREATMENT FOR CHRONIC LYMPHOCYTIC LEUKEMIA IN UKRAINE**

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**OBJECTIVES:** The major aims of the current research are to learn the average cost of treatment of Chronic lymphocytic leukemia (CLL) in Ukraine and examine factors that may be associated with it. The number of patients burdened by the dis-

ease in Ukraine is considerable and cost implications for individuals requiring care are significant. In Ukraine only limited amounts of necessary medicines are compensated by the government, with the major expenses covered by patients themselves. **METHODS:** A database containing records from hospital cards (2004-2010) for patients with CLL was analyzed retrospectively. The sample was composed of 113 patients, aged 39 to 85 (mean age 61.3, 61.9% males). Medicine costs related only to direct diagnosis were calculated. **RESULTS:** The average annual costs of pharmaceutical treatment for patient with relapse were \$1,561.16 (1\$=7.95 UAH on 12.01.2011). A negative correlation was found to exist between age of the patient's diagnosis and costs of treatment ( $r = -.218$ ;  $p < .05$ ). Furthermore, similar to past research in other countries male gender was associated with a significant increase in treatment costs,  $t(109)=1.95$ ,  $p=.05$ . **CONCLUSIONS:** Although other studies on CLL have shown a positive association between treatment cost and age, our research showed an opposite association for the sample studied in Ukraine. A possible explanation can be income limitations among the elderly that may restrict their ability to pay for medicines and, simultaneously, cause doctors to prescribe lower-priced pharmaceuticals. The average annual cost of treatment for CLL is higher than the minimum subsistence level, equal to \$1,320.75 for people of working age and \$1,107.92 for the retired population. To ensure effective treatment, especially for vulnerable populations, reimbursement for pharmaceuticals should be implemented.

**PCN50**  
**COST ANALYSIS OF DRG BASED FIRST LINE COLON CANCER THERAPIES IN HUNGARY**

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**OBJECTIVES:** In Hungary, costs of anti-cancer protocols are covered by hospitals' budget, and the funds of therapy expenditures provided by DRG accounts, on a "cycle-by-cycle" basis. Main goal of research was to investigate the cost of medicines of colon cancer chemotherapies and compare to DRG based remittance allocated by National Health Fund. **METHODS:** Cost analysis of CRC chemotherapy protocols has been conducted from the perspective of audited Oncology Centres. Regimens of 5-fluorouracil, raltitrexed, capecitabine, irinotecan, cetuximab, bevacizumab and oxaliplatin have been investigated, focusing on cost of medication, and DRG value of protocols. Research time horizon was January-June 2010. **RESULTS:** Real expenditures of protocols were assessed. The range of drug related costs were 3.1-3412.9 USD as expenditures of hospitals. Total expenditures of chemotherapy-regimens have been assessed and compared to allocation of remittances from National Health Fund Administration. The value of remittances have been found between 303.7 and 3261.8 USD, depending on protocols. The analysis of drug expenditures and remittances has resulted a wide range of gap: -178.0 to 1167.5 USD. The ratio of drug related expenditures and total remittance of hospitals showed diversity from 1.0% to 125.1%. **CONCLUSIONS:** As demonstrated by the analysis of costs, one of the reasons of the increase in expenditures spent on the therapy of metastatic colon cancer is the emerging of these new, expensive high efficiency therapies. Analysis shows, that fixed DRG values does not represent expenditure of chemotherapies of CRC treatment. Neither priority, nor incentive elements have been found in protocols, containing molecules with high efficacy or improved safety. Remittances should be validated regularly, based on hospitals' perspective.

**PCN52**  
**WILLINGNESS TO PAY AND COST BENEFIT ANALYSIS OF DELIVERY METHODS FOR DECISION SUPPORT FOR RURAL CANCER PATIENTS**

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**OBJECTIVES:** Consultation planning (CP), a decision support for patients provided by trained lay people, increases cancer patient's decision-self-efficacy (DSE) when conducted in-person. It may be more cost-beneficial to conduct CP by telephone. Compare DSE, costs, willingness-to-pay (WTP) and cost-benefit (CBA) of two CP delivery methods in rural breast cancer patients. **METHODS:** Randomly assigned clients from cancer resource centers were enrolled (n=67). Interventions were CP in-person (n=32) or by telephone (n=35) between patients and trained resource center staff to discuss knowledge for informed care decisions at their next physician visit. Outcomes were DSE and WTP for services. 2009 costs of training, CP and patient time, travel, telephone, and center overhead were determined. We compared costs and WTP using t-tests, ranked-sum or Kolmogorov-Smirnov tests depending on Shapiro-Wilk tests for normality. CBA compared net benefit and CB ratios for delivery methods. **RESULTS:** As hypothesized, DSE did not differ between delivery methods (mean=3.44 in-person; 3.54 telephone) but each improved significantly ( $p<0.001$ ). Patients' WTP did not differ by method; telephone (\$154), in-person (\$144) ( $p=0.78$ ). Intervention costs were significantly lower for telephone than in-person (\$139 vs \$181,  $p<0.001$ ) due to higher patient travel for in-person (\$26 vs \$2,  $p<0.001$ ). Training costs were \$5.78-\$147/person depending on amortization volume. Net benefit for telephone over in-person is \$52; \$42 less cost, with \$10 more value. CB ratios when training (\$6.00-\$147/patient) and overhead (\$25/patient) are added to program costs are 0.41-0.68 for in-person and 0.49-0.90 for telephone depending on number delivered, so patients are WTP up to 68% of in-person and 90% of telephone costs; 22% more return-on-investment for telephone CP. **CONCLUSIONS:** Telephone delivery is more cost-beneficial than in-person CP. The value of CP is the same for either method and there are significant cost savings with telephone delivery. Adoption of CP by telephone could result in additional access for rural patients.