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Health and Safety Executive

Joint study of UK medical secondary care provision for occupational lung disease

Prepared by the **Health and Safety Laboratory**
for the Health and Safety Executive 2007

RR575
Research Report

HSE

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Joint study of UK medical secondary care provision for occupational lung disease

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The Health and Safety Commission's 'Strategy for Workplace Health and Safety in Great Britain to 2010 and Beyond', which HSE has the challenge to implement, aims to reduce the incidence of work related ill health by 20% by 2010. HSE aims to achieve this, in part, by reducing incidence of occupational respiratory diseases such as occupational asthma, and disease specific packages of measures have been devised to realise this aim. For example, the headline target in HSE's strategy for occupational asthma is to reduce incidence of disease caused by exposure to substances in the workplace by 30% by 2010. Key to the realisation of this target is the reduction to a minimum the time between the first onset of respiratory symptoms at work and the instigation of measures post diagnosis to eliminate or reduce offending workplace exposures. This is necessarily reliant on workers recognising work related respiratory symptoms quickly, possibly aided by occupational health advice or health surveillance at work, then consulting a general practitioner. General practitioners and general practice nurse staff then need to recognise early, suspected cases of occupational asthma through appropriate assessment, and refer cases on to secondary care for further assessment and diagnosis. The clinical approach by which respiratory or occupational consultants diagnose occupational asthma then needs to operate effectively so that cases of disease are quickly and correctly diagnosed. Secondary care departments that see occupational asthma patients obviously need to be appropriately resourced and staffed to achieve this, or failing this, a more specialist secondary care department needs to be sufficiently close allowing the patient to be easily referred on for further assessment.

This report and the work it describes were funded by the Health and Safety Executive (HSE). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.

HSE Books

First published 2007

Acknowledgements

HSL wish to thank all those participating in the study, in particular, the many respiratory consultants who volunteered to participate in the study.

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EXECUTIVE SUMMARY

Key to the realisation of the Public Sector Agreement targets for occupational respiratory diseases is the reduction to a minimum the time between the first onset of respiratory symptoms at work and the instigation of measures post diagnosis to eliminate or reduce offending workplace exposures. This is necessarily reliant on the clinical approach by which respiratory or occupational consultants diagnose occupational respiratory disease operating effectively so that cases of disease are quickly and correctly diagnosed. Secondary care departments that see occupational asthma patients obviously need to be appropriately resourced and staffed to achieve this, or failing this, a more specialist secondary care department needs to be sufficiently close allowing the patient to be easily referred on for further assessment.

The present study was commissioned to document the current situation in UK hospitals regarding the provision of medical care for diagnosis of occupational respiratory diseases. Specifically, the study took the form of a baseline audit, which aimed to document the facilities and resources available for diagnosis in a UK wide sample of secondary care settings, as well as the range of clinical approaches employed for diagnosis in a representative sample of respiratory consultants. In addition, the study aimed to document the number and range of occupational respiratory disease cases seen in secondary care and their contribution to consultant workload.

A stratified random sample of 100 hospitals was identified from a sampling frame containing all UK hospitals with at least one respiratory consultant in a full time post. The most senior consultants within the hospital respiratory departments were contacted by letter and asked to nominate consultant colleagues, or perhaps themselves, based on interests and specialties, to participate in the study. 54 hospitals and 101 consultants were recruited to the study. One consultant from each participating hospital was contacted between April 2004 and January 2005 to arrange a date for interview. Remaining consultants were invited to participate via completion of a self-administered questionnaire.

The results of this survey highlight a marked variation in the approaches employed by respiratory consultants for diagnosis of occupational asthma. Results also suggest that there may be potential gaps in occupational care provision in several general hospitals across the UK that potentially require occupational asthma patients to be referred to hospitals over relatively long distances if they are to receive appropriate medical care. In addition, there appear to be many respiratory consultants in the UK that prefer to diagnose patients with occupational asthma in-house but are lacking the in-house diagnostic facilities enabling them to quickly and effectively arrive at a correct diagnosis. Study results also highlight variation in the approaches employed by respiratory consultants for diagnosis of asbestos related lung diseases, particularly relating to the medical care offered to pleural plaques patients after diagnosis, and how asbestosis patients are investigated at follow-up.

The laboratory services available to respiratory consultants to aid in the diagnosis of cases of occupational asthma for which sensitising agents are suspected to be the cause, where also surveyed as part of this study. With specific IgE testing via Radioallergosorbent analysis (or RAST) no longer a commercial option due to the discontinuation of commercially available radiolabelled anti-IgE, the ability to carry out bespoke testing to workplace agents/allergens as an alternative to testing using commercially produced allergens has been significantly reduced. The limited scope of

testing with the immuno-testing systems that tend to be employed in hospitals means that diagnosis of occupational asthma attributable to more novel sensitising agents, such as, low molecular weight chemicals, may be more problematic. The development of bespoke testing services compatible with the immuno-testing systems currently employed in most hospital immuno-laboratories would be one possible solution to this problem.

It is recommended that the information provided by this survey on the gaps in occupational care provision across UK secondary care, is used to inform future health policies so as to improve the standard of medical care offered to patients. In particular, the merits of establishing a national NHS funded network of specialist medical centres for treatment of occupational respiratory disease should be explored. Bearing in mind the documented variability in occupational care provision, a workable standard of care for diagnosis of occupational respiratory diseases and occupational asthma in particular would appear to be required. In addition, more stringent undergraduate and postgraduate medical training would also appear to be required to ensure greater national consistency in the clinical approaches employed for occupational respiratory disease diagnosis.

1 BACKGROUND AND AIMS

The Health and Safety Commission's "Strategy for Workplace Health and Safety in Great Britain to 2010 and Beyond", which HSE has the challenge to implement, aims to reduce the incidence of work related ill health by 20% by 2010. HSE aims to achieve this, in part, by reducing incidence of occupational respiratory diseases such as occupational asthma, and disease specific packages of measures have been devised to realise this aim. For example, the headline target in HSE's strategy for occupational asthma is to reduce incidence of disease caused by exposure to substances in the workplace by 30% by 2010. Key to the realisation of this target is the reduction to a minimum the time between the first onset of respiratory symptoms at work and the instigation of measures post diagnosis to eliminate or reduce offending workplace exposures. This is necessarily reliant on workers recognising work related respiratory symptoms quickly, possibly aided by occupational health advice or health surveillance at work, then consulting a general practitioner. General practitioners and general practice nurse staff then need to recognise early, suspected cases of occupational asthma through appropriate assessment, and refer cases on to secondary care for further assessment and diagnosis. The clinical approach by which respiratory or occupational consultants diagnose occupational asthma then needs to operate effectively so that cases of disease are quickly and correctly diagnosed. Secondary care departments that see occupational asthma patients obviously need to be appropriately resourced and staffed to achieve this, or failing this, a more specialist secondary care department needs to be sufficiently close allowing the patient to be easily referred on for further assessment.

Currently, agreement among occupational respiratory professionals regarding the requirements necessary to deliver an appropriate standard of care for diagnosis of occupational asthma, as well as other occupational respiratory diseases, is still to be reached. The present study was commissioned to document the current situation in UK hospitals regarding the provision of care for diagnosis of occupational respiratory diseases. Specifically, the study took the form of a baseline audit, which aimed to document the facilities and resources available for diagnosis in a UK wide sample of secondary care settings, as well as the range of clinical approaches employed for diagnosis in a representative sample of respiratory consultants. In addition, the study aimed to document the number and range of occupational respiratory disease cases seen in secondary care and their contribution to consultant workload.

Accurate diagnosis of disease remains key to the formulation of effective treatment and preventative strategies. However, at present, there is an absence of formal clinical guidance to support clinical decision making with regards the provision of care for occupational respiratory disease. Ultimately, it is envisaged that the data collected as part of this study may contribute to the creation of such guidance in the future, as well as identify potential gaps in occupational care provision across the UK, for future health policies to address.

2 RESEARCH METHODS

2.1 STUDY WORK-UP

2.1.1 Study Steering Committee

To contribute to the study work-up process, a study steering committee was established made up of representatives from HSE, BTS, the Department of Health (DoH), the British Lung Foundation (BLF), plus the study team at HSL. As well as contributing to the marketing of the study and the recruitment of hospitals and consultants, the steering committee were consulted when deciding on data requirements for the study, the most suitable methods of data collection, and an appropriate content and format for the study proformas. As part of the study marketing process, a flyer was prepared providing background to the study and forewarning of the imminent start of recruitment to the study, which was circulated around members of the BTS. The study steering committee also provided input during the results interpretation phase of the study. Given the study was a baseline audit of practice no ethics committee approval was necessary.

2.1.2 Study Pilot

As part of study work-up, the study methodology was piloted with four respiratory consultants working in Sheffield hospitals. This was to determine, in particular, the likely length of the interview and whether the data collection methods, for example, the sorts of questions asked, were effective in sourcing the information sought for the study. Feedback and opinion from the consultants interviewed during the pilot was obtained after the interview. The study steering committee was contacted to gather their opinion on the data collected from the pilot. Methods of data collection were then altered accordingly based on the results of the pilot exercise. Only minor changes to the methodology were found to be necessary.

2.2 HOSPITAL SELECTION AND RECRUITMENT

A stratified random sample of 100 hospitals was identified from a sampling frame containing all UK hospitals with at least one respiratory consultant in a full time post. This data was generated using available information from the current national register of respiratory departments compiled annually by the British Thoracic Society (BTS 2004). Hospitals were sampled from the BTS directory so that a number from each of the listed regions were represented in the study sample. The most senior consultants within the hospital respiratory departments were contacted by letter and asked to nominate consultant colleagues, or perhaps themselves, based on interests and specialties, to participate in the study. Non-respondents at four weeks were sent a reminder regarding the study and were again invited to participate. Of the 100 hospitals approached, 54 hospitals and 101 consultants were recruited to the study. One consultant from each participating hospital was then contacted between April 2004 and January 2005 to arrange a date for interview. Remaining consultants were invited to participate via completion of a self-administered questionnaire. The study's primary foci were the clinical approaches employed by non-occupational specialists, therefore the recruitment process selectively targeted general respiratory consultants working in District General Hospitals as opposed to occupational specialists. Non-respondents and those declining to participate were re-contacted as part of the study in order to enquire about the reasons for non-participation and to request a little information on the numbers and types of occupational respiratory disease patients

they tended to see in outpatients clinic so that the potential for any participation bias could be assessed.

2.3 INTERVIEW PROFORMA

A structured interview proforma was produced for use in the interviews to ensure that data was collected in as standardised a manner as possible (see Appendix). The proforma was structured as follows:

2.3.1 Section 1 of Proforma

Requested general hospital data, such as the number of beds, the serving population, department staffing, and in-house diagnostic facilities.

2.3.2 Section 2 of Proforma

Requested information on the types of outpatients clinics carried out and patients seen over the past 4 weeks (including a breakdown by disease type). Data was also collected on patient referral patterns.

2.3.3 Sections 3 and 4 of Proforma

The last 2 sections of the proforma took the form of 2 clinical scenarios, which the consultants were asked to provide opinion on.

Consultants who agreed to participate via completion of self administered questionnaire were sent an adapted version of the interview proforma, which requested broadly the same information as that collected via interview minus the hospital/department information requested in Section 1, with the latter information being sourced via the interview process.

2.4 CLINICAL SCENARIOS

The first clinical scenario was based around a case of occupational asthma attributable to flour dust exposure, while the second was based around a case of asbestos related lung disease. Consultants were provided with a limited amount of background data regarding the two cases and were then asked to provide a detailed description of the approach they would employ at first consultation in order to arrive at a diagnosis. The following five broad areas in approach were explored: 1) Clinical, 2) Imaging, 3) Physiological, 4) Immunological and 5) Other.

The consultants were provided with the following information on the two clinical scenarios:

2.4.1 Scenario 1

"*A 37 year old man presents to outpatients with a relatively long history of intermittent cough and wheeze. He has worked since 1987 in a flourmill as a tanker driver, but also gets involved in general maintenance and cleaning duties. He is a current smoker of 20 cigarettes per day and is currently on inhaled corticosteroids. He has had two episodes of significant skin rash on his shoulder, normally after carrying bags of flour."*

2.4.2 Scenario 2

"A 66-year-old man presents with atypical chest pain to the GP. The GP ordered a Chest X Ray, which notes the presence of multiple pleural plaques, largely calcified. The patient's FEV_1 and FVC, as assessed in primary care, are normal. You have seen the patient in clinic and he also complains of mild shortness of breath only on moderate to heavy exertion. The patient is overweight for his age."

2.5 DATA COLLATION AND PRESENTATION

Data recorded on the interview proforma sheets during the interviews, as well as that returned via self-administered questionnaires, were transferred to an Excel database. All study data were then collated, summarised and illustrated using descriptive statistical techniques. Much of the data collected for the study, particularly that on the approaches employed by consultants for each of the two clinical scenarios, were transcribed to the interview proforma by the interviewer as textual descriptions. These were collated and summarised by scrutinising all the responses, identifying broad themes and associated key terms/words, then determining their frequencies. If such terms/words were absent within a response, the response was assumed to be negative for the specific approach to which they related. It should be noted that the categories making up the data series presented in many of the figures in the results section are non-mutually exclusive, i.e. an individual consultant may contribute more than once to the counts across categories. Therefore, in many figures, the total counts across all categories are greater than the number of consultants questioned. This is merely a reflection of how the data was collected and collated. In addition, because some of the consultants surveyed by self-administered questionnaire failed to provide answers to all questions asked, the sizes of the total samples quoted with the data summaries in the results section are often variable.

3 RESULTS

Of the 100 hospitals approached, 54 hospitals across England, Scotland and Wales, and 101 consultants, were recruited to the study. The study team was successful in scheduling 42 consultant interviews over the period set aside for the carrying out of interviews, while 10 consultants returned a study questionnaire.

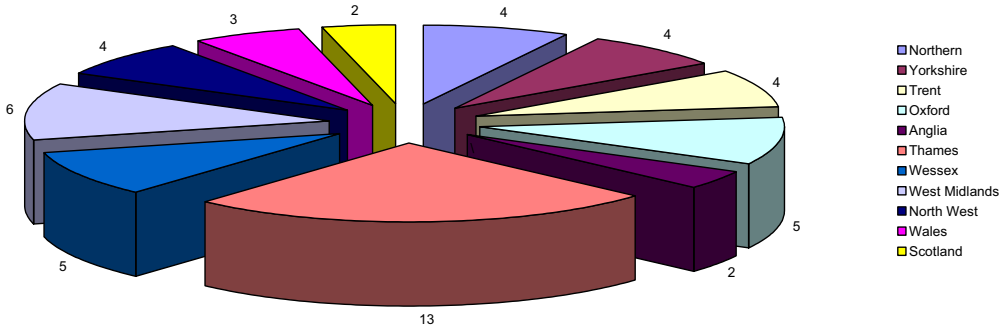
3.1 DATA FROM NON-RESPONDENTS

The data collected from non-participants on the reasons for not participating in the main survey, as well as the numbers and types of occupational respiratory disease patients they tended to see in outpatients clinic, were investigated so that the potential for any participation bias could be assessed. The most common reasons reported for not participating were that occupational lung disease made up a small part of the consultant's total workload and that other work commitments meant that the consultant was unable to find the free time needed to participate. Considering the former reason it was judged possible the consultants who agreed to participate in the study may have seen an above average number of occupational lung disease cases compared to the UK average. This was investigated by comparing data on the numbers of patients seen and the numbers and types of clinics carried out for the non-participants population to that for the main study population. The mean number of patients with occupational lung disease per 100 patients seen by the non-participating consultants was found to be similar to that estimated from the main study data. The types of clinics carried out were also found to be similar for the two groups.

3.2 SCOPE AND GEOGRAPHICAL SPREAD OF SURVEY

Figure 1 illustrates the geographical spread of the consultants questioned as part of the study. The majority of consultants were employed in England. Interviews were also carried out in Scotland and Wales. Unfortunately, no interviews were conducted in Northern Ireland.

Figure 1 - Consultants Questioned by Region (n=52)



Of the 52 consultants questioned, 7 carried out a dedicated occupational respiratory clinic per month and so were deemed an occupational respiratory specialist. Given

the remit of this study was to investigate medical care provision for occupational lung disease in non-specialist secondary care settings, the data collected from these 7 consultants were separated from the rest of the study data. The data summaries in the sections that follow are based on the data collated from returns from the remaining 45 consultants.

3.3 STAFFING

Statistics on hospital staffing are summarised in Table 1. The average serving population of the hospitals visited was 333,657. Hospitals had, on average, 3 whole time equivalent (WTE) respiratory consultants. The average serving population of the consultants interviewed was 151,000. There were fewer Specialist Registrars (SpRs) in respiratory training posts than number of respiratory consultants in the departments visited, the mean ratio of SpRs to consultants being 0.7. All but one of the hospitals employed at least one Respiratory Nurse Specialist (97%), the mean number being 4 per hospital, while 5 hospitals (17%) employed a Respiratory Nurse Consultant. Not all respiratory departments had Respiratory Physiology Technicians (83% had), and 28% had access to an Occupational Health Physician within the hospital.

Table 1 - Hospital Staffing

Staffing	*N*	*No.*	*%*[2]	*Missing*[1]
Mean hospital serving population	35	334k	-	6
Hospitals with WTE RC (mean no. per hospital)	35	29 (3)	100	6
Mean consultant serving population	35	151k	-	6
Mean ratio of SpR's:Consultants	35	0.7	-	6
Hospitals with WTE RNS (mean no. per hospital)	35	28 (4)	97	6
Hospitals with WTE RNC (mean no. per hospital)	35	5 (<1)	17	6
Hospitals with WTE RPT (mean no. per hospital)	35	24 (2)	83	6
Hospitals with WTE OHC (mean no. per hospital)	35	8 (<1)	28	6

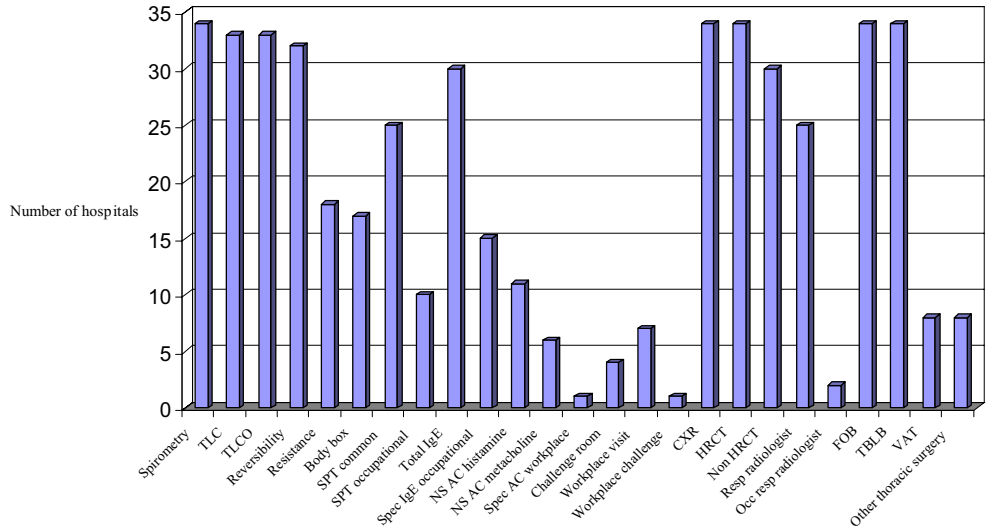
[1]Missing data indicates the number of consultants not providing data for the particular question, as some surveyed by self-administered questionnaire failed to provide answers to all questions asked.
[2]Percentages are calculated with denominators minus missing data.

3.4 DIAGNOSTIC FACILITIES

All consultants were asked about the facilities available in-house enabling them to make a diagnosis of occupational lung disease. This was variable and results are summarised in Figure 2. All hospitals had facilities to measure spirometry and all had access to plain radiology and high-resolution CT imaging, as well as fibreoptic bronchoscopy (FOB) and trans-bronchial biopsy (TBLB). Measurement of lung volume (TLC) and transfer factor (TLCO) and the carrying out of reversibility testing were also widespread, although were available in most but not all hospitals. Facilities to measure airway resistance and body box were less common. Around half of hospitals had facilities to undertake non-specific bronchial challenges although only

one was able to carry out specific challenges. However, few had a dedicated challenge room. Around half of hospitals had the ability to carry out blood IgE testing to occupational allergens, such as flour allergens, in-house, while around a quarter were able to carry out skin prick testing to occupational allergen. More used neighbouring hospital laboratory services if immunological testing to occupational allergens were required. Investigations such as video assisted thoracoscopy (VAT) and other thoracic surgery were not offered as a routine service in the majority of hospitals.

Figure 2 - Diagnostic Facilities Available (n=34)



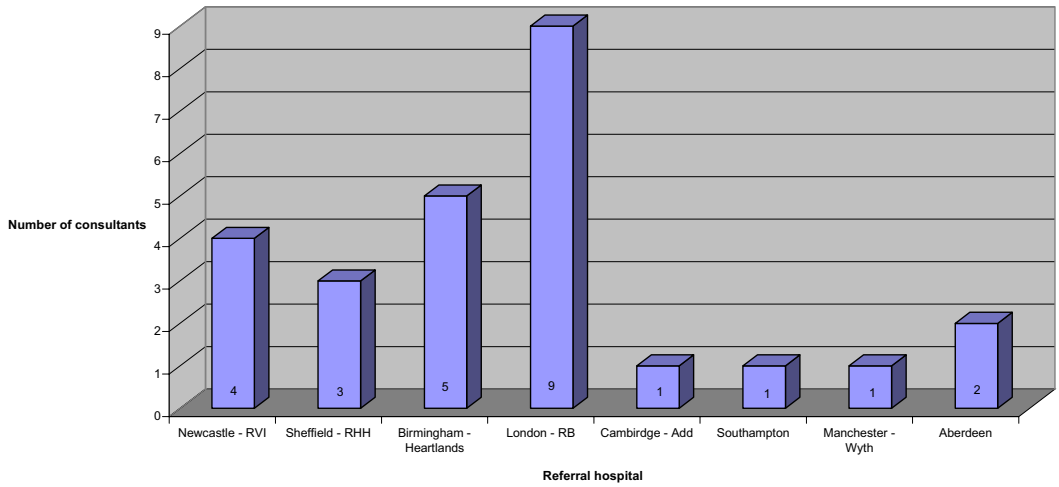
3.5 REPORTING TO SWORD

Three quarters (33/45 or 73%) of consultants questioned reported occupational disease cases to the Surveillance of Work-Related Occupational Respiratory Disease (SWORD) scheme. Consultants reporting to the SWORD scheme are either core reporters, reporting disease cases seen the previous month on a monthly basis, or non-core reporters, reporting one month in twelve. 6/33 or 18% who reported to SWORD were core reporters, while 21/33 or 64% were non-core reporters (6/33 or 18% failed to respond to the question). All Sword reporters, both core and non-core, were asked when they would usually report a patient to the SWORD scheme. Nearly half of reporters (13/27 or 48%) would not report a case until they were 75%+ certain that the diagnosis was correct. Others (11/27 or 41%) were less rigorous, reporting a case where the diagnosis was between 51-74% certain (3/27 or 11% failed to respond to the question). Other triggers highlighted for reporting to SWORD included: "…on documentation of a positive occupational history…", "…immediately following first consultation on balance of certainty…", and "…immediately following second consultation on balance of certainty…". In addition, of those consultants that tended to refer cases to an occupational specialist, a minority relied on the specialist reporting the case to SWORD.

3.6 REFERRAL OF OCCUPATIONAL ASTHMA CASES

When consultants were asked whether they ever referred suspected cases of occupational asthma to an occupational specialist, 58% (26/45) reported they had referred a patient in the past. Referral locations for the consultants questioned are summarised in Figure 3 The mean referral distance was 42 miles (range = 1 to 111 miles).

Figure 3 - Referral Locations for Occupational Asthma (n=26)



3.7 PATIENTS AND OUTPATIENTS CLINICS

The mean number of clinics carried out by a consultant and the mean number of new and follow-up patients seen, on average, by a consultant in outpatients clinic, are shown in Tables 2-4.

Tables 2-4 – Mean No. of Clinics Carried Out and Patients Seen in Outpatients Clinic per Consultant

Table 2- Per month

Ave. clinics per month	12
Ave. new patients per month	41
Ave. follow-up patients per month	94
Ave. new and follow-up patients per month	135

Data are averages of consultant reported data

Table 3 - Per clinic

Ave new patients per clinic	4
Ave follow-up patients per clinic	8
Ave new and follow-up patients per clinic	12

Data derived by dividing data in Table 2 by the ave. no. of clinics per month (i.e. 12)

Table 4 - Per year

Ave new patients per year	492
Ave follow-up patients per year	1128
Ave new and follow-up patients per year	1620

Data derived by multiplying data in Table 2 by 12 (months per year)

The mean number of patients with occupational lung disease per 100 patients seen by a respiratory consultant, based on the data collected for this study, was 5. Assuming 1620 patients are seen by a consultant in outpatients clinic per year on average (see Table 4), this equates to an estimated 81 patients per year, and assuming there are 528 practicing respiratory consultants in the UK (BTS, 2004), this is equivalent to 42,768 occupational lung disease cases nationally. Bearing in mind

the estimate of the number of practicing respiratory consultants is based on figures for England only, the latter two estimates are likely to be conservative. Tables 5 to 7 provide a more detailed breakdown of the data on patients seen in clinic by disease type. The mean number of cases of occupational asthma seen in outpatients clinic per year by a consultant, based on the estimates provided by the consultants questioned in the study, was 15. Equivalent figures for pneumoconiosis, pleural plaques, mesothelioma, and lung cancer were 22, 33, 14 and 2 respectively.

Table 5 - New and follow-up occupational asthma patients seen per consultant and averaged for the UK as a whole

	Asthma
Mean no. cases per 100 patients per consultant	0.92
Mean no. cases per year per consultant Both new and follow-up New only	 14.9 4.5
Cases seen by consultants per year in UK	7867
New cases diagnosed by consultants per year in UK	2367

Figures for mean number of cases per 100 patients per consultant derived by converting number of specific disease cases seen per total number of patients seen for each consultant to number per 100 patients seen then averaging figures
Figures for mean number of cases (new and follow up) per year per consultant derived by adjusting figures per 100 patients using estimate of average number of patients seen per year (i.e. 1620, see Table 4)
Figures for new only derived assuming 30% of total number of patients seen are new patients (based on data in Table 3)
Figures for new cases diagnosed and cases seen by consultants per year in UK derived by multiplying number of cases by estimated number of practicing respiratory consultants in UK (i.e. 528, BTS, 2004)

Table 6 – Pneumoconiosis and pleural plaques patients seen per consultant and averaged for the UK as a whole

	Pneumoconiosis	Pleural plaques
Mean no. cases per 100 patients per consultant	1.35	2.03
Mean no. cases per year per consultant	21.9	32.9
Cases seen by consultants per year in UK	11,582	17,388
Asbestos related	3475	17,388

Figures for mean number of cases per 100 patients per consultant derived by converting number of specific disease cases seen per total number of patients seen for each consultant to number per 100 patients seen then averaging figures
Figures for mean number of cases per year per consultant derived by adjusting figures per 100 patients using estimate of average number of patients seen per year (i.e. 1620, see Table 4)
Figures for cases seen by consultants per year in UK derived by multiplying number of cases per year per consultant by estimated number of practicing respiratory consultants in UK (i.e. 528, BTS, 2004)
Figure for asbestos related pneumoconiosis derived assuming 30% of all cases are asbestos related (based on data from 2003/04 HSE Occupational Health Statistics Bulletin)

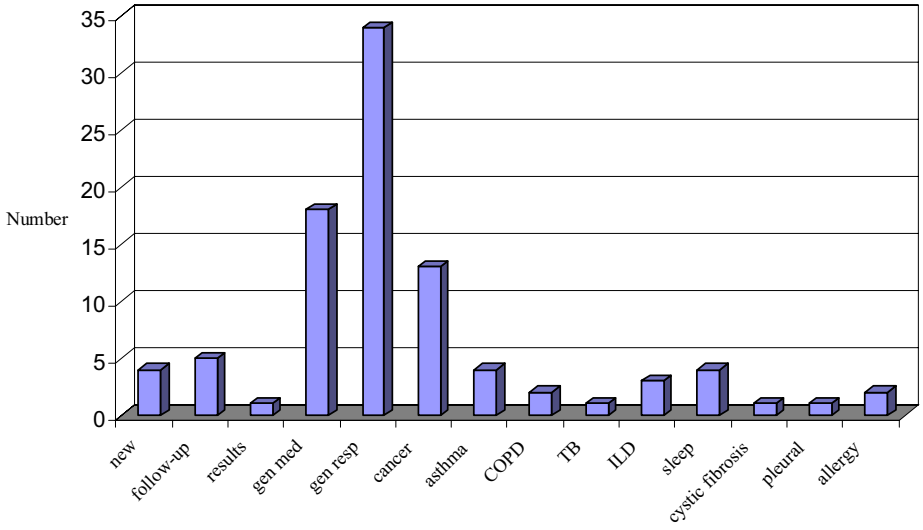
Table 7 Mesothelioma and occupational lung cancer patients seen per consultant and averaged for the UK as a whole

	Mesothelioma	Lung cancer
Mean no. cases per 100 patients per consultant	0.87	0.1
Mean no. cases per year per consultant	14.1	1.6
Cases seen by consultants per year in UK	7455	853
Asbestos related	7455	853

See explanation below Table 6 for how data were derived
N.B. Figures for numbers of asbestos related cases assumes all cases are asbestos related

The general and specific occupational respiratory workload of the consultants questioned in the study was found to be very variable. Of the consultants questioned, 7/52 (15%) carried out at least one dedicated occupational clinic per month. A summary of the other types of respiratory clinics carried out is shown in Figure 4.

Figure 4 - Types of clinics carried out (n=45)



76% of consultants (34/45) carried out at least one general respiratory clinic per month, although 18 of these reported that some of their respiratory clinics also included general medicine patients. The percentage carrying out dedicated asthma (not necessarily occupational), interstitial lung disease and pleural disease clinics were 9, 7 and 2% respectively.

3.8 APPROACHES FOR DIAGNOSIS OF OCCUPATIONAL ASTHMA

The range of clinical approaches employed by the consultants questioned for diagnosis of occupational asthma is summarised in Table 8.

Table 8 – Approaches for Diagnosis of Occupational Asthma

Clinical approach for diagnosis	*N*	*No.*	*%*[2]	*Missing*[1]	*%*
History taking					
Investigate assoc. between symptoms & work routines or improvements in symptoms away from work	45	18	46	6	13
Physical exam					
Chest exam	45	14	36	6	13
Imaging					
CXR	45	42	100	3	7
Poss. CT Scan	45	9	21	3	7
Physiological testing					
FEV1 and FVC	45	41	98	3	7
TLC and TLCO	45	26	62	3	7
Reversibility	45	14	33	3	7
Non-specific airway challenge	45	4	10	3	7
Specific airway challenge	45	0	0	3	7
Peak flow diary	45	36	86	3	7
Peak flow diary – duration of recordings					
At least 3 weeks	36	26	84	5	14
<3 weeks	36	5	16	5	14
Peak flow diary – frequency of recordings					
At least 4 per day	36	26	72	0	0
<4 per day	36	10	28	0	0
Immunological testing					
Either skin prick or blood IgE	45	33	77	2	4
Skin prick only	45	3	7	2	4
Blood IgE only	45	13	30	2	4
Both skin prick and blood IgE	45	17	40	2	4
Neither skin prick or blood IgE	45	10	23	2	4
Blood IgE	45	30	70	2	4
Total only		3		2	
Specific only		7		2	
Total and specific		18		2	
Flour allergens only		16		5	
Common allergens only		0		5	
Both flour and common allergens		4		5	
Skin prick test	45	20	47	2	4
Flour allergens only		6		2	
Common allergens only		9		2	
Both flour and common allergens		3		2	
Specific IgE to flour using either blood IgE or skin prick test	45	20	47	2	4

[1]Missing data indicates the number of consultants not providing data for the particular question, as some surveyed by self-administered questionnaire failed to provide answers to all questions asked.
[2]Percentages are calculated with denominators minus missing data.

3.8.1 Clinical and Imaging

The scope and detail of the clinical histories the consultants reported that they would take varied much between respondents. 24% reported simply that they would investigate associations between symptoms and work, while 46% went further in their responses, reporting either that they would enquire about associations between symptoms and specific work routines/exposures, or improvements in symptoms while away from work. With regards the carrying out of a physical examination and use of imaging, 36% stated that they would carry out a chest exam at first consultation, while the requesting of a plain chest x-ray was routine in all. In addition, 21% communicated that they may request a CT Scan depending on other results.

3.8.2 Physiology

The range of physiological tests that would be carried out by consultants was very varied. For the purposes of data interpretation, pulmonary function tests (PFT's) were assumed to consist of the flow and volume measures derived by spirometry (i.e. FEV1 and FVC) plus total lung capacity (TLC) and gas transfer (TLCO), unless otherwise stated. 98% communicated that they would carry out spirometry, either alone or as part of the tests carried out under the PFT suite of tests, 86% would request the patient keep a PEF diary, and 33% would carry out reversibility testing. The numbers advocating the carrying out of TLC and TLCO tests, either in isolation or as part of PFT testing, were both 62%. A minority of consultants (10%) reported that they would carry out airway challenge testing, with 3 challenging with histamine and 1 with metacholine, while none reported that they would carry out specific occupational challenge. Of those consultants that advocated the use of a PEF diary, 84% reported that they would recommend the diary be kept over a period of at least 3 weeks. There was more varied opinion regarding the recommended number of recordings made daily, with 72% recommending at least 4 per day. In addition, 77% reported that they would recommend the keeping of a diary over a period including both a routine working week plus and an extended period away from work. With respect to the interpretation of PEF diary data, 14% of consultants reported that they would explore any work related trends using OASYSII, with the remaining eyeballing data.

3.8.3 Immunology

The main immunological approaches reportedly used by consultants to document allergy were either one or a combination of skin prick testing or blood IgE measurement. 70% of consultants reported that they would use blood IgE measurement to investigate allergic status. Skin prick testing was found to be less commonly employed compared to blood IgE testing, with 47% reporting that they would consider using skin prick testing. Of those that advocated the use of blood IgE measurement (30), 3 reported that they would determine total IgE only, 7 reported that they would determine specific IgE only and 18 reported that they would seek both. Blood IgE measurement was found to be used most commonly to determine the presence of specific IgE to flour allergens rather than common aeroallergens, with 16 reporting that they would use the test to determine specific IgE to flour only and just 4 to also determine specific IgE to common aeroallergens. Skin prick testing, in those that reportedly would use the test, was found to be used more to determine the presence of specific IgE responses to common aeroallergens than flour. 9 reported that they would use the test to determine specific IgE to common aeroallergens only, 6 to determine specific IgE to flour allergens only and 3 to investigate both categories of allergens. In total, 20 consultants (47%) reported that they would use either blood IgE or skin prick testing to determine specific IgE to flour

allergens. Those consultants whose approach involved specific IgE testing were further asked which allergens specifically they felt may be relevant with respect to the case in question and, of those, which they would seek information on. Many consultants reported that they tended to rely on direction from immunology, or the department equivalent, or that the immuno-laboratory services tended to provide a standard suite of allergen tests based on information provided by the respiratory consultants and the allergens routinely held by the testing laboratory.

3.8.4 Approach post diagnosis

Table 9 – Approach Post Diagnosis

Approach post diagnosis	*N*	*No.*	*%*[2]	*Missing*[1]	*%*
Post diagnosis advice:					
Advise patient reduces exposure by changing role or employment	45	27	63	2	4
Refer patient to specialist for advice	45	6	14	2	4
Advise patient consults OH service/TU/employer or solicitor	45	10	23	2	4
Provide legal advice – i.e. possible eligibility for industrial injuries benefit or civil compensation	45	12	28	2	4

[1]Missing data indicates the number of consultants not providing data for the particular question, as some surveyed by self-administered questionnaire failed to provide answers to all questions asked.
[2]Percentages are calculated with denominators minus missing data.

The information reported by consultants on approach post-diagnosis (see Table 9) was collated by subdividing into the advice provided to the patient by the consultant direct, and the advice provided more indirectly, perhaps through referral to relevant people, organisations and groups, providing additional specialist sources of information. The most commonly provided direct source of advice post diagnosis was the recommendation for the patient to take positive steps to reduce exposure either by a change of role in their current job or a change of employment altogether (63%). 28% reported that they would provide legal advice post diagnosis based on the clinical findings of consultations, in particular, possible eligibility for industrial injuries benefit, or perhaps compensation via a civil claim. 14% of consultants communicated that they felt that they were not fully equipped to provide the necessary scope and depth of advice required post diagnosis and therefore would consider referring to an occupational specialist or at the very least would seek a second opinion. In addition, 23% would advise the patient consulted their employer or their employer's occupational health service, their trade union or a personal injuries solicitor.

3.9 APPROACHES FOR DIAGNOSIS OF ASBESTOS RELATED OCCUPATIONAL LUNG DISEASES

The range of clinical approaches employed by the consultants questioned for diagnosis of asbestos related lung disease is summarised in Table 10.

Table 10 - Approaches for Diagnosis of Asbestos Related Lung Disease

Clinical approach for diagnosis	*N*	*No.*	*%*[2]	*Missing*[1]	*%*
History taking:					
Investigate occupational history	45	35	83	3	7
with particular emphasis on exposure to asbestos	45	26	62	3	7
Query other possible causes of symptoms:	45	14	33	3	7
Interstitial lung disease	45	2	5	3	7
Mesothelioma	45	1	2	3	7
Overweight	45	9	21	3	7
Pulmonary embolism	45	1	2	3	7
Cardiac	45	3	7	3	7
Physical examination:					
Chest exam for crackles	45	14	33	3	7
Imaging:					
CXR	45	6	15	3	7
CT Scan	45	41	98	3	7
Physiological testing:					
Full PFT's (FEV1, FVC, TLC, TLCO)	45	30	77	6	13
FEV1 and FVC	45	6	15	6	13
TLC	45	4	10	6	13
TLCO	45	6	15	6	13
Oxygen saturation	45	9	23	6	13
Shuttle	45	4	10	6	13
Exercise tolerance	45	2	5	6	13

[1]Missing data indicates the number of consultants not providing data for the particular question, as some surveyed by self-administered questionnaire failed to provide answers to all questions asked.
[2]Percentages are calculated with denominators minus missing data.

Table 11 - Approaches for Diagnosis of Asbestos Related Lung Disease

Clinical approach for diagnosis	*N*	*No.*	*%*[2]	*Missing*[1]	*%*
Approach if plaques					
Discharge	45	29	69	3	7
Follow up	45	13	31	3	7
Frequency					
Yearly	13	7		0	
After 6 months then yearly	13	1		0	
6 monthly	13	2		0	
After 3 months then 6 monthly	13	2		0	
3 monthly	13	1		0	
Duration					
While symptomatic	13	7		0	
Over 1 year	13	2		0	
Over 1.5 years	13	1		0	
Over 2 years	13	1		0	
Over 3 years	13	2		0	
Approach if fibrosis					
Discharge	45	0	0	5	11
Follow up	45	40	100	5	11
Frequency					
Yearly	40	3		2	
After 3 months then yearly	40	2		2	
6 monthly	40	13		2	
After 3 months then 6 monthly	40	5		2	
4 monthly	40	1		2	
3 monthly	40	14		2	
Duration					
While symptomatic	40	22		2	
Over 1 year	40	4		2	
Over 2 years	40	6		2	
Over 3 years	40	1		2	
Over 4 years	40	1		2	
Over 5 years	40	4		2	
Approach if fibrosis and follow up					
CXR	40	24		5	
CT Scan	40	11		5	
Full PFT's (FEV1, FVC, TLC, TLCO)	40	23		5	
FEV1 and FVC	40	8		5	
TLC	40	1		5	
TLCO	40	6		5	
Oxygen saturation	40	3		5	
Shuttle	40	1		5	
Exercise tolerance	40	0		5	

[1]Missing data indicates the number of consultants not providing data for the particular question, as some surveyed by self-administered questionnaire failed to provide answers to all questions asked.
[2]Percentages are calculated with denominators minus missing data.

3.9.1 Clinical and Imaging

As in the first case scenario, the scope and detail of the clinical history described to the interviewer that would be taken by the consultant varied much between consultants (see Table 10). 83% communicated that they would take an occupational history as part of the process of documenting relevant clinical history for the second case scenario, and of these, 26/42, or 62%, reported that they would look for evidence of previous asbestos exposure. With regards physical examinations, 33% reported that a chest examination for crackles would form part of the first consultation. In addition, 33% reported that their approach would explore other possible causes of symptoms such as being overweight, a mesothelioma, interstitial lung disease, a pulmonary embolism or a cardiac rather than pulmonary problem. With respect to imaging, all but one of the consultants questioned said that they would request a CT scan or at the very least consider a CT scan as an option, often subject to positive physiological evidence of lung restriction. In addition, 15% communicated that they may request a baseline plain chest x-ray also.

3.9.2 Physiology

Lung function tests (PFTs) were assumed to consist of the flow and volume measures derived by standard spirometry (i.e. FEV1 and FVC) plus total lung capacity (TLC) and gas transfer (TLCO) unless otherwise stated. 92% of consultants communicated that they would carry out TLCO testing, and 87%, TLC testing, either alone or as part of the tests carried out under the PFT suite of tests. In addition, 92% consultants reported that they would carry out spirometry. Other physiological tests employed included oxygen saturation (23%), a shuttle test (10%), and an exercise tolerance test (5%). Results are summarised in Table 10.

3.9.3 Other

A minority of other tests made up the approaches of a number of consultants, including an ECG (6), a cholesterol test (1), and a full blood count (1).

3.9.4 Follow-up

As part of the second clinical scenario, consultants were asked to describe their approach following first consultation assuming two scenarios: firstly, that no abnormality other than pleural plaques was observed following first consultation, and secondly, that fine bilateral sub pleural fibrosis was observed. Results are summarised in Table 11. For the first outcome, i.e. that pleural plaques only were apparent, 69% of consultants reported that they would discharge the patient, while 31% (13 in total) reported that they would follow-up. Of the latter, most (7) reported that they would follow the patient just while symptomatic. The frequency of follow-up varied between every three months and annually, the most common approach being annually (7). For the second outcome, i.e. that evidence of fine bilateral sub pleural fibrosis was apparent, all respondents reported that they would follow-up the patient rather than discharge. The most common approach employed by consultants was to follow up between three and six monthly (33/40) and over an indefinite period while the patient was symptomatic (22/38). The range of approaches taken by consultants at follow-up, under the assumption that sub-pleural fibrosis was apparent, are also summarised in Table 11. All consultants reported that they would carry out some form of imaging, with 24/35 opting for a plain chest x-ray and 11/35 a CT scan, either yearly or every other year. In addition, 31 consultants reported that they would carry out spirometry, 29 TLCO and 24 TLC. Shuttle test and oxygen saturation were less routinely used at follow-up.

3.9.5 Approach post diagnosis

The range of advice given to patients with asbestos related diseases, including pleural plaques and sub-pleural fibrosis, post diagnosis, is summarised in Table 12.

Table 12 – Approach Post Diagnosis

Approach post diagnosis	*N*	*No.*	*%*[2]	*Missing*[1]	*%*
Post diagnosis advice:					
Provide legal advice – i.e. possible eligibility for industrial injuries benefit or civil compensation	45	27	64	3	7
Advice via third party:	45	11	26	3	7
Refer on for advice or seek second opinion	45	3	7	3	7
Provide advice via leaflet/telephone advice line	45	4	10	3	7
Personal injuries solicitor	45	4	10	3	7

[1]Missing data indicates the number of consultants not providing data for the particular question, as some surveyed by self-administered questionnaire failed to provide answers to all questions asked.
[2]Percentages are calculated with denominators minus missing data.

64% of consultants communicated that the provision of relevant legal advice to the patient would form part of their approach. In addition, 10% highlighted that it was routine for asbestos related disease cases to be given advice in the form of information leaflets and/or telephone advice numbers; this was particularly the case for consultants working in hospitals in areas with high numbers of prevalent cases of disease, such as in coastal areas of SE Scotland and SW England, where the legacy of shipping related industries is marked. Other advice reportedly given to patients by consultants included recommendations to consult a variety of third parties, such as a personal injury solicitor (20%). 7% would refer on or seek a second opinion prior to providing advice.

4 DISCUSSION

The results of this survey provide information on how well equipped respiratory departments in the UK are at present for diagnosis of occupational respiratory diseases such as occupational asthma and asbestos related respiratory diseases. Results also provide information on patterns employed by respiratory consultants for diagnosis and follow-up.

4.1 OCCUPATIONAL ASTHMA

Occupational asthma is a common occupational disease, with up to 3000 new cases diagnosed in the UK population each year. HSE estimates that 5% of all asthma relates directly to occupational exposures and that the disease has cost UK society over £1.1 billion over the last 10 years (Newman Taylor et al. 2004).

The clinical consequences of developing occupational asthma have been well researched. Once sensitised to a workplace agent, sufferers will develop respiratory symptoms. If exposure continues, symptoms may worsen and become severely disabling. Therefore a quick diagnosis following the first onset of asthma symptoms at work and the immediate instigation of measures post diagnosis to eliminate or reduce offending workplace exposures is essential for a good long term prognosis. A key hurdle for the effective diagnosis of occupational asthma is that agreement among occupational respiratory experts regarding the requirements necessary to deliver an appropriate standard of care for diagnosis of occupational asthma is still to be reached. The British Occupational Health Research Foundation (BOHRF) guidelines for the prevention, identification and management of occupational asthma (Newman Taylor et al. 2004), published in September 2004, attempt to address this failing, somewhat. The guidelines provide evidence based recommendations to inform doctors and nurses working in general practice, occupational health and respiratory medicine, as well as employers, safety representatives and workers exposed to asthmagens, as to appropriate professional best practice regarding diagnosis of occupational asthma. A group of 12 UK based occupational respiratory disease specialists recently provided further input to the issue by attempting to formally agree a working definition of occupational asthma and what clinical facilities were necessary to run a specialist occupational asthma clinic. This took the form of a modified RAND appropriateness exercise, which was used to reach consensus agreement taking into account a combination of current scientific opinion as well as the expert opinion of the panel (Francis et al. 2005).

The BOHRF occupational asthma guidelines regard a number of clinical tests as key for effective diagnosis, these are: 1) the taking of a detailed history, regarded to have high sensitivity for occupational asthma, 2) the serial measurement of peak flow, specifically, at least 4 readings per day over 3 weeks, preferably including an extended period away from work, 3) measurement of specific IgE responses, the key strength of tests being to exclude an agent as a cause of occupational asthma, and 4) specific provocation challenge, widely regarded as a gold standard test for occupational asthma diagnosis. It is perhaps informative to evaluate and summarise the clinical approaches employed by the consultants surveyed as part of this study with such recommendations in mind. With regards history taking, 46% of the consultants questioned for this study, reported that an investigation of the relation between symptoms and work, in particular, whether symptoms worsened while at work or were associated with particular roles or exposures, would form part of the clinical approach they would employ at first consultation. Clearly, whether the responses provided in the study interview by the consultants questioned are well

illustrative of the clinical approaches that were actually likely to be employed if the case in the clinical scenario presented is debatable, but the use of open questioning was regarded to increase the likelihood that responses were a good reflection of reality. The patterns in use of peak flow diaries for the purposes of occupational asthma diagnosis by the consultants questioned is in broad keeping with the recommendations of the BOHRF guidelines, with 86% of the consultants questioned reporting that they would request the keeping of a peak flow diary for the case in the clinical scenario. In addition, 84% advocated the recording of peak flow over a period of at least 3 weeks, while 72% reported that they would request the patient record PEF at least 4 times daily. The BORHF guidelines also advocate the carrying out of testing for specific IgE responses, either by blood IgE measurement or skin prick testing, particularly in cases where exposure to allergen in the workplace may have occurred. Most (77%) of the consultants questioned advocated the carrying out of some form of allergy testing, either by skin prick testing or blood IgE measurement. However, only 47% of consultants reported that they would investigate specific IgE responses to flour allergens (by skin prick or blood IgE), although many reported that the testing laboratory often provided advice on which allergens specifically to test for. None of the consultants questioned reported that they would consider carrying out specific provocation challenge for the case described in the clinical scenario; indeed only 12% of the respiratory departments visited had a dedicated challenge room for the administration of such tests. Given this, together with the fact that referral of cases to specialist centres is not commonplace (as many as 42% of the consultants questioned reported that they had never referred a suspected case of occupational asthma to a specialist centre), it is likely that specific provocation challenge plays little role currently in the diagnosis of the majority of occupational asthma cases seen in UK secondary care. Respiratory consultants are well placed to provide advice to newly diagnosed occupational asthma patients on suggested actions post diagnosis, such as use of personal protective equipment or changing roles or jobs to avoid exposures as well as pursuing legal claims. Access to good legal advice regarding possible eligibility for civil compensation for damages following diagnosis of an occupational disease, such as occupational asthma, is particularly important because of the rule that claims for civil compensation must be brought within 3 years from the date that the claimant knew or ought reasonably to have known of the damage and the person liable. This date tends to be the date of disease diagnosis. However, only 28% of consultants questioned, explicitly reported that the provision of legal advice would form part of the approach they would employ post diagnosis for the case in the clinical scenario, whereas just 37% reported that they were likely to refer the case to a specialist for post diagnosis advice or advise the patient consulted a trade union representative or a personal injuries solicitor. In summary, these results highlight marked variation in the approaches employed by respiratory consultants for diagnosis of occupational asthma. It is likely that the development of a formal standard of care for diagnosis of occupational asthma, developed specifically to provide guidance to respiratory disease specialists working in secondary care, would aid the communication and practical implementation of key messages within the BOHRF guidelines in secondary care settings.

Key outcomes of the exercise undertaken by the 12 UK based occupational respiratory disease specialists, which aimed to reach a consensus opinion on the clinical facilities deemed necessary to run a specialist occupational asthma clinic, are summarised in Table 13. Of the 28 facilities postulated at the start of the exercise as being required to run a specialist occupational asthma clinic, consensus was achieved for 18, with four being considered “an absolute necessity in all patients”, six classified as “maybe useful but not a necessity” and four considered to be either “no relevance to occupational asthma” or “not a facility routinely required”. The numbers of respiratory departments visited as part of the present study that had the diagnostic

facilities categorised in Table 13 as either a necessity or a facility that must be available, are summarised in Table 14. Also summarised are patterns in use of such diagnostic facilities by the consultants questioned as part of this study with respect to the baker's asthma clinical scenario. Gaps in in-house access to what Niven et al. regarded as key diagnostic facilities for occupational asthma diagnosis in the departments surveyed related to the ability to carry out both specific and non-specific airway challenge testing, specific IgE response testing to occupational allergens, and workplace visits. Nearly all consultants had access to spirometry, chest x-ray and gas transfer. It is likely that the former mentioned facilities are potentially accessible in neighbouring hospitals when required. Past use of neighbouring hospital facilities for diagnosis of occupational asthma was investigated in the present study; It was found that 58% of the consultants questioned had referred on an occupational asthma patient in the past. The referral patterns of the consultants questioned have been summarised (see Figure 3). All regions covered by the study, with the exception of Yorkshire, Oxford and Wales, had at least one respiratory department within their boundaries that a consultant reported that they had referred to. RVI, Newcastle was a potential referral centre for the Northern region, RHH, Sheffield for the Trent region, the Heartlands, Birmingham for the West Midlands region, the Royal Brompton, London for the Thames region, Addenbrookes, Cambridge for the Anglia region, Southampton for the Wessex region, Manchester for the North West region and Aberdeen for Scotland. Based on the above, the nearest referral centre for many of the hospitals within the Yorkshire region is the RHH, Sheffield, and the Heartlands in Birmingham for hospitals in the Wales and Oxford regions. However, for the latter, these are likely to be associated with potentially large referral distances. In summary, these results suggest that there may be potential gaps in occupational care provision in several general hospitals across the UK that potentially require patients to be referred on to hospitals over relatively long distances if they are to receive an adequate standard of care. In addition, there may be potentially many respiratory consultants in the UK that prefer to diagnose patients with occupational asthma patients in-house but are lacking the diagnostic facilities readily accessible in-house enabling them to quickly and effectively arrive at a correct diagnosis.

Table 13 – Facilities necessary to run a specialist occupational asthma clinic (Francis et al. 2005)

Rating	Median panel score	Facility
Absolute necessity in all patients	**9**	Pre-bronchodilator FEV1 as a percent of predicted Pre-bronchodilator FVC as a percent of predicted
Facility must be available	**8**	Peak Flow monitoring and plotting of results OASYS II analysis of peak flow records Non-specific provocation challenge in the laboratory Specific IgE to a wide variety of occupational allergens
Facility must be available	**7**	Carbon monoxide transfer factor (TLCO) Transfer coefficient (KCO) Non-specific challenge serially at work and away from work Specific occupational challenge in the clinical laboratory Chest x-ray Total IgE Skin prick testing to common environmental allergens Workplace visit by a clinician Workplace challenge with peak flow monitoring /spirometry Standard haematology/biochemistry (LFT, TFT, CA2+) Access to a toxicology database RAST testing to common environmental allergens
Maybe useful but not a necessity	**6-4**	Measurement of workplace exposure levels Assessment of vocal cord dysfunction Portable lung function logging device Standardised occupational history form Training in occupational medicine to at least Dip Occ Med Total lung capacity
Not routinely required	**3**	Sputum eosinophils
Not routinely required	**2**	Exhaled nitric oxide Expired carbon monoxide Exhaled breath condensate for analysis of inflammatory markers

Table 14 – Facilities necessary to run a specialist occupational asthma clinic by hospital resourcing for occupational asthma diagnosis

Rating	Facility	Departments with facility (%)
Absolute necessity in all patients	Pre-bronchodilator FEV1 as a percent of predicted	100%
	Pre-bronchodilator FVC as a percent of predicted	100%
Facility must be available	Peak Flow monitoring and plotting of results	100%
	OASYS II analysis of peak flow records	14%
	Non-specific provocation challenge in the laboratory	50% (12% with challenge room)
	Specific IgE to a wide variety of occupational allergens	29% (skin prick) 44% (blood IgE)
	Carbon monoxide transfer factor (TLCO)	97%
	Transfer coefficient (KCO)	97%
	Non-specific challenge serially at work and away from work	-
	Specific occupational challenge in the clinical laboratory	3%
	Chest x-ray	100%
	Total IgE	88%
	Skin prick testing to common environmental allergens	74%
	Workplace visit by a clinician	0%
	Workplace challenge with peak flow monitoring /spirometry	-
	Standard haematology/biochemistry (LFT, TFT, CA2+)	-
	Access to a toxicology database	-
	RAST testing to common environmental allergens	-

4.2 ASBESTOS RELATED DISEASE

Asbestos use was first restricted in the UK following the introduction of the Asbestos Regulations in 1969 and its use is now banned in most of the developed world. However, respiratory consultants still regularly see patients in secondary care, both new and follow-up, showing signs of asbestos related lung damage, due to the legacy of asbestos use in the UK between the 1950's and 1970's. In fact, HSE estimate that cases of mesothelioma, caused by environmental exposure to asbestos, are only likely to peak between 2011 and 2015, when it is estimated there will be around 2000 deaths per year (HSE 2003/04).

The effects of asbestos inhalation have been well researched and include disease of the conducting airways (or bronchi), the gas exchange parts of the lungs (or alveoli), and the surface membrane that covers the lungs (or the pleura). Disease may manifest in the form of scarring of tissue (or fibrosis) of the lung (i.e. asbestosis), cancer of the airway, pleural plaques, diffuse pleural thickening or malignant mesothelioma of the pleura, the interval between initial exposure and development of disease typically being greater than 10 years. The Industrial Injuries Disablement Benefit (IIDB) Scheme provides benefits for disablement if proven to be attributable to a prescribed disease arising in a worker during the course of employment. The IIDB Scheme covers several asbestos related prescribed diseases, these are asbestosis, mesothelioma, lung cancer due to asbestos and diffuse pleural thickening. Pleural plaques, whether symptomatic or otherwise, is not a recognised prescribed disease, although the condition has in the past attracted compensation in civil litigation when psychological distress due to the possible risk of other asbestos related diseases has been demonstrated. In 2002, there were 570 new assessments under the IIDB scheme for disablement due to asbestosis, while between 1998 and 2002 there were 4750 IIDB claims and 3618 IIDB assessments for mesothelioma, giving annual averages of 950 and 724 respectively (DWP 2005). In addition, over the period 1998 to 2002, there were an average of 330 claims per year and 50 assessments per year for lung cancer due to asbestos exposure (DWP 2005).

In occupational asthma, the main driver behind diagnosing disease quickly and effectively, is that diagnosis followed by post diagnostic advice to avoid exposure to the agent causing the condition, if exposure is concurrent, is able to improve prognosis. However, for diagnosis of asbestos related diseases, the situation is different because exposure to the causal agent, i.e. asbestos, in the UK at least, is no longer likely to be a current issue. As such, the implications of diagnosing asbestos related disease relate more to providing the patient with a clear picture of the nature and extent of lung damage, an indication of likely prognosis, possibly treatment to alleviate symptoms, and information regarding potential eligibility for disablement benefit and compensation. Withstanding these differences, the importance of arriving at a diagnosis quickly and effectively remains none-the-less although, as for occupational asthma, consultants vary in opinion as to what they regard as best clinical practice when dealing with such patients. The predominant approach employed by the consultants questioned as part of this study for the clinical investigation of a patient referred from primary care with pleural plaques, as documented by their response to the second study clinical scenario, would start with the taking of a clinical history (83% reporting that they would investigate occupational history) with particular emphasis placed on the documentation of any previous exposure to asbestos (62% enquiring explicitly about previous asbestos exposure), full pulmonary function testing (i.e. FEV_1, FVC, total lung capacity and gas transfer) (77%, and including those that would carry out spirometry without dynamic tests (92%), and gas transfer without spirometry (92%)) and, depending on the results of initial questioning and tests, a CT scan (98%). The main area where the clinical

approach employed by consultants at first consultation varied, related to how abnormalities in lung function would be investigated, with consultants falling into two camps, 1) those that focused on the documentation of restriction, and 2) those that focused on the documentation of abnormal oxygen saturation and gas transfer. With a recent CXR already available for the case, nearly all consultants relied just on a CT scan to investigate the presence of any other asbestos related disease, such as subpleural fibrosis or pleural thickening, a decision that tended to follow the documentation of previous exposure to asbestos in the clinical history and evidence of abnormal lung function. Variability in clinical approach was evident more in decision-making following first consultation as well as the approach employed at follow-up. For example, assuming pleural plaques only were apparent following first consultation, 69% of consultants would discharge the patient, compared to 31% who would follow-up, the rationale for the latter tending to be for reasons of reassurance or that the reporting of chest pain and breathlessness necessitated follow-up because of the possibility of an undetected mesothelioma or lung cancer. In the event that fine bilateral subpleural fibrosis were observed, consistent with asbestosis, variability in approach employed was much less marked, with all consultants reporting that they would follow-up. The most frequently reported frequency and periodicity of follow-up for asbestosis patients were between 3 and 6 monthly (87%), while the patient was symptomatic (58%). Less consistency in approach was evident at follow-up (for patients showing evidence of asbestosis) compared to that employed at first consultation, with fewer consultants carrying out full pulmonary function testing (i.e. 66%, and 89% carrying out spirometry without dynamic tests, and 83 carrying out gas transfer without spirometry). In addition, 69% of consultants reported that they would also carry out a further CXR at follow-up in order to document possible disease progression or lung abnormalities not evident at previous consultation. Once a diagnosis were reached, as well as providing the patient with medical opinion regarding the results of the tests and the likely cause and possible medical implications, 64% reported that they would discuss the issue of potential eligibility for industrial injuries benefit or compensation, whereas 26% would refer the patient to third parties to source legal advice, for example other more specialist occupational consultants, personal injury solicitors or telephone advice lines. 10% of consultants provided no legal advice. In summary, these results highlight variation in the approaches employed by respiratory consultants for diagnosis of asbestos related lung diseases, particularly relating to the medical care offered to pleural plaques patients after diagnosis, and how asbestosis patients are investigated at follow-up.

4.3 RECOMMENDATIONS

It is recommended that the information provided by this survey on the gaps in occupational care provision across UK secondary care is used to inform future health policies so as to improve the standard of medical care offered to patients. In particular, the merits of establishing a national NHS funded network of specialist medical centres for treatment of occupational respiratory disease should be explored. Bearing in mind the documented variability in occupational care provision, a workable standard of care for diagnosis of occupational respiratory diseases and occupational asthma in particular would appear to be required. In addition, more stringent undergraduate and postgraduate medical training would also appear to be required to ensure greater national consistency in the clinical approaches employed for occupational respiratory disease diagnosis.

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6 APPENDIX – STUDY PROFORMA

HSE - BTS Joint Study of UK Medical Provision for Occupational Lung Disease
Interview Proforma

CONSULTANT……...

HOSPITAL……...

DATE……...

HSE - BTS Joint Study of UK Medical Provision for Occupational Lung Disease
Interview Proforma

SECTION A – GENERAL HOSPITAL DATA

NOTES

Designation of Trust

_____ _____

_____ _____

No. of beds

_____ _____

Serving population (thousands)

_____ _____

No. of whole time equivalent (WTE) respiratory physicians

_____ _____

No. of WTE specialist registrars

_____ _____

No. of WTE nurse specialists

_____ _____

No. of WTE nurse consultants

_____ _____

No. of WTE respiratory physiology technicians

_____ _____

No. of WTE occupational health physicians

_____ _____

HSE - BTS Joint Study of UK Medical Provision for Occupational Lung Disease
Interview Proforma

SECTION B – IN HOUSE DIAGNOSTIC FACILITIES

NOTES

Non-computerised peak expiratory flow (PEF) monitoring

yes no _____

Computerised PEF monitoring (e.g. OASYS 2)

yes no _____

Spirometry

yes no _____

Lung volume assessment

yes no _____

Transfer factor assessment

yes no _____

FEV_1 reversibility testing

yes no _____

Airway resistance measurement

yes no _____

Body box

yes no _____

Skin prick testing to common aeroallergens

yes no _____

Skin prick testing to specific occupational allergens

yes no _____

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Interview Proforma

NOTES

Total IgE testing

yes no _____

Specific IgE testing to occupational allergens

yes no _____

Bronchial challenge – non specific – histamine

yes no _____

Bronchial challenge – non specific – methacholine

yes no _____

Bronchial challenge – non specific – other

yes no _____

Bronchial challenge – specific - workplace allergen

yes no _____

Dedicated challenge room

yes no _____

Workplace visit

yes no _____

Workplace challenge

yes no _____

Plain chest radiology (e.g. CXR)

yes no _____

High resolution CT scanning (HRCT)

yes no _____

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Interview Proforma

NOTES

Non HRCT scanning

yes no _____

Dedicated respiratory radiologist

yes no _____

Dedicated respiratory radiologist with an interest in occupational lung disease

yes no _____

Fibre optic bronchoscopy

yes no _____

Trans-bronchial lung biopsy

yes no _____

Video assisted thoracoscopy

yes no _____

Other thoracic surgery

yes no _____

Lung Cancer MDT clinic

yes no _____

Local Oncology Service

yes no _____

Palliative Care Service

yes no _____

Named local HSE contact

yes no

_____ _____

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Interview Proforma

NOTES

Named local EMAS contact

yes no

_____ _____

Core SWORD reporter

yes no _____

Non-Core SWORD reporter

yes no _____

Please provide details of any quality assurance controls/protocols associated with any of the prior mentioned clinical procedures carried out on suspected cases of occupational lung disease

_____

_____

_____

_____

_____

_____

_____

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Interview Proforma

SECTION C – DATA ON PATIENTS SEEN

To be answered by named respiratory consultant

NOTES

Work pattern over last 4 weeks

_____ _____

No. of patients seen over last 4 weeks:

New _____ _____

Follow-up _____ _____

No. of patients with suspected occupational lung disease seen over last 4 weeks:

New _____ _____

Follow-up _____ _____

Breakdown by (suspected) occupational disease:

Occ. asthma _____ _____

Occ. COPD _____ _____

Toxic bronchitis _____ _____

Pneumoconiosis
(incl. Silicosis, Asbestosis, CWP) _____ _____

Toxic pneumonitis _____ _____

Malignant mesothelioma _____ _____

Occ. lung cancer _____ _____

Benign pleural disease _____ _____

Occ. tuberculosis _____ _____

Occ. non-tuberculosis infections _____ _____

Sick building syndrome _____ _____

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Interview Proforma

	NOTES
No. of non-specific challenges carried out in-house on suspected occupational cases in a 4 week period	
_____	_____
No. of specific challenges carried out in-house on suspected occupational cases in a 4 week period	
_____	_____

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Interview Proforma

SECTION D – OTHER DATA

To be answered by named respiratory consultant

Please provide details of any occupational respiratory health qualifications that you hold.

_____

_____

Please provide details of any occupational respiratory health training you have received (both pre and post registration).

_____

_____

Would you welcome any (more) training in occupational respiratory health?

yes no

If yes, in which areas in particular?

_____

_____

Do you ever refer cases of occupational lung disease to a specialist care centre?

yes no

If yes, where?

_____

_____

Do you ever make use of any local contacts to advise on cases of occupational lung disease?

yes no

If yes, who?

_____

_____

HSE - BTS Joint Study of UK Medical Provision for Occupational Lung Disease
Interview Proforma

Do you ever have any communication with HSE relating to cases of occupational lung disease?

yes no

Do you ever make use of any published medical literature as a source of reference material to advise on cases of occupational lung disease?

yes no

If yes, what?

_____

_____

HSE - BTS Joint Study of UK Medical Provision for Occupational Lung Disease
Interview Proforma

SECTION E – CLINICAL SCENARIOS

To be answered by named respiratory consultant

SCENARIO 1

A 37 year old man presents to outpatients with a relatively long history of intermittent cough and wheeze. He has worked since 1987 in a flourmill as a tanker driver, but also gets involved in general maintenance and cleaning duties. He is a current smoker of 20 cigarettes per day and is currently on inhaled corticosteroids. He has had two episodes of significant skin rash on his shoulder, normally after carrying bags of flour.

Q1 What would be your approach at first consultation?

If you deem any of the categories not relevant, leave blank

Clinical _____

_____

Imaging _____

_____

Physiology _____

_____

Immunology _____

_____

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Interview Proforma

Q1.1 If your approach would involve serial PEF:

Q1.1.1 How often and over what duration? *(If not, leave blank and go to question 1.2)*

_____

Q1.1.2 How would you interpret the PEF data?

_____

_____

Q1.2 If your approach would involve skin prick testing, which allergens specifically? *(If not, leave blank and go to question 1.3)*

_____

_____

Q1.3 If your approach would involve blood IgE testing, which measures specifically? *(If not, leave blank and go to question 1.4)*

_____

_____

Q1.4 If your approach would involve bronchial challenge, which tests and techniques specifically? *(If not, leave blank and go to question 2)*

_____

_____

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Interview Proforma

Q2 Should you think that further tests are required, approximately how far away is the hospital that you would refer to?

_____/_____ miles away

Q3 If a diagnosis of occupational asthma is confirmed, what would you do next?

For example, what information/advice would you tell the patient, who else would you inform

_____

_____

_____

Q4 Are you aware of the SWORD reporting scheme?

yes no

If no go to question 5

If yes:

Q4.1 Before reporting to SWORD, what level of certainty in diagnosis would you require? (*Tick as many elements as you think are required)*

Work related history
Suggestive spirometry/PEF
Positive immunology to occupational allergen
Positive non-specific bronchial responsiveness
Positive specific bronchial responsiveness to occupational allergen

Q4.2 At what stage in the process would you report to SWORD?

_____

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Interview Proforma

Q5 Are you aware that cases of occupational lung disease may be eligible for government compensation

yes no

If no go to SCENARIO 2

If yes:

Q5.1 At what stage in the process would you give any compensation advice?

_____

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Interview Proforma

SCENARIO 2

A 66-year-old man presents with atypical chest pain to the GP. The GP ordered a Chest X Ray, which notes the presence of multiple pleural plaques, largely calcified. The patient's FEV_1 and FVC, as assessed in primary care, are normal. You have seen the patient in clinic and he also complains of mild shortness of breath only on moderate to heavy exertion. The patient is overweight for his age.

Q6 What would be your approach at next consultation?

If you deem any of the categories not relevant, leave blank

Clinical _____

_____

Imaging _____

_____

Physiology _____

_____

Immunology _____

_____

Q7 If no abnormalities other than plaques are observed what would you do next?

Follow-up
Discharge

If follow up:

Q7.1 After how long and how frequent?

_____

Q8 If fine bilateral sub pleural fibrosis is observed what would you do next?

Follow-up
Discharge

If follow up:

Q8.1 After how long and how frequent?

_____

Q8.2 What tests would you perform at follow-up?

_____

_____

_____

_____

Q9 Once a diagnosis is confirmed what would you do next?

For example, what information/advice would you tell the patient, who else would you inform

_____

_____

_____

7 ANNEX - HSE-BTS JOINT STUDY OF UK MEDICAL SECONDARY CARE PROVISION FOR OCCUPATIONAL LUNG DISEASE – SURVEY OF LABORATORY IMMUNOLOGICAL SERVICES

BACKGROUND

This survey was carried out as part of the HSE-BTS study of medical provision for diagnosis of occupational lung disease (HSL report MU 05/05). A pilot study was carried out as part of project initiation process for the main HSE-BTS study. This identified further areas within secondary care, which were likely to contribute to the diagnostic process, in particular, the services provided by hospital immunological laboratories for the analysis of blood sera samples for IgE. The specific aims of this study were to determine:

- the range of laboratory immunological services used by the consultants interviewed as part of the main study
- how the scope of testing for presenting cases is decided
- the range of techniques used in the analysis of blood IgE
- the form in which test data is reported back to consultants

The study team hypothesised, that one of the factors influencing current practice among consultants regarding the scale of use of blood IgE testing for diagnosis occupational asthma was the scope of testing services readily accessible in-house and in neighbouring referral laboratories.

RESEARCH METHODS

LABORATORY SELECTION AND RECRUITMENT

During the HSE-BTS study of the medical provision for diagnosis of occupational lung disease, a random selection of hospitals were identified from the BTS directory of services in respiratory medicine and invited to participate in the study. Those hospitals that agreed to contribute to the study were visited between April 2004 and January 2005 and the participating consultants were subsequently interviewed. During this visit, the participating consultants were asked to comment on the available resources and clinical approaches for the diagnosis of occupational respiratory disease, the hospital protocols for requesting specific IgE testing and the extent to which the consultants used the testing services. In addition, the relevant hospital laboratories were directly contacted to request information on issues such laboratory accreditation, how specific IgE testing was carried out, which allergens they were able to routinely test for, how results were reported and which, if any, neighbouring laboratories were used for referrals. The latter, if any, were then contacted and similar information was requested.

DATA COLLECTION PROFORMA

A structured proforma was used to collect data based around a clinical scenario involving a case of occupational asthma. The clinical scenario described the patient's occupation as one where there was a recognised risk of exposure to airborne allergens in the workplace, although no details regarding specific agents were provided. The proforma requested the following information from the respiratory consultants interviewed:

- Whether the consultant would consider using specific IgE testing of blood as part of the process to arrive at a diagnosis of occupational asthma, and if so:

- How decisions are made regarding which specific tests to carry out (i.e. which allergens)
- How the request for tests are made
- Which common aero-allergens would the consultant consider testing for
- For a given occupation/exposure, which specific allergens might the consultant consider testing for

With regards to questions four and five, consultants were prompted with the following broad categories of allergens and were asked to list specific allergens as appropriate:

1) Common aero-allergen categories
   a) Plant pollens
   b) Mites
   c) Micro-organisms
   d) Epidermals/animal proteins
   e) Plant foods
   f) Eggs/fowl
   g) Fish
   h) Milk/meat
   i) Insects

2) Occupational allergen categories (occupation, possible significant exposures):
   a) Food processor/baker, flour dust
   b) Agricultural worker, grain dust
   c) Timber worker/builder, joiner, wood dust
   d) Textile worker, silk, cotton, colouring agents
   e) Paint sprayer, isocyanates
   f) Metal smelter, metal salts
   g) Pharmaceutical worker, drugs
   h) Medic/laboratory worker, aldehydes (glutaraldehyde), latex
   i) Pest controller, pesticides (captafol, phosdrin)
   j) Welder/solderer, colophony (abietic, plicatic acids)
   k) Chemical manufacturer/processor, glues (acrylates), detergents/soaps, paint (amines, enzymes), curing agents (anhydrides)

Immuno-laboratory staff were also posed questions two and three and were asked to list which common aero-allergens and occupational allergens the hospital immuno-laboratory had the facility for routine testing of specific IgE . The participating staff were prompted with the same broad categories of common and occupational allergens as listed above. Issues such as laboratory accreditation, how tests are carried out, how results are reported and which, (if any) neighbouring laboratories were used for referrals, were also investigated.

DATA COLLATION AND PRESENTATION

Data recorded on the proforma sheets during the interviews, and via self-administered questionnaires, were transferred to an Excel database. All study data were then collated and summarised.

RESULTS

LABORATORIES

40 laboratories were contacted and invited to take part in the study. Staff working in 6 laboratories agreed to participate and were questioned. The reasons for non-

participation were not investigated due to difficulties in tracing the staff originally contacted.

Five laboratories used the Pharmacia Immunocap system for specific IgE testing and one used the Hycor EIA system. All laboratories surveyed were CPA accredited.

All six laboratories reported a positive test result if the measured levels of specific IgE were >0.35 KU/L, although some reported the use of a higher cut-off value for low molecular weight allergens. The most frequently used method to report test results, was the use of an arbitrary test score (usually 0-6, 0 being negative i.e. no IgE antibody detected, 1 being mildly positive and 6 being strongly positive) or the use of a combination of a score plus raw data (KU/L).

Most of the laboratories used blood test request proformas, which the respiratory consultants used to submit generic requests for tests to the hospital laboratory, for example, which broad categories of allergens testing was required for. Typically, the decision regarding which specific allergens testing were carried out for was then made by appropriately trained staff within the laboratory.

Laboratory staff reported that the range of allergen caps routinely held by the laboratory was a key factor in determining which specific allergens the laboratory would test for specific IgE. However, some staff highlighted that if non-routine tests were requested by respiratory consultants, the appropriate caps may be ordered, or, alternatively, the tests would be contracted out to a referral laboratory.

From the data collected from the participating hospitals in the study, the most frequently used referral laboratories were the immuno-laboratory at the Health and Safety Laboratory, particularly for bespoke testing, the Protein Reference Laboratory at the Northern General Hospital in Sheffield and St Georges Hospital in London, and the immuno-laboratories at the following hospitals:

- Southampton General Hospital
- Royal Victoria Infirmary in Newcastle
- St Mary's Hospital in Manchester
- Churchill Hospital in Oxford
- Royal Brompton Hospital in London
- Royal Infirmary in Edinburgh
- University Hospital of Wales, in Cardiff

All the laboratories surveyed had the capability to carry out testing for specific IgE to all common aeroallergens investigated in this study. Capabilities to carry out specific IgE testing to occupational allergens are summarised in Table 1.

Table 1: Occupational allergen laboratory test capabilities (n=6):

Occupation	Laboratory Possible significant exposures	1	2	3	4	5	6
Food processor/baker	Flour dust	✓		✓		✓	✓
Agricultural worker	Grain dust					✓	✓
Timber worker/builder, joiner	Wood dust				✓	✓	✓
Textile worker	Cotton, silk, colouring agents						
Paint sprayer	Isocyanates	✓		✓	✓	✓	✓
Metal smelter	Metal salts (platinum/aluminium)						
Pharmaceutical worker	Drugs (e.g. Penicillin)	✓	✓	✓	✓	✓	✓
Medic/laboratory worker	Aldehydes, latex, drugs (e.g. Penicillin)	✓	✓	✓	✓	✓	✓
Pest controller	Pesticides (e.g. captafol, phosdrin)						
Welder/solderer	Abietic/plicatic acids				✓		✓
Chemical manufacturer	Glues (acrylates)						
Chemical manufacturer	Detergents/soaps, paints (amines)				✓		✓
Chemical manufacturer	Curing agents in resins (acid anhydrides)			✓			✓

Perhaps expectedly, all hospitals had the capability to carry out routine testing for specific IgE to latex and Penicillin (allergens which may be prevalent in hospitals), while the majority were able to routinely test for specific IgE to isocyanates and protein components of flour dust, for example, wheat, rye, barley and fungal alpha-amylase. Approximately half were able to routinely test for specific IgE to components of wood dust, such as pine and cedar extracts, while only a minority were able to carry out routine testing for specific IgE to abietic and plicatic acids and acid anhydrides. None reported routine testing capabilities for textiles such as cotton and silk, fabric colouring agents, metal salts, pesticides, acrylates or amines.

APPROACHES EMPLOYED BY RESPIRATORY CONSULTANTS

The majority (15 or 94 %) of respiratory consultants participating in the study reported that they would consider using IgE testing of blood as part of the process to arrive at a diagnosis of occupational asthma for the case described in the study clinical scenario. It was generally reported that the consultants themselves decided which categories of allergens to test for, with varying degrees of specific guidance and advice provided by laboratory staff. Of the consultants that communicated they would consider using IgE testing, (12 or 71 %) reported that they would test for IgE to selected occupational allergens. Consultants reported using specific IgE testing of blood as part of the diagnostic process for occupational asthma to varying degrees depending on the occupation of the patient. The frequencies of testing for specific categories of allergens are summarised in Table 2.

Table 2: Occupational allergen testing by respiratory consultants (n=22)

Occupation	**Possible significant exposures**	**n (%)**	**Common allergens reportedly tested for**
Food processor/baker	Flour dust	22 (100%)	Wheat, rye, barley flour dust
Agricultural worker	Grain dust	13 (59%)	Wheat, rye, barley grain dust
Timber worker/builder, joiner	Wood dust	16 (73%)	Pine, cedar wood dust
Textile worker	Cotton, silk, colouring agents	4 (18%)	
Paint sprayer	Isocyanates	13 (59%)	Isocyanates
Metal smelter	Metal salts (platinum/aluminium)	10 (45%)	
Pharmaceutical worker	Drugs e.g. Penicillin	12 (55%)	Penicillin
Medic/laboratory worker	Aldehydes, latex, drugs e.g. Penicillin	14 (64%)	Latex
Pest controller	Pesticides (e.g. captafol, phosdrin)	3 (14%)	
Welder/solderer	Abietic/plicatic acids, colophony	6 (27%)	
Chemical manufacturer	Glues (acrylates)	6 (27%)	
Chemical manufacturer	Detergents/soaps, paints (amines)	6 (27%)	
Chemical manufacturer	Curing agents in resins (acid anhydrides)	6 (27%)	

All consultants who reported using specific IgE testing for occupational asthma diagnosis (n=22) reported that they may test for specific IgE to components of flour dust if the patient presenting with symptoms of occupational asthma were a baker. 73% reported that they may test for specific IgE if the patient in question was a wood workers (exposed to wood dust), 64% for medical workers (exposed to latex), 59% for paint sprayers (exposed to isocyanates), 59% for grain workers (exposed to grain dust), 55% for pharmaceutical workers (exposed to Penicillin) and 45% for smelter workers (exposed to metal salts). Only a minority of consultants (<30%) reported that specific IgE testing may form part of their approach for patients working in occupations including welding and chemical processing/manufacture and an even smaller minority (<20%) for patients working in pest control.

Table 3: Immunocap Occupational Allergens

Exposure category	**Immunocap Allergens**
Flour dust	wheat, oat, maize, rye, barley, gluten, yeast, alpha-amylase
Grain dust	Wheat, oat, maize, rye, barley, Aspergillus, Alternaria, Cladosporium, storage mite
Wood dust	Abachi, Ficus spp.
Cotton, silk, colouring agents	Cotton (fibre, seed), silk
Isocyanates	HDI, MDI, TDI
Metal salts (platinum/aluminium)	
Drugs	Amoxicilloyl, Ampicilloyl, Cefaclor, InsulinPenicilloyl, Suxamethonium
Aldehydes (glutaraldehyde), latex	Latex, Chloramin T, formaldehyde, Formalin
Pesticides (e.g. captafol, phosdrin)	Ethylene oxide
Colophony (abietic/plicatic acids)	
Glues (acrylates)	
Detergents/soaps, paints (amines)	
Curing agents in resins (acid anhydrides)	TMA

DISCUSSION

Study findings suggest that the use by respiratory consultants of specific IgE testing of blood to diagnose occupational asthma, in patients working with known sensitisers, varies in part with the occupation of the patient presenting. It is likely that this trend reflects varied awareness among consultants of the potential allergic basis of respiratory symptoms attributable to work exposures for certain occupations, and/or varied awareness of the potential to carry out specific IgE testing for certain agents.

Given nearly all the laboratories surveyed used the Pharmacia Immunocap system (Sweden Diagnostics, UK Ltd) for specific IgE testing, the scope for occupational allergen testing by such laboratories is largely confined to the occupational-type allergen caps commercially available through Sweden Diagnostics. These are summarised in Table 3 for the categories of allergens investigated in the study.

However, the utilisation of specific IgE testing by respiratory consultants for occupational asthma diagnosis may be further limited by whether the consultant lends weight to the results of such tests as part of the clinical investigative process and, secondly, if they do, awareness of the potential and appropriateness of undertaking specific IgE testing for suspected allergens.

With specific IgE testing via Radioallergosorbent analysis (or RAST) no longer a commercial option due to the discontinuation of commercially available radiolabelled anti-IgE, the ability to carry out bespoke testing to workplace agents/allergens as an alternative to testing using commercially produced allergens has been significantly

reduced. The limited scope of testing with the immuno-testing systems that tend to be employed in hospitals means that diagnosis of occupational asthma attributable to more novel sensitising agents, such as, low molecular weight chemicals, may be more problematic. The development of bespoke testing services compatible with the immuno-testing systems currently employed in most hospital immuno-laboratories would be one possible solution to this problem.

APPENDIX – STUDY PROFORMA

HSE - BTS Joint Study of UK Medical Provision for Occupational Lung Disease
Interview Proforma

INITIAL....

DATE....

HSE - BTS Joint Study of UK Medical Provision for Occupational Lung Disease
Questionnaire Proforma

Specific IgE Blood Testing

A patient presents to a respiratory physician in outpatient clinic. The symptoms history taken and the results of chest exam are consistent with a diagnosis of asthma. PFT results as carried out in primary care are also suggestive of variable/reversible airflow obstruction. The patient is atopic. Given the patient is potentially exposed to airborne allergens in the workplace, an occupational component to the cause is a possibility, therefore the physician decides that specific IgE testing of blood should be carried out to determine possible allergic sensitisation.

How are the decisions made regarding which tests to carry out, in particular, who generally decides which allergens specifically to test for?
e.g. outpatient consultant (chest physician/allergist) decides, nurse specialist decides, laboratory consultant (biochemist/immunologist) decides, laboratory technician decides

_

_

_

How is the request for tests made, in particular, what directions for testing does the laboratory technician carrying out the tests receive?
e.g. via completed proforma, specific list of allergens provided, generic categories of allergens provided (laboratory decides specifics)

_

_

_

_

Which allergens are you able to test for?
For example, for the following generic and specific occupational situations (see table overleaf)

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Questionnaire Proforma

Generic allergens

Category of allergen *Please tick*		**Please tick categories of allergens you are able to test for in-house. For those ticked, list main allergens. Please also indicate allergens tested for externally and the name of the external testing laboratory.**
Plant pollens (incl. grass and tree)		
Mites (incl. storage and house dust mites)		
Micro-organisms (incl. Penicillium, Cladosporium, Aspergillus, Alternaria)		
Epidermals and animal proteins (incl. animal urine, droppings, dander and skin)		
Foods of plant origin (incl. fruits, nuts, vegetables, herbs and spices)		
Foods – egg and fowl		
Foods – fish, shellfish and molluscs		
Foods – milk and meat		
Insects (incl. beetles and cockroach)		

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Questionnaire Proforma

Specific occupational allergens

Occupation	**Possible significant exposures** *Please tick*		**Please tick categories of allergens you are able to test for in-house. For those ticked, list main allergens. Please also indicate allergens tested for externally and the name of the external testing laboratory.**
Food processor, baker	Flour dust		
Food processors, farmer	Grain dust		
Wood processor/construction worker	Wood dust		
Textile worker	Reactive dyes, colouring agents for fabrics, lanosol		
Paint sprayer	Isocyanates, hardening agents in spray paints		
Metal smelter/refinery/processing worker	Metal salts, platinum and aluminium in metal refineries and smelters		
Pharmaceutical worker	Drugs, penicillin		
Chemical manufacturer	Commercial enzymes, biological detergents		
Medics/laboratory worker	Aldehydes, formaldehyde and glutaraldehyde, natural rubber latex		
Farmers/pest controller	Pesticides, fungicides and insecticides such as captafol and phosdrin		

Welder/solderer	Abietic and plicatic acids in colophony, pine and cedar resin		
Chemical manufacturer	Acrylates, methyl-methacrylate and methyl-cyanoacrylate in glues		
Chemical manufacturer	Amines, emulsifiers used in soaps, detergents and paints		
Chemical manufacturer	Acid Anhydrides, curing agents in epoxy resins		

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Questionnaire Proforma

What testing techniques are used?
e.g. RAST, Pharmacia CAP

_____

_____

_____

_____

How are test results reported back?
i.e. form of data, units

_____

_____

_____

_____

How is a +/- test defined?

_____

_____

_____

_____

Is the laboratory accredited ? Are the tests carried out according to any QA protocols ? If yes, please give details

_____

_____

_____

_____

Published by the Health and Safety Executive 07/07

HSE
Health and Safety Executive

Joint study of UK medical secondary care provision for occupational lung disease

The Health and Safety Commission's 'Strategy for Workplace Health and Safety in Great Britain to 2010 and Beyond', which HSE has the challenge to implement, aims to reduce the incidence of work related ill health by 20% by 2010. HSE aims to achieve this, in part, by reducing incidence of occupational respiratory diseases such as occupational asthma, and disease specific packages of measures have been devised to realise this aim. For example, the headline target in HSE's strategy for occupational asthma is to reduce incidence of disease caused by exposure to substances in the workplace by 30% by 2010. Key to the realisation of this target is the reduction to a minimum the time between the first onset of respiratory symptoms at work and the instigation of measures post diagnosis to eliminate or reduce offending workplace exposures. This is necessarily reliant on workers recognising work related respiratory symptoms quickly, possibly aided by occupational health advice or health surveillance at work, then consulting a general practitioner. General practitioners and general practice nurse staff then need to recognise early, suspected cases of occupational asthma through appropriate assessment, and refer cases on to secondary care for further assessment and diagnosis. The clinical approach by which respiratory or occupational consultants diagnose occupational asthma then needs to operate effectively so that cases of disease are quickly and correctly diagnosed. Secondary care departments that see occupational asthma patients obviously need to be appropriately resourced and staffed to achieve this, or failing this, a more specialist secondary care department needs to be sufficiently close allowing the patient to be easily referred on for further assessment.

This report and the work it describes were funded by the Health and Safety Executive (HSE). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.

RR575

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