## P157 PREDICTORS OF OBSTRUCTIVE SLEEP APNOEA-HYPOPNEA SYNDROME IN ATTENDERS TO A SLEEP DISORDERED BREATHING CLINIC

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**Introduction** Several formulae have attempted to predict the presence and severity of the obstructive sleep apnoea-hypopnea syndrome (OSAHS) with variable success. Many have been used to differentiate OSAHS from the background population rather than symptomatic clinic attenders, and few have been retested as our population becomes older and more obese.

**Methods** A retrospective review of a prospectively recorded database for a sleep-disordered breathing clinic at a district general hospital. We selected a random sample of 534 subjects with complete data regarding sleep studies referred between 2004 and 2008 to a respiratory service with symptoms of daytime tiredness and usually snoring or apnoeas. We defined OSAHS as daytime sleepiness and a 4% dip rate >15 events/h or apnoea-hypopnea index >20 events/h on limited channel overnight sleep study (Embletta or Visilab). We compared variables traditionally associated with OSAHS in those with OSAHS versus those without eventual OSAHS (Mann-Whitney U test/$\chi^2$ test). We then entered potentially discriminating factors as independent variables using the $\log_{10}$ transformation of the respiratory disturbance index (RDI) (for the whole sample) as the dependent variable, in a linear regression model to look for predictors of the severity of sleep disturbed breathing.

**Results** Our multiple linear regression model, entering these factors suggests that only body mass index (BMI) ($p = 0.045$) and collar size ($p = 0.047$) were significant predictors. (Age ($p = 0.308$), Epworth ($p = 0.268$) and systolic BP ($p = 0.226$)). The overall regression effect was highly significant ($F(5,239) = 5.33$, $p<0.001$), but $R^2 = 0.10$. Mean values are shown in table 1.

**Abstract P157 Table 1**

| | OSAHS (n = 441) | Non-OSAHS (n = 97) | p Value |
|---|---|---|---|
| Age (years) | 54.9 | 50.7 | 0.002 |
| % female | 16 | 25 | 0.014 |
| BMI (kg/m2) | 36.9 | 33.3 | 0.001 |
| Collar size (cm) | 45.0 | 43.2 | 0.003 |
| Epworth score | 13.0 | 12.7 | 0.752 |
| Systolic BP (mm Hg) | 141 | 130 | <0.001 |

BMI, body mass index; OSAHS, obstructive sleep apnoea-hypopnoea syndrome.

**Conclusion** We have identified similar differences in baseline characteristics that help identify those with OSAHS from, for example, sleepy snorers, with BMI and collar size appearing the most important variables in predicting the severity of sleep disturbed breathing in those referred to a sleep clinic. However, together these variables still only account for 10% of the variance in (log)RDI, suggesting that other factors such as upper airway shape are important and sleep studies are ultimately still needed.

# Lung cancer: practice and epidemiology

## P158 DOES VARIATION IN COMPLETENESS OF DATA ENTRY TO LUCADA AFFECT THE TREATMENT OFFERED TO PATIENTS WITH LUNG CANCER?

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**Introduction** Since its inception in 2004, the National Lung Cancer Audit (Lucada) has steadily increased the capture of people with lung cancer. However, the collection of data is non-mandatory and inevitably there is variation in completeness of data entry. This has led to concern that use of Lucada data to compare standards of care across NHS trusts may be unreliable.

**Methods** To quantify completeness of data entry we calculated an observed:expected (O:E) ratio for each NHS trust. Lucada provided the "observed" number of patients. To calculate an "expected" number we used data from the Thames Cancer Registry, but these data are only available at the level of a Primary Care Trust (PCT). We generated an O:E ratio at the level of a PCT, and then mapped this to the NHS trusts from whom they commissioned services. These O:E ratios were then stratified into quartiles. We used multivariate logistic regression to compare the use of different treatment modalities across NHS trusts, stratified on the basis of data completeness.

**Results** Our dataset includes 67 824 patients, of whom 11% (7689) were excluded on the basis of incomplete key data. The results of logistic regression analyses are shown in table 1. It shows very little variation in access to curative treatment across NHS trust strata. However, patients from NHS trusts in the lowest stratum had a small but statistically significant reduction in the likelihood of being

**Abstract P158 Table 1** Logistic regression analyses for curative and active palliative treatment across NHS trust strata

| | Absolute no (%)* | Unadjusted OR (95% CI) | Adjusted OR (95% CI)† |
|---|---|---|---|
| *Curative treatment* | | | |
| NHS trust strata based on O/E ratio | | | |
| Highest quartile | 2421 (10) | | |
| 2nd highest quartile | 1475 (8) | 0.81 (0.75 to 0.86) | 0.83 (0.77 to 0.90) |
| 3rd quartile | 1044 (8) | 0.82 (0.76 to 0.89) | 1.03 (0.94 to 1.12) |
| Lowest quartile | 527 (10) | 0.99 (0.90 to 1.10) | 0.97 (0.86 to 1.09) |
| *Active palliative treatment*‡ | | | |
| NHS trust strata based on O/E ratio | | | |
| Highest quartile | 9936 (45) | | |
| 2nd highest quartile | 5914 (36) | 0.67 (0.64 to 0.70) | 0.84 (0.81 to 0.88) |
| 3rd quartile | 4041 (35) | 0.65 (0.62 to 0.68) | 0.94 (0.89 to 0.99) |
| Lowest quartile | 1510 (32) | 0.55 (0.52 to 0.59) | 0.72 (0.66 to 0.77) |

The comparator NHS trust stratum was the highest quartile.
*Percentage of patients referred for each treatment modality from each trust strata.
†Adjusted for sex, age quintile, performance status, basis of diagnosis, histology and stage of tumour.
‡Patients receiving curative treatment (n = 5467) were excluded from this analysis.

referred for active palliative treatment (adjusted odds ratio 0.72, 95% CI 0.66 to 0.77).

**Conclusion** The apparent reduction in use of active palliative treatment in NHS trusts with a low O:E ratio could be a ''true'' reflection of different practice or could reflect poor data entry. The latter explanation is supported by the finding that ''no specific anti-cancer care'' is more likely to be recorded as the multidisciplinary team treatment decision in these trusts (adjusted OR 1.26, 95% CI 1.09 to 1.47). Although there is variation in data completeness across NHS trusts, our analyses show no evidence that this introduces bias in terms of treatment referral. This supports our earlier work[1] which recommended that Lucada is a valuable national database for health resource planning.

1. **Rich AL**, Tata LJ, Free CM, *et al*. The National Lung Cancer Audit Database (LUCADA); essential analyses of data quality. *Lung Cancer* 2009;**63**(Suppl 1).

## P159 CAN WE IMPROVE ADJUVANT CHEMOTHERAPY UPTAKE IN THE MANAGEMENT OF RESECTED LUNG CANCER? AN AUDIT OF PRACTICE ACROSS THE MID TRENT LUNG CANCER NETWORK

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**Introduction and Objectives** In the UK, lung cancer survival rates lag behind the rest of Europe. Adjuvant chemotherapy confers a survival advantage for those patients with resectable disease who undergo surgery. Current UK guidelines state that adjuvant chemotherapy should be offered to patients who have had complete resection, with discussion of risks and benefits. Our Network policy is that all patients with resected stage II or IIIa non-small cell lung cancer should see an oncologist to discuss chemotherapy. We conducted an audit of adjuvant chemotherapy rates across the Mid Trent Lung Cancer Network, specifically to determine: (1) the proportion of patients receiving adjuvant chemotherapy; (2) whether patients completed the full standard course; and (3) the length of time from surgery to starting chemotherapy.

**Methods** We audited all cases of lung cancer resected between October 2006 and September 2007 identified from the Nottingham University Hospitals NHS Trust surgical database. For those patients with stage II or IIIa disease (ie, N1/2 or T3 disease), we determined whether patients received chemotherapy, the length of time from surgery to chemotherapy and the number of chemotherapy cycles completed.

**Results** There were 110 resections in total, 47 for N1/2 or T3 disease. Of these 47, 22 (47%) received adjuvant chemotherapy. One received radiotherapy for positive resection margins. 13 of 18 (72%) patients completed the full course (data unavailable for 4 patients). Median time from surgery to chemotherapy was 56 (mean 59) days. Median age of patients receiving chemotherapy was 65 (mean 63) years compared with 71 (mean 70) years in those not receiving chemotherapy.

**Conclusions** Less than 50% of eligible patients received adjuvant chemotherapy, and more than 50% of patients waited more than 8 weeks from surgery to starting treatment. Patients not receiving chemotherapy were older; co-morbidities and general fitness may have affected the balance of risks and benefits for this group. If UK survival rates for lung cancer are to be improved, adjuvant chemotherapy must be offered promptly to all eligible patients and, where the balance of risks and benefits favours it, patients should be encouraged and supported in pursuing this option.

## P160 MESOTHELIOMA IN THE NATIONAL LUNG CANCER AUDIT

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**Methods** The National Lung Cancer Audit is an audit of lung cancer run jointly by the Royal College of Physicians and The Information Centre for Health and Social Care. The aim of the audit is to facilitate service improvement by recording outcomes in lung cancer on a large scale and, through case mix adjustment, to start to explain the wide variations noted. This abstract presents results for mesothelioma in England only (2005–7), although results from the data collection in 2008 will be included in the final presentation.

**Results** There were 2469 patients with mean age of 70.9 years. Of these, 2043 (82.7%) were men and 426 (17.3%) were women. 41.6% have right-sided disease, 24.1% are left-sided, 0.6% are bilateral and 0.1% are midline, with the location recorded as unknown in 33.7%. 46.4% are referred by their GP, 15.7% are emergency admissions, 16.6% are referred by another consultant, 4.9% are referred following an A&E episode, 8.7% come through other routes and in 7.6% the referral route is recorded as unknown. Survival was calculated from a census date of 13 January 2009 to the date of diagnosis (or date first seen if not available). Overall, the median survival is 249 days with a 1YS of 36.1%. Further analysis by histological subtype and by treatment received is shown in table 1.

**Conclusions** There is a striking tendency for mesothelioma to be right-sided. 23% of cases have no histological confirmation recorded but, where this is obtained, the epithelioid subtype has a much better prognosis. Patients receiving chemotherapy have the best survival, but this result is subject to selection bias.

**Abstract P160 Table 1** Analysis by histological subtype and by treatment

| | % of subtype | Median survival (days) | 1 year survival (%) |
|---|---|---|---|
| *Further details by histological subtype* | | | |
| Unspecified | 44.6 | 249 | 35 |
| Epithelioid | 27.0 | 353 | 49 |
| Sarcomatoid | 5.2 | 117 | 14 |
| Biphasic | 0.5 | 177 | 23 |
| No histology | 22.7 | 200 | 32 |

| | % having treatment | % having first treatment | Median survival by first treatment (days) | 1 year survival (%) |
|---|---|---|---|---|
| *Further details by treatment* | | | | |
| Surgery | 21.6 | 21.4 | 336 | 46% |
| Chemotherapy | 14.3 | 10.6 | 388 | 55% |
| Radiotherapy | 24.2 | 18.7 | 268 | 37% |
| Palliative | 18.7 | 16.7 | 134 | 22% |
| No specific treatment recorded | 21.2 | 32.7 | 198 | 30% |

## P161 IMPACT OF IMPLEMENTING A LOCAL CANCER AWARENESS CAMPAIGN ON REFERRALS TO SECONDARY CARE FOR SUSPECTED LUNG CANCER

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**Background** The Manchester Versus Cancer Alliance launched the campaign ''Don't be a cancer chancer'' in 2007 to raise public awareness of the signs and symptoms of lung cancer to encourage earlier presentation top health professionals.
**Methods** A wide advertising strategy was used including leaflets, billboard posters, local press, stationery and a road show. An initial pilot study showed that these were effective methods of raising awareness of the symptoms of cancer and were well received by the public. Areas of social deprivation were particularly targeted. A quantitative analysis of the number of referrals to Wigan Infirmary for suspected lung cancer was performed comparing January to May 2007 and the same period in 2008, a year after implementation of the campaign.
**Results** There was a 18.7% increase in the number of GP referrals to secondary care for suspected lung cancer in 2008 compared with 2007 (602 vs 507 respectively). The number of urgent referrals rose by 51% (100 vs 66 respectively). The largest rise in referral rates was seen in the most socially deprived areas. A total of 40 patients were given a definitive diagnosis of lung cancer from January to May 2007; in 2008 there were 8 additional lung cancers diagnosed in the same period. GPs' perception of the campaign was positive.
**Conclusion** This campaign has been effective in raising awareness of the main symptoms of lung cancer and the number of patients referred to Wigan Infirmary for investigation of suspected lung cancer.

## P162 INFLUENCE OF CASE MIX ADJUSTMENT ON OUTCOMES IN THE NATIONAL LUNG CANCER AUDIT

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**Background** One aim of the National Lung Cancer Audit (NLCA) is to determine the extent to which differences in case mix account for the wide variations seen in lung cancer outcomes across England and Wales. The quality of data submitted to the audit has improved year on year so that more meaningful comparisons between organisations are now possible. We assessed the effect of case mix adjustment on key quality of care outcome measures for patients first seen in 2007 in England and Wales.
**Methods** Case mix adjusted logistic regression models were fitted to NLCA data. Adjustments were made for sex, age, stage, performance status and deprivation (by postcode). The models compared the odds of an outcome occurring in one network compared with a baseline network, which were generally chosen based on size. Networks were deemed to be significantly different from the baseline network if their 95% confidence intervals did not overlap.
**Results** Data were available for 22 628 patients, representing 75% of the expected number of cases. Data completeness for performance status and stage were 63% and 59%, respectively. Treatment was recorded in 79% of cases. The range of results for key quality of care outcome measures is shown in table 1, together with a comparison of networks with the baseline network before and after case mix adjustment. After case mix adjustment, a significant correlation remained between histological confirmation and surgical resection rates ($R = 0.370$, $p<0.05$).
**Conclusions** The available data suggest that differences in sex, age, stage, performance status and deprivation do not explain the wide variations in quality of care outcome measures for lung cancer patients across English and Welsh cancer networks. Alternative explanations include differences in co-morbidities that are not linked to deprivation or variations in lung cancer pathways, particularly achieving a histological diagnosis. Organisations are encouraged to examine their own results and review their local guidelines and care pathways in order that regional variability is reduced and outcomes are improved.

## P163 ANALYSIS OF SIGNIFICANT EVENT AUDITS OF LUNG CANCER DIAGNOSIS IN PRIMARY CARE

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**Background** The principal method of identification of lung cancer in the UK is symptomatic presentation, usually to general practitioners who, as a result of their gate-keeping role within the NHS, are the usual source of referral to secondary care. Significant event audit (SEA) is a quality improvement technique that is in routine use in general practice. The purpose of this study was to gain insights into the events that surround the diagnostic process for lung cancer, drawn from secondary analysis of SEA documents.
**Methods** Practices in two NHS areas in the north-east of England were invited to participate. They were asked to identify the last patient in the practice diagnosed with lung cancer, even if that patient was now deceased, and to complete an SEA report. Documented accounts were synthesised and a qualitative approach to analysis was adopted, involving development of an interpretative matrix based on a modified framework approach and analysis of the reflections of practitioners.
**Results** SEA reports were returned for a total of 132 lung cancer diagnoses. Interpretation of these accounts demonstrated the complexity of the process of diagnosis in general practice. The majority of SEAs demonstrated appropriate recognition and referral.

**Abstract P162 Table 1**

| | Range of results prior to case-mix adjustment | | Number of networks significantly different to baseline network | |
|---|---|---|---|---|
| | Lowest network (%) | Highest network (%) | Before adjustment | After adjustment |
| Histological diagnosis (NSCLC) | 39.6 | 88.5 | 24 (73%) | 24 (73%) |
| Anti-cancer treatment (NSCLC) | 17.8 | 67.4 | 21 (64%) | 20 (61%) |
| Surgery (NSCLC) | 3.6 | 37.2 | 17 (52%) | 18 (55%) |
| Chemotherapy (SCLC) | 18.2 | 85.2 | 12 (36%) | 13 (39%) |

NSCLC, non-small cell lung cancer; SCLC, small cell lung cancer.

Where the process of recognition had taken longer, there were often reasonable explanations for this. These related to chest radiographs reported as normal or with findings consistent with benign disease, patient factors such as time to re-presentation or declining earlier referral, and presentation complicated by co-morbidity or presenting complaint. Some examples of opportunities for earlier diagnosis were also found. The most common presenting symptom was cough, productive cough and other symptoms indicative of infection, suggesting that it is from understanding more about these patients in particular that most could be gained. Learning points identified by practices centred on the themes of (a) presentation and diagnosis of cancer, (b) system issues and the primary/secondary care interface, (c) patient related factors, (d) practitioner issues and (e) the role of guidelines.

**Discussion** This is a novel approach to investigating recognition and referral of cancer. Useful insights into the process in primary care have been identified, generating useful recommendations for practice.

## P164 UK NATIONAL SURVEY ON RADIOLOGISTS' PERSPECTIVE OF LUNG CANCER MDT: CAN WE DO BETTER?

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**Introduction** To ensure the quality of lung cancer MDT (LCMDT), the RCR and NICE have produced standards on the role of chest radiologists (CRs) which includes number of consultants, cases discussed, time requirement, presence of other subspecialties, etc. To investigate current UK practice we conducted a postal survey.

**Method** 262 questionnaires were sent to CRs working in all the hospitals listed in the BTS directory (204 hospitals, 135 (66.2%) responded) to investigate the number of CRs in hospital and at each LCMDT, case load, time between review of scans and LCMDT, time spent to review scans, time allocation in job plan, junior training, order of cases, presence of thoracic surgeons (TS), oncologists (ON), pathologists (Path), palliative care (PC), travel and video-conferencing, proximity of thoracic surgical centre (THC) and influence on patient outcome.

**Results** 150 CRs replied; 74% worked in a DGH, 24% in a tertiary centre (TC). Mean number of CRs 2.25 (range 0–8)/hospital, significant difference ($p<0.004$) between DGH and TC and also by per 1000 population ($p<0.002$) and 2.06/LCMDT (range 1–8), 33%−1, 39%−2, rest 3 or more ($p<0.05$ between DGH and TC). 82.7% gave opinion on more than 10 cases including 26% on more than 20. 78% review scans before LCMDT, 87% of the rest would like to. 38% get 1 day's notice and 34% 2 days, average time spent to review scans 6.5 min (range 6–14), 37.3%–5 min, 21% 10 min. Only 50% of CRs have this time incorporated in job plan. At LCMDT, 4.2 min (range 3–12) spent on each case with 55% being 3 min. 73.3% think >75% cases discussed are LC.16.6% had time to teach radiology trainees, 39% discuss cases in order (surgical, oncology, palliative) and believed this increases efficiency. 92% of every LCMDTs attended by ON, 80% by Path, 66.7% by TS and 59.4% by PC. 27% of CRs used video-conferencing, 5% CRs had to travel to LCMDT. 89.3% had THC within 50 miles. 95.4% felt their opinion was valued to influence patient outcome.

**Conclusion** This survey expresses the difference in number and work load of CRs and LCMDT practice across the UK. More effort should be made to address the issues raised including time to review scans, number of cases, job planning, junior training, attendance of TS to improve the quality and standards of LCMDT for better patient outcome.

## P165 SURVIVAL IN STAGE III PRIMARY NON-SMALL CELL LUNG CANCER FOLLOWING RADICAL SURGERY

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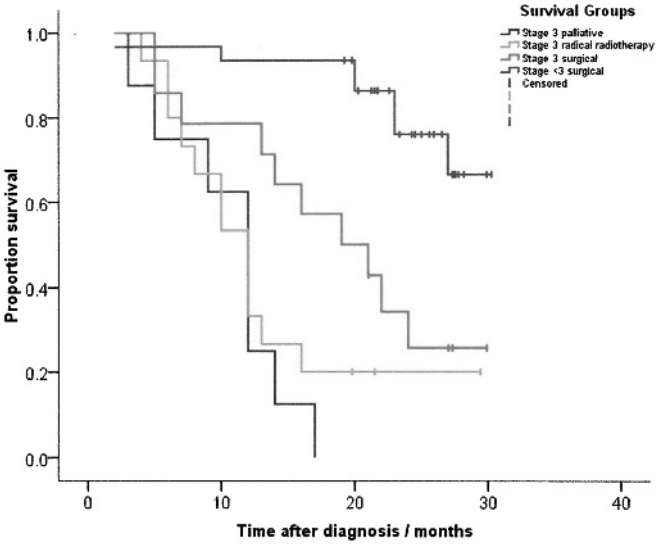
**Introduction and Objectives** BTS guidelines suggest that surgery is not indicated in patients with advanced non-small cell lung cancer (NSCLC) stages. Much of this data predates computed tomography with positron emission tomography (CT-PET) scanning. The aim of the study was to explore survival in patients undergoing radical surgery for stage III NSCLC and compare this to radical radiotherapy.

**Methods** Retrospective cohort analysis of all patients with pathologically confirmed NSCLC who had a CT-PET scan in 2007. Collected data included: age, performance status, CT-PET staging, management and survival until 30 June 2009. Survival figures were obtained using Kaplan-Meier analysis and compared between groups stratified by mode of management (radical radiotherapy or surgical) and stage of cancer (<III or III). Log rank test was used to calculate statistical significance between subgroups. Data are presented as mean survival (95% CI) and survival at 12 months (95% CI).

**Results** 97 patients (71% male; mean age 67.9, range 41–89) diagnosed with primary NSCLC had CT-PET of whom 16 had stage IV disease and were excluded from further analysis. 51 had surgery (24 stage I, 12 stage II, 15 stage III), 22 had radical radiotherapy (16 stage III) and 8 had palliative treatment (8 stage III). Patient groups with stage III disease were matched for performance status, age and nodal CT-PET stage. For surgical patients, mean survival was 27 months (24–29) for stage I and II disease and 18.8 months (14–23) for stage III disease ($p = 0.002$). Following radical radiotherapy, mean survival for stage III patients was 13.6 months (9.3–17.9). There was a trend for improved survival in patients with stage III disease having surgery when compared with radical radiotherapy (fig 1), although not statistically significant ($p = 0.09$). For patients receiving palliative treatment, mean survival was 10.5 months (7.2–13.7). This was comparable to radical radiotherapy ($p = 0.72$) but significantly lower than surgery ($p = 0.02$). 12-month mean survival for patients with stage III disease was 27% for radical radiotherapy (6–48) and 64% for surgery (39–89).




**Abstract P165 Figure 1**

**Conclusions** Our data support a role for radical surgery in patients with stage III NSCLC in carefully selected patients. Further follow-up is required.

## P166 WHY DO LUNG CANCER PATIENTS NOT RECEIVE FIRST CHOICE TREATMENT? AN IN-DEPTH LOCAL ANALYSIS OF NATIONAL LUNG CANCER AUDIT DATA

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**Background** A significant proportion of patients with lung cancer are elderly with multiple co-morbidities, advanced disease and poor performance status. This may explain the comparatively low treatment rates in the UK. The National Lung Cancer Audit (NLCA) now reports case mix adjusted data to address this. However, co-morbidity is not included in this case mix adjustment due to variations in user definition of this data item. Therefore, we undertook an in-depth analysis of our lung cancer population to determine why patients do not receive first choice treatment and, in particular, whether this can be explained by co-morbidities.
**Methods** Demographic, histological, staging and performance status data for patients with lung cancer diagnosed in 2007 were identified from data uploaded to the NLCA. Additional data on co-morbidities, change in performance status and treatments were obtained from the hospital notes.
**Results** 230 patients were identified, which represents 94% of expected numbers. Performance and stage data were complete for 94% of patients. Histological confirmation rate was 89%. The treatments given and the reasons why patients did not receive first choice treatment are summarised in table 1. Documented performance status score deteriorated from the first clinic appointment to the oncology appointment by $\geq$1 point in 31% of patients, despite a median diagnostic time of only 19 days. 74% of patients commencing palliative chemotherapy (for NSCLC or SCLC) completed the full course of treatment with a good or partial response rate of 58% for NSCLC and 85% for SCLC.
**Conclusions** Co-morbidities, in particular chronic obstructive pulmonary disease, are responsible for over half of patients who do not receive the first choice lung cancer treatment at our institution. Furthermore, performance status deteriorates rapidly in lung cancer patients and a significant proportion die before they can start treatment. This highlights the need for rapid diagnostic and treatment pathways. Finally, a surprising number of patients declined first choice treatment and the reasons behind this require further study.

## P167 DOES AN INCIDENTAL FINDING OF LUNG CANCER ON CTPA HAVE A BETTER OUTCOME THAN LUNG CANCER FOUND BY AN ALTERNATIVE APPROACH?

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**Introduction** Early diagnosis and surgical resection are determinants of a better outcome for patients with lung cancer.[1] The use of computed tomographic pulmonary angiography (CTPA) for investigating suspected pulmonary embolism has increased at our centre. Some of these examinations reveal unsuspected lung cancer. The aim of this study was to determine whether identification of cancer in this way leads to an increased rate of surgical resection and hence a better prognosis.
**Methods** Patients diagnosed with lung cancer and their outcomes were identified from the Southwest Cancer Registry. The hospital Radiology Information System was searched to identify which of these patients had undergone CTPA and in which patients this was the first test to demonstrate a lung cancer.
**Results** During 2008, 1346 CTPA scans were undertaken and 263 cases of lung cancer were diagnosed at our centre. Of those with lung cancer, 14 (5.3%) had their lung cancer originally identified on CTPA. However, of these 14, only 2 went on to surgical resection (14.3%) compared with 39 (15.6%) undergoing surgery for all those diagnosed with lung cancer by other means (table 1). Using the Fisher exact test, the statistical significance was found to be 0.62350, demonstrating no significant statistical difference between the number of patients undergoing surgery diagnosed incidentally on CTPA compared with those diagnosed by other means.
**Conclusion** There is a considerable increase in the number of CTPA scans completed at our centre over the last 5 years. This investigation led to the diagnosis of lung cancer in 5.3% of all those with lung cancer. Unfortunately this incidental finding does not appear to translate into patient benefit as a lesser proportion go onto surgical resection.

1. **National Institute for Health and Clinical Excellence**. *The diagnosis and treatment of lung cancer*. Clinical Guideline CG24, 2005.

**Abstract P167 Table 1** Number of patients diagnosed with lung cancer by CT pulmonary angiography (CTPA) and by other means and the number of patients who went on to have surgery in 2008 at our hospital trust.

| | CTPA | No CTPA | Total |
|---|---|---|---|
| Surgery | 2 | 39 | 41 |
| No surgery | 12 | 210 | 222 |
| Total | 14 | 249 | 263 |

**Abstract P166 Table 1**

| | NSCLC | | | |
|---|---|---|---|---|
| Treatment given | Stage I and II | Stage III and IV PS 0–1 | SCLC | Total |
| n | 31 | 63 | 35 | |
| Surgery | 16 | | | |
| Chemotherapy | | 45 | 27 | |
| Reason not receive 1st choice treatment | | | | |
| COPD | 4 | 2 | 0 | 6 (15%) |
| Other co-morbidity | 6 | 6 | 3 | 15 (37%) |
| Refused | 0 | 4 | 1 | 5 (12%) |
| Died | 5 | 4 | 3 | 12 (29%) |
| Other | 0 | 2 | 1 | 3 (7%) |

COPD, chronic obstructive pulmonary disease; NSCLC, non-small cell lung cancer; SCLC, small cell lung cancer; PS, performance status.

## P168 IMPROVING THE LUNG CANCER PATHWAY: A 1-YEAR AUDIT OF CT EVALUATION OF EQUIVOCAL CXRS

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**Background** A local pathway for abnormal chest radiographs (CXRs) was developed with the respiratory team and radiology which included rapid notification of suspected lung cancers. For equivocal abnormalities it was agreed that the radiology department would organise CT scans through the general practitioners (GPs) to avoid unnecessary urgent chest clinic referrals. Standards agreed included that GPs would be instructed in the radiology report to discuss the CXR results with patients and refer directly to radiology for a CT chest scan. They would also be advised to not refer to the chest clinic at that point.
**Aim** To streamline the lung cancer pathway by providing direct CT chest access to GPs and potentially avoid urgent referrals.
**Methods** All CT chest scans referred directly via GPs after an equivocal CXR report, suspicious but not typical of neoplasm, between June 2008 and June 2009 were analysed. Parameters audited included the instructions provided to GPs with the CXR report, the time from CXR to CT referral and the outcome of the CT chest scan. CXRs that showed definite evidence of malignancy were referred to the chest clinic and not included in this study.
**Results** 88 CT chest scans were performed, all of which had an initial CXR report suspicious but not definitive of sinister pathology. In 7 (8%), cancer was diagnosed on the CT chest scan and confirmed on biopsy. 29 patients had incidental and non-malignant findings, 17 had infective changes and 35 were normal. The median time from CXR to CT referral was 19 days (average 24 days). Although instructions to GPs were variable, they were adequate for the purpose of the pilot scheme.
**Conclusions** 81 (92%) of patients with an equivocal CXR did not need an urgent suspected lung cancer clinic appointment. This shows that through simple organisation of services, it is possible to streamline the lung cancer pathway thus reducing unnecessary referrals and patient anxiety.

## P169 SURVIVAL OF PATIENTS WITH BRAIN METASTASES AND NON-SMALL CELL LUNG CANCER (NSCLC)

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**Introduction and Objectives** Up to 25% of patients with non-small cell lung cancer (NSCLC) may have brain metastases. Median survival ranges from 1–6 months; response to cranial irradiation is unclear. We did a retrospective analysis of survival in patients with brain metastases and NSCLC.
**Methods** We identified 915 patients (Sept 1997–Dec 2006) from our cancer database. Minimum follow-up was 12 months. Brain metastases were classified as early (<30 days) or late (>30 days). Chemotherapy and radiotherapy treatment was noted.
**Results** The data are summarised in table 1. Brain metastases were found in 118/915 (13%) patients with NSCLC histology. Median survival was 150 days compared with 237 days in patients (n = 138) without brain metastases (p = 0.022). Cranial radiotherapy was given to 74/118 (63%) patients with brain metastases. Median survival was 169 days, compared to 87 days with no radiotherapy (p = 0.006). Median survival with early metastases was 54 days; those with late metastases 263 days (p<0.0005).

Patients who had intracerebral metastases alone had a median survival of 208 days; those with both intracerebral and extracranial metastases had a survival of 75 days. Compared to patients with no metastases (median survival 237 days), these differences did not reach significance when adjusted for age and stage (p = 0.065; p<0.0005 without adjustment).

In the brain metastases group, 27 patients had chemotherapy, 44 did not (data post-2001). Median survival was 308 and 262 days respectively (p = 0.907). 5 had early metastases and 22 were late.
**Conclusions** 13% of our cohort developed clinically apparent brain metastases, which reduced survival by almost 3 months. We found a significant survival advantage in those patients with brain metastases who received radiotherapy. Patients with early metastases, and those with both intracerebral and extracranial metastases had a poor prognosis.

**Abstract P169 Table 1** Characteristics of patients with brain metastases and non-small cell lung cancer (NSCLC)

| | Number | % | Median survival in days (95% CI) |
|---|---|---|---|
| Total patients | 915 | – | 173 |
| Mean age (±SD) | 69.5±10.4 | – | – |
| Chemotherapy* | 211/915 | 23 | 321 |
| Had brain scan | 256/915 | 28 | – |
| Normal scan | 137/256 | 54 | 237 (177 to 297) |
| Brain metastases | 118/915 | 13 | 150 (110 to 190) |
| Early metastases | 58/118 | 49 | 54 (42 to 66) |
| Late metastases | 60/118 | 51 | 263 (155 to 370) |
| Radiotherapy | 74/118 | 63 | 169 (129 to 209) |
| Brain metastases, no other metastases | 67/118 | 57 | 208 (168 to 248) |

*Post-2001.

## P170 USE OF EXPERIAN MOSAIC TO EXPLORE VARIABILITY IN PROCESS AND OUTCOMES IN LUNG CANCER PATIENTS

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**Introduction** Factors such as stage and performance status (PS) are known to correlate strongly with outcomes in lung cancer. While socioeconomic status (SES) is known to correlate with incidence (following smoking habits), the relationship between care provided/outcomes of care and SES is less clear. Traditionally, SES has been measured by mapping postcode to the Index of Multiple Deprivation (IMD). MOSAIC UK is a system provided by Experian which classifies all consumers in the UK into 61 types aggregated into 11 groups. We hypothesised that this system might be more effective in highlighting differences in cancer care and outcomes in different SES groups.
**Methods** All lung cancer patients in the hospital database were analysed by mapping postcode to IMD quintiles as well as to MOSAIC groups and types (kindly provided by Experian). Differences in proportions were analysed by $\chi^2$ analysis and survival by Kaplan-Meier methods.
**Results** 527 patients (58% male, 24% female) were used in the analysis. The proportions in IMD quintiles 1–5 were 12%, 20%, 25%, 27% and 17%, respectively (1 = most deprived, 5 = least deprived). Due to small numbers in some MOSAIC types, the largest five groups were chosen for analysis; similarly, the largest six MOSAIC groups were analysed (see table 1). There were no significant differences between IMD quintiles or MOSAIC groups/types in the proportion of patients having histological confirmation, emergency presentation, disease stage ⩽IIIA, PS 0–1 and surgical resection. Similarly, median survival was not significantly different

**Abstract P170 Table 1**

| | C | D | G | H | J |
|---|---|---|---|---|---|
| MOSAIC type (49% of all patients) | Older families living in suburbia | Close-knit, inner city and manufacturing town communities | Low income families living in estate based social housing | Upwardly mobile families living in homes bought from social landlords | Independent older people with relatively active lifestyles |
| Includes MOSAIC groups | 15–20 | 21–27 | 41–43 | 44–47 | 51–56 |

| MOSAIC group (77% of all patients) | C16 | C17 | D22 | D23 | G43 | H44 |
|---|---|---|---|---|---|---|
| | Low density private estates, now with self-reliant couples approaching retirement | Small business proprietors living in low density estates in smaller communities | Comfortably off manual workers living in spacious but inexpensive private houses | Owners of affordable terraces built to house 19th century heavy industrial workers | Older people, many in poor health from work in heavy industry, in low rise social housing | Manual workers, many close to retirement, in low rise houses in ex-manufacturing towns |

between the SES groups. However, patients in MOSAIC type 22 were more likely to have chemotherapy than type 23 ($p<0.001$).

**Conclusions** In our study only chemotherapy rates differed between groups. This may reflect an absence of any real association, but may also be due to a small sample size or a lack of socioeconomic variation in our catchment population. Use of MOSAIC as a tool to evaluate these differences in larger datasets may still be useful due to the rich picture of UK consumers in terms of demographics, socioeconomics, lifestyles, culture and behaviour that it provides.

## P171 USE OF CHEMOTHERAPY IN NSCLC IN THE NATIONAL LUNG CANCER AUDIT

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**Introduction** Patients with lung cancer frequently present with locally advanced or metastatic disease that is incurable and unsuitable for surgery. Clinical trials have shown that the use of chemotherapy in patients with stage IIIB/IV non-small cell lung cancer (NSCLC), if of good performance status (PS), is associated with improved survival, disease control and quality of life. Such treatment is recommended in all National Guidelines. We sought to evaluate whether this guidance is being followed by examining data from the National Lung Cancer Audit.

**Methods** Data on patients submitted to the National Lung Cancer Audit (England only) with a date first seen in 2007 were analysed (further data will be included in any presentation). Cases of small cell lung cancer and mesothelioma were excluded.

**Results** Of the 20 699 patients in the whole dataset, 3190 (15.4%) were excluded as small cell lung cancer or mesothelioma. Of the remaining 17 509 patients, 10 522 (60.3%) had histologically confirmed NSCLC. Of these patients, overall 30.9% received chemotherapy and further breakdown by age, stage and PS is shown in table 1. Patients with stage IIIB/IV were further analysed and rates of chemotherapy by PS are shown in table 2. Overall, the proportion of patients having chemotherapy in stage IIIB/IV, PS 0/1 was 55% but varied widely by cancer network. Of the 7000 patients having presumed (not histologically-confirmed) NSCLC, 9.8% were reported to have received chemotherapy.

**Abstract P171 Table 2**

| | PS0 | PS1 | PS2 | PS3 | PS4 |
|---|---|---|---|---|---|
| IIIB | 63% | 54% | 23% | 7% | 0% |
| IV | 59% | 51% | 22% | 8% | 3% |

**Conclusions** Overall, only just over 60% of NSCLC cases are histologically confirmed and, for these patients, only 1 in 3 receives chemotherapy. As expected, the worse the PS and the older the patient, the lower the likelihood of chemotherapy. For the well-defined group of stage IIIB/IV and PS 0/1, chemotherapy is given to 55% but the proportion varies according to cancer network. Trusts and networks should examine their local data and consider whether they are properly following national guidance.

## P172 CHANGING HISTOPATHOLOGY OF RESECTED LUNG CANCER

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The histopathology of lung cancer has changed considerably over time. Adenocarcinoma rates have increased and in some countries this is now the main type of lung cancer found. While changing patterns of diagnosis (fibreoptic bronchoscopy, mucin stains) and classification could have led to these changes over time, it is postulated that cigarettes have changed. An increase in carcinogens, notably nitrosamines, and an increase in puff volume have been linked to the increase in adenocarcinoma.

A retrospective analysis of all lung cancer resections between 1980 and 2009 was performed. Resections involved wedge resections, lobectomies and pneumonectomies. 1427 patients were identified and split into five year groups (1980–4, 1985–9, 1990–4, 1995–9, 2000–4, 2005–9). 982 (69%) were men.

Since 1990 there has been a significant decrease in the number of resections performed. This trend appears to be continuing. Over 50% of resections occurred in disease staged as IIA or below.

**Abstract P171 Table 1**

| Age | 30–39 | 40–49 | 50–59 | 60–69 | 70–79 | 80–89 | 90–99 |
|---|---|---|---|---|---|---|---|
| | 58% | 50% | 50% | 39% | 26% | 9% | 1% |

| Stage | IA | IB | IIA | IIB | IIIA | IIIB | IV |
|---|---|---|---|---|---|---|---|
| | 5% | 9% | 21% | 20% | 28% | 43% | 35% |

In keeping with other data the rates of adenocarcinoma appear to be increasing dramatically, particularly in women. Overall rates were 12% in 1980–4 and increased to 49% in 2005–9. Adenocarcinoma is now the most common form of resected lung cancer at our centre. Large cell and squamous cell rates have declined. These data are the first to our knowledge analysing histopathology of resected lung cancer. This could have implications for treatment.

### P173 THE NATIONAL LUNG CANCER AUDIT: YEAR 4 COMPLETENESS AND OUTCOMES

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**Introduction** The National Lung Cancer Audit is an audit of lung cancer run jointly by the Royal College of Physicians and The Information Centre for health and social care. Its development was driven by the realisation that lung cancer outcomes vary widely across the UK and are poor compared with other western countries. The aim of the audit is to record outcomes in lung cancer on a large scale and, through case mix adjustment, start to explain the wide variations noted. Although Wales and Scotland also submit data to the audit, this abstract presents results for England only.
**Results** In year 4, participation has again increased and all trusts have now contributed data at some time. The number of cases submitted has risen from 10 920 cases in 2005 to 16 922 in 2006, to 20 639 in 2007 and to 25 757 in 2008. Completeness of data on individual cases has also improved (table 1). The results suggest that the quality of care is improving, with annual increases in the proportion of patients being discussed in an MDT, the proportion of patients receiving anti-cancer treatment and in the surgical resection rate (table).
**Conclusions** These results highlight the considerable achievement of the National Lung Cancer Audit in collecting data and suggest that care for lung cancer patients is slowly improving. However, wide variations in outcomes persist between organisations. Further work on this high quality dataset should determine whether these variations can be explained by case mix. Such information will be a powerful lever for reducing variation and further improving quality of care and outcomes.

## Causes and consequences of chronic cough

### P174 REPEATABILITY OF OBJECTIVE COUGH FREQUENCY IN ACUTE COUGH

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**Background** Acute cough is most commonly due to viral upper respiratory tract infections (URTI) and has been estimated to cost the UK economy £979 million annually. Cough is reported to occur in 40–50% of natural colds, but little is known about the frequency of coughing in acute cough and its repeatability over time.
**Objective** To investigate objective cough frequency in acute cough and short-term repeatability of objective and subjective cough measures.
**Methods** We studied 56 otherwise healthy volunteers with acute cough (<3 weeks duration) associated with symptoms in keeping with a URTI (median age 22 years (IQR 21–26), 63% female, mean forced expiratory volume in 1 s 97.6% predicted (±10.5)); current smokers were excluded. All subjects performed 48 h of ambulatory cough monitoring (Vitalojak, Vitalograph Ltd) and explosive cough sounds were manually counted by a trained observer. Subject perception of cough frequency was recorded each day and night using VAS scales.
**Results** Objective cough frequencies were high (24 h: median 13.5 coughs/h (IQR 6.5–20.6), daytime: 19.0 coughs/h (9.2–31.7) and overnight: 1.6 coughs/h (0.3–4.2)) and significantly fell from day 1 to day 2 (mean difference in cough frequency 24 h: −3.1 c/h (95% CI −5.0 to −1.4) $p<0.001$; daytime: −5.2 (−7.8 to −2.5), $p<0.001$; overnight: −0.7 (−2.4 to +0.9), $p=0.37$). Cough frequency VAS also significantly fell during the day (mean difference daytime: −6.6 mm (95% CI −11.0 to +2.2), $p=0.004$; overnight: −1.6 mm (95% CI −5.8 to +2.6), $p=0.44$). Objective cough frequencies were highly repeatable (intraclass correlation coefficient (ICC) 24 h: 0.93 (95% CI 0.85 to 0.96); daytime 0.91 (0.79 to 0.95); overnight 0.85 (0.74 to 0.91), all $p<0.001$), more so than cough frequency VAS (day VAS ICC = 0.76 (0.57 to 0.86) and night VAS ICC = 0.78 (0.62 to 0.87), all $p<0.001$).
**Conclusion** Objective cough frequencies in acute cough are comparable to those reported in chronic cough, repeatable over 48 h (ie,

**Abstract P173 Table 1**

| | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|
| *Data completeness* | | | | |
| Histology | 79% | 78% | 82% | 90% |
| PS | 66% | 77% | 80% | 87% |
| Staging | 51% | 55% | 70% | 77% |
| Treatment | 66% | 72% | 79% | 82% |
| *Process and outcomes* | | | | |
| Confirmed histological diagnosis | 68% | 66% | 65% | 66.7% |
| Histology | | | | |
| NSCLC | 44.8% | 43.9% | 45.5% | 52.2% |
| SCLC | 10.3% | 10% | 9.6% | 10.3% |
| Mesothelioma | 3.7% | 3.5% | 4.2% | 4.4% |
| Discussed at MDT? | 79% | 84.3% | 86.8% | 88.6% |
| Any anti-cancer treatment? | 45% | 50% | 52% | 54% |
| Overall surgical resection rate | 9% | 9.4% | 10.3% | 11.2% |
| NSCLC resection rate | 13.8% | 14.3% | 15.2% | 16% |
| SCLC chemotherapy rate | 57.7% | 61.7% | 64.5% | 63% |

although falling, cough frequencies are highly correlated on days 1 and 2) and therefore useful for the testing of antitussives.

## P175 ACUTE COUGH: MEASUREMENT OF QOL WITH THE LEICESTER COUGH QUESTIONNAIRE (LCQ)

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**Introduction** The Leicester Cough Questionnaire (LCQ) is a brief, easy to use and well validated cough-related health status questionnaire for patients with chronic cough. Its validity for use in patients with acute cough has not been studied. The purpose of this study was to investigate the suitability of LCQ for patients with acute cough, conduct a clinical evaluation and determine the clinical minimal important difference (MID).

**Methods** 10 subjects with cough due to acute upper respiratory tract infection underwent focused interviews to investigate face validity of the LCQ. Patients using antitussive drugs were excluded. 30 subjects completed the LCQ and visual analogue score (VAS: 0–100 mm) within 1 week of onset of cough and again <1 week later. They also completed four Global Rating of Change Questionnaires (GRCQ) relating to the LCQ domains at the second visit (GRCQ: −7 (a great deal worse) to +7 (a great deal better)). The LCQ total score ranges from 3 to 21 (normal) and from 1 to 7 for each domain. The MID was calculated as the mean change in LCQ score for patients responding to GRCQ category: little or somewhat changed.

**Results** All subjects found the LCQ questionnaire acceptable for assessing their cough. Health status was severely impaired at baseline affecting all domains: median (IQR) total LCQ 12.84 (3). The MIDs for total LCQ and VAS were 2.4 and 1.3 respectively (table 1).

**Conclusions** The LCQ can be used to determine health status (quality of life) in patients with acute cough. These data should facilitate the design of clinical trials evaluating therapies for cough and clinical interpretation of LCQ scores.

**Abstract P175 Table 1**

| | Global rating of change | | | |
|---|---|---|---|---|
| Change in LCQ QOL score | Same (−1/0/1) | MID (−3/−2/3) | Moderate (−5/−4/4/5) | Large (−7/−6/6/7) |
| Total score | 0.79 (4) | 2.4 (4) | 4.55 (4) | 6.76 (4) |
| Physical | 0.6 | 0.62 (1) | 0.86 (1) | 1.88 (2) |
| Social | 0.75 (1) | 0.88 (2) | 2.25 (1) | 2.5 (1) |
| Psychological | 0.14 (1) | 0.71 (1) | 1.43 (1) | 2.21 (3) |

LCQ, Leicester Cough Questionnaire; MID, minimal important difference; QOL, quality of life.

## P176 FACTORS AFFECTING COUGH FREQUENCY IN A MIXED POPULATION

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**Introduction** Little is known about factors influencing cough frequency. We assessed ambulatory 24-hour cough frequency and factors potentially associated with it in healthy adult volunteers and patients with respiratory diseases characterised by or associated with cough.

**Methods** 52 healthy adults and 65 patients with respiratory diseases underwent spirometry, 24-hour ambulatory cough frequency monitoring, capsaicin cough sensitivity testing to determine the concentration required to cause 2 (C2) and 5 (C5) coughs, and induced sputum analysis. 24-hour recordings were analysed using an automated algorithm and expressed as the number of individual cough sounds.

**Results** The geometric mean (log SD) number of coughs/24 h in healthy individuals was 23.2 (0.51) compared with 306 (0.44) for those with respiratory diseases; women coughed more than men in health (mean difference 3.5-fold; 95% CI 1.9 to 6.4; $p<0.001$) and disease (mean difference 1.9-fold; 95% CI 1.1 to 3.2, $p = 0.008$). Healthy individuals had significantly higher C2 (mean difference 8.5-fold; 95% CI 4.1 to 17.3; $p<0.001$) and C5 (mean difference 19.4-fold; 95% CI 8.6 to 44; $p<0.001$) and a significantly lower sputum neutrophil percentage (mean difference 18.6; 95% CI 8.1 to 29.1; $p = 0.001$). Cough frequency was not related to body mass index, age or smoking status. Multiple linear regression identified log C5 ($p = 0.02$), gender ($p = 0.001$), percentage induced sputum neutrophils ($p = 0.001$) and the presence of respiratory disease ($p<0.0001$) as the most important independent predictors of log 24-hour cough frequency; these factors explained 69% of the variance found in cough frequency.

**Conclusion** In this population, gender, percentage induced sputum neutrophil count, log C5 and the presence of respiratory disease are important independent predictors of 24-hour cough frequency.

## P177 COUGH HYPERSENSITIVITY SYNDROME: A DISTINCT CLINICAL ENTITY

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**Introduction and Objectives** We postulate that most patients with chronic cough have a single discreet clinical entity, the cough hypersensitivity syndrome. We constructed a questionnaire which elicits the major components of this syndrome. Here we describe the validation of this questionnaire.

**Methods** Following iterative development, the Hull Cough Hypersensitivity Questionnaire (HCHQ, see table 1) was self-administered to patients and normal volunteers. It comprises 14 items with a maximum score of 70. Unselected patients were recruited sequentially from the Hull Cough Clinic. Pre-clinic questionnaires were compared with those obtained at the clinic. Responsiveness was assessed two months post clinic visit.

**Results** 185 patients (mean age 61 years, 118 women) and 70 normal volunteers (mean age 55 years, 43 women) completed the study. There was a marked difference between cough patients and normal volunteers. The sensitivity (94.1%) and specificity (95%) of the HCHQ was high with the area under the ROC curve of 0.99. All items of the scale significantly correlated positively with others in the scale and the total score. On repeatability testing using Cohen's kappa with quadratic weights, significant agreement was noted for all items. Good correlation was observed between the total scores ($r = 0.78$). The questionnaire was also responsive to treatment; the minimum clinically significant change was observed to be 16.

**Conclusion** We have demonstrated the HCHQ to have good construct-based and criterion-based validity. It is both reproducible and responsive to change. It can be used as a diagnostic instrument and demonstrates that chronic cough represents a single coherent entity, the cough hypersensitivity syndrome.

**Abstract P177 Table 1** The Hull Cough Hypersensitivity Questionnaire

| Within the last MONTH, how did the following problems affect you? 0 = no problem and 5 = severe/frequent problem | | | | | | |
|---|---|---|---|---|---|---|
| Hoarseness or a problem with your voice | 0 | 1 | 2 | 3 | 4 | 5 |
| Clearing your throat | 0 | 1 | 2 | 3 | 4 | 5 |
| Excess mucus in the throat, or drip down the back of your nose | 0 | 1 | 2 | 3 | 4 | 5 |
| Retching or vomiting when you cough | 0 | 1 | 2 | 3 | 4 | 5 |
| Cough on first lying down or bending over | 0 | 1 | 2 | 3 | 4 | 5 |
| Chest tightness or wheeze when coughing | 0 | 1 | 2 | 3 | 4 | 5 |
| Heartburn, indigestion, stomach acid coming up (or do you take medications for this, if yes score 5) | 0 | 1 | 2 | 3 | 4 | 5 |
| A tickle in your throat or a lump in your throat | 0 | 1 | 2 | 3 | 4 | 5 |
| Cough with eating (during or soon after meals) | 0 | 1 | 2 | 3 | 4 | 5 |
| Cough with certain foods | 0 | 1 | 2 | 3 | 4 | 5 |
| Cough when you get out of bed in the morning | 0 | 1 | 2 | 3 | 4 | 5 |
| Cough brought on by singing or speaking (for example, on the telephone) | 0 | 1 | 2 | 3 | 4 | 5 |
| Coughing during the day rather than night | 0 | 1 | 2 | 3 | 4 | 5 |
| A strange taste in your mouth | 0 | 1 | 2 | 3 | 4 | 5 |
| Total score_____/70 | | | | | | |

This is self-administered and has 14 items. Responses to each question can vary from 0 to 5.

## P178 DESCRIPTION OF THE URGE-TO-COUGH IN CHRONIC COUGH

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**Background** Experimentally, the urge-to-cough has been shown to occur at lower levels of capsaicin inhalation than reflex cough. However, little has been reported about spontaneously occurring urge-to-cough in patients with chronic cough, either the quality of the sensation or its relationship with cough-specific quality of life.
**Methods** We designed an investigator-led questionnaire focused on the urge-to-cough sensation (ie, the quality, location, intensity, triggers, relievers and associated cognitions), all rated on a 5-point Likert scale (strongly disagree to strongly agree).
**Results** 100 patients were studied from a specialist cough clinic (mean age 60 years (SD ± 11.89), 71 women, median cough duration 7 years (IQR 11.13)) with a mean cough quality of life score (Leicester Cough Questionnaire (LCQ)) of 11.32 (SD ± 4.05). The median VAS urge-to-cough intensity was 84.5 mm (IQR 26) and LCQ score weakly inversely correlated with urge-to-cough intensity ($r = -0.312$, $p = 0.002$). Most patients agreed/strongly agreed that the urge-to-cough was unpleasant (68%) and preferred descriptions were a tickle (73%) or irritation (86%). 91% of patients agreed or strongly agreed that they would always cough after perceiving an urge-to-cough. 74.7% felt the sensation was localised (rather than diffuse) and 55% located the sensation in the throat. Triggers identified included: cold temperature (67%), smoky atmospheres (79%), dry atmospheres (66%), perfumes (61%), during meals (63%), lying down (54%), laughing (61%), talking (72%), shouting (59%), eating dry crumbly foods (55%). The commonest emotional responses were distress (71%), anxiety (63%), and embarrassment (82%). The urge-to-cough could be relieved by coughing (63%), drinking (61%) and sucking sweets (54%); however, 42% stated that nothing provided relief.
**Conclusion** Chronic cough patients consistently describe the urge-to-cough as an intense unpleasant irritation/tickle localised centrally in the throat/pharynx and associated with distress and anxiety. Whether other patient groups who cough experience the same symptoms requires further investigation.

## P179 ASSESMENT OF COUGH IN PATIENTS WITH IPF AND SARCOIDOSIS

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Little is known about the impact of cough in patients with interstitial lung disease. We set out to investigate the relationship between cough symptom severity (visual analogue scale), cough frequency (Leicester Cough Monitor) and health-related QOL (Leicester Cough Questionnaire). We recruited 9 patients with idiopathic pulmonary fibrosis (IPF), 7 with pulmonary sarcoidosis and 5 healthy subjects. 6 patients (3 sarcoidosis and 3 IPF) were reassessed after treatment with corticosteroids and change in cough severity was quantified with a Global Rating of Change Questionnaire (GRCQ). The GRCQ scores were used to estimate the minimal important difference (MID) in cough frequency.

Cough frequency was significantly increased and severe in patients with IPF (mean (SEM) 29.4 (6.1) coughs/h) and sarcoidosis (28.9 (8.8) coughs/h) compared with healthy subjects (1.8 (0.7) coughs/h; $p = 0.03$). QOL related to cough was severely impaired in patients with IPF (mean LCQ total score 10.7 (1.4) and sarcoidosis (10.6 (1.9)) and all health domains were affected. QOL was related to cough frequency in patients with sarcoidosis ($r = -0.85$, $p = 0.02$) but not in IPF ($r = -0.01$, $p = 0.98$). There was no significant relationship between cough VAS and cough frequency. There was a significant reduction in mean (SEM) cough frequency (28.5 (8.6) coughs/h or 69.5 (9.2)% change; $p = 0.02$) following corticosteroid therapy. The GRCQ correlated significantly with the change in cough frequency following corticosteroid therapy ($r = -0.89$, $p = 0.02$). The MID for cough frequency was a 40% reduction in coughs/h.

In conclusion, cough is a common symptom in patients with IPF and sarcoidosis and is associated with significant physical and psychological morbidity. Subjective assessments of cough severity correlate poorly with objective assessments in patients with IPF. Cough frequency monitors can be used to assess cough severity in ILD and are responsive to changes following treatment.

## P180 PATIENT REGISTRATION OF COUGH DURING OESOPHAGEAL MONITORING

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**Introduction** Gastro-oesophageal reflux disease (GORD) is known to be associated with chronic cough. Recent evidence suggests significant temporal associations may occur between cough and reflux events in the absence of other findings suggestive of GORD. During oesophageal monitoring patient symptoms are usually recorded by patient registration, however this may be unreliable.
**Aim** To assess the accuracy of patient registration of coughing compared with acoustically recorded cough.
**Methods** We studied 61 patients with chronic cough (>8 week duration) (median age 57.0 years (IQR 49–64), 40 female). During a 24-hour oesophageal reflux monitoring study (pH/impedance, Sandhilll Scientific) patients were instructed to register each bout of coughing by pressing a button on the data logger. Cough sounds were recorded simultaneously (Vitalojak) and a trained observer counted the number of recorded cough bouts (continuous coughing without a 2 s break). Patient-registered coughs were considered correct if they occurred within the 2 min following acoustic coughing.
**Results** Patients only registered a median of 42.6% (IQR 21.4–61.4) of the acoustically detected cough bouts (median 24.0 bouts (IQR 10.5–37.5) vs 62.0 bouts (IQR 32.5–108.0), $p<0.001$), a median difference of −30 cough bouts (IQR −77.5 to −13.0). Of the patient registered coughs, a median of 90.8% (IQR 76.4–98.6) occurred within 2 min of an acoustically recorded cough bout. A median of 2.0 (IQR 0.5–6.0) registered bouts were unrelated to acoustic coughs and appeared to increase with age. Patients aged 57–79 years registered significantly more cough bouts that did not occur within 2 min after an acoustically recorded cough bout than patients aged 26–56 years (median 4.00 (IQR 1–7) vs median 1.00 (IQR 0–3.5), $p = 0.02$).
**Conclusions** This study suggests patient registration of cough during oesophageal monitoring is unreliable, the main source of error being patients failing to register the majority of genuine cough bouts. This is likely to have a significant influence on the assessment of the temporal relationships between cough and reflux.

## P181 POOR ADHERENCE TO BTS RECOMMENDATIONS FOR THE MANAGEMENT OF COUGH IN ADULTS

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**Background** Cough is the most common symptom encountered in both primary and secondary care. We analysed data collected from three cough clinics across the UK to assess adherence to the current BTS guidelines prior to referral for a specialist opinion.
**Methods** Data were collected from new referrals to cough clinics in Belfast, Hull and Manchester. Information was gathered regarding the source of referral (primary or secondary care), sex, age, duration of cough, investigations performed (CXR and spirometry) and use of ACE inhibitors.
**Results** Data were collected from 177 patients (median age 59 years (IQR 48–65), 66.5% female, median cough duration of 2.5 years (IQR 0.9–7.4); 52 patients from Manchester, 25 from Hull and 100 from Belfast). 100 (56.5%) were referred from primary care. At the time of referral a CXR had been performed in 64.8% of patients, spirometry in 52.0% and home PEFR measurement in 20.5%. ACE inhibitors were being taken by 6.8% of patients.
**Conclusions** The adherence to the BTS guidelines on cough remains poor, even for mandatory investigations such as CXR and spirometry.

## P182 DOES IT MATTER HOW WE BREATHE? PERCEPTIONS IN NORMAL SUBJECTS WHEN ADOPTING DIFFERENT ROUTES OF BREATHING

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**Introduction** We have recently reported that normal subjects have both quantitative and qualitative differences in ventilation and ventilatory patterns when adopting nasal compared to oral routes for ventilation.[1 2] Minute ventilation and its components (tidal volume, breathing frequency) were reduced by a mean of 33% and followed a shift of thoracoabdominal respiration to favour ''diaphragmatic'' breathing during nasal ventilation and ''upper thoracic cage'' during mouth breathing.
**Study** The clinical implications of this have been explored in 20 normal subjects (mean age 54 years, range 20–89) at rest (tidal breathing) during a 2× 2-min crossover exercise in which subjects were requested to note their perceptual experiences when randomly allocated initially to either nasal breathing (NB) or, after a break, mouth breathing (MB). The results have been compared with the individual's preferred route of breathing normally.
**Results** 17/20 (85%) of subjects during NB found the exercise to be comfortable compared with only 10/20 (50%) during MB ($p = 0.04$). During MB, commonly reported symptoms witnessed were discomfort in breathing and breathlessness in 8/20 (40%) and dry mouth in 6/20 (30%). 13/20 (65%) subjects normally preferred to breathe through the nose, 4/20 (20%) expressed no preference and only 3/20 (15%) preferred the mouth. No subject had a positive Nijmegen or Hospital Anxiety Depression (HAD) score.
**Conclusions** This study has shown that the adoption of MB in normal subjects is associated with the uncomfortable sensation of breathlessness. It provides evidence for our hypothesis that mouth breathing per se, even in normal subjects, may predispose to the perception of breathlessness by dynamically changing chest wall mechanics and thus proprioceptive input. It may also help to explain the success of various physiotherapy exercises including Buteyko.

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2. *Am J Respir Crit Care Med* 2003;**167**:A545.

## P183 GAMMA SCINTIGRAPHY: REGIONS OF INTEREST IN THE LUNGS. ARE WE BEING CONSISTENT IN WHAT WE ARE MEASURING?

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**Introduction** Two-dimensional gamma scintigraphy (2DGS) is able to quantify the amount of drug delivered from a therapeutic inhaler device to the lungs. To obtain information on the regional lung deposition of inhaled drug, the lung image is divided into several ''regions of interest (ROI)'' that each represent airways of different sizes. Research groups tend to use their preferred method of ROI, which is often different from other centres. Presently, there is no standard method of defining ROI.
**Objectives** We compare different methods to determine ROI and ask whether the data generated are comparable.
**Methods** Using our own lung deposition data with 99mTc-labelled 3 μm particle size monodisperse aerosols[1] and lung borders determined