

to enrollment. HRU data associated with SREs (spinal cord compression, surgery to bone, pathologic fracture or radiation to bone), as attributed by investigators, were collected retrospectively for 90 days prior to enrollment and prospectively for up to 18–21 months. HRU included number and length of inpatient hospitalisations, outpatient visits, emergency room visits, nursing home/long-term care facility stays, home health visits, procedures and certain medications. These data are from centres in Germany, Italy, Spain and UK.

**Results:** Of the 631 European patients 223 (35.3%) had a primary diagnosis of BC, 135 (21.4%) LC, 120 (19%) PC and 153 (24.3%) MM. There was limited variation in HRU across tumour types (Table) although HRU varied by country (ranges) due to different treatment approaches.

Cancer type (SREs)	BC (457 [47–180])	LC (214 [31–63])	PC (222 [34–97])	MM (281 [43–109])
% of SREs requiring inpatient hospitalisation	23–27.8	29–47.6	20.6–29.1	33.3–41.9
Length of stay per SRE, days (SD)*				
Mean	12.9 (12.3)–	16.4 (11.3)–	16.3 (11.2)–	16.5 (10.9)–
Median	27.2 (24.8)	20.1 (14.2)	25.9 (14.3)	25.5 (36.4)
	8.0–17.0	17.0–20.0	15.0–21.0	11.5–14.5
% of SREs requiring outpatient visits	68.1–82.0	58.3–83.9	74.5–82.4	60.5–71.2

\*SREs with inpatient hospitalisation; ranges are for intercountry variation

The least common SRE requiring hospitalisation, radiation to bone (BC 6.9–11.4% of 279 events; LC 20.8–50% of 140 events; PC 4.5–23.3% of 166 events; MM 6.7–17.9% of 107 events), was still associated with mean in-patient length of stays ranging 2.0–29.9 (16.2) days across all tumour types and countries.

**Conclusions:** SREs can lead to lengthy hospitalisations and outpatient visits in patients with bone metastases/lesions. Although HRU was generally similar across tumour types, there is a trend to a higher percentage of SREs requiring hospitalisation in LC and MM. Preventing SREs across all cancer patients is important to substantially reduce the burden of hospitalisation for patients and of costly HRU across European healthcare systems.

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POSTER

**HRQoL in Different Health States of Colorectal Cancer**

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**Background:** This study was conducted to assess the health-related quality of life (HRQoL) for different health states in colorectal cancer (CRC) and to explore factors determining HRQoL as well as to compare different HRQoL instruments.

**Material and Methods:** An observational cross-sectional study among CRC patients in the Helsinki and Uusimaa hospital district was carried out between September 2009 and December 2010. A total of 502 CRC patients (aged 26–96; colon cancer 56.4%; female 46.8%) assessed their HRQoL with the generic 15D and EQ-5D and the cancer specific EORTC-QLQ C30 questionnaires.

Patients were divided into five mutually exclusive groups based on disease state: baseline before treatment, 1<sup>st</sup> year after diagnosis or recurrence, 2<sup>nd</sup> or following years of remission, metastatic disease and terminal care. Linear stepwise regression analysis was used to evaluate the association between the VAS score and clinical and demographic factors and the EORTC scales for symptoms and functioning.

Table 1. The mean HRQoL scores of the CRC patients in different health states

	Baseline (n=51)	1st year (n=87)	Remission (n=212)	Metastatic disease (n=110)	Terminal care (n=42)
15D score	0.890 (0.091)	0.879 (0.099)	0.885 (0.106)	0.860 (0.090)	0.756 (0.143)
EQ-5D index value	0.764 (0.228)	0.829 (0.203)	0.849 (0.205)	0.824 (0.194)	0.644 (0.307)
EORTC C30 Global Health Score	65.84 (21.61)	72.89 (20.61)	75.31 (22.11)	68.96 (20.72)	55.15 (19.90)
VAS score	69.40 (21.52)	75.75 (19.73)	78.82 (18.10)	74.44 (17.81)	58.09 (22.14)

**Results:** The 15D provided the highest utility values, whereas EQ-5D, VAS and EORTC Global Health were lower in each state. Utility scores

provided by EQ-5D, VAS and EORTC C30 improved after diagnosis and were highest in the remission state whereas 15D scores were highest in the baseline state (Table 1). Largest differences between the instruments were seen in baseline and terminal care states. Most 15D dimensions deteriorated with advancing severity of disease with most marked decline seen in "usual activities". In regression analysis poor HRQoL measured by VAS was significantly associated with female sex, dyspnea, fatigue and diarrhea while emotional and role functioning predicted better scores.

**Conclusions:** CRC has clear impact on patients' HRQoL. The effect is most evident within baseline and terminal care patients, but results vary between HRQoL instruments. Regression analysis showed that female sex, symptoms and functional capacity have more impact on HRQoL than clinical factors.

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POSTER

**A Pharmacoeconomic Model of Personalized Chemotherapy for Primary Breast Cancer Based on Cross-activity Analyses Using an Ex Vivo Chemosensitivity Assay**

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**Background:** During the last two decades, the costs of chemotherapy (Ctx) for primary breast cancer (PBC) have been dramatically increased mainly due to the use of expensive drugs. It is unclear however, which individual patient (pt) is likely to benefit from such a Ctx compared to a less expensive one. We therefore developed a pharmacoeconomic model of personalized Ctx for PBC using the results of cross-activity analyses of standard Ctx regimens (Ctx-R) in the ex vivo ATP-based chemosensitivity assay (ATP-TCA).

**Methods:** Eight Ctx-R were studied in a total of 96 native PBC samples: epirubicin (EPI); mitoxantrone (MXN); paclitaxel (PCT); docetaxel (DCT); CMF, 4-OH-cyclophosphamide (4-HC)+methotrexate (MTX)+5-fluorouracil (5-FU); EC, EPI+4-HC; ET, EPI+PCT; NT, MXN+PCT. Each Ctx-R was tested at a 1.5 log dose range. Using a semi-quantitative score, the individual chemosensitivity was classified as complete, incomplete, or resistance. Eight head-to-head comparisons were made: CMF vs EC, n = 56; CMF vs PCT, n = 49; CMF vs DCT, n = 34; EC vs PCT, n = 51; EC vs DCT, n = 35; EC vs ET, n = 45; ET vs NT, n = 24; PCT vs DCT, n = 34. For every comparison, the assumed cost reduction if using ATP-TCA directed Ctx was calculated for the tested population in regard to the German prices of both Ctx and supportive medication and the costs for the ATP-TCA, as well.

**Results:** CMF was at least equal to EC in 47 (84%), to PCT in 37 (76%), to DCT in 29 PBCs (79%). EC was at least equal to PCT in 41 (80%), to DCT in 28 (80%), and to ET in 28 PBCs (62%). NT was at least equal to ET in 19 PBCs (79%), and PCT was at least equal to PCT in 27 PBCs (80%). The calculated potential cost reduction by personalized ATP-TCA directed Ctx ranged between € 457 (PCT vs DCT) and € 18.847 (CMF vs DCT) per treatment. Regarding the whole study population, the potential cost reduction ranged between € 2.550 (PCT vs DCT) and € 611.819 (CMF vs DCT). Assuming a total of 30.000 newly diagnosed PBC pts per year subjected to Ctx in Germany, the extrapolation of our data would lead to a potential yearly cost reduction of around 75–240 million € if every pt would receive personalized chemotherapy.

**Conclusions:** Our results are in good agreement with clinical studies showing that novel Ctx-R will benefit only a limited proportion of PBC pts. Systemic analyses using biological methods like the ATP-TCA could help to identify individual pts who are likely to benefit from costly Ctx whereas the remainder could be equally subjected to less expensive or less toxic Ctx-R. Depending on the particular comparison made in this study, the use of ATP-TCA based personalized Ctx could lead to a considerable cost reduction in the treatment of PBC.

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POSTER

**The Relationship Between Volume or Surgeon Specialty and Outcome in the Surgical Treatment of Lung Cancer – a Systematic Review and Meta-analysis**

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**Background:** Whether improvement of quality and increased cost-effectiveness of surgical cancer care can be achieved by centralising care

in high-volume specialized centres is subject of an ongoing debate in many countries. We have conducted a systematic review and the first meta-analysis of the literature on the effect of procedural volume or surgeon specialty on outcome of lung resections for cancer.

**Material and Methods:** A systematic search was done to identify articles investigating the effects of surgeon specialty and hospital or surgeon volume of lung resections on mortality and survival, published between January 1990 and December 2010. All articles were scrutinized on methodological quality. After strict inclusion, meta-analysis assuming a random effects model was done to estimate the effect of surgeon specialty and higher volume on patient outcome. Meta-regression was used to identify volume cut-off values. Heterogeneity in study results was evaluated with an  $I^2$ -test; the risk of publication bias with Egger's regression intercept. **Results:** Nineteen studies investigating the relationship between procedural volume or surgeon specialty and outcome of lung resections were found. Studies were heterogeneous, especially in the definition of volume categories. Ten studies met the inclusion criteria for meta-analysis on hospital volume and postoperative mortality and 7 studies on hospital volume and survival. The pooled estimated effect size was significant in favour of high-volume providers in the analysis of postoperative mortality (OR 0.71; CI 0.62–0.81) but not for the survival analysis (OR 0.93; CI 0.84–1.03). The meta-analysis on surgeon volume and outcome showed no significant results. General surgeons had significantly higher mortality rates than general thoracic (OR 0.78; 0.70–0.88) or cardio-thoracic surgeons (OR 0.82; 0.69–0.96). A cut-off value for volume of resections for lung cancer could not be identified. No publication bias was detected.

**Conclusions:** Hospital volume and surgeon specialty are important determinants of outcome in lung cancer resections, but evidence-based minimal volume standards are lacking. Using a minimal volume standard as a tool, not a goal in itself, to enable more statistically accurate evaluation of individual institutions in a national audit program can help elucidate the influence of individual quality-of-care parameters, including hospital volume, on outcome.

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POSTER

#### Cost-Effectiveness of Cetuximab and Bevacizumab in the First-Line Treatment of Metastatic Colorectal Cancer (mCRC) for Patients With KRas Wild-Type Tumours in the United Kingdom

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**Background:** Combinations of chemotherapy (CT) and monoclonal antibodies (MAbs) against the vascular endothelial growth factor (bevacizumab) and the epidermal growth factor receptor (cetuximab) have been shown to improve the clinical outcome of patients (pts) with mCRC. Little is known about the economic implications of their use. The aim of this analysis was therefore to evaluate the cost, clinical- and cost-effectiveness of adding the MAbs cetuximab or bevacizumab to CT in the first-line treatment of mCRC pts with KRAS wild-type (wt) tumours, from the United Kingdom (UK) NHS perspective.

**Methods:** A semi-Markov model was developed to simulate patient outcomes and costs for first and subsequent lines of treatment including long-term survival after a curative resection of liver metastases. Data for progression-free survival, resection rates and other model parameters were mainly derived from the CRYSTAL and NO16966 phase 3 studies. The long-term benefits of surgery were estimated from a consecutive series of 1439 pts. Resource use included drugs, physician visits, scans, hospitalizations and treatment of adverse events. Extensive scenario and univariate sensitivity analyses were undertaken to explore the robustness of the results with regard to various modeling assumptions and parameter uncertainty.

**Results:** In the base case, the estimated mean life expectancy for cetuximab- and bevacizumab-containing regimens was 3.22 and 2.31 years (all undiscounted) respectively. The incremental cost-effectiveness ratio (ICER) for FOLFIRI + cetuximab compared with FOLFIRI alone was £30,665 per quality-adjusted life year (QALY) and £17,626 per QALY compared with FOLFOX + bevacizumab. The ICER is mainly driven by the number of pts becoming resectable and the acquisition cost for each antibody.

**Conclusions:** This analysis suggests that cetuximab in combination with FOLFIRI is the most effective treatment regimen compared with FOLFOX + bevacizumab or CT alone for pts with KRAS wt tumours. The incremental cost-effectiveness ratios of cetuximab in combination with CT compared with CT alone, and bevacizumab-containing regimens are within the commonly accepted threshold for cost-effectiveness in the UK.

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POSTER

#### Multidisciplinary Meetings for Linking Cancer Care Centres in Rural Australia – Results From a Clinical Practice Improvement Project

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**Background:** Cancer care in regional Australia has some unique challenges; geographic vastness of the area is one of the major hurdles. Cancer patients from remote areas often travel long distances to access various health services including specialist consultations, chemo/radiotherapy sessions, and follow-up care. We report the results of a clinical practice improvement project-involving establishment of a multidisciplinary team (MDT) meeting linking several rural and remote health service providers.

**Methods:** It was established that lack of MDT meeting was a key factor precluding optimal care. This currently runs fortnightly from a host site based in TRRH. We retrospectively reviewed MDT meeting documentation from May 2010 to December 2010.

**Results:** Three centres (Moree, Tamworth, and Newcastle) were actively involved in the MDT meeting. MDT was constituted by Medical Oncologist, Radiation Oncologist, General Surgeons, Pathologist, Radiologist, Palliative Care Physician and Allied Staff. Total of 80 cases were discussed during this period. Approximately 50% of the cases were referred from general surgery. Cancers of colon, lung, and breast were the main cases discussed (16, 15, and 13 cases respectively). Remote area surgeon [from Moree] presented three cases. Fourteen cases were referred to higher centres for further work-up and management, four cases were referred to tumour specific MDT, and seven cases were considered for clinical trials. Average time taken to initiate chemotherapy, based at Tamworth Hospital, was one week as compared to 4–6 weeks before the MDT. Allied health care intervention was achieved in 27 patients within 24 hour after MDT meeting. Pathological and Radiological diagnosis were modified in 4 cases. Minutes of the MDT were circulated by email and patients were notified by phone within 24–48 hrs. MDT meeting also generated revenue through medicare and this was utilised for upgrading resources.

**Conclusion:** Lack of co-ordinated cancer care was one of the main issues identified in rural cancer care. Establishment of MDT resulted in appropriate care for patients from remote locations. Increased awareness of the limitations in regional cancer centres has resulted in referring appropriate patients to higher centres for more specialised care. It was observed that there is substantial increase in the quality of the service, better co-ordination among patients and care providers.

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POSTER

#### Factors Affecting Time From Surgery to Adjuvant Chemotherapy for Early Breast Cancer in a Rural and Urban Medical Oncology Unit – a Retrospective Cohort Study

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**Background:** A delay in commencing adjuvant chemotherapy after surgery by more than 12 weeks is associated with increased mortality (Hershman, 2006). Patients living in rural areas are particularly vulnerable to delays in therapy due to their limited access to oncology services. This study compared waiting times between a rural and urban oncology unit operated by the same institution in Australia.

**Materials and Methods:** This retrospective study included all patients who received adjuvant chemotherapy for stage I-III breast cancer during the period from 2008–10 (in the rural unit) and during 2009 (in the urban unit). We evaluated factors affecting the time from primary surgery and definitive surgery until the commencement of adjuvant chemotherapy.

**Results:** We identified 79 rural patients and 94 urban patients. Rural patients were significantly less likely than urban patients to commence chemotherapy within 12 weeks of primary surgery (80% vs 97%,  $p < 0.001$ ), but equally likely to commence chemotherapy within 12 weeks of definitive surgery (97% vs 98%,  $p = 0.9$ ).

We identified a number of factors affecting treatment delay. Rural patients were more likely than urban patients to undergo multiple operations (43% vs 24%,  $p = 0.01$ ), mainly due to more staged rather than immediate axillary dissections (34% vs 12%,  $p < 0.001$ ). They were also less likely to see a medical oncologist within 4 weeks of primary surgery (24% vs 81%,  $p < 0.001$ ), but more likely to commence chemotherapy within 2 weeks of consultation by a medical oncologist (72% vs 55%,  $p = 0.02$ ). Further details are included in the accompanying table.

**Conclusions:** In our institution, rural patients are more likely than urban patients to experience delays in receiving adjuvant chemotherapy for early breast cancer. Treatment delay is associated with a longer time from