Invited Editorial

Occupational Asthma: Research, Change and the 30% Target

ANDREW D. CURRAN* and DAVID FISHWICK

Health and Safety Laboratory, Broad Lane, Sheffield S3 7HQ, UK

Received 9 May 2003; in final form 19 May 2003

BACKGROUND

In his Colt lecture at the Ninth Inhaled Particles Symposium, Anthony Newman Taylor described asthma as ‘the most prevalent cause in the UK, and probably in the Western world, of respiratory ill-health during working life’ (Newman Taylor, 2002). Estimates vary of the contribution of working conditions, but probably $\sim 9\%$ of adult asthma can be attributed to the workplace (Blanc and Toren, 1999). In the recent past, there has been debate about the role of exposure limits in control (Heederik and Houba, 2001; Nieuwenhuijsen and Burdorf, 2001), but Newman Taylor points out the relative ineffectiveness of these in small businesses, and the importance of involving stakeholders in a broad approach. This is essential if the target of the UK Health & Safety Commission (HSC), i.e. to reduce the incidence of asthma caused by workplace exposure to substances by 30% by 2010, is to be achieved. The necessary new approach was recognized in a package of measures agreed by HSC in October 2001. As one element, the Health & Safety Executive (HSE) convened a workshop in Manchester in January this year, to discuss information needs on four core topic areas—diagnosis, consequences, behaviour and prevention—and the change of approach that will be required by researchers to provide the solid evidence base on which the target can be achieved.

DIAGNOSTIC ISSUES

A simple definition of occupational asthma is asthma that is 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 immunoglobulin E (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.

It is often assumed 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 show that there is even a wide level of disagreement in the interpretation of some standard tests (Baldwin et al., 2002). The toolkit available to specialist respiratory physicians to investigate the condition includes history, spirometry, bronchial reactivity, specific antibody measurement (skin prick test or IgE by RAST), knowledge of workplaces and potential sensitizers, and specific allergen challenge with workplace agents. At present there is no information on the extent to which specialist centres use these techniques, or the consistency with which these procedures are performed.

From the patient’s perspective, their first step is to recognize the relationship between work and symptoms they may be experiencing, and to realize 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. 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). General practitioners, practice nurses and some occupational...
physicians do not always have access to the knowledge that would enable them to provide timely and appropriate interventions in cases of occupational asthma. It is certainly acknowledged that most cases of occupational asthma are probably seen and managed within this sector, even if many cases remain undiagnosed.

In the UK, specialist respiratory physicians have agreed that there is a need to define more clearly the most effective route by which sufferers from the condition can be identified and managed. In countries with a national occupational health service (e.g. Finland), this issue does not arise to the same extent. Such an exercise would include development of systems for peer review and an audit of existing services and the development of standards in the diagnosis and management of patients by both non-specialist respiratory physicians and specialist regional centres. Such an approach would include a goal to reduce the time to referral from the onset of symptoms.

**CONSEQUENCES OF DEVELOPING THE DISEASE**

Much is known about the clinical consequences of developing occupational asthma. Once sensitized 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 exposure to a workplace agent may aggravate symptoms in the same way as cold, exercise or pollutants may do. Furthermore, continued exposure for work-aggravated asthmatics does not cause increased pathology and morbidity; however, there is little concrete evidence to support this view.

The non-health consequences of developing the condition are poorly understood. At the personal level, it may not be easy for individuals to relocate within the workplace once symptoms develop. Previous work has shown 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.

In the UK, the societal costs of developing the condition are not well documented. At present there is little financial support available for retraining or rehabilitation of affected individuals. 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 healthcare arena.

It is not clear how sufferers move through the stages of the ‘occupational ill-health process’; 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 retirement on the grounds of ill health. Furthermore, it is not clear at which point in this cycle the most effective interventions could be made.

In order accurately to 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 (Meyer et al., 2001) provides the best estimates of UK incidence of occupational asthma. However, the limitations of the data from this scheme must also be recognized, in that it does not include data from the primary care sector, there is no agreed standard for diagnosis within the scheme, and the numbers notified to the scheme vary widely between expert centres. Where the scheme is useful is in the identification of new sensitzers and in drawing attention to agents and occupations that should be targeted for primary prevention.

**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 some effect to change practices within workplaces (Williams et al., 1999) by providing biological feedback to workers to improve their performance in specific tasks; benchmarking against colleagues doing similar work can provide a useful incentive to improve.

In order to change behaviours within workplaces, there needs to be a shared commitment to make the change. Important messages regarding occupational asthma could be packaged within well-established systems such as personnel/human resource functions or indeed within the first-aid training syllabus. The advantage of including messages within compulsory requirements, such as first aid, may be a useful way of drip-feeding important messages into workplaces.

Other potential mechanisms for change include the possibility of involvement of the supply chain, including the provision of quality, consistent information to end-users (e.g. safety data sheets). In addition, the media could have a powerful role to play.
through the advocacy of role models suffering from the condition or through soap opera storylines. The use of family pressure through the targeting of partners and children could also be considered as a possible mechanism for change. However, any effective and long-lasting behavioural change within the workplace needs to result in a better potential outcome for the individual, e.g. full funding of retraining if return to the workplace is not possible. Without due consideration of the economic issues that result from a diagnosis of occupational asthma, behavioural change may be difficult to achieve.

**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 among these disparate groups, and that they share common goals. Much could be done to encourage key stakeholder groups to engage in more effective partnership to prevent the condition. For example, specialist respiratory 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 that could be used to identify common failures in control to see if any common themes emerge [e.g. from the RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995) database]. These sources could also be used to investigate blocks to effective implementation of control strategies. It is also important to recognize that different prevention strategies would be required for different industrial sectors, and that different barriers to successful prevention may be encountered across the sectors.

**RESEARCH NEEDS**

Table 1 highlights the significant research needs identified at the workshop held by HSE in January 2003. It can be seen that this represents a change in direction to include questions where, at first glance, occupational hygiene does not feature strongly. However, the challenge for the occupational hygiene community is to review how occupational hygiene skills could be utilized in a different way to meet the challenge posed in the context of the target, and the identified information gaps. For example, it could be used to effect changes in behaviour in workplaces (as illustrated by biological monitoring), and it should have a significant role in issues relating to prevention (as shown by the risk banding approach). Furthermore,
there is a need to understand how the psychosocial work environment interacts with the physical and chemical work environment to provide the opportunity for occupational asthma to develop to enable appropriate and effective intervention strategies to be developed. There has been some success using this change in thinking in Ontario, where a concerted series of activities designed to reduce isocyanate asthma has proved extremely successful over a 10 yr period (Tarlo and Liss, 2002). In this case, the introduction of a medical surveillance programme in 1983 was followed by retrospective assessments to determine benefits. This was supported by awareness-raising among user groups, and other targeted activities. By 1993, the proportion of all accepted compensation claims for occupational asthma that were attributed to diisocyanates fell to 35% of the total claims from a peak of 64%. In addition, workers from firms who were using the appropriate surveillance measures were found to have a better long-term outcome.

**CONCLUSION**

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. It is clear that much has been done to understand occupational asthma. However, if we are to rise to the challenge posed by the HSC’s target to reduce the incidence of the condition, we must begin to think about how best future research could contribute most effectively to the reduction in asthma caused by exposure to substances in the workplace by 30% by 2010.

**Acknowledgements**—The authors are grateful for the contribution made by delegates to the HSE workshop.

**REFERENCES**


