Abstract S69 Table 1 Headline data from the national lung cancer audit

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Data Completeness									
Number of cases	10,920	16,922	20,639	25,757	30,158	30,329	31,429	31,003	30,508
PS	66%	77%	80%	87%	88%	84%	89%	91%	93%
Staging	51%	55%	70%	77%	80%	82%	84%	94%	93%
Treatment	66%	72%	79%	82%	89%	89%	91%	91%	92%
Process and Outcomes									
HCR	68%	66%	65%	66.7%	69.5%	76.5%	73.8%	75.5%	75.1%
NSCLC NOS rate	-	36%	32%	33.6%	30%	24%	19%	16%	13%
Discussed at MDT?	79%	84.3%	86.8%	88.6%	93.2%	96.1%	95.9%	95.6%	95.2%
Anti-cancer treatment?	45%	50%	52%	54%	58.9%	58.5%	60.5%	61.0%	60.2%
Overall resection rate	9%	9.4%	10.3%	11.2%	13.9%	13.9%	15.3%	15.5%	15.4%
NSCLC resection rate	13.8%	14.3%	15.2%	16%	19%	18.3%	21%	22%	23%
SCLC chemotherapy rate	57.7%	61.7%	64.5%	63%	66%	65%	68%	68%	70%
Seen by LCNS	-	-	-	50.9%	64.4%	75.5%	79.4%	81.9%	83.9%
LCNS at diagnosis	-	-	-	28.5%	41%	51.9%	58.7%	61.2%	65.3%

HCR=histo-cytological confirmation rate; LCNS=lung cancer specialist nurse; NOS=not otherwise specified

audit as part of a new commissioning process, and the linkage with other developing datasets will allow the project to continue to realise the goal of improved and less variable outcomes and for patients with lung cancer.

S70 RESULTS FROM THE FIRST NATIONAL LUNG CANCER ORGANISATIONAL AUDIT

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Background National Lung Cancer Audit reports consistently demonstrate variation in diagnostic pathways, treatment rates and outcomes which are not wholly explained by case-mix. One possible explanation for this variation is different access to diagnostics and treatment specialists, however little is known about the provision of these services across England and Wales lung cancer services.

Methods An electronic survey was sent to all lung cancer lead clinicians in England and Wales in January 2014. The survey included seven questions for all MDTs on service provision, diagnostic services, staging services, and lung cancer treatment. There were a further 3 questions for treatment centres. Two reminders were sent and the survey closed in May 2014.

Results 128 records were submitted from 176 trusts. After removal of duplicate and empty records 101 were available for analysis. Mean (range) average number of patients discussed per MDT meeting is 26 (5–88) and 29% Trusts have a separate diagnostic meeting. There is considerable variation in the mean (range) number of whole time equivalent (wte) on site lung cancer specialists e.g. thoracic pathologists 1.4 (0–10), lung CNS 2.0 (0.5–10) and respiratory physicians 3.9 (0–20). Most diagnostic and staging procedures are available either on or off site, although medical thoracoscopy is not available at all to 14% Trusts. Chemotherapy, radiotherapy and surgery are available on site in 89%, 33% and 18% of Trusts, respectively. VAT lobectomy, stereotactic radiotherapy and radiofrequency ablation are not available at all to 6%, 5% and 10% of Trusts, respectively. Centres performing thoracic surgery report mean (range) wte number of surgeons at 1.5 (0–6) and thoracic HDU beds at 4 (0–24). Acute oncology services are available to 92% chemotherapy treatment centres and 96% radiotherapy centres.

Conclusion The data provide a moderately representative snapshot of diagnostic and treatment services available for lung cancer patients in England and Wales. There is significant variation in the number of specialists available and some patients do not have access to key treatment modalities e.g. VAT lobectomy. Further work is required to determine how this relates to patient experience and outcomes. All Trusts are encouraged to submit validated data for the next round of organisational audit.

S71 ARE QUALITY STANDARDS AND ACCREDITED CENTRES FOR MEDIASTINAL STAGING WITH EBUS NEEDED? A REPORT FROM THE MANCHESTER CANCER EBUS GROUP

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Introduction Mediastinal staging in lung cancer is a core function of EBUS-TBNA. There has been an explosion of EBUS -TBNA services across the UK over recent years. However, quality standards and adherence to such standards are not widely known. The aim of this study was to describe the current practices of four independent EBUS centres serving a large UK cancer network.

Materials and Methods In 2012, the number of centres providing EBUS-TBNA in this Network increased from one to four. This prompted the development of an EBUS sub-group and service specification that mandates the collection of pre-defined data for all EBUS procedures. Analysis of this prospectively maintained database was undertaken for this report.

Results 741 lung cancer patients underwent EBUS-TBNA in the study period. 56.4% (418/741) were for nodal staging, with the remaining performed for pathological confirmation of lung cancer. The proportion of staging procedures performed at each centre varied significantly (range 4.8% - 80.3%, $p < 0.0001$). In those patients undergoing EBUS for mediastinal staging, the average number of lymph stations sampled per procedure varied from 1.3 to 1.9 across the four centres and the proportion of

patients with 3 or more stations sampled varied from 0% to 26.6%. Furthermore, there was variability in the rate of inadequate sampling (2.4–7.6%), sensitivity (69.2–90.5%), negative predictive value (50–87.5%) and rate of surgical sampling of negative nodes (6.3–35.0%) across the EBUS centres.

Discussion There is variability in practice in all parameters of EBUS practice examined in our Network, in the absence of agreed standards and protocols for mediastinal staging. Such protocols and standards have now been agreed and implemented across our Network and the EBUS sub-group is committed to ongoing data collection and publication to drive quality outcomes in this pivotal lung cancer service.

S72 CLINICAL PREDICTION MODELS FOR MALIGNANCY IN SOLITARY PULMONARY NODULES – A VALIDATION STUDY IN A UK POPULATION

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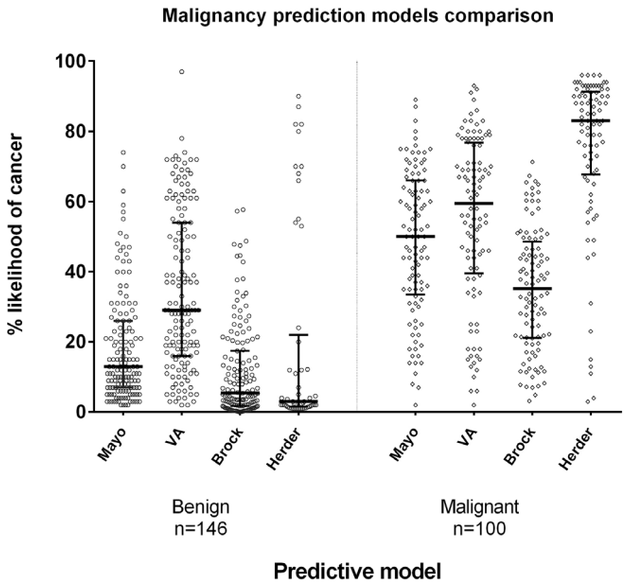
Background Management of solitary pulmonary nodules (SPNs) depends critically on the pre-test probability of malignancy. Several quantitative prediction models have been developed using clinical and radiological criteria. Three models include CT criteria (Mayo, Veterans Association, Brock University) with a fourth model (Herder) incorporating FDG avidity on CT-PET scan in addition. These models have not been validated in a UK population, and the current study aimed to compare their performance in a population of patients recruited from a UK teaching hospital.

Methods Patients with SPNs (4–30 mm) were retrospectively identified from the lung cancer MDT and a nodule follow-up clinic (n = 246). All patients had a final diagnosis confirmed by histology or radiological stability on a 2-year follow up. For each patient, the probability of the pulmonary nodule being malignant was calculated using the four models described. The models were used both in a restricted cohort of patients based on their respective exclusion criteria, and in the total cohort of patients. The accuracy of each model was assessed by calculating the area under the receiver operating characteristic (ROC) curve.



Abstract S72 Figure 1 Malignancy prediction models comparison

Results The median age of the patient population was 69 years (range 32–94) and 50% were male. The prevalence of malignancy was 40.6% (33.3% primary lung cancer, 7.3% metastatic disease). Figure 1 shows the distribution of the probabilities of malignancy according to the four different models.

The areas under the ROC curves for the cohorts restricted by respective exclusion criteria were (AUC, 95% CI): Mayo 0.892 (0.847–0.937); VA 0.736 (0.672–0.801); Brock 0.901 (0.855–0.947) and Herder 0.924 (0.875–0.974). For the total cohort, the AUC values were Mayo 0.873, VA 0.736, Brock 0.867 and Herder 0.916.

There was no statistical difference between the Mayo and Brock models, but both were significantly better than VA (AUC difference of 0.14 and 0.13 respectively, $p \leq 0.0001$ for both). The Herder model performed significantly better than both Mayo and Brock models (AUC difference of 0.10 and 0.14 respectively, $p \leq 0.01$).

Conclusion Both the Mayo and the Brock models perform well in a UK population, but accuracy is improved by incorporating CT-PET findings using the Herder prediction model.

S73 INFRARED SPECTROSCOPY FOR THE DETECTION OF EXTENDED FIELD CARCINOGENESIS: A NEW PARADIGM FOR LUNG CANCER SCREENING?

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Background Computerised Tomography (CT) has been shown to be the only lung cancer screening modality to be effective in reducing lung cancer specific mortality.[1] A minimally invasive technique to stratify those at greatest risk within the population of adult smokers may help to target CT screening more effectively.

Rationale Tobacco smoke exposure causes a field of injury to the airways (including nose and mouth) that if detected may inform an individual's risk of lung cancer.[2] Infrared spectroscopy (IR) is a technique that can detect subtle biochemical alterations in macroscopically normal cells.

Methods Buccal cells were exfoliated from 76 patients including 38 smokers without and 38 with lung cancer (matched for age, gender and pack years). The cells were fixed onto IR windows and spectra recorded using synchrotron radiation (Diamond facility, Oxford). Data was acquired using x36 objective and 15 × 15 μm aperture in transmission mode; 256 interferograms at 4 cm^{-1} resolution were recorded for 50 cells per sample. All samples analysed were confirmed to be cytologically normal. Outlying data was removed using principal component analysis and a prediction model built using partial least squares discriminant analysis.

Results Smokers with lung cancer could be differentiated from matched smokers without lung cancer with a diagnostic accuracy of 80%. The spectral region showing greatest difference between groups was in the 1200–900 cm^{-1} region; comparison to reference spectra shows that this is likely to represent a metabolic change caused by an increased abundance of glycogen or its derivatives.

Conclusions We have shown for the first time that IR spectroscopy of macroscopically normal upper respiratory tract cells may have a role to play in the early detection of lung cancer. Future work will validate these findings and aim to develop this