



Which patients are assessed by lung cancer nurse specialists? A national lung cancer audit study of over 128,000 patients across england



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ABSTRACT

Background: Lung cancer nurse specialists (LCNS) are integral to the multidisciplinary clinical team, providing personalised physical and psycho-social interventions, and care management for people with lung cancer. The National Institute of Health and Care Excellence (NICE) recommend that all patients have access to a LCNS. We conducted a national study assessing whether there is variation in access to and timing of LCNS assessment.

Methods: The National Cancer Action Team's LCNS workforce census in England was linked with patient and hospital Trust data from the English National Lung Cancer Audit. Multivariate logistic regression was used to assess features associated with LCNS assessment.

Results: 128,124 lung cancer patients were seen from 2007 to 2011. LCNS assessment confirmation was 'yes' in 62%, 'no' in 6% and 'missing' in 32%. Where (in clinic versus ward) and when (before versus after diagnosis) patients were assessed by a LCNS also varied. Older patients with poor performance status, early cancer stage, and comorbidities were less likely to be assessed; there was no difference with sex or socioeconomic group. Patients receiving any anti-cancer treatment were more likely to be assessed. Assessment was lower in Trusts with high annual patient numbers (odds ratio = 0.58, 95% confidence interval 0.37–0.91) and where LCNS caseload > 250 (0.69, 0.41–1.16, although not statistically significant), but increased where workload was conducted mostly by band 8 nurses (2.22, 1.22–4.02).

Conclusion: LCNS assessment varied by patient and Trust features, which may indicate unmet need for some patients. The current workforce needs to expand as well as retain experienced LCNSs.

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1. Introduction

Lung cancer (LC) is the second most common cancer in the United Kingdom (UK) with 39,000 new cases annually in England [1,2]. Recent National Institute for Health and Care Excellence (NICE) guidelines recommend that every person diagnosed with LC has direct personal access to a Lung Cancer Nurse Specialist (LCNS) in their local hospital who they can meet with and be supported by throughout the cancer pathway [1,3]. LCNSs are now

integral to the multidisciplinary team (MDT) within which they contribute to decisions on their patients' treatment and care [4]. Previous research has shown the effectiveness of tailored nursing care and proactive LCNS case management in reducing unnecessary hospital admissions and doctor consultations, symptom control, emotional functioning and patient-reported satisfaction for early and metastatic LC [5–8]. A 2002 randomised control trial by Moore and colleagues of 203 patients showed that LCNS led follow-up was also cost-effective when compared with conventional medical follow-up [8].

Although LC is the second commonest cancer in the UK [9], LCNSs comprise only 11% of the Cancer Nurse Specialists (CNSs) in England, compared with breast (20%), colorectal (14%) and urol-

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ogy (12%) CNSs [10]. A recent Macmillan report highlighted that on average, there is one LCNS for every 161 people diagnosed with LC, compared with 117 people diagnosed with breast cancer [11]. According to the 2013 National Lung Cancer Audit (NLCA) annual report, approximately 80% of all patients are now assessed by a LCNS, but there is variation by Trust and only 30% of LC patients are assessed in some Trusts [12].

In this study we linked individual clinical information from the NLCA, the English Hospital Episode Statistics (HES) and Office of National Statistics (ONS) deaths with the National Cancer Action Team (NCAT) census on the LCNS workforce. We assessed whether, when and where patients are assessed by a LCNS and how clinical, demographic, socioeconomic status (SES) of patients and National Health Services (NHS) Trust characteristics including Trust size, LCNS salary bands and caseload affected their assessment.

2. Methods

The NLCA collects key clinical information on all new patients presenting with a diagnosis of LC in the UK. In this study data from the NLCA was linked with HES, which includes all inpatient admissions in England, ONS mortality data to provide nationally registered dates of death, and NCAT, a census of the entire cancer specialist nurse workforce in England which provided details on the LCNS workforce.

We included all patients in the NLCA who were first seen in England between January 1st, 2007 and December 31st, 2011 across 150 NHS Trusts in England. We used the latest NCAT census carried out in 2011 to map the workforce of 321 LCNS to NHS Trusts. Trusts without LCNS workforce information from the NCAT ($n=4$) were dropped leaving 146 Trusts for analysis. Patients diagnosed with LC through death certificate and those with mesothelioma or carcinoid were excluded.

The NLCA records whether the patient is assessed by a LCNS (*yes, no*), date of assessment, timing of assessment in the cancer pathway and location of the first assessment. We categorised the timing of assessment as *before/at diagnosis versus after diagnosis* and the location of assessment as *in clinic versus ward or other location (i.e. home visit, telephone or other)*. For each of the three variables, where no information was entered they were separately categorised as missing.

Age at diagnosis, sex, SES, source of referral to a LC physician, performance status (classified according to WHO definition) and stage of disease (Union for International Cancer Control definition) were identified from NLCA. Data on active treatment were obtained from a combination of the NLCA and HES using methods as previously described in Ref. [13–15] and categorised as no treatment, surgery, chemotherapy and radiotherapy, chemotherapy alone or radiotherapy alone. We used HES to calculate a patient's composite score of co-morbidity (Charlson Index).

We used the NLCA to calculate the number of new LC patients seen annually in each Trust using our established methods [14]. We estimated each Trust's caseload per whole time equivalent (WTE) LCNS using the number of new cases first seen in 2011 plus the number of patients surviving since 2004, divided by the number of WTE LCNSs employed at the Trust. We assumed that the patients initially seen in a particular Trust were equally divided between the LCNSs employed by that Trust and that patients followed the LC pathway in that same Trust. Using NCAT information on salary bands of WTE LCNSs, we assessed the composition of the LCNS team at each trust. We also estimated which LCNS salary band conducted the majority of the work based on WTE employment at each Trust (e.g. Trust A was categorised at Band 7 if more than 50% of the total WTE LCNSs were on salary band 7).

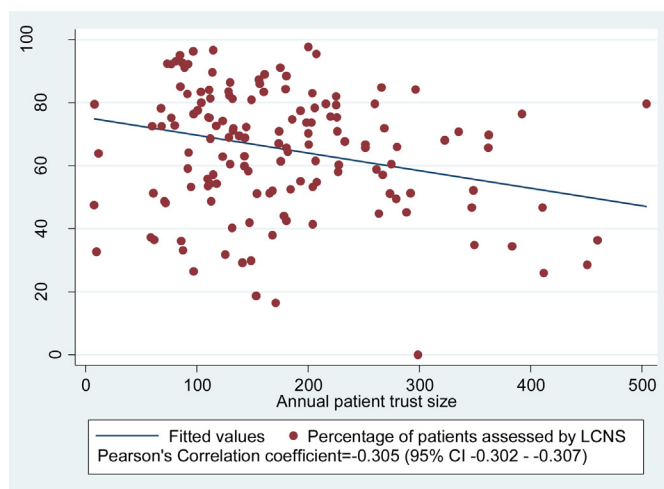


Fig. 1. Percentage of patients with LCNS assessment by Trust size (annual number of new lung cancer patients).

2.1. Statistical analysis

All data analyses were performed using Stata MP12. Initially we plotted the percentage of patients recorded as having been assessed by a LCNS by the Trust size (average number of patients seen annually) and calculated the Pearson's correlation coefficient to quantify the relationship. We used multinomial logistic regression analyses, to estimate the relative risk ratio (RRRs) of being assessed by a LCNS by patient and NHS Trust features. For all patients who had information on having been assessed, we also performed separate analyses to estimate the RRRs of being assessed after diagnosis versus before/at diagnosis and being assessed in clinic versus being assessed on wards. The unadjusted and adjusted RRR were clustered by NHS Trust to account for the hierarchical grouping of patient observations. A separate analysis was carried out for patients with missing data and a sensitivity analyses was conducted excluding all patients who died within 30 days of diagnosis to account for immortal time bias.

3. Results

There were a total of 128,124 people with LC who were first seen between 1 January 2007 and 31 December 2011, of whom 80,113 (63%) were seen by a LCNS, 7544 (6%) were not seen and 40,467 (31%) had missing data. The proportion of patients assessed increased over the study period (6216 (31%) in 2007–23,045 (80%) in 2011), mainly driven by a decrease in the missing data. From those who were assessed, 3809 (5%) had missing information on the timing of first assessment and 8317 (10%) on the location. We observed a borderline moderate negative correlation between the number of new cases seen at a Trust and the proportion of patients assessed by a LCNS (Fig. 1 Pearson's correlation coefficient = -0.305).

3.1. Who is assessed by LCNS

Table 1 shows results for being assessed by a LCNS by patient features. The RRR of being assessed by a LCNS was 6% higher for men compared with women, but this association was accounted for when we adjusted for other patient features and Trust/LCNS features (RRR 1.02, 95% CI 0.96–1.07). There was a clear association seen with age with patients > 75 years less likely to be assessed. Patients with worse performance status (PS) and with comorbidities were also less likely to have been assessed. Patients with LC stage other than stage IA–IB and stage IV had a higher RRR of being

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