compared with BEV + IFN and sunitinib. METHODS: A linear decision analytic model was developed to assess the management costs of all-grade and grade 3/4 AEAs for BEV + LD IFN from the perspective of health care purchasers in Germany, France, and UK. Data sources included published cost literature and clinical trials, original published data, and expert opinions specific cost databases. RESULTS: The total side-effect management costs for BEV + LD IFN were €908, €1,381 and €703 in Germany, France and UK, respectively. The use of BEV + LD IFN provides reduced management costs per patient of €616, €576 and €606, respectively, compared with BEV + IFN, and €1,266, €1,746 and €1,647, respectively, compared with sunitinib. The main drivers for sunitinib costs were thrombocytopenia, neutropenia and lymphopenia compared with fatigue/asthenia, proteinuria and anemia for BEV + LD IFN. CONCLUSIONS: Costs of managing the side effects of sunitinib treatment are greater than those for BEV + IFN in Germany, France and UK [Mickisch, ASCO 2008]. The present analysis shows that combining BEV with LD IFN is associated with the lowest side effect management costs. The tolerability profiles and associated management costs of agents used in mRCC may therefore influence selection of therapy.

COST OF MANAGING SIDE EFFECTS OF FIRST-LINE THERAPY FOR METASTATIC RENAL CELL CARCINOMA (mRCC) IN GERMANY, FRANCE, UK AND ITALY: BEVACIZUMAB (BEV) + INTERFERON-ALPHA2A COMPARED WITH SUNITINIB

Mickisch GH1, Escudier B2, Gore M3, Procopio G4, Walzér S5, Nuijen MJ6
1Center of Operative Urology Bremen, Bremen, Germany; 2Institut Gustave Roussy, Villejuif, France; 3The Scapens-Bluhm Hospital, London, UK, “Fondazione IRCCS “Istituto Nazionale dei Tumori”, Milan, Italy; 4Hoffmann-La Roche Pharmaceuticals, Basel, Switzerland; 5Arz Access Media, jsp, Netherlands

OBJECTIVES: The combination of BEV + interferon-alpha2a (IFN) prolongs progression-free survival compared with IFN + placebo [Escudier, Lancet 2007]. This study assessed the comparable efficacy to sunitinib in patients with mRCC. Notably, the type and frequency of side effects differ between the two regimens. When selecting treatment options, the management of side effects and associated costs are important factors to consider for physicians and health care payers. A previous report showed that grade 3/4 adverse events (AEs) account for the majority of side-effect management costs [Mickisch, ASCO 2008]. We report here the results of an updated analysis of grade 3/4 AE management costs for BEV + IFN and sunitinib. METHODS: A linear decision analytic model was developed to compare the management costs of grade 3/4 AEs of BEV + IFN and sunitinib from the perspective of health care purchasers or hospital-based care in Germany, France, the UK and Italy. Data sources included published cost literature and clinical trials, official priorcrit list and country-specific cost data. RESULTS: The grade 3/4 AE costs for sunitinib were higher than those for BEV + IFN in Germany (€1075 vs €1376), France (€2350 vs €1618), UK (£1475 vs £804) and Italy (€897 vs €402). The main cost drivers were country dependent, but in general were lymphopenia, leucopenia, neutropenia, thrombocytopenia and fatigue/asthenia for sunitinib; the main cost drivers for BEV + IFN were proteinuria, fatigue/asthenia, bleeding, anaemia and gastrointestinal perforation. The difference in management costs between the two regimens was mainly due to the higher incidence of haematological side effects with sunitinib compared with BEV + IFN and their associated high management costs. CONCLUSIONS: The costs of managing AEs in sunitinib are greater than those for BEV + IFN in Germany, France, UK and Italy. AE profiles are therefore an important consideration when selecting treatments for mRCC.

ECONOMIC IMPACT OF SEVERE INFUSION REACTIONS IN PATIENTS WITH COLORECTAL CANCER TREATED WITH CETUXIMAB

Wong A1, Prayson K1, Kapoor N1, Bourke M1, Coakley G1, D’Aloia S1, Helper J1
1Department of Gastrointestinal Surgery, Lenox Hill Hospital, New York, NY, USA

OBJECTIVES: To assess the incidence rate and risk factors of severe infusion reactions (IRs), and to quantify the costs associated with their management in patients with colorectal cancer (CRC) treated with cetuximab, METHODS: Using administrative claims of a US national commercially insured population, the study evaluates patients with CRC receiving cetuximab treatment from 2004 to 2006. An algorithm was developed to identify IRs using a combination of three indicators: outpatient diagnoses of angioedema/edema of IRs, outpatient treatment for IRs, and ER visits or hospitalizations for IRs. IRs were categorized as severe based on the occurrence of an ER visit, hospitalization with an IR admitting diagnosis; or presence of both outpatient diagnosis of IR, signs/symptoms and outpatient IR treatment. Total costs associated with each cetuximab administration were calculated. A logistic regression was run to identify risk factors for IRs. A Generalized Linear Model regression controlling for demographic and clinical characteristics was conducted to quantify additional economic impact of severe IRs. RESULTS: A total of 1,122 patients were identified with 12,367 cetuximab administrations. The incidence of severe IRs was 8.4%. Approximately 38% of patients experiencing severe IRs required an ER visit or hospitalization. Mean adjusted costs were $6,339 for administrations resulting in a severe IR that required outpatient treatment only; $13,174 for administrations resulting in a severe IR that required an ER visit or hospitalization; and $4,450 for administrations without an IR. Younger age was associated with a statistically higher likelihood of IRs. Living in states with high pollen counts also had a trend of increased likelihood of severe IRs, although it was not statistically significant. CONCLUSIONS: The rate of severe IRs with cetuximab in clinical practice was found to be higher than that reported in the product labeling and clinical trials. Total costs associated with managing severe IRs to payers were substantial.

CANCER – Cost Studies

BUDGET IMPACT ANALYSIS OF SARGRAMOSTIM USE IN PATIENTS WITH CHEMOTHERAPY-INDUCED NEUTROPENIA

Toy TL1, Porter CL2, Books P3, Veileman P4, Barghout V5, Duh M6, Skarin A1
1Analysis Group, Inc, Lakewood, CO, USA; 2University of Arizona, Tucson, Montana, QC, Canada; 3Bayer HealthCare Pharmaceuticals, Inc, Wayne, NJ, USA; 4Analysis Group, Inc, Boston, MA, USA; 5Dana-Farber Cancer Institute, Boston, MA, USA

OBJECTIVES: Myeloid growth factors are used to treat and prevent chemotherapy-induced neutropenia (CIN). Filgrastim and lenograstim (pegfilgrastim) granulocyte colony-stimulating factors (G-CSF), whereas sargramostim is a dual granulocyte-macrophage colony-stimulating factor (GM-CSF). This study analyzed the budget impact of substituting GM-CSF for G-CSF in the management of CIN from the perspective of a US health plan. METHODS: A spreadsheet model was developed to compute annual and per-member-per-month (PMPM) costs associated with CSFs. Inputs included cancer prevalence, the proportion of patients receiving chemotherapy and GGM-CSFs, incidence and treatment cost of relevant adverse events (e.g., bone pain), and G-CSF-GM-CSF drug acquisition and administration costs. Incidence and costs of adverse events- and febrile neutropenia-related hospitalizations, based on literature analysis of medical insurance claims data, were also used. Cost savings (2006 USD) were assessed for utilization share switches from G-CSF to GM-CSF. RESULTS: For a health plan with 1 million members, an estimated 976 patients received G/GM-CSF annually, with a mean annual cost of $52,525. Savings from substituting sargramostim for filgrastim and pegfilgrastim in CIN patients with 25% of sargramostim substitution, cost savings could reach more than 16 cents PMPM for a typical US health plan.

THE BUDGETARY IMPACT OF PEMETREXED PLUS CISPLATIN AS FIRST-LINE THERAPY FOR ADVANCED NONSQUAMOUS NON-SMALL CELL LUNG CANCER (NSCLC)

Wielage RC1, Muchensine CB1, Liepa AM1, Babinaux SM1, Klein RW1, Schwartzberg Ls1
1Medical Decision Modeling Inc, Indianapolis, IN, USA; 2Eli Lily and Company Indianapolis, IN, USA; 3The West Clinic, Memphis, TN, USA

OBJECTIVES: Pemetrexed plus cisplatin (Cis/Pem) was recently approved in the US as initial treatment for advanced nonsquamous NSCLC. We developed a budget impact model to estimate the effect on a US health plan budget of adopting Cis/Pem for this new indication. METHODS: A deterministic Excel-based budget impact model was developed from the perspective of a one million member US health plan over a one-year time horizon. A survey of nine US thoracic oncologists was used to quantify the impact of introducing Cis/Pem as first-line therapy on the frequency of chemotherapy use and the choice of first- and second-line regimens. Results were calculated from SEER incidence rates and the anticipated changes in first- and second-line regimen utilization rates. The costs associated with each regimen were based on Medicare reimbursement rates and a claims database analysis. Model outputs included health plan total cost, cost per patient per year, and per member per month (PMPM) costs. RESULTS: Following the adoption of Cis/Pem, total cost per patient per year for advanced NSCLC is estimated to decrease by $702 from $67,539 to $66,837. Anticipating that the number of NSCLC patients receiving treatment over the course of one year would increase slightly, a net additional cost to the health plan of $35,512 is estimated. Overall a neutral PMPM cost ($0.00) is expected. Most sensitivity analyses produced ER costs between $-0.02 and $0.02. CONCLUSIONS: Introduction of Cis/Pem as first-line therapy is anticipated to reduce the use of less expensive doublet regimens including gemcitabine and pemetrexed; however, it is also anticipated to reduce the use of more expensive triplet regimens containing bevacizumab. When Cis/Pem is used as first-line therapy, alternatives for pemetrexed plus carboplatin, are recommended for use as second-line therapy. Overall, the adoption of Cis/Pem as first-line therapy for advanced nonsquamous NSCLC is anticipated to be budget neutral.

BUDGET IMPACT ANALYSIS OF NON-SMALL CELL LUNG CANCER (NSCLC) TREATMENT WITH ERLOTINIB IN POLISH SETTING

Orłowska E, SzczHorza A, Szukalska-Dubek M
1Lodz University of Pharmacy, Lodz, Poland; 2Regional Lung Diseases Hospital, Otwock, Poland; 3Hoče Polaka, Warsaw, Poland

OBJECTIVES: To assess the financial consequences of the introduction of erlotinib as second/third line treatment in patients with (II/IV NSCLC) in Poland. METHODS: Two scenarios were compared: “baseline scenario” where 96% patients received...
Abstracts

PCN24
THE ECONOMIC IMPLICATIONS OF RASBURICASE TREATMENT IN ADULT TUMOR LYMPHOSARCOMA PATIENTS
Luddy M1, Seai B1, Tangraa M1, O'Day K1
1Wexner, Palm Harbor, FL, USA; 2Aventis; Bridgewater, NJ, USA; 3Smith, Hanley Consulting Group LLC; Lake Mary, FL, USA
OBJECTIVES: Rasburicase is a recombinant urate-oxidase enzyme that reduces high levels of plasma uric acid (UA) resulting from tumor lymphosarcoma (TLS). Rasburicase reduces UA levels within four hours of administration, minimizing TLS complications from TLS. Treatment pattern analyses indicate rasburicase is often used in combination with allopurinol; however, no studies have evaluated the clinical and economic consequences of this pattern of care. This study compared hospitalization costs, length of stay, and duration of critical care in patients receiving rasburicase or without allopurinol. METHODS: Patients within the Premier hospital database administered rasburicase or combination therapy in the first two days of hospital admission were eligible for study inclusion. Patients were excluded if they were aged < 18 years or received hemodialysis on admission. Patients were propensity score matched to rasburicase based on gender, race, hospital type, provider type, payer type, admission source, use of electrolyte modification therapy, critical care admission, and comorbid diagnoses. Differences in health care costs, length of stay, and duration of subsequent critical care were assessed using gamma distribution models with a log link function. Projection weights were used to produce national projected patient counts. RESULTS: There were 280 rasburicase and 310 combination patients matched in the analysis. The mean age was 63.2 years, with 31% being female. No statistical differences existed in matched covariates across the cohort. Rasburicase patients incurred an average total cost of $39,245 per hospitalization compared to $52,402 for combination patients (p = 0.0354). Rasburicase patients also had a lower length of stay (10.2 days) compared to combination therapy (16.1 days, p < 0.0001). Duration of critical care was similar in both cohorts (rasburicase = 2.9 days vs. 3.1 days, p = 0.792). CONCLUSIONS: Combination therapy of rasburicase and allopurinol resulted in higher total hospitalization costs and a longer length of stay compared to rasburicase monotherapy.

PCN25
DRUG UTILIZATION AND COSTS FOR ERYTHROPOIESIS STIMULATING AGENTS (ESA) IN PATIENTS WITH BREAST, LUNG, OR GASTROINTESTINAL CANCER RECEIVING CHEMOTHERAPY
Lafeulles MH1, McKenzie RS2, Vekeman R1, Bailey R1, Pichchi CT1, Lefebvre P1
1Groupe d’analyse, L’ete, Montreuil, QC, Canada; 2Centroc Ortho Biotech Services, LLC, Hornham, PA, USA; 3Groupe d’analyse, L’ete, Montreuil, QC, Canada
OBJECTIVES: To evaluate recent utilization patterns and costs for epoetin alfa (EPO) and darbepoeitin alfa (DARB) across tumor types in managed care cancer patients receiving chemotherapy. METHODS: Medical claims from the Ingenix Impact National Managed Care Database between January 2006-June 2008 were analyzed. Patients with at least one claim for 10 years or 10 years prior to treatment initiation, were newly initiated on EPO or DARB with 22 doses of either drug, and received chemotherapy during treatment. Mean cumulative ESA dose was used to calculate drug cost (based on 1008 wholesale acquisition cost) and dose ratio (Units EPO/mg DARB). Stratified analyses for breast, lung, and gastrointestinal cancer patients were also conducted. RESULTS: Stratified analysis of 9799 cancer patients receiving chemotherapy reported a dose ratio of 2.5:1.2 which resulted in a 28% lower drug cost in the EPO group compared to the DARB group. Stratified analyses by major tumor types yielded similar findings.

PCN26
COMPARISON OF EPOETIN ALFA AND DARBEPOETIN ALFA DOSING PATTERNS AND COSTS IN CANCER INPATIENTS RECEIVING CHEMOTHERAPY
Vekeman R1, Bailey R1, Lafelulle MH1, McKenzie RS2, Herrera AD3, Lefebvre P1
1Groupe d’analyse, L’ete, Montreuil, QC, Canada; 2Centroc Ortho Biotech Services, LLC, Hornham, PA, USA; 3Groupe d’analyse, L’ete, Montreuil, QC, Canada
OBJECTIVES: To examine recent real-world dosing patterns and associated drug costs of epoetin alfa (EPO) and darbepoeitin alfa (DARB), two erythropoiesis-stimulating agents (ESAs), in hospitalized patients with cancer who were receiving chemotherapy. METHODS: An analysis of recent electronic inpatient records (2006–2007) from the Premier Perspective Comparative Hospital Database was conducted. Patients were 218

PCN2
PHARMACOECONOMIC APPLICATIONS IN FORMULART MANAGEMENT: BUDGET IMPACT ANALYSIS OF CLORFARABINE AT A MAJOR CANCER CENTER
Miller LA, Lau J, Lal LS, Arbuckle R
University of Texas MD. Anderson Cancer Center, Houston, TX, USA
OBJECTIVES: To perform a budget impact analysis (BIA) to present to the Pharmacy and Therapeutics (P&T) Committee for approval of clorfarabine (FDA-approved for ALL in December 2004) to the institution’s Formulary for acute lymphoblastic leukemia (ALL). A post-approval study was performed to assess the accuracy and validity of our model. METHODS: A pre-approval annual budget impact model for clorfarabine was developed for an institutional population of 24 ALL patients, and presented to P&T in May 2005. Assumptions regarding clorfarabine’s number of doses per cycle and median number of cycles per patient were estimated from published clinical trial and clinicians estimated use. In August 2008, a post-approval economic analysis was conducted to assess the annual budget impact of clorfarabine. We reviewed all use (including investigational) of clorfarabine from June 2006 through May 2007. We also reviewed charge and reimbursement data for clorfarabine for the same period. All costs were adjusted to 2008 dollars. The 3-year retrospective study period for the post-approval analysis, we treated 23 patients with clorfarabine; of these, only 5 (22%) were for ALL, 13 (56%) for acute myelogenous leukemia and 5 (22%) for other indications. For the ALL population, we had a positive reimbursement margin, and reimbursement to charge ratio was 77%. For all indications, the overall reimbursement to charge ratio for clorfarabine was 33%. Actual budget impact was $1,105,598; less than the $2,430,000 predicted from the pre-approval model. CONCLUSIONS: The result of the post-approval budget impact analysis of clorfarabine was lower than that estimated by the pre-approval model. Our pre-approval model included prospective ALL patients and underestimated the number of patients actually treated. Major factors driving the difference between the pre- and post-approval studies were actual drug cost per dose, actual number of doses per patient, and off-label usage. Future studies will include estimation of off-label usage in the pre-approval model.

PCN3
BUDGET IMPACT ANALYSIS OF DOCTEAXEL REIMBURSEMENT IN INDUCTION THERAPY OF LOCALLY ADVANCED HEAD AND NECK SQUMOUS CELL CARCINOMA IN POLAND
Walczak I1, Lasota K1, Malczak I1, Pawlik D1, Semeniuk A1, Simon A1, Bryl M1, Gierzyński J1, Nogas T1
1Arrara Institute, Cracow, Poland; 2Sanofi-Aventis sp. z oo, Warszawa, Poland
OBJECTIVES: To estimate the impact of docetaxel reimbursement in the induction therapy of locally advanced head and neck squamous cell carcinoma (HNSCC) on the budget of the Public Payer in Poland. Strategy containing docetaxel (TPP – docetaxel cisplatin/fluorouracil) was compared with the standard strategy of induction treatment (PF – cisplatin/fluorouracil), reimbursed in Poland. METHODS: The budget impact analysis was performed in 3 years time horizon (years 2008-2012). Analysis was performed from the public payer’s perspective (National Health Fund in Poland). Two scenarios were compared: present and future. In the “present scenario” it was assumed that all patients from target population will be treated with standard chemotherapy – PF. In the “future scenario” induction treatment of locally advanced HNSCC with scheme with docetaxel (TPF) was considered. Sensitivity analysis was performed to test the impact of changes in the key assumptions of the analysis. Additionally, the analyses of the best and the worst case scenarios were performed. RESULTS: Estimated number of target population qualified for induction therapy of locally advanced head and neck cancer will amount from 483 patients in 2008 to 488 patients in 2012. Assumption of reimbursement of docetaxel in treatment of HNSCC, annual expenses from budget of National Health Fund would raise by PLN3.54 million in 2008, PLN3.96 million in 2009, PLN1.97 million in 2010, PLN3.98 million in 2011 and PLN3.99 million in year 2012. Incremental LYG will amount from 299 to 299 years in 2008 to 2012 respectively. CONCLUSIONS: Docetaxel reimbursement in the treatment of locally advanced HNSCC will not considerably influence the expenses of the Public Payer in Poland. Treatment with docetaxel improves survival compared with standard care.

do cetaxel 75 mg/m2 every 21 days and 4% received pemetrexed 500 mg/m2 every 21 days versus “new scenario” where 100% patients were treated with erlotinib 150 mg/ d. To assess the impact of disease progression, survival, safety profile and cost estimates after starting a therapy, a Markov health-state model was developed. Budget impact analyses depict delivering a patient cohort progress through the model, allowing for new eligible patients to enter the model each year. For each scenario the model computes annual costs for 3-years time horizon. Only direct medical costs were included and estimated from the health care payer perspective. All costs were assessed in PLN (1 EUR = 4.03 PLN, 2008), without discounting. Extreme scenario sensitivity analyses were performed. RESULTS: Assuming that the number of patients eligible for erlotinib therapy would be 200 annually, substitution of “baseline scenario” with erlotinib is expected to reduce expenditure by 251,344 PLN, 517,116 PLN, 533,012 PLN in the 1st, 2nd and 3rd year, respectively, (1,301,472 PLN over 3 years). Savings are mostly associated with oral administration of erlotinib. Sensitivity analysis shows that depending on assumptions regarding the costs of intravenous administration of docetaxel and pemetrexed or market share of docetaxel and pemetrexed, substitution with erlotinib could result in savings of up to 1,358,635 PLN over 3 years or to cost increases of up to 508,732 PLN over 3 years. CONCLUSIONS: Given the results of this budget impact simulation in the treatment of patients with secondline metastatic NSCLC, erlotinib offers potential cost-savings to docetaxel and pemetrexed.