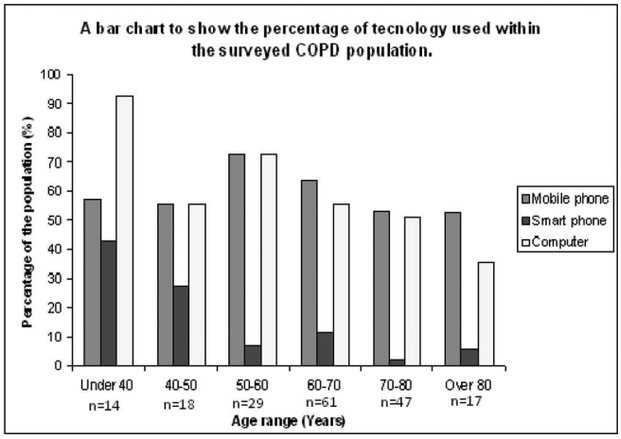
of population was; <40 yrs 14 (8%); 40–50 yrs 18 (9.6%); 50–60 yrs 29 (15.5%); 60–70 yrs 61 (32.6%); 70–80 yrs 47 (25.1%); > 80yrs 17 (9.1%). Within the total population it was found that 112 (60.5%) owned a computer and 138 (74.2%) own a mobile telephone however, of 138 only 22 (11.8%) were owners of a smart phone. Within each age range there were a small number of smart phone users but the predominant usage of smart phones occurred within the younger age ranges. Furthermore, within each age range a higher percentage of the population owned a mobile phone than those that did not. Similarly within each age range a higher percentage of the population owned a computer than did not, excluding the >80 yrs, where 9 (52.9%) did not own a computer.

Conclusion Overall the use of technology is limited in this COPD population. A significant proportion of those taking part used a mobile phone but a very small percentage used a smart phone, upon which a number of interventions might be delivered. Over half the population had a computer. There is a potential target market for providing alternative forms of pulmonary rehabilitation utilising technology, however, more evaluation is needed to ascertain whether a technological intervention would be acceptable to these patients.



Abstract P48 Figure 1.

Lung cancer: investigation and treatment

P49 INCIDENTAL PULMONARY NODULES; ARE WE DOING TOO MANY FOLLOW UP SCANS? SERVICE REVIEW AND VALUE OF PET-CT IMAGING

[1]Z Zaitout, [2]A Zia, [2]R Senasi, [2] S Matthews; [1]*Barts Health, London, Greater London;* [2]*Sheffield Teaching Hospitals, Sheffield, South Yorkshire*

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Incidental lung nodules are problematic. Their detection generates 2 years of CT scan follow-up, causing patient anxiety, immense cost and a high radiation burden. Few of these nodules are malignant. The 2005 Fleischner society guidelines are complex with no reference to the value of PET- CT imaging.

The Sheffield Teaching Hospital Trust follows a modified Fleischner protocol where the majority of patients have 3 follow-up scans over 2 years. This study aimed to:

- Determine the final diagnosis of each nodule and the number of follow-up CT scans performed.
- Asses the value of PET-CT nodule imaging.
- Determine whether an experienced chest radiologist could predict which nodules were malignant/ benign by CT characteristics alone.

Pulmonary nodules under review were extracted from the Trust lung cancer database. The final diagnoses were determined after 2 + years of follow up. An experienced chest radiologist reviewed all the nodules, recording their impression of whether the nodules were benign/ malignant.

162 nodules in 140 patients were analysed. Six patients were excluded as no follow up data. 148\156 nodules were benign (95%), 7 malignant and one presumed malignant (had inadequate follow-up). The 140 patients had 427 scans follow-up CT scans (mean 2.7, mode 3). 47 patients had fewer scans than required by protocol due to eg nodule resolution (9), recommendation to stop follow-up on CT report (13) and diagnosis of other disease (11). 20/22 patients had 4 + follow-up scans due to shortened time interval between scans.

35 patients had PET CT scan. 28/29 nodules with low FDG uptake were morphologically benign and stable at 2 years. 1 "cold" nodule with malignant morphology was resected (adenocarcinoma).

The analysis of lung nodules by experienced chest radiologist found NPV 97.6%, PPV 15%, specificity 81% and sensitivity 62.5%.

Comment The vast majority of lung nodules followed-up were benign. Better use of CT nodule morphology and review by an experienced chest radiologist is advised. We recommend that patients with a "cold", morphologically benign, nodule on PET-CT scan should have a single 12 month CT scan to confirm stability.

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P50 A LOCAL ASSESSMENT OF THE ESCALATING IMPACT OF PULMONARY NODULE SURVEILLANCE AND ITS RELATIONSHIP TO PATIENT OUTCOMES IN A DGH

LD Calvert, S Chatterji, F Miller, SO Brij, A Nakas; *Peterborough City Hospital NHS Foundation Trust, Peterborough, UK*

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Introduction Recent national emphasis on increased awareness to improve detection of early lung cancer has led to dramatic increases in CT chest scans being performed. Consequently, increased detection of incidental lung nodules requires monitoring. In response, we set up a dedicated Nodule Surveillance Service (2 physicians, 1 radiologist, 1 surgeon, 1 tracker). To determine likely future service requirements, we assessed current resource allocation to nodule surveillance and related this to patient outcomes.

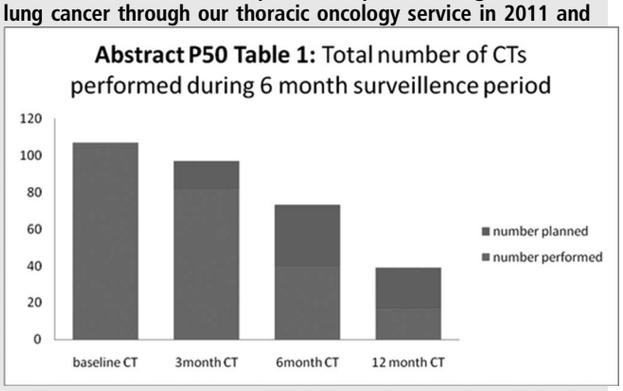
Methods Patients discussed though our local Nodule Surveillance Service over 6 months were identified, and their electronic records reviewed.

Results 107 patients (64 male) undergoing surveillance were discussed November 2012-May 2013: 71 had single nodules, 36 multiple. This constituted an average 25 extra patient-discussions/month. Mean age 67years (range 39–93years); smoking status 27 current, 53 ex-smokers, 22 non-smokers. Referral

pathways: 2WW 37, inpatients 15, angiograms 6, PE service 5, respiratory OPD 17, other MDT 4, OPD 11, GP 3. Only 4/107 patients (3.7%) had high suspicion for lung cancer at outset, - 2 confirmed at surgery, 1 received radiotherapy (age 91yrs), 1 declined treatment. No further pathology was detected from surveillance. So far, a total of 246 CTs have been performed with 72 awaited (table 1). Fifteen patients had PET-CT (all low SUV). Fourteen underwent bronchoscopy (normal). Two had CT biopsy (benign), 2 declined biopsy, 2 were smaller at biopsy. One benign lesion was resected (patient choice). Only 28 patients have been discharged from surveillance; 10/28 resolved on 3month CT, 3/28 resolved on 6month CT, 15/28 stable on 12month CT. Fleischner guidance was accurately followed in 67%, most deviance due to delayed timing of 6month CT. Twenty-nine (27%) were discussed without documented nodule size.

Conclusion Nodule surveillance has put a significant burden on local Thoracic-Oncology services. No unexpected pathology was encountered during this surveillance period. Until clear clinical and/or radiological identifying factors for high risk patients are understood and rationalised, nodule surveillance will have to continue. There are cost implications not only for Radiology and Respiratory services, but also to patients' emotional and physical well-being. This highlights the continued need for clear surveillance protocols supported by service development.

Abstract P50 Table 1. Comparison of patients diagnosed with lung cancer through our thoracic oncology service in 2011 and



P51 FOLLOW-UP OF THE INCIDENTAL PULMONARY NODULE–OUTCOMES AND COSTS

J Harper, C Marchand, H Bevan, V Masani, J Suntharalingam; *Royal United Hospital Bath NHS Trust, Bath, United Kingdom*

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A retrospective study to analyse the outcomes and costs of follow-up of incidental nodules (solitary and multiple) referred to our Department from 2010–2011.

Method Consecutive nodule cases were identified by reviewing CT reports of 619 patients discussed at our Lung Cancer MDT from 2010–2011. Only clinically incidental nodules were included. Information was gathered using PACS and hospital records. In our department incidental nodules are seen once in clinic and then largely managed 'remotely' via correspondence. All nodules are managed to Fleischner guidelines.

Costs for investigations/procedures/appointments were calculated using local 2012–13 reference costs. Manpower costs for MDTs and correspondence were calculated using a 'bottom-up' costing approach.

Results 62 patients were referred with a new incidental nodule (s). Mean age was 66(34–92) with a 1:1 male:female ratio. 56% (35/62) had PS 0–1 and 56%(35/62) were current/ex-smokers. 66%(41/62) had a SPN. Mean size of largest nodule was 9mm.

11%(7/62) were diagnosed with malignancy, 6%(4/62) of pulmonary origin. The 3 non-pulmonary malignancies were renal, breast and metastatic squamous cell. New clinically important diagnoses were made in a further 11%(7/62) including TB/amyloid/ILD, whilst 78%(48/62) were benign.

In the malignancy group, 71% (5/7) were current/ex-smokers, 86% (6/7) had a SPN with mean size 7.7mm and there was a higher likelihood of nodules enlarging on follow-up CTs (40% versus 2% at 2nd CT). 75%(3/4) of patients with lung malignancy underwent curative treatment. In the benign group (48), the mean number of follow-up CTs/patient (excluding baseline CT) was 1.8. 21 ultimately unnecessary investigations were performed, including 9 invasive procedures. (Table) The cost of screening to the NHS to identify a single malignancy was £5805. The cost to our service per patient screened was £655 resulting in a shortfall of £455/patient compared with the £200 charge to the PCT for an initial appointment.

Conclusions In our study, incidental nodule follow-up led to a clinically relevant diagnosis in 22% of patients, including identification of malignancy in 11%. Whilst the study had a high yield, those who received a benign diagnosis underwent a number of ultimately unnecessary investigations, some invasive, with no gain. Our 'remote management' model of care is efficient but requires an appropriate tariff.

Abstract P51 Table 1. Additional Investigations Performed: Benign Group.

Investigation	Number
PET CT	9
Bronchoscopy	4
CT abdomen & pelvis	1
MRI adrenals	2
Colonoscopy	1
Breast lump biopsy	1
Lung biopsy (CT/VATS)	3
TOTAL	**21**

P52 INCIDENTAL NON-CALCIFIED PULMONARY NODULES: RATIONALE FOR CT SCANNING AND COST ANALYSIS

M Murthy, T Medeiros, J Radhakrishnan, V Cardinal da Silva, K Irion, M Ledson; *Liverpool Heart and Chest Hospital NHS Foundation Trust, Liverpool, UK*

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Introduction The advent of CT scanning as a routine test in the work-up of pulmonary disease has brought with it the unexpected detection of large numbers of pulmonary nodules, most of which are of a benign aetiology, even in high risk groups. Previous lung cancer screening studies have shown that likelihood of malignancy in nodules < 7 mm in size is < 1% in patients. Current guidance for the follow-up of these patients bases repeat CT scanning on nodule size and the risk of malignancy (Fleischner Society 2005; figure 1). However, such surveillance comes with increased healthcare costs, patient anxiety and radiation exposure. To look at this further, we reviewed the burden of repeat scanning on the healthcare economy.