

### 437. Quality management for lung cancer patients

**P4418**

**The National Lung Cancer Audit – Year 5 completeness and outcomes and case-mix adjustment**

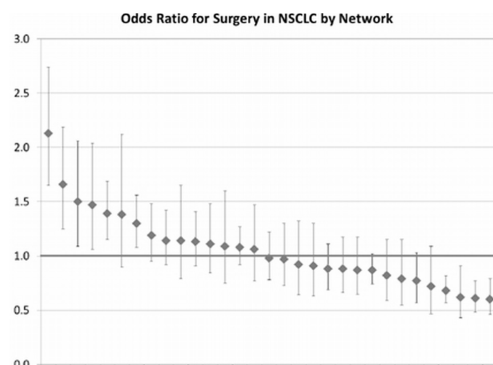
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**Introduction:** The National Lung Cancer Audit aims to record outcomes in lung cancer on a large scale and through case-mix adjustment, start to explain the wide variations in outcomes between hospitals in the UK and between the UK and other westernised countries. This abstract presents results for patients first seen in 2009 in England and Wales.

**Results:** For patients first seen in 2009, 37,304 cases were submitted from England (30,096), Wales (1,973), Scotland (4,379), Northern Ireland (819) and Jersey (37), representing >97% of the expected number of cases. Results suggest that the quality of care is improving.

Headline results

	2005	2009
Confirmed Histological diagnosis	68%	76%
Any anti-cancer treatment?	45%	59%
Overall surgical resection rate	9%	14%



However, these mean results hide significant variation across the cancer networks, which persists even after adjustment for case-mix (age, sex, stage, performance status, socio-economic status). The example of surgery for NSCLC is shown in the figure.

**Conclusions:** The results suggest that care for lung cancer patients in the UK is slowly improving, although some of the apparent improvement is likely to reflect the rise in data quality. However, wide variations in outcomes persist between organisations which is not explained by simple case-mix variation. These variations need to be the focus of on-going service improvement work.

**P4419**

**Improvement of the survival of lung cancer in a French monocentric cohort between 1990 and 2010**

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**Background:** Authors report analysis of monocentric cohort of 1400 patients with lung cancer followed between 01.01.1990 and 31.12.2009.

**Methods:** Kaplan-Meier and Foucher methods are used.

**Results:** The survival with Kaplan-Meier method is 56% at 1 year, 23% at 5 years and 17% at 10 years.

Analysis of relative survival, taking into account the mortality of the general population without lung cancer is 57% at 1 year, 26% at 5 years and 22% at 10 years (Method of Foucher, on 1990-2005 population).

	Relative survival at 1 year	Relative survival at 5 years	Relative survival at 10 years
Stage I	94%	76%	64%
Stage II	71%	51%	36%
Stage IIIA	60%	30%	21%
Stage IIIB	56%	22%	16%
Stage IV	34%	6%	3%

The period analysis shows an improvement on overall relative survival.

	Relative survival at 1 year	Relative survival at 5 years	Relative survival at 10 years
1990–1994	50%	16%	14%
1995–1999	59%	27%	22%
2000–2004	59%	30%	ND = insufficient delay
2005–2010	ND	ND	ND

The period analysis shows an improvement in relative survival at 5 years by stage.

Survival at 5 years	1990-4	1995-9	2000-04
Stage I	57%	65%	64%
Stage II	37%	28%	47%
Stage IIIA	8%	20%	35%
Stage IIIB	7%	8%	26%
Stage IV	0%	1%	5%

**Conclusion:** This analysis shows a very interesting increase of the relative survival of lung cancer patients since 1990, global and by stage (1997 WHO Classification). Best staging by PET and RMI and best medical strategies explain this results, specially for Stage III and Stage IV: An Hope for this pathology.

**P4420**

**Survival outcomes of non small cell lung cancer (NSCLC) patients who are suitable for radical treatment at initial presentation**

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**Background:** Lung cancer survival continues to remain poor despite the availability of better diagnostic & management strategies; as most patients have advanced disease at presentation with poor performance status (PS) & coexisting morbidities. All patients with limited disease bulk & good PS should be offered radical treatment to improve overall outcomes.

**Aims:** To assess the number of NSCLC patients who were suitable for treatment & determine the reasons for either not receiving or completing treatment. To compare outcomes of those who completed treatment with those who did not.

**Methods:** Retrospective study of all (136) newly diagnosed NSCLC (Jun 2008-May 2009), 9 were excluded (insufficient data).

**Results:** Of the 127 patients, 93% aged  $\geq 60$ , 52% females, 95 were not suitable and 32 were suitable for treatment. 28 received treatment (8 surgical resection, 8 radical radiotherapy, 12 chemo-radiotherapy) and 4 either did not receive or complete treatment (1 refused treatment, 1 deteriorated while receiving radical radiotherapy, 1 recurrent chest infections with deterioration, 1 treatment related side effects).

**Conclusion:** Although, carefully selected patients who received treatment showed

Table 1

	Not suitable for treatment (n=95)	Suitable but did not complete treatment (n=4)	Suitable & completed treatment (n=28)
Age, years (mean)	73	72	69
Female sex (%)	46	43	60
PS 0-1 (n)	21	3	22
PS 2	24	1	5
PS 3-4	50	0	1
6-month survival (%)	15	20	87
1-year survival	7	0	68

better survival, a good number of suitable patients (12%) either did not receive or complete treatment resulting in poor prognosis. Holistic approach is required in dealing with this unfortunate group.

**P4421****Survival outcomes in advance non-small cell lung cancer – A developing country scenario**

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**Background:** Lung cancer is common and has poor survival outcome. Chemotherapy provides modest improvement. Many patients can not afford chemotherapy and its utility in advanced lung cancer in resource limited setting is debatable. Our goal was to assess the effect of chemotherapy on survival.

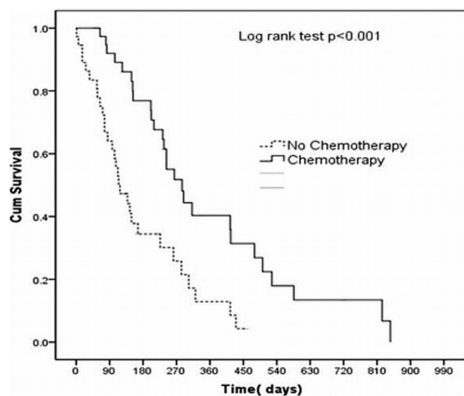
**Method:** 78 cases with advanced Non Small Cell Lung Cancer were followed up. All cases were offered platinum based chemotherapy. Patient characteristics, staging and performance status was noted. Chemotherapy arm was compared with the group not willing for chemotherapy for mortality and other parameters. Relevant statistical analysis was done. Kaplan-Meier survival estimates was generated.

**Results:** 41 patients received chemotherapy and 37 patients did not receive chemotherapy. The 2 groups were well matched.

Table 1

	Chemotherapy (n=41)	Not on chemotherapy (n=37)	p-value
Age, mean (std)	55.6 (10.7)	58.38 (10.6)	0.257
BMI, mean (std)	20.7 (3.5)	19.2 (3.1)	0.05
Stage, 3 (%)	19 (46.3%)	15 (40.5%)	0.653
Stage, 4 (%)	22 (53.7%)	22 (59.5%)	0.653
ECOG, 1 (%)	18 (43.9%)	14 (37.8%)	0.256
ECOG, 2 (%)	21 (51.2%)	17 (45.9%)	0.256
ECOG, 3 (%)	2 (4.9%)	6 (16.2%)	0.256
Death	27	30	
Median Survival, days (95% CI)	285 (209-360)	118 (74-161)	
6 months survival	52%	26%	

Results of Kaplan-Meier analysis are shown.



**Conclusion:** In advanced lung cancer patients a platinum based chemotherapy provided a significant survival advantage and should be advised to these patients even in a resource limited setting.

**P4422****The role of chemotherapy re-challenge in non small cell lung cancer. A retrospective study in a tertiary general hospital and thoracic center**

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**Background:** Chemotherapy re-challenge (CTR) is an established clinical approach in some malignancies such as ovarian cancer and small cell lung cancer.

**Aims and methods:** We screened medical records of 2160 patients (pts) diagnosed with NSCLC and treated with chemotherapy (CT) at our institution, between January 2003 and February 2011.

**Results:** 10/2160 pts (0.46%) were offered a CTR regimen. The histological subtypes were adenocarcinoma (A) (5 pts), squamous cell carcinoma (3 pts) and not specified (NS) (2 pts). All patients were of good Performance Status (0-1), and the majority without any comorbidities (7/10). All pts were treated with a platinum agent combined with either pemetrexed (6 pts), taxane (3 pts) or gemcitabine (1 pt). 3/10 pts had initially received adjuvant CT and CTR on their first relapse, whereas 7 pts were initially treated for advanced/metastatic disease. In the later 7 pts, partial response (PR) as best response was observed in 6 (85.7%). Median time to progression (TTP) after the initial CT was 9.8 months (range 3.6-37.5). Best responses following CTR were PR in 2 (20%), stable disease (SD) in 2 (20%) and disease progression (PD) in 4 (40%), with 2 pts still on treatment. Median TTP after CRT was 3 months (2.5-12). The 2 pts with PR after CTR (1 A, 1 NS) were both treated with platinum-pemetrexed combination and had both demonstrated PR after the initial CT and TTP of 9 and 17 mo respectively.

**Conclusions:** CTR is rarely opted in NSCLC likely due to rapid disease progression. The role of CTR is limited and rather unsuccessful. Nevertheless, selected patients might benefit from this approach.

**P4423****Curative treatment vs. best supportive care in advanced non small cell lung cancer in aged person**

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**Rationale:** With the introduction of new chemotherapeutics showing better efficacy and low side effects, it was reevaluated whether the curative anticancer treatment including chemotherapy and/or radiation therapy of curative aim had a survival benefit comparing to best supportive care (BSC) especially in aged advanced lung cancer subjects.

**Methods:** The data was retrieved retrospectively from medical records of 618 patients who had been diagnosed as non-small cell lung cancer (NSCLC) in tertiary university hospital from 2000 through 2007. The analysis was confined to 146 subjects of stage IIIb or IV NSCLC over 70 years old.

**Results:** The mean age at diagnosis was 77 years old (range: 70-95). In good performance group (ECOG, 0-1) was 109 patients (75%) and bad performance group (ECOG, 2-3) was 37 (25%). The mean survival time following the diagnosis was  $10.0 \pm 12.8$  months (m). As compared to BSC (n=92), the curative treatment (CT) group (n=54) showed the better survival rate (CT median  $7 \pm 0.9$  m, 95% confidence interval [CI]: 5.2-8.8 vs. BSC median  $4 \pm 0.8$  m, 95% CI: 2.3-5.7,  $p = 0.008$ ). Within good performance group, the better survival rate was also shown in curative treatment group than BSC. Contrarily, within bad performance group, there was no significant survival gain in curative treatment over BSC.

**Conclusions:** In over 70 years old, the survival benefit was observed in curative treatment, especially in good performance status, compared to best supportive care. In relatively poor performance status, although the outcome of survival time had a little superior tendency in curative treatment, meticulous attention should be given in treatment decision.

**P4424****Assessment of German national lung cancer guideline quality indicators in routine practice – Does the new TNM-system make a difference?**

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**Background:** Quality assurance is an essential tool for assessing and optimizing quality of care. For that purpose, the German national lung cancer guideline (GL), published in 2010, has defined nine quality indicators (QI). So far, neither these QI have been prospectively evaluated, nor corresponding reference intervals have been specified. Furthermore, no evidence exists for the practicability of the QI concerning the utilization of the new TNM-system (UICC 7).

**Methods:** All patients with a first diagnosis of lung cancer (FD), admitted to our lung cancer centre between 01.01.2008 and 31.12.2009, were included into this study. Data collection has been performed prospectively using our tumour documentation system (TDS) and hospital information system (HIS). In a retrospective analysis two groups were defined in which the patients were staged by the old UICC 6 (FD in 2008) and the new UICC 7 (FD in 2009) staging system, respectively.

**Results:** Patients' characteristics were similar in both groups (2008: 595 pt.; 2009: 641 pt.). For 7 out of 9 QI a result could be determined according to the defaults of the GL (example: tab.1)

	Nominator	Denominator	Result
QI4: comb. radiochemo-tx in pat. with NSCLC IIIA4/IIIB	2008: 69 pt.	2008: 151 pt.	2008: 45,6%

**Conclusions:** In this study we were able to completely assess 7 out of 9 QI proposed by the GL exclusively on the basis of routine data of our TDS and HIS.

These data will not only help to improve the quality of care in our lung cancer centre but also allow first conclusions on the undetermined reference intervals of the GL-QI. However, the GL-QI should be further evaluated within a prospective, multicentric study.

**P4425**

**Outcome of patients discharged from rapid access lung clinic (RALC) with non cancer diagnosis: Five year follow up**

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**Introduction:** Since publication of NICE guidelines in 2000 RALC has become standard practice. These clinics target service towards diagnosis of lung cancer, with streamlined investigation and MDT discussion. We set up our RALC in 2003.

**Aim:** To assess if patients discharged from RALC without a diagnosis of cancer had received adequate care and were not re-presenting with malignancy.

**Methods:** We analysed a random selection of patients discharged from RALC without diagnosis of cancer from 2003-5.

Data collected: investigations, duration of follow-up, diagnosis on discharge and 5 year outcome

**Results:** A total of 220 patients were discharged during the study period from or RALC without a diagnosis of lung cancer and 55 were analysed. Male: 28. Average (SD) age 63 (14). CT scan was done in 43 patients (78%) and bronchoscopy in 20 (36%). All the cases were discussed at MDT. 30% of patients were discharged from RALC with 70% discharged to respiratory out patient follow-up. Main diagnoses on discharge were: infection (38%), COPD (15%), benign nodules/plaques (10%), interstitial lung disease (7%), bronchiectasis (7%), vascular (7%), others (15%). Median (range) follow-up in RALC was 24 (0-700) days. 14 (25%) patients died over the 5 years, with average age when first seen of 76 (range 61-86). Cause of death was: non respiratory malignancy (5), cardiac disease (3) and infective causes (6). None of these deaths was related to initial presentation to RALC. No patients developed lung cancer over the duration of study.

**Conclusion:** Our five year follow up study shows that streamlined investigations and MDT input in RALC is effective in ruling out lung cancer.

**P4426**

**Reducing unscheduled attendances at hospital due to lung cancer via a rapid access flexible clinic**

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Brighton and Sussex University Hospitals (BSUH) comprises two acute hospitals in SE England. The lung cancer MDT sees 250 new cases/year. Regional and UK outcomes have been historically poor for 1 & 5 year survival with high numbers presenting late.

Data suggests that lung cancer had the highest rate of unscheduled admissions & the greatest number of inpatient bed days compared with other cancer sites in the Trust.

We present a review of admissions in 2010, including stage at presentation/route to diagnosis and the impact of introducing a flexible clinic through which patients with a known diagnosis can self-trigger an appointment or rearrange their existing appointment.

During 2010 there were 110 patients admitted as an unscheduled emergency, 83 (75%) through A&E.

33 patients (30%) were newly diagnosed and of those 26 patients (24%) had metastatic disease at presentation (Stage IV).

Within the flexible clinic 22 patients triggered an appointment and thereby avoiding an emergency unscheduled attendance. There was a 20% reduction overall in lung cancer admissions in 2010 compared with 2008/9. 107 clinic appointments were cancelled following a telephone contact with the patient facilitating capacity for rapid access referrals: 96 of these were cancelled as the patients were asymptomatic.

**Conclusions:** 1. Introduction of the flexible clinic has reduced overall admissions by 20%. 2. A high proportion of patients were diagnosed with advanced disease whilst an inpatient. 3. Greater awareness of the symptoms of lung cancer may reduce late presentation. 4. Greater uptake of the flexible clinic may further reduce unscheduled admissions with lung cancer.

**P4427**

**P4428**

**Rapid access lung cancer clinic – A patient satisfaction survey**

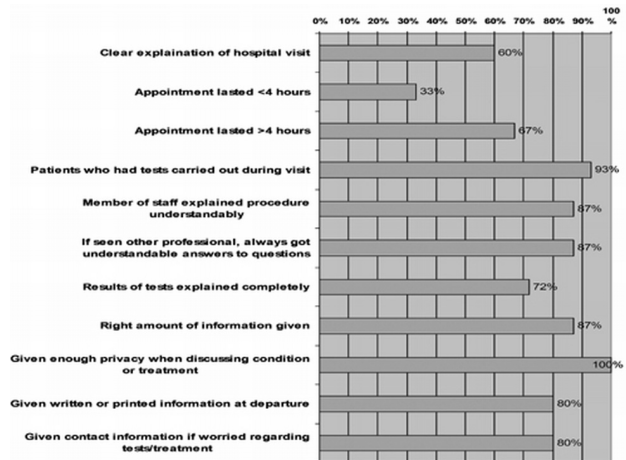
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**Background:** Royal Preston Hospital runs a rapid access lung cancer clinic for efficient staging of suspected lung cancer patients. Staging CT-scans and discussion with chest radiologists for planning and scheduling the investigation/s for definitive staging is carried out at first attendance. Moreover management plans are discussed with patients by doctors and reinforced by dedicated lung cancer nurse specialists who also provide ongoing psychological support to suspected cancer patients at first appointment.

**Aim:** To ascertain if patients were satisfied with the service offered at the rapid access clinic and if this service lead to early diagnostic/& or staging investigations as promised. We also wanted to identify areas which needed further development and aspects of service which were particularly well liked by our patients.

**Methods:** Survey questionnaires were posted to 35 patients attending the rapid access lung cancer clinic between January 2010 and February 2010.

**Results:** 42% (n=15) of patients returned the questionnaires.



**Conclusion:** Rapid access lung cancer clinic at our centre offers prompt investigations to suspected lung cancer patients. Although a large proportion of appointments lasted more than 4 hours, most of our patients had preliminary staging work up completed at first appointment. Our patients reported high levels of satisfaction with the adequacy of information given and degree of privacy observed by health care professionals.

**Abstract P4427 – Table 1.** Summary of results

	CO2 (days)	Non CO2 (days)	Unit Target	DoH Target	Target achieved – CO2 (%)	Target achieved – Non CO2 (%)
Referral to 1st out-patient appointment (OPA)	7 (1–14)	8 (1–33)	7 days	14 days	unit target 69, DoH 100	Unit target 19%, DoH n/a
CT prior to Bronchoscopy	n/a	n/a	100%	100%	100	100
Sampling to pathology	5 (1–18)	7 (3–15)	n/a	7 days	71	56
PET prior to radical treatment	n/a	n/a	100%	100%	100	100
Referral to completion of diagnostics (Triage)	18 (1–35)	17.5 (1–100)	28 days	n/a	92	82
Triage to OPA Oncology (Onc), Surgery (Surg)	Surg 7 (1–31), Onc 5 (1–16)	Surg 7.5 (6–13), Onc 7 (1–31)	7 days	n/a	Surg 82, Onc 90	Surg 50, Onc 67
Decision to treat to 1st treatment.	Surg 21.5 (4–28), Onc 12.5 (0–31)	Surg 19 (9–31), Onc 6 (0–29)	n/a	31 days	Surg 100, Onc 100	Surg 100, Onc 100
Initial referral to 1st definitive treatment.	46 (6–116)	32 (0–103)	n/a	62 days	81	83

TUESDAY, SEPTEMBER 27TH 2011

**P4429****How do patient and hospital features influence outcomes in small cell lung cancer in England?**

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**Introduction:** There is geographical variation in the delivery of active treatment in lung cancer. We wanted to find out whether the features of patients and/or NHS Trusts influence this variation.

**Methods:** We linked the National Lung Cancer Audit and Hospital Episode Statistics and used multiple logistic and Cox regression analyses to assess the influence of patient and NHS Trust features on small cell lung cancer outcomes.

**Results:** There were 87,252 patients, of whom 7,845 had histologically proven small cell lung cancer and 4820 (61%) received chemotherapy. Increasing age, worsening performance status, extensive stage and greater co-morbidity all significantly reduced the likelihood of receiving chemotherapy. Patients first seen in a "good" trial centre (defined as those entering >5% of expected patients into clinical trials) were 42% more likely to receive chemotherapy than those seen in other centres (adjusted OR 1.42, 95% CI 1.06, 1.90).

Overall survival was lower in men, and as age, performance status, stage and co-morbidity increased prognosis worsened. Chemotherapy led to a 50% reduction in the likelihood of death (adjusted HR 0.48, 95% CI 0.42, 0.55), and in those patients who received chemotherapy, overall survival was not affected by where they were first seen.

**Conclusion:** Chemotherapy clearly benefited overall survival, and patients first seen in an NHS Trust defined as a "good" trial centre had an increased likelihood of receiving chemotherapy without any adverse effect on survival. In order to ensure equal and safe access to treatment, the proportion of patients receiving chemotherapy in "poor" trial centres should increase to the level of "poor" trial centres.

**P4430****A retrospective analysis of patient presentation to primary and secondary care prior to subsequent late stage lung cancer diagnosis**

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**Introduction:** Lung cancer causes significant mortality representing over 20 percent of cancer death in 2008 in the UK. This is largely due to the high percentage of late stage disease at presentation and low proportion of radical treatment. We retrospectively audited primary and secondary care presentation in patients subsequently diagnosed with late stage (3 or 4) lung cancer.

**Method:** All patients with stage 3 or 4 lung cancer diagnosed in 2008 were included. Primary care, A&E and secondary care presentation were retrospectively analysed prior to lung cancer diagnosis. Symptom presentation was audited using NICE lung cancer referral guidelines as a gold-standard.

**Results:** 70 patients were identified during the study period. Primary care information was available in 38 patients. 34 percent of patients were diagnosed following an emergency secondary care presentation. 40 patients presented to health professionals prior to their emergency presentation or lung cancer referral with symptoms fulfilling NICE criteria for lung cancer specialist referral with 9 weeks from referral/presentation being the average. Where primary and secondary care information was available, 21 percent of patients did not see a health care professional till emergency presentation or referral. Average length of symptoms of patients prior to presentation/referral was 12 weeks.

**Conclusion:** Our study shows there is considerable delay in specialist referral from health professionals alongside considerable delay in patient presentation. This suggests further lung cancer awareness is required amongst at-risk patient populations as well as primary and secondary health care providers.

**P4431****General practitioner (GP) communication with potential lung cancer patients; review of practices prior to onward secondary care referral**

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**Background:** Anecdotally, there is heterogeneity in what patients understand as to why they are being asked to urgently attend respiratory clinics for suspected lung cancer; this is partly because of accelerated referral pathways after initial abnormal radiology and potentially bypassing direct contact in primary care.

**Aim:** We investigated patients referred to our urgent lung cancer referral pathway and report (1) how and what patients are told prior to attending secondary care clinics, (2) how these findings relate to subsequent outcomes, and (3) the performance status of patients at the point of initial review.

**Results:** Over a 4 month period to August 2010, of 107 referrals, 95 (89%) had complete data available for analysis. Mean (range) age was 65.8 (29-95) years. 51

(54%) are male. 79/95 (83%) had prior information from their GP with no home consultations, 15 (19%) had been contacted by telephone, 4 (5%) had received letter, and 60 (76%) had attended the GP surgery. 8 (10%) had been told that they had a possible or definite lung cancer, 54 (68%) had been told they had abnormal chest x-ray findings, and 17 (22%) had been told they were being referred for investigation. Performance status was, respectively from 0 to 4, 36 (38%), 34 (36%), 18 (19%), 6 (6%), and 1 (1%).

**Conclusions:** Results confirm the variation in referral routes and methods as well as the wide age range referred under this urgent system, but with only 23 (24%) patients with an eventual outcome of lung cancer. Results further emphasize the need to balance any direct and early information from the GP priming the patient before subsequent consultation in secondary care.

**P4432****Does raising awareness of lung cancer symptoms in primary care alter referral patterns?**

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**Background:** Patients with lung cancer often present late with advanced disease. This results from both symptomatic patients not presenting to primary care and delayed referral following presentation.

**Aim:** To examine whether sending General Practitioners (GPs) a reminder of the "red light" symptoms of lung cancer would increase urgent referrals and lead to earlier diagnosis.

**Method:** All 67 surgeries in South East Essex PCT received a postal reminder of the referral criteria for lung cancer. All suspected cancer referrals to Chest Clinic for 10 weeks before and after this were audited retrospectively and each case followed to completion on the pathway.

**Results:** 121 patients were referred over 20 weeks. The total number of referrals increased post intervention from 57 to 64 (12%) though this was not statistically significant (p=0.6). There was a statistically significant increase in referrals in the first 3 weeks post intervention (p=0.046) but this effect was lost by week 4 (p>0.2). More patients were discharged from the pathway in the post intervention group (28.1% vs 24.6%, p>0.2) and fewer diagnosed with cancer (26.6% vs 28.1%, p>0.2). Referrals due to haemoptysis increased in the post intervention group (10% vs 5.2%) but this did not reach significance (p=0.06).

**Conclusion:** Sending out referral guidelines resulted in an initial increase in referral numbers. This effect was lost after 3 weeks and did not improve cancer detection rates however numbers in this study were small. This suggests that resources need to be focussed on increasing patient as well as GP awareness if outcomes are to improve.

**P4433****Outcome of lung cancer alerts in chest X-rays**

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**Background:** Appropriately communicated alert messages on suspicious chest x-rays (CXR) is an important cornerstone in diagnosing lung cancer early. It is a standard practice in our hospital for a suspicious CXR to be faxed to the requesting clinician and lung cancer nurse. Strengthening the safety net this way minimises the chance of the report being slipped through system.

**Objective:** We assessed the outcome of CXR alerts in our institution to evaluate the effectiveness of the aforesaid system.

**Method:** Retrospective analysis of the outcome of CXR alerts from 2008-10 using the hospital radiology, laboratory systems and clinic letters.

**Results:** Out of 387 alerts analysed [mean age (sd) 70 (13) years], 239 (62%) resulted in rapid access lung clinic referrals. Radiological follow up (f/u) occurred in 90% (348) of which 163 (47%) were diagnosed to have cancer. CXR f/u was done in 93 (%) (after a median period of 3 weeks; inter-quartile range 1-5wks) and 298 (77%) had CT scan (after a median gap of 3 wks; IQR 2-4wks). In 17 (4%), no identifiable reason could be found for no radiological f/u. 5/17 patients (1.3% of all) were eventually found to have malignancy.

We also measured the outcomes of different abnormality patterns in the initial CXR

Table 1

	Opacity/consolidation	Effusion	Hilar mass	collapse	Pleural thickening
Total no.	316	36	100	13	39
No. of cancer	140 (44%)	21 (58%)	43 (43%)	5 (39%)	13 (33%)

**Conclusion:** Nearly half the alerts resulted in cancer diagnosis. By distributing alert messages on suspicious CXR, radiology departments can expedite early diagnosis of lung ca. We also found out that pleural effusion, opacity/consolidation, hilar mass findings in the CXR had similar potential for eventually turning out to be malignant in the study population.

TUESDAY, SEPTEMBER 27TH 2011

**P4434****A repeat audit of computed tomography scanning prior to fibreoptic bronchoscopy in the diagnosis of lung cancer**John Seymour, Timothy Ho. *Department of Respiratory Medicine, Frimley Park Hospital NHS Foundation Trust, Frimley, Surrey, United Kingdom*

**Background:** United Kingdom (UK) clinical guidance recommends CT (computed tomography) imaging prior to conventional fibreoptic bronchoscopy (FOB) in the investigation of lung cancer. Previous audit at our centre reported that cancer was unlikely to be visualised in 67% of non-diagnostic FOBs based on the CT scan.

**Aims:** We hypothesized that local practice would be consistent with UK guidance. A repeat audit was conducted to see whether the rate of CT scanning prior to FOB had improved.

**Methods:** Patients with a final diagnosis of small cell (SCLC) or non-small cell (NSCLC) lung cancer over a 6-month period in 2010 and the equivalent period in 2008 were analysed. The timing of the CT scan and whether FOB resulted in a diagnosis from biopsy or cytology was recorded. CT scans were reviewed to assess whether a lesion was likely to be visible at FOB.

**Results:** 88 patients (mean (SD) age 69 (11) years) with SCLC (n=13) and NSCLC (n=75) were identified in 2010. All underwent a CT scan. 32% of patients underwent FOB (60% in 2008). CT scanning was performed prior to bronchoscopy in 86% of patients (68% in 2008). Non-diagnostic FOBs remained common (48% in 2010, 35% in 2008). CT scans indicating endobronchial disease were associated with a positive likelihood ratio of 2.6 (2.8 in 2008). 62% of non-diagnostic procedures were predictable from the CT scan (67% in 2008).

**Conclusions:** Despite earlier findings, a CT scan was not performed prior to FOB in all patients. Fewer FOBs occurred in 2010, and may be due to the selection of patients for endobronchial ultrasound. Non-diagnostic FOBs occurred in both periods, however, further reductions in unnecessary procedures may be achievable.

**P4435****Validation of existing clinical prediction models for patients with solitary pulmonary nodules (SPN) managed by a lung multi-disciplinary team (MDT)**Puneet Malhotra<sup>1</sup>, Natasha Lovell<sup>1</sup>, Paul Plant<sup>1</sup>, Shishir Karthik<sup>2</sup>, Andrew Scarsbrook<sup>2</sup>, Matthew Callister<sup>1</sup>. *<sup>1</sup>Respiratory Medicine, Leeds Teaching Hospitals NHS Trust, Leeds, United Kingdom; <sup>2</sup>Nuclear Medicine and Radiology, Leeds Teaching Hospitals NHS Trust, Leeds, United Kingdom*

**Background:** Management of patients with SPNs depends critically on the pre-test probability of malignancy. There are currently two clinical predictions models for SPNs based on data from North America. However, these models have not been validated in UK patients, in particular those managed by a Lung MDT.

**Objective:** To validate two existing clinical prediction models in patients with SPNs managed by the Lung MDT at a large teaching hospital.

**Methods:** 175 patients with SPNs measuring 8–30 mm managed by the Lung MDT over 3 years (2007-2009) were identified retrospectively through the institutional Lung Cancer database. Data on age, smoking, cancer history, nodule size, location, spiculation, and final diagnosis was collected. Each case's final diagnosis was compared with the probability of malignancy predicted by two models: the Mayo Clinic model and the Veteran Affairs (VA) one. The accuracy of each model was assessed by calculating areas under the receiver operating characteristic (ROC) curve and the models were calibrated by comparing predicted and observed rates of malignancy.

**Results:** The area under the ROC curve for the Mayo model (0.832; 95% CI 0.753-0.911) was higher than that of the VA model (0.739; 95% CI 0.641-0.838). Calibration curves showed that both models slightly underestimated the probability of malignancy for patients across all deciles of predicted probabilities, except for those with highest probability of malignancy, where the VA model slightly overestimated probability.

**Conclusions:** The two existing prediction models are sufficiently accurate to guide management of patients with SPNs managed by a Lung MDT.

**P4436****The value of immunohistochemical markers in the differential diagnosis of adenocarcinomas**Aysegul Eylen<sup>1</sup>, Aysegul Karalezli<sup>1</sup>, Olcay Kandemir<sup>2</sup>, Gokhan Aykun<sup>1</sup>, Hatice Hasanoglu<sup>1</sup>. *<sup>1</sup>Chest Diseases, Ankara Atatürk Training and Research Hospital, Ankara, Turkey; <sup>2</sup>Pathology, Ankara Atatürk Training and Research Hospital, Ankara, Turkey*

When differential diagnosis of adenocarcinoma in lung cannot be made, immunohistochemical staining may be necessary. Value of immunohistochemical staining in the differential diagnosis of adenocarcinomas was evaluated.

74 cases of different adenocarcinomas were enrolled. Pathology slides were stained with routine H&E staining and immunohistochemical markers. Positive CK7 immunostaining was seen in 100% of lung adenocarcinomas, papillary thyroid adenocarcinomas (PTC) and breast invasive ductal carcinomas (BIDC) and 15% of gastrointestinal (GI) adenocarcinomas, whereas none of prostate adenocarcinomas were positive. Positive CK20 immunostaining was seen in 75% of GI carcinomas and 10% of prostate adenocarcinomas whereas none of lung adenocarcinomas, BIDCs and PTCs showed positive CK20 immunostaining. TTF-1 staining was observed in 100% of PTCs, 83.3% of lung adenocarcinomas, 20% of BIDCs, 15% of GI carcinomas and 10% of prostate carcinomas. Positive p53 immunostaining

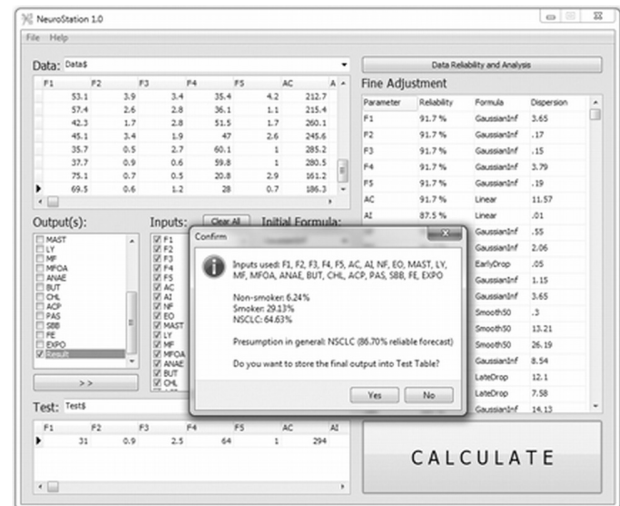
was seen in 87.5% of lung adenocarcinomas, 85% of GI adenocarcinomas, 90% of PTCs and 80% of BIDCs. P53 staining wasn't observed in prostate adenocarcinomas. CK7+CK20- staining panel's sensitivity and specificity was found as 100% and 90% respectively in differential diagnosis of lung and GI adenocarcinoma. In differential diagnosis of lung adenocarcinomas from breast adenocarcinomas, TTF-1 marker had 83.3% sensitivity and 80% specificity.

Consequently, immunohistochemical studies were found valuable in differential diagnosis of lung adenocarcinomas from other adenocarcinomas. Especially in patients with lung adenocarcinoma CK 7+CK20- staining pattern seem to give important contribution to differential diagnosis.

**P4437****NeuroStation – Statistical software based on artificial intelligence and pattern recognition for NSCLC development prediction through comprehensive biomarker analysis**Nikola Minic<sup>1</sup>, Svetlana Zunic<sup>2</sup>, Snezana Zunic<sup>3</sup>. *<sup>1</sup>Research Department, Corponest, Belgrade, Serbia; <sup>2</sup>Institute of Nuclear Medicine, Clinical Center of Serbia, Belgrade, Serbia; <sup>3</sup>Institute of Pathological Physiology, Clinical Center of Serbia, Belgrade, Serbia*

A feed-forward artificial neural network is the perfect way to organize gathered information into precisely defined categories regardless blurred borders among them. Well-trained neural network with sufficient number of neurons in processing layer will act as an expert with highly increased learning and data processing skills and reduced error possibility below 0.001.

NeuroStation statistical software is uniquely made for analysis of three biomarker categories: apoptotic, cytological and cytochemical parameters. Initial learning database contains 24 patients (9 non-smokers, 6 smokers and 9 NSCLC patients), plotted into 21-dimensional space neural network based on observed biomarkers. After thorough analysis and testing, the system offers a reliable prediction in percentages what is the probability of NSCLC development based on any collected biomarker for a new person.



An analyst can further adjust statistical factors, such as influence ratio diameter and dispersion formula. Although the sample of 24 patients usually does not fulfill requirements for standard statistic tests, this network demonstrated significant results both in sense of reliability and mean squared error reduction.

Software NeuroStation has remarkable potential in becoming essential tool both for in scientific purposes and for medical staff who work with NSCLC endangered patients.