Methods 28 subjects with chronic cough and 21 healthy subjects underwent measurement of oesophageal pressure (Poes), gastric pressure (Pga), peak abdominal electromyographic activity (EMGabd) and peak cough flow rate (PCFR) during 10 maximum voluntary cough manoeuvres. Coughs were performed at functional residual capacity. Inspiratory volume (IV) preceding cough efforts was calculated by integration of flow. Expiratory muscle strength was assessed by measuring twitch gastric pressure (TwPga) in response to magnetic stimulation. EMGabd data was normalised to EMGabd twitch compound muscle action potential and PCFR data normalised to predicted peak flow rate (PEFRp). The analysis of data was restricted to gender and expressed per unit IV.

Results Subjects were matched for age, gender, BMI and had normal lung function. All measures of cough intensity were significantly higher in chronic cough compared to healthy controls, irrespective of gender (Table 1). However, this was not due to increased activation of the abdominal muscles since there were no significant differences in EMG ($p>0.2$) or due to increased expiratory muscle strength ($p>0.36$). There was no significant difference in Poes/IV and Pga/IV between male and female patients or controls ($p>0.28$), but female cough subjects produced significantly higher PCFR/IV compared to males ($p<0.01$).

Conclusions Cough intensity is increased in patients with chronic cough, during MVC. This raises the possibility that cough intensity in these patients may contribute to cough severity and health status. The mechanism is unclear and deserves further investigation in studies of VC and spontaneous cough.

Abstract P160 Table 1 Maximum cough intensity during voluntary cough per unit inspired lung volume

	Females			Males		
	Cough	Controls	P-value	Cough	Controls	P-value
Poes (cmH2O)	110±51	72±23	0.02	138±69	80±27	0.02
Pga (cmH2O)	126±30	82±27	<0.01	162±82	93±29	0.04
PCFR:PEFRp ratio	1.2±0.9	0.78±0.39	<0.01	0.94±0.22	0.70±0.15	0.02

Data presented as mean±SD IV: inspiratory volume; Poes: oesophageal pressure; Pga: gastric pressure; PCFR: peak cough flow rate; PEFRp: predicted peak cough flow rate.

P161 COUGH INTENSITY IN VOLUNTARY, INDUCED AND SPONTANEOUS COUGH

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Introduction Cough intensity is an important determinant of cough severity. We set out to investigate and compare the physiological characteristics and intensity of voluntary (VC), induced (IC) and spontaneous cough (SC) in subjects with chronic cough.

Methods 28 subjects with chronic cough (17 female, mean age 57 years) underwent measurement of oesophageal pressure (Poes), gastric pressure (Pga), normalised peak cough flow rate (PCFR) and peak abdominal electromyographic activity (EMG) were measured during **(1)** maximum VC (MVC), **(2)** capsaicin IC (2 doses: C_5 and supra-C_5; 1st effort in a bout) and **(3)** SC (mean of 1st efforts of all bouts), in a subset of patients (n=9). Cough efforts were categorised as bouts or single events and as true cough or expiratory reflex (ER: absence of preparatory inspiration).

Results MVC by definition was always a single effort and all efforts were true coughs; no subject initiated an ER during MVC manoeuvres. The majority of efforts in IC (C_5) and SC occurred within coughing bouts. ERs were the most frequent type of efforts in both IC and SC, 61–67% of all efforts, but accounted for only one third of the initial efforts of bouts in both IC and SC; true cough was the most frequent 1st effort (Table 1). Cough intensity was greatest in MVC for all measures. Poes, Pga and EMGabd were similar for IC and SC, and were approximately 60–70% of MVC intensity. PCFR:PEFRp however, was significantly higher in SC compared to IC. The analysis was similar for supra-C_5 stimulus with capsaicin. When restricted to the subgroup that underwent studies of all cough models (VC, IC and SC), the analysis was also similar.

Conclusions This is the first study of the physiology of cough in patients with chronic cough and spontaneous cough. MVC produces the most intense cough. The type of cough effort in IC and SC is similar but there were important differences in cough intensity (flow). The reason for this and its implications for the induced cough model are unclear and warrant further investigation.

Lung cancer epidemiolgy, presentation and survival

P162 WHEN DO PATIENTS WITH KNOWN LUNG CANCER PRESENT TO EMERGENCY SERVICES?

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Introduction Use of electronic patient alerts systems are encouraged by government initiatives, especially within the realms of oncology, as a way of expediting relevant clinical review of oncology patients. When a known cancer patient attends an emergency unit,

Abstract P161 Table 1 The physiological characteristics of cough in patients with chronic cough

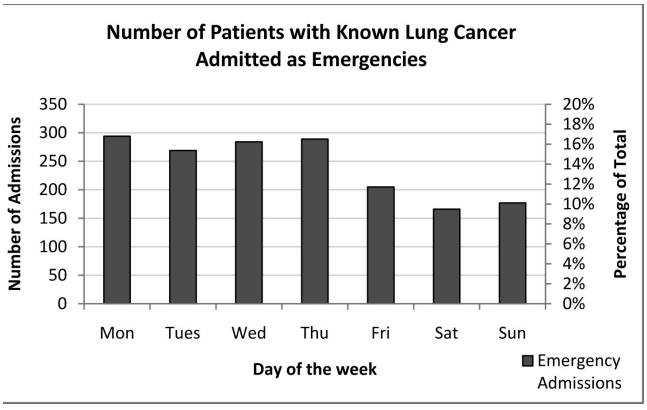
	MVC	IC	SC	ANOVA p-value	IC vs SC p-value
Type of cough effort Efforts occurring in bouts (%)	N/A	91±14	82±19	N/A	0.04*
ERs (% of all efforts)	0	67±14	61±19	N/A	0.40
ER was 1st effort in bout (%)	N/A	25±28	27±22	N/A	0.49
Cough intensity					
Poes (cmH2O)	179±45	112±61	128±28	<0.001*	0.42
Pgas (cmH2O)	194±59	116±68	141±43	<0.001*	0.36
EMGabd	0.14±0.11	0.09±0.07	0.07±0.07	0.05	0.57
PCFR:PEFRp ratio	1.52±0.38	0.38±0.12	0.82±0.32	<0.001*	<0.001*

Data presented as mean±SD MVC: maximum voluntary cough; IC: induced cough; SC: spontaneous cough; ER: expiratory reflex; Poes: oesophageal pressure; Pga: gastric pressure; EMGabd: peak abdominal electromyographic activity; PCFR: peak cough flow rate; PEFRp: predicted peak expiratory flow rate.

an electronic alert advises selected clinical team members of the attendance, to allow rapid assessment and appropriate management in line with patient's stage of malignancy.

Methods Retrospective data captured by the electronic patient alert system was analysed. Data was from three hospital sites within the same trust, which are together form a tertiary referral centre. Data from March 2010 till April 2012 was included.

Results There were 15,625 cancer attendances in total over the time period, 1,684 were for patients with lung cancer (10.8%). There was no detectable seasonal variation in any cancer group. 1341 of the total cancer admissions occurred during weekdays, averaging 268 patients per named day (12–17% each day) with a fall to approximately 10% at weekends (166 and 177 on Saturdays and Sundays respectively). Overall for lung cancer, 46% (781/1684) of emergency admissions are in-hours (defined Monday to Friday, 9am to 5pm), compared to 42% (6619/15625) of all cancer presentations. Over the whole week, 13% (217/1684) of lung cancer patients arrived before 9am (between midnight and 9am), and 30% (509/1684) arrive after 5 (between 5pm and midnight). Approximately a quarter (24%= 410/1684) of emergency lung cancer attendances occurred between 5pm on Friday and 9am on Monday. Conclusion. This information would indicate that a substantial proportion of unscheduled lung cancer work occurs out-of-hours. To optimise patient care and prevent attendances there may be justification for exploring alternative ways of working to improve cover in late afternoon and early evening when there is increased patient attendance so that these alerts can be received and acted upon rapidly. These data suggest that increased community support is needed especially at weekends.



Abstract P162 Figure 1

P163 EFFECTS OF SOCIO–ECONOMIC STATUS ON LUNG CANCER STAGE AND MORTALITY – NORTH-WEST PERSPECTIVE

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Background Lung cancer prevalence and mortality has been shown to be higher in the lower socio-economic group in England and Wales.[1] Northwest of England has one of the highest density of economically deprived regions in the country. Our institution caters to a population of approximately 330,000 in one of the poorest regions of Northwest England. We aimed to analyse the effect of socio–economic status on lung cancer staging on presentation and mortality in our patient cohort.

Methods – All patients with newly diagnosed lung cancer patients between 1st Jan–31st Dec 2011 were included in this cross sectional study. Patient data was accessed from our local lung cancer database. Deprivation score as detailed by index of multiple deprivation (IMD) of our cohort were obtained from the local council.

Results – Our socioeconomic postcodes showed that there were no patients from the top 10th centile postcodes of the country in our catchment. However, 37% (93) were in the lowest 20th centile compared to 20% nationally [(2)]. The disease staging and mortality for top and bottom quartiles is shown in Table 1.

Of 249 patients, 113 (45%) were females. Mean age was 72.4 years (Range 40–97). On diagnosis, 57 (23%) patients had stage 3 and 139 (56%) had stage 4 disease. 162 (65%) of patients died with an average survival after diagnosis of only 62 days (range 31.25– 148.5 days).

Conclusions – No significant differences were noted in lung cancer incidence or mortality across socio-economic ends in our local population. Noticeably, there was a high incidence of patients with extensive stage cancer reflecting high mortality. This late presentation may be a reflection of poor health awareness amongst our deprived population belt. A longer study may give us an idea of which areas to target for further education and improvement.

References

1. UK Lung cancer registry, 2011.
2. Cancer incidence and mortality, Office for National Statistics.

Abstract P163 Table 1 Staging and mortality in patients with lung cancer from different socio-economic backgrounds

Stage	< 25TH centileof IMD (n-63)	>75TH centile Of IMD (n=63)
1	10	5
2	3	5
3	18	16
4	32	37
Death	40	31

P164 LUNG CANCER SURVIVAL IN ENGLAND: WHICH PATIENTS HAVE DEMONSTRATED IMPROVED SURVIVAL?

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Introduction Several recent studies have reported the overall survival of patients with lung cancer in England is improving. However, when compared with other European and North American countries, England still has worse survival figures. The aim of this study is to look at the spectrum of people with lung cancer and to identify groups in which the survival is improving.

Methods We used data from the National Lung Cancer Audit to identify patients with a proven or presumed diagnosis of non-small cell lung cancer in England. We stratified patients according to their performance status (PS) and clinical stage of cancer. We then divided patients into 'year groups' based on their year of diagnosis. People diagnosed in 2004 and 2005 were grouped together and used as our comparator group. We performed Cox regression analyses to calculate the changes in overall survival for patients diagnosed each year between 2004/05 to 2010.

Results Our cohort consisted of 66,433 patients diagnosed between January 2004 and December 2010. Based on the stratification by stage and PS, we observed that having adjusted for confounders including sex, age, ethnicity, comorbidity and source of referral, the overall survival for patients in group 1 (patients with good PS and stage IA-IIB) has improved every year (adjusted HR 0.74 in 2010, 95% CI 0.68 – 0.82), while the survival for patients in