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**Occupational Asthma Research Issues: report
from an HSE Workshop 6-7 January 2003**

HSL/2003/05

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ACKNOWLEDGEMENTS

The Health and Safety Executive would like to acknowledge the contribution made by all participants at this Workshop.

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EXECUTIVE SUMMARY

Objectives

This report summarises the discussions from a Health and Safety Executive sponsored Workshop to review research needs and priorities in the field of occupational asthma. These priorities were considered in the context of the Health and Safety Commission's target to reduce asthma caused by exposure to substances in the workplace by thirty per cent by 2010. Knowledge gaps in each of four thematic areas were reviewed in turn (Diagnosis; Consequences of developing the disease; Behavioural issues; Prevention of the condition)

Main Findings

The following areas were identified as priority research needs that will contribute to the outcome of a reduction in asthma caused by exposure to substances in the workplace by thirty per cent by 2010.

Diagnosis

- Review of current practice across all chest physicians (both specialist and non specialist).
- Agreement of standards for diagnosis.
- Improvements in elements within the diagnostic tool kit, particularly: agreed minimum diagnostic standard; improved diagnostic tests (e.g. *in vitro* tests, expert systems).
- Developing criteria for the establishment of specialist referral centres, that includes an audit protocol and systems to ensure quality assurance of diagnostic tests (e.g. IgE testing, lung function testing etc.)

Consequences of developing the disease

- Better understanding of both the personal and societal costs that result from developing the condition.
- Better understanding of the incidence and prevalence of the condition.
- Knowledge about the burden of occupational asthma within the primary care sector.
- The consequences of continued exposure on individuals with work aggravated asthma.

Behavioural issues

- Review of the evidence base for behavioural change with the context of the workplace, including the barriers to effective implementation.
- Consideration of novel approaches to change behaviours including use of the media, economic issues and channeling of information through partners and children.

Prevention

- Analysis of existing data sets to identify common failures.
- Targeted interventions for specific sectors (e.g. bakeries, isocyanates)
- Major intervention studies (perhaps involving the Department of Health)
- Identifying and understanding the barriers to successful interventions at: the primary care level; the secondary care level; amongst occupational health practitioners; the workplace.

Recommendations

In order to achieve the outcome of a reduction in occupational asthma by 30% by 2010, some of the high priority research areas should be considered for funding.

1 INTRODUCTION

Occupational asthma remains a common occupational disease in the UK and around the world. Estimates of prevalence vary, but a best estimate would probably be that about 9% of all adult asthma could be attributed to work (Blanc and Toren, 1999). A simple definition of occupational asthma is asthma, wholly or predominantly due to an agent encountered at work. Clinically, this is associated with variable airflow restriction, and/or airway hyper-responsiveness; often agent-specific IgE may be detected in serum. This definition is distinct from work-aggravated asthma, where a pre-existing asthma sufferer has their symptoms brought on by workplace exposures. However, in both cases the result for the sufferer is symptoms of wheeze, shortness of breath and chest tightness. Over the last 10 years HSE has supported much research activity in this field including: development of the diagnostic toolkit (Curran, 1996); surveillance schemes for the disease (Meyer *et al.*, 2001); methods for monitoring exposure (Elms *et al.*, 2001) and the identification of potential sensitisers (Kimber *et al.*, 2000).

In October 2001, the Health and Safety Commission agreed a package of measures aimed at reducing the incidence of asthma caused by exposure to substances in the workplace by thirty per cent by 2010. This will involve HSE inspectors in making the control of substances that cause asthma a compliance priority. This will be backed up by an Appendix to the main Approved Code of Practice under the COSHH Regulations which sets out employers' duties and new, easy-to-use guidance for employers on what steps they need to take to control substances that may cause asthma. The Commission recognises that, in addition, partnerships with key stakeholders will be needed if the target is to be realised. To help achieve this a Project Board has been set up to develop, publish and help implement an action plan. Membership has been drawn from industry, unions and charities involved with asthma and health professionals. As a part of this work, the Health and Safety Executive has also identified information needs based around four core topic areas (Diagnosis, Consequences, Behaviour and Prevention). These needs were discussed at a research Workshop held in Manchester on 6-7 January 2003.

The aim of the workshop was to explore these questions in detail, and identify areas where research will help to achieve the key outcome of a 30% reduction in occupational asthma cases by 2010. As a secondary outcome, opportunities for funding some of these initiatives with organisations other than HSE were explored. Thus the workshop considered:

- (i) The potential contribution of answering the individual questions to delivery of the asthma targets;
- (ii) HSE's assessment of priority, indicative cost and likely timescale; and
- (iii) Are additional questions needed for any topic area? - HSE is keen to see more work under prevention.

HSE considers that successful partnership between disciplines is essential to achieve the targets. Therefore, participants from a variety of backgrounds were invited to this event. We sought active participation for all invited delegates, through extended discussion sessions and syndicate exercises.

This summary report highlights some of the challenges faced by researchers in the four thematic areas as identified during the discussion sessions. In addition, the key prioritised research questions that were identified during the Workshop are shown. Where possible some direct quotes from occupational asthma sufferers have been included to illustrate specific points. As the issues presented in this report have been crystallised from a diverse range of viewpoints expressed by participants at the Workshop they do not necessarily reflect the

views or policies of the Health and Safety Executive.

It is anticipated that some of the research priorities identified may be taken forward, in partnership with other research funding bodies to provide a targeted and prioritised research strategy targeted at reducing occupational asthma by 30% by 2010.

2 DIAGNOSTIC ISSUES

It is tempting to speculate that there is little to be gained from further research into the diagnosis of occupation asthma. However, this assumption is often made on the understanding that there is an agreed standard for the diagnosis of the condition; this is not the case. Indeed, the criteria for the diagnosis of the condition remain controversial. Published data from experts shows that there is even a wide level of disagreement in the interpretation of some standard tests (Baldwin *et al.*, 2002). The toolkit available to secondary care physicians to investigate the condition includes history, spirometry (including assessment of variability in peak expiratory flow), bronchial reactivity (to histamine or methacholine), specific antibody measurement (skin prick test or IgE by RAST), knowledge of workplaces and potential sensitisers (through visits and experience) and specific allergen challenge with workplace agents. At present there is no information to quantify the extent of utilisation of these techniques in secondary care at the national level, or the consistency with which these procedures are performed. It was agreed that such information would help to identify the extent to which standards could be agreed, implemented and monitored by both general chest physicians and chest physicians in specialist occupational referral centres. Furthermore, there is a need to develop more effective tools to aid diagnosis (e.g. questionnaire, blood tests etc.)

“My health problems started four months ago, I have two brothers with asthma and recognised the symptoms”

From the patient's perspective, their first step is to recognise the relationship between work and any symptoms that they may be experiencing, and to realise they need to seek further help. Existing data suggest that there are barriers to this process; first, that exposed workers anticipate economic consequences for them if they report any symptoms, even if there is an annual health surveillance programme in place (see section 3). Second, it appears that there is a reluctance for patients to discuss with any healthcare professional both lifestyle and workplace restrictions resulting from asthma symptoms (Jones *et al.*, 2002). In the primary care arena general practitioners and practice nurses do not always have access to the knowledge that would enable them to provide timely and appropriate interventions in cases of occupational asthma. There is a need to identify the most effective mechanism to increase the level of understanding of this issue within the primary care setting (both amongst GPs and practice nurses) so that cases can be managed appropriately. It is certainly acknowledged that most cases of occupational asthma are probably seen and managed within this sector, even if many cases remain undiagnosed. However, the actual extent to which individuals remain undiagnosed within the primary care sector remains unclear.

“I told the company nurse that I was asthmatic at induction week but I was still placed in the paint-shop despite the occupational health nurse advising I shouldn't be put in that area”

The situation is less clear amongst occupational physicians. Again, there is little information to enable the consistency of practice amongst this sector to be established.

Specialist secondary care physicians agree that there should be more activity to establish a hierarchy in the diagnosis and management of occupational asthma cases, including the realistic expectation of patients through each of the potential routes of referral. This would

include development of systems for peer review and audit of existing services and the development of standards for both non-specialist chest physicians and specialist regional centres. Such an approach would include a goal to reduce the time to referral from the onset of symptoms. This may include the consideration options for referral direct from the workplace or other potential sources such as NHS plus, and an understanding of the barriers that prevent referral by these routes at present.

It was agreed that all these issues should be reviewed in a global context, so that that the value of other models could be considered within the UK framework.

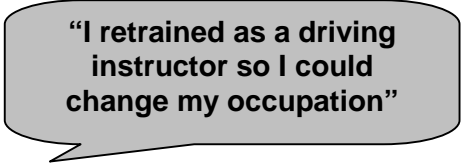
Priority Research Topics

- Review of current practice across all chest physicians (both specialist and non specialist), and agreement of standards for diagnosis
- Improvements in components of diagnostic tool kit, particularly: agreed minimum diagnostic standard; improved diagnostic tests (e.g. *in vitro* tests, expert systems).
- Identifying and understanding the barriers to successful interventions at: the primary care level; the secondary care level; amongst occupational health practitioners; the workplace.
- Developing criteria for the establishment of specialist referral centres, that includes an audit protocol and systems to ensure quality assurance of diagnostic tests (e.g. IgE testing, lung function testing etc.)

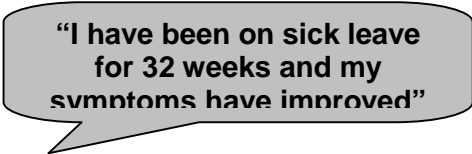
3 CONSEQUENCES OF DEVELOPING THE DISEASE

Much is known about the clinical consequences of developing occupational asthma. Once sensitised to a workplace agent, sufferers will develop respiratory symptoms. If exposure continues, symptoms may worsen and become severely disabling. In rare cases, occupational asthma may result in death. With work-aggravated asthma, the situation is not as clear. The current assumption is that aggravation of symptoms may occur in a similar way to that which asthmatics can experience symptoms when exposed to cold, exercise or environmental pollutants. The assumption is therefore that continued exposure for work-aggravated asthmatics does not cause increased pathology and morbidity; however, there is little concrete evidence to support this view.

It is very clear that the non-health consequences of developing the condition are poorly understood. At the personal level, it may not be easy for individuals to be relocated within the workplace once symptoms develop. Some evidence exists that demonstrates that workers do not always feel able to answer respiratory health surveillance questionnaires truthfully, as this may lead to redeployment to less well paid areas of the workplace (Gordon et al., 1997). Once identified as suffering from the condition workers may have difficult choices to make.



“I retrained as a driving instructor so I could change my occupation”



“I have been on sick leave for 32 weeks and my symptoms have improved”

In the UK, the societal costs of developing the condition would include the costs associated with impaired work performance, short term/long term sick leave, the cost of assessment and payment of incapacity benefit, early retirement through ill health in addition to all the costs associated with the increasing numbers of civil claims. At present there is little money used for retraining or rehabilitation. The impact of legislation such as the Disability Discrimination Act (1995), the EU Convention on Human Rights has yet to be established. Although models exist to quantify some elements of the costs associated with some disease states, most models do not take account of elements outside the health care arena (i.e. they only include cost of treatment, cost of care, cost of drugs etc.).



“I took early retirement due to ill health and my symptoms have improved since retiring”

It is not clear how sufferers move through these different support mechanisms; initially they will suffer impaired work performance, probably with some periods of short-term sick leave. This may lead to long-term sick leave, followed by payment of incapacity benefit and/or ill health retirement. The extent to which individuals progress through these different stages following a diagnosis of occupational asthma is not well understood; furthermore, it is not clear at which point in this cycle the most effective interventions could be made.

In order to best estimate costs there needs to be good quality information relating to the prevalence and incidence of the condition. At present, the SWORD element of the THOR scheme provides the best estimates of UK incidence of occupational asthma. However, the limitations of the data from this scheme must also be recognised, in that it does not include data from the primary care sector, there is no standard for diagnosis within the scheme so diagnostic rigor varies between reporting clinicians, and the numbers notified to the scheme

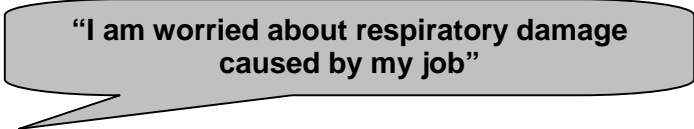
vary widely between expert centres. Where the scheme is very useful is in the identification of potential new sensitisers and in drawing attention to agents and occupations that should be targeted for primary prevention. Using the data from Blanc and Toren (1999), which showed that 10% of all adult asthma could be attributed to work, it is possible to calculate a theoretical prevalence in the UK population. Assuming that 13.6% of the UK population has been diagnosed with asthma, and that 33% of this population is of working age, there should be 272,000 individuals with occupational asthma in the UK. As there are 450 chest physicians in the UK, this means that each would be providing care to approximately 604 occupational asthmatics; a typical chest physician with a specialist interest in occupational asthma sees far fewer cases.

Priority Research Topics

- Better understanding of both the personal and societal costs that result from developing the condition.
- Better understanding of the incidence and prevalence of the condition.
- Knowledge about the burden of occupational asthma within the primary care sector.
- The consequences of continued exposure on individuals with work aggravated asthma.

4 BEHAVIOURAL ISSUES

In order to affect change in the workplace, there is a need to modify the behaviour of individuals within it, both employer and employees. This is not an easy task; indeed some people believe that behaviour modification in the work environment is an impossible goal. However, evidence exists both for and against. In a study by Slater *et al.*, (2000), it was shown that welders who had been extensively trained in effective control measures to reduce exposure, actually performed less effectively after the training in comparison with the previous situation. Conversely, biological monitoring has been used to effectively change practices within workplaces. In a study by Williams *et al.* (1999) workers at a garage that re-sprayed cars complained of ill health including dry, irritated throats, coughing and shortness of breath. Analysis of the urine samples showed that all staff, including office workers and managers who never did any painting, had been exposed to chemicals from the spray paints being used. An investigation showed that the spray booth (in which the cars were sprayed) at the garage was leaking. Chemicals coming out of this leaking booth were able to spread throughout the building, so everybody who worked there was exposed to them. This was an unexpected finding because the spray booth had been recently serviced and tested, and was thought to be working properly. Once the problem had been identified, the contractor who serviced the spray booth was called back in to repair the faulty equipment. More urine samples were taken which showed that the spray booth was working properly. However, one person, the paint sprayer, was still exposed to the paint chemicals. Further investigation found that he had not received proper instructions and was not using his breathing apparatus correctly. Proper training was then advised and his urine levels returned to normal.



**“I am worried about respiratory damage
caused by my job”**

It was agreed that in order to change behaviours within workplaces, there needs to be shared commitment to make the change. One approach to be suggested was that important messages regarding occupational asthma should be packaged within well-established systems such as personnel/HR functions or indeed within the first aid training syllabus. The advantage of including messages within compulsory requirements, such as first aid, was seen as a useful way of drip-feeding important messages into workplaces.

Other potential mechanisms for change that were considered included the possibility of involvement of the supply chain to provide a duty of care to others. Of particular importance is the provision of information to end users within the supply chain. For example, safety data sheets were seen as very important mechanisms for providing information that is easy to understand and clear in its message. However, more often than not this information is complex, and difficult to interpret. Furthermore, information provided needs to be consistent, not only in the context of safety data sheets, but also in the information given to sufferers by healthcare professionals. It was felt that at present, different advice may be given by different players (e.g. primary care vs. secondary care)

It was felt that other less traditional routes should also be identified and reviewed in terms of their proven ability to affect changes in behaviours and attitudes. For example, the media could have a powerful role to play through the help of role models suffering from the condition or through soap opera story lines. There is also much that can be learnt from previous successful campaigns, such as the Scottish back-pain campaign, which was promoted through local radio. The use of family pressure through the targeting of partners and children could also be considered as a possible mechanism for change.

However, it was felt that in order to achieve any effective and long lasting behavioural change within the workplace there needed to be a better potential outcome for the individual. For example, full funding of re-training if return to the workplace is not possible. Without due consideration of the economic issues which result from a diagnosis of occupational asthma, it was felt that behavioural change would be difficult to achieve.

Priority Research Topics

- Review of the evidence base for behavioural change with the context of the workplace, including the barriers to effective implementation.
- Consideration of novel approaches to change behaviours including use of the media, economic issues and channeling of information through partners and children.

5 PREVENTION

Occupational asthma is an entirely preventable condition; if exposure is absent then the disease will not occur. Yet despite this, the disease is still diagnosed with alarming frequency.

Figure 1 identifies some key stakeholders, through which interventions could be made. However, it is essential that there is co-ordination of knowledge and strategies amongst these disparate groups, and that they share common goals.

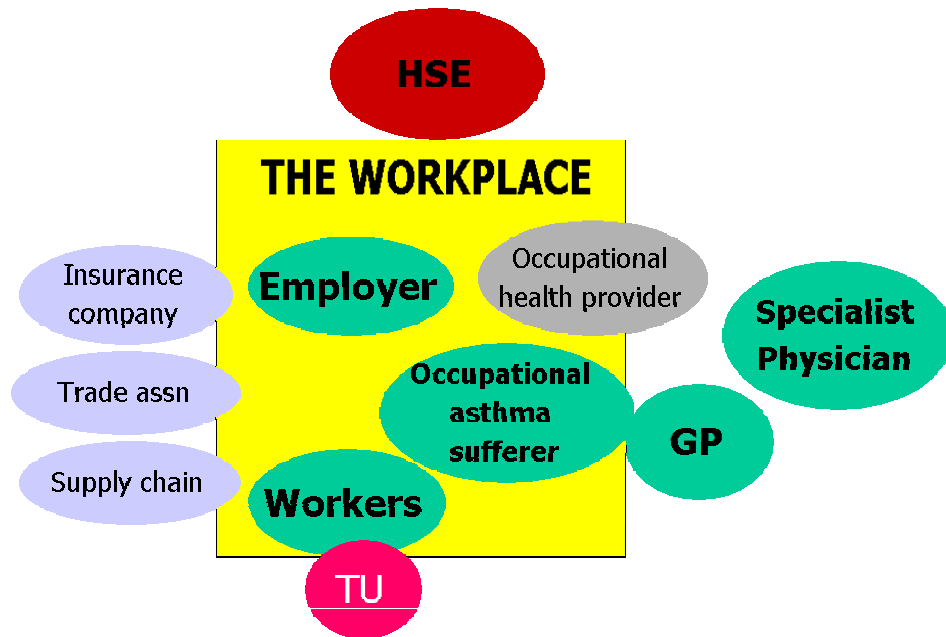


Figure 1: Key stakeholders who may be involved in workplace interventions to prevent occupational asthma

It was agreed that much could be done to encourage key stakeholder groups to engage in more effective partnership to prevent the condition. For example, secondary care physicians could have a very important role in prevention, but at present they do little in this area.

There are number of existing data sources which could be used to identify common failures in control to see if any common theme emerge (e.g. RIDDOR). These sources could also be used to investigate blocks to effective implementation of control strategies.

It was also agreed that different prevention strategies would be required for different sectors, and that different barriers to successful prevention may be encountered across the sectors. For example, the conflict between cross infection teams and the drive to reduce exposure to latex gloves within the healthcare setting.

The example of the Ontario isocyanate programme was cited as a “success story” that is currently missing from the UK context (Tarlo and Liss, 2002). This programme, was a concerted series of activities designed to reduce isocyanate asthma that proved extremely successful over a 10 year period. A number of approaches were used to achieve the desired outcome, and all elements of the programme were used to inform the “bigger picture”

Two areas were identified as low priority in the context of the target: dose response relationships were not considered a high priority for research, but the establishment of threshold levels and determination of potency of allergens was considered important.

Genetic screening was not regarded as a useful avenue for research. Information on the exclusion of atopic individuals (approximately 50% of the young adult population) has shown that 32% of non-atopic subjects became sensitised, and 27% developed occupational asthma (refs)

Priority Research Topics

- Analysis of existing data sets to identify common failures.
- Targeted interventions for specific sectors (e.g. bakeries, isocyanates)
- Major intervention studies (perhaps involving the Department of Health)

6 CONCLUSIONS

It is sometimes useful to take a stock check of knowledge to see if the direction it is taking is that required to achieve a specific goal. The aim of this workshop was to identify the areas of research that could contribute most effectively to the reduction in asthma caused by exposure to substances in the workplace by thirty per cent by 2010.

The occupational asthma research strategy was subjected to review by a group of UK experts, and was broadly agreed with some minor amendments, in terms of its scope, and its priorities. The group agreed that it was important that any research activity was used to inform a “bigger picture” i.e. that the elements of any commissioned research should be complimentary, and be used together to “add value”. The priority areas for research are shown below, with the highest priorities indicated in italics:

Diagnosis

- *Review of current practice across all chest physicians (both specialist and non specialist).*
- *Agreement of standards for diagnosis.*
- Improvements in elements within the diagnostic tool kit, particularly: agreed minimum diagnostic standard; improved diagnostic tests (e.g. *in vitro* tests, expert systems).
- Developing criteria for the establishment of specialist referral centres, that includes an audit protocol and systems to ensure quality assurance of diagnostic tests (e.g. IgE testing, lung function testing etc.)

Consequences of developing the disease

- *Better understanding of both the personal and societal costs that result from developing the condition.*
- Better understanding of the incidence and prevalence of the condition.
- Knowledge about the burden of occupational asthma within the primary care sector.
- The consequences of continued exposure on individuals with work aggravated asthma.

Behavioural issues

- *Review of the evidence base for behavioural change with the context of the workplace, including the barriers to effective implementation.*
- Consideration of novel approaches to change behaviours including use of the media, economic issues and channeling of information through partners and children.

Prevention

- *Targeted interventions for specific sectors (e.g. bakeries, isocyanates)*
- Major intervention studies (perhaps involving the Department of Health)
- Identifying and understanding the barriers to successful interventions at: the primary care level; the secondary care level; amongst occupational health practitioners; the workplace.
- Analysis of existing data sets to identify common failures.

The plan will now be used to review research funding in this area, and to identify possible funding partners within the UK research community. The approach taken was judged a success by all attendees, and it may be worth considering this approach for other occupational disease states.

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8 APPENDICES

Appendix 1: Attendees

Andrew Curran, Health and Safety Laboratory
David Fishwick, University of Sheffield and Health and Safety Laboratory
Paul Nicholson, Proctor and Gamble
Brian Kazer, British Occupational Health Research Foundation
John Thompson, Health and Safety Executive
Mark Piney, Health and Safety Executive
Chris Money, CEFIC and Exxon Chemical Ltd
Tony Gissane, Health and Safety Executive
Sherwood Burge, Birmingham Heartlands Hospital
Nerys Williams, Health and Safety Executive
Monica Fletcher, NRTC
Lucy Wright, BP Ltd
Philippa Major, National Asthma Campaign
Richard Ennals, Centre for Working Life, Kingston University
Michael Topping, Health and Safety Executive
Donald Adey, Health and Safety Executive
Paul Cullinan, National Heart and Lung Institute
Roger Rawbone, Health and Safety Executive
Jacqui Bailey, Health and Safety Executive
Chris Collinson, Health and Safety Executive
Gareth Evans, Health and Safety laboratory
Jon Karnon, University of Sheffield
Chris Stenton, Royal Victoria Infirmary, Newcastle
David Hendrick, Royal Victoria Infirmary, Newcastle
Shamim Rahman, Health and Safety Laboratory
Rachel O'Hara, Health and Safety Laboratory

Appendix 2: RESEARCH PLAN

ASTHMA RESEARCH PLAN

The research topics in this plan were identified in a brainstorming session in HSE, and the Health and Safety Commission's Asthma Project Board has seen the draft plan and their comments have been incorporated. The plan was further refined, developed and prioritised at this Workshop by all attendees. HSE will consider funding research that has the potential to generate information that can be directly applied to actions that will improve control and management in the workplace

TOPIC AREA 1: Diagnostic issues

Research Question	Specific issues that could be addressed	Notes	Priority	Indicative cost	Time scale for delivery
How can diagnostic approaches for occupational asthma be improved?	<ul style="list-style-type: none"> • Can current diagnostic rigour be mapped across specialist centres? • Can a ranking for diagnostic rigour be agreed? • What additional information/tests would help to make a diagnosis? • Can criteria be agreed to support the establishment of specialist referral centres on a regional level? 	Existing schemes and new projects could be used to collect this information.	High	Low	>24 months
What is the evidence base for pre-existing asthma made worse by work?	<ul style="list-style-type: none"> • Can population based studies provide useful information that can be extrapolated to the workplace environment (e.g. Effects of SO₂ on workers with pre-existing asthma)? 	Could be an opportunity for joint funding with another interested body.	Medium	Medium	>24 months
What tools and techniques need to be developed to aid monitoring, diagnosis and health surveillance?	<ul style="list-style-type: none"> • Can the technology for achieving health surveillance be improved (eg. use of mobile communications/ logging peak flow meters)? • Can laboratory tests provide increased sensitivity and specificity? • What clinical research endpoints are most appropriate? • What is the evidence base for the use of health surveillance? • Can a standardised/validated questionnaire be developed? • Can objective measures add value at low cost? • Value of pre-employment screening 		Medium	Medium	12-24 months

TOPIC AREA 2: Consequences of developing the disease

Research Question	Specific issues that could be addressed	Notes	Priority	Indicative cost	Time scale for delivery
What is the natural history of occupational asthma?	<ul style="list-style-type: none"> • What are the implications for future health if (a) exposure ceases (b) exposure continues? • What are the implications for future employment once a diagnosis is made? 	Existing schemes and projects could be used to collect this information	High	Low	12-24 months
What are the costs incurred as a result of a diagnosis of occupational asthma?	<ul style="list-style-type: none"> • Can the cost to the employee, employer, health service, rehabilitation services etc. be quantified? • Is it feasible for Government funded compensation to ameliorate these effects? • What is the actual burden of occupational asthma in the primary care setting? • Should retraining be considered as part of any societal intervention? 		High	Medium	<12 months
Is additional epidemiological data required to supplement existing surveillance schemes?	<ul style="list-style-type: none"> • How can incidence/prevalance be accurately measured? 		Medium	Medium	12-24 months
Can dose response relationships be identified for occupational allergens?	<ul style="list-style-type: none"> • Can sensitive and specific measurement methods be developed for the top eight occupational allergens where methods are not already in place? • Can threshold levels for exposure/response be established? 	Not clear how this will impact on the target, when all other relevant factors considered e.g. sensitisation vs. elicitation doses; susceptibility.	Low	High	>24 months

TOPIC AREA 3:

Behavioural aspects of occupational asthma

Research Question	Specific issues that could be addressed	Notes	Priority	Indicative cost	Time scale for delivery
Is it feasible to change behaviours in the workplace?	<ul style="list-style-type: none"> Review of the evidence base for behavioural change within the context of the workplace, including the barriers to successful intervention? Could other approaches be used to change behaviours including the use of the media, economic issues and channelling information through partners and children? 	Some overlap with the 3 "r"s project	High	Low	<12 months
What behavioural factors contribute to the development of occupational asthma?	<ul style="list-style-type: none"> Are there circumstances when behavioural factors are more likely to impact? How can effective/consistent dissemination and use of knowledge be achieved? Why do such circumstances occur? What influence does the health and safety climate have in the workplace on the ability to affect behavioural change? Can 'biofeedback' (eg. biological monitoring) be used to influence behaviour? 	An under-researched area at present.	High	Medium	12-24 months
How can improvements be quantified?	<ul style="list-style-type: none"> How can the success of the programme be evaluated? What were the key drivers for change? 	The evaluation programme needs to be agreed ASAP so that arrangements can be made for appropriate outcomes to be measured.	High	Medium	>24 months
Can relevant and appropriate data be collected from workplace surveys?	<ul style="list-style-type: none"> Need to map nature and extent of HSE field activities in this area Need to ensure that, when appropriate, relevant and appropriate health endpoints are included in surveys 	Need to map Field Force activities to research activities. Opportunity afforded by review of flour dust MEL.	Medium	High	>24 months

TOPIC AREA 4 :

Prevention issues

Research Question	Specific issues that could be addressed	Notes	Priority	Indicative cost	Time scale for delivery
What measures can be taken to help prevent occupational asthma	<ul style="list-style-type: none"> • How practical is substitution? • What information is required to inform the substitution process? • Risk communication: what means of communication hazard/risk are most successful? • Can existing data sets be used to identify common failures • Identify targeted interventions (e.g. bakers, isocyanates) • What are the barriers that prevent successful interventions at all levels? 	Any projects within this area should be considered in the context of the "bigger picture", and each should add value to the others (c.f. Tarlo <i>et al.</i> , 2002)	High	High	>24 months
Is additional epidemiological data required to supplement existing surveillance schemes?	<ul style="list-style-type: none"> • How can incidence/prevalence be accurately measured? • Understanding of the limitations of existing schemes. 		Medium	Medium	12-24 months
Can routes of exposure other than the respiratory tract facilitate sensitisation?		Previous invitation to tender exercise was not successful; the need to consider the regulatory impact has been agreed by policy sections.	Low	High	>24 months
Are existing methods for hazards assessment for potential new sensitisers adequate?	<ul style="list-style-type: none"> • How can existing methodologies work together (e.g. Structure Activity Relationship vs local lymph node assay) • Can the reliance on animal data be 'engineered' out of the hazard assessment process through the validation of in vitro testing? 		Low	High	>24 months
Can susceptible individuals be identified?	<ul style="list-style-type: none"> • Can screening tests reliably identify susceptible individuals? • What are the ethical/socio-economic implications of such an approach? • What are the implications for the regulatory authorities? 	A sensitive area; efforts should be targeted at reducing/controlling exposure.	Low	High	>24 months