**Conclusions:** Induction erlotinib therapy in IIIA-N2 NSCLC with EGFR activating mutation is a promising strategy. The study is planned to start in Sep. 2011.

**9036** POSTER

**Population-based Outcomes of Limited Stage Small Cell Lung Cancer Patients Treated With Cisplatin-Etoposide vs. Carboplatin-Etoposide**

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**Purpose:** Although a previous randomized control trial did not demonstrate an advantage for Cisplatin-Etoposide (EP) over Carboplatin-Etoposide (EC), cisplatin-based therapy remains standard-of-care in North America. This descriptive study compares overall survival (OS) and locoregional recurrence (LCR) between EP and EC at a population level in patients with limited stage small cell lung cancer (LD-SCLC).
**Methods and Materials:** All patients with LD-SCLC who were diagnosed from January 2006 to December 2008 and treated with EP or EC and concurrent or sequential radiotherapy were identified. A retrospective review examining prognostic features and outcomes was performed. Demographic comparisons were made using Fisher's exact test for discrete variables and Mann-Whitney non-parametric test for continuous variables. Overall Survival (OS) and locoregional control (LRC) curves were calculated using the Kaplan–Meier method.
**Results:** A total of 168 patients with LD-SCLC was identified. Ninety-eight patients received EP and 70 received EC. Patients treated with EC were significantly older (median age 74 vs. 62, p value <0.0001). Median follow-up time was 22.3 months. Median OS for the EP and EC patients were 21.5 and 22.1 months (p value = 0.63), and the two year OS rates were 41% and 47%, respectively. LRC rates at 6 and 12 months were 98% and 73% for the EP group and 96% and 68% for the EC group (p value = 0.77). The most common prescription used for the thoracic radiotherapy was 40 Gy/15 fractions in 86% of cases. Concurrent radiation was delivered to 104 patients (89%) treated with EP or EC. Fifty six patients had a thoracic recurrence with 33 (28%) being within the radiation field and 23 (20%) being outside the radiation field. Sixty one patients (52%) recurred distantly as the site of first progression.
**Conclusion:** Despite the preferential use of EC in a more elderly population, the median survival time, two-year survival rates and locoregional control rates were similar to patients treated with EP.

**9037** POSTER

**Induction Chemotherapy With Docetaxel (D) and Cisplatin (C) Followed by Concurrent Thoracic Radiotherapy With Biweekly D and C for Stage III Non-Small Cell Lung Cancer (NSCLC) − a Galician Lung Cancer Group Study**

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**Background:** Concurrent chemoradiation (CChRT) is recommended as the evidence-based approach for the management of patients (p) with locally advanced stage III NSCLC and a good performance status, although a clearly superior regimen has not been identified. D has been shown to possess good single agent activity against NSCLC as well as radiosensiziting properties, both alone and sinergisitically with C. The aim of our study was to evaluate the feasibility of induction chemotherapy with D-C followed by CChRT with biweekly D-C.
**Methods:** 85 p with inoperable locally advanced NSCLC, stage IIIAN2/IIIB (no pleural T4), were included in a phase II study with induction chemotherapy consisting of three cycles of D 75 mg/m$^2$ on day 1 and C 40 mg/m$^2$ days 1−2 every 3 weeks and, if no surgery and no progresion, then underwent CChRT with D 30 mg/m$^2$ and C 30 mg/m$^2$ every 2 weeks for four courses, during conformal thoracic radiotherapy (60−66 Gys, 180 cGy/day). The primary objective was overall survival (OS); secondary objectives were progression free survival (PFS), response rate (RR) and toxicity. Median follow-up: 17.6 months.
**Results:** The p characteristics were: mean age 61.1 years (44−75); male/female 77/8; ECOG PS 0/1 in 25/60 p; squamous/adeno/large cell carcinoma: 51.8%/28.2%/20%; stage IIIAN2 20 p (23.5%) and stage IIIB 65 p (76.5%). 78 p were evaluable for response and 82 p for toxicity. Induction D-C response: 2 CR, 46 PR (RR 61.5%; 95% CI:51−72), 21 SD (26.9%) and 9 PD (11.6%). 9 p were treated with surgery: 1 pCR, 5 pPR, 1 pEE and 2 p unresectable. 56 p completed CChRT and 55 p were evaluable (one toxic death) with 8 CR, 37 PR (RR 80%; 95% CI:70−90), 3 SD and 7 PD. The median PFS was 11 months (95% CI:8−14) and median OS was 19 months (95% CI:14.8–23.2). The PFS and OS at 1/3 years were 46%/14% and 63%/15% respectively. A total of 235 cycles of D-C were given (2.8 per p); main toxicities (NCI-CTC 3.0) per p Grade (g) 1−2/3−4 (%) were as follows: neutropenia 10.9/25.6; anemia 30.4/3.5; nausea/vomiting 30.4/7.3; fatigue 28/0; diarrhea 17/9.7; there were ten episodes of febrile neutropenia and there was one treatment-related death. Main toxicities per p in CChRT (D-C doses: 211, 3.6 per p; mean doses RT: 55.4 Gys) were: g1−2 neutropenia/anemia 12/34.4%; g1−2/3 esophagitis in 51.7/1.7% and g1−2 pneumonitis in 24.5%; there was one treatment-related death.
**Conclusions:** Induction chemotherapy with Docetaxel and Cisplatin followed by concurrent thoracic radiotherapy with biweekly Docetaxel and Cisplatin is a feasible treatment option for locally advanced stage III Non Small Cell Lung Cancer, showing good clinical activity and tolerability with acceptable long-term survival.

**9038** POSTER

**Radiofrequency Ablation Combined With Conventional Radiotherapy − a Treatment Option for Patients With Medically Inoperable Lung Cancer**

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**Background:** To evaluate the effectiveness of lung radiofrequency ablation (RFA) followed by conventional radiotherapy in medically inoperable stage I non-small cell lung cancer and the extent of treatment related morbidity.
**Methods and Materials:** Between June 2003 and July 2010 we treated a series of 10 patients with medically unresectable stage I (T1-T2aN0M0) lung cancer: 9 male and 1 female, with a mean age of 75.8 (range: 65−89). The mean follow-up period was 22.1 months (range: 5 to 77). Patients were considered non surgical candidates by an interdisciplinary group because of age, insufficient respiratory reserve and comorbidity (mainly cardiovascular disease). RFA was performed under conscious sedation using CT fluoroscopy guide. Radiation was performed with 25 fractions of 2.5 Gy per fraction for a total of 62.5 Gy. Evaluation of the therapeutic effects was determined using contrast enhanced CT scans taken every 6 months and PET/CT in some cases.
**Results:** There were minor complications after RFA as pneumothorax (2) and pleural effusion (3) without requiring chest tube. There were no cases of symptomatic pulmonary toxicity secondary to radiotherapy. There were no lung cancer-related deaths. Two patients died of respiratory failure secondary to COPD exacerbation and one case due to bleeding in the upper digestive tract. There was no evidence of local recurrence. Two patients developed metastases in lung (1) and adrenal glands (1) treated with chemotherapy.
**Conclusions:** Combined CT-guided RFA and conventional radiotherapy in medically inoperable patients is a safe modality for the local control of stage I lung cancer better than radiotherapy alone. Randomized studies are needed to know if there is a survival improvement.

**9039** POSTER

**The Burden of Mesothelioma Mortality − Estimation as the First Step to Prevention**

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**Background:** Mesothelioma is a rare cancer that principally affects the pleura and is almost always caused by asbestos exposure. The disease is rapidly fatal; most of those affected dying within a year of diagnosis. There is a long latent period between first exposure to asbestos and diagnosis of mesothelioma that is seldom less than 15 years and often exceeds 60 years. Mesothelioma incidence has increased in South East England of which East Kent is a major part, particularly for men aged over 70 years, reflecting areas of asbestos use in shipbuilding and industry in the past.
**Methods:** Work-related cancers are largely preventable. The aim of the study is to estimate the current burden of cancer in the area of East Kent in the UK attributable to occupational factors, and identify carcinogenic agents, industries and occupations for targeting risk prevention.

Data of all cases diagnosed at East Kent Hospitals NHS Trust were collected retrospectively from April 2009 to March 2010.
**Results:** There were a total of 15 cases in East Kent Hospital NHS trust, UK over the period of one year which is a significantly high number as compared to previous years,the current population being 614,576. All of them were male. Median age was 74 years and median survival from diagnosis was 8.9 months. All of them had histological or cytological confirmation and 85% had documented evidence of definite or probable exposure to asbestos. There were seven cases that were treated with chemotherapy and 6 patients had advanced malignancy and received radiotherapy and 2 patients with advanced malignancy had palliative treatment only. No patient had radical surgery and there was minimal difference in relative survival between men with localised and non-localised disease stage.
**Conclusion:** In Great Britain, where asbestos use continued later than many other countries, the peak is anticipated to occur later between 2011 and 2115. Between 1981 and 2000, North East England and South East England were the areas with the highest standardised mortality ratios. Cancer networks, especially those with primary care trusts with high incidence, need to be aware of this disease and ensure that risk reduction strategies and services are in place to assist these patients. More research is needed to understand the interrelationships of prognostic factors, treatment choices and survival, and to determine the best care and support for these patients and their families.

**9040** POSTER

**Development of an Innovative Method to Simulate Lung Motions**

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**Background:** One of the possibilities to improve the accuracy of lung radiotherapy is to improve the understanding of the individual lung motion of each patient. Indeed, using this knowledge, it becomes possible to follow the evolution of the Gross Tumour Target or Clinical Target Volume defined by a set of points according to the lung breathing phase. Currently, only the 4D-scanner allows to know the motion (in ten breathing phases) but it is not without temporal and spatial uncertainties and biases.
**Material and Methods:** We present an innovative method to simulate the positions of points in a person's lungs for each breathing phase. Our method, based on an Artificial Neural Networks (ANN), allowed us to learn the lung motion of five different patients and to then simulate it accurately for three other patients using only beginning and end points. The training set for our ANN consisted of more than 1100 points spread over ten breathing phases (from 4D-scanner) and five patients on a specific area of the lungs. The points were defined on healthy tissue by a medical expert.
**Results:** Two studies were made. For each patient tested, 500 to 600 points have been computed in 50 to 80 ms using a Dual Core 2100 MHz processor. The first one consisted to compare the motion of points measured by 4DCT and computed by the ANN in healthy tissue. We obtain an average accuracy of 1.5 mm while the spatial resolution is $1\times1\times2.5$ mm3 − the temporal uncertainty is not quantifiable because we can not know the displacement measured by the 4DCT for the point. The second one consisted to select points around non small cell tumour and gave the same results.
**Conclusion:** In addition of the possibility to compute the motion in real-time, the first results are very promising and open the perspective to design an ANN capable of simulating motions using a 3D-scans as inputs: this will allow to improve the dosimetric report for diagnostic and a description of motion more realistic without artifacts from 4DCT. In addition, the accuracy of the method and its coverage (whole lung areas) will be improved even more using more data.

**9041** POSTER

**Evaluation of Efficacy of Replanning in Lung Dose in Chest Radiotherapy**

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**Background:** When gross tumour volume (GTV) becomes smaller during chest radiotherapy, we may be able to reduce lung dose and adverse effect on lung by decreasing field size. This study evaluates impact of replannning at 40 Gy on lung dose.
**Materials and Methods:** We reviewed radiation treatment plannings of patients who started chest radiotherapy between Nov. 2006 and Mar. 2011. We selected patients who met the following requirements:
a. computer tomography (CT) was taken before the start of radiotherapy (first CT) and another CT was taken before 40 Gy (second CT);
b. GTV on first CT was more than 30 $cm^3$ (nearly 4 cm in diameter);
c. GTV became smaller on second CT.
We made two treatment plans retrospectively with these selected patients. In the first plan, we made fields on first CT from the start to 60 Gy (plan A). In the second plan, we made fields on first CT from the start to 40 Gy and on second CT after 40 Gy to 60 Gy (plan B).
We calculated dose-volume histogram and recorded GTV, planning target volume (PTV) and V20.
(1) We examined the change of V20 between plan A and plan B. We calculated V20 under the following conditions;
(1−1) plan A on first CT, plan B on first CT
(1−2) plan A on second CT, plan B on second CT
(1−3) plan A on first CT, plan B on second CT
(2) We analyzed the relationship between GTV reduction and V20 reduction, and the relationship between PTV reduction and V20 reduction. We calculated V20 under the following conditions;
(2−1) plan A on first CT, plan B on first CT
(2−2) plan A on second CT, plan B on second CT
**Results:** Eight patients were selected (seven lung cancer patients, one patient with primary unknown cancer). GTV was 33–250 $cm^3$ (mean 120 $cm^3$), GTV reduction was 8–136 $cm^3$ (mean 55 $cm^3$), and PTV reduction was 19–234 $cm^3$ (mean 110 $cm^3$).
(1) The change of V20 between plan A and plan B. On plan B, (1−1) V20 significantly **decreased** by 1.18% ($t = 2.984$, 7df, $p = 0.0204$); (from 15.1% to 13.1%, 8.5% to 7.8%, 34.3% to 30.7%, 7.6% to 7.1%, 5.6 to 5.2%, 18.5% to 18.3%, 9.4% to 8.5%, 30.1% to 28.9%) (1−2) V20 significantly **decreased** by 1.11% ($t = 2.906$, 7df, $p = 0.0228$); (from 18.6% to 16.8%, 9.2% to 8.6%, 37.9% to 34.4%, 9.3% to 9.1%, 5.7% to 5.2%, 23.4% to 23.0%, 12.1% to 11.2%, 34.8% to 33.8%) (1−3) V20 significantly **increased** by 1.63% ($t = -2.630$. 7df, $p = 0.0339$).
(2) The relationship between GTV reduction and V20 reduction, and the relationship between PTV reduction and V20 reduction (2−1) There were correlations between GTV reduction and V20 reduction ($r = 0.772$, $n = 8$, $p = 0.0218$) and between PTV reduction and V20 reduction ($r = 0.844$, $n = 8$, $p = 0.0058$). (2−2) There were correlations between GTV reduction and V20 reduction ($r = 0.753$, $n = 8$, $p = 0.0285$) and between PTV reduction and V20 reduction ($r = 0.819$, $n = 8$, $p = 0.0098$).
**Conclusions:** When GTV is more than 30 $cm^3$ and decreases before 40 Gy in chest radiotherapy, V20 can be reduced by replanning on CT before 40 Gy. Reduction of GTV and PTV correlated with reduction of V20. These findings are applicable when V20 is calculated on the same CT, and not applicable when V20 without replanning is calculated on CT before the start of radiotherapy and V20 with replanning is calculated on CT before 40 Gy.

**9042** POSTER

**Predictive Factors for Acute Esophageal Toxicity in Lung Cancer Treated With Chemoradiotherapy**

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**Background:** The standard treatment for locally advanced lung cancer is chemotherapy and radiation therapy concomitantly. One of the major toxicities due to treatment is the esophageal toxicity. This injury can require hospitalization, or radiotherapy breaks that could lower local tumour control and an unfavorable prognosis of the disease.
**Materials and Methods:** Between 2009–2010, 66 patients were treated with chemoradiotherapy for lung cancer. Toxicity was scored using the Radiation Therapy Oncology Group (RTOG).
A variety of clinical and dosimetric parameters have been associated with acute toxicity. We analyzed esophageal dose-volume parameters (V15, V30, V40, and V50), and others factors like albumin, prealbumine and glucose at the beginning and the end of the treatment.
**Results:** Of 66 patients, 65 were evaluated. Of these patients, 42, 16 and 7 had grade 0, 1 and 2 RTOG esophageal toxicity. In a first analysis, the V30 was the most predictive parameter (p 0.002 odds ratio 1.089) for Grade 1 acute esophageal toxicity.
For Grade 2 acute esophageal toxicity, V30 (p 0,052, odds ratio 1.114) and hyperglycemia (p 0,013, odds ratio 1,041) were the predictive factors. However, the nutritional status did not influence the toxicity nor radiotherapy breaks.
**Conclusions:** In conclusion, our study have suggested that V30 and hyperglycemia are significant parameters associated with esophageal toxicity. Our findings might useful in designing a treatment plan to prevent severe esophageal toxicity.