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**Isocyanates: Progress, Priorities and Plans.
Report from an HSE Workshop 27-28 April 2004**

MU/04/

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EXECUTIVE SUMMARY

Introduction and Objectives

In October 2001, the Health and Safety Commission (HSC) agreed a target of reducing the incidence of asthma caused by exposure to substances in the workplace by thirty per cent by 2010. Given that isocyanates are the most significant cause of occupational asthma in the UK, it is reasonable to postulate that much success in reducing disease incidence may be achieved by focusing attention on users of isocyanates both directly and indirectly via stakeholders. In order to ensure that future exposure management strategies associated with isocyanates use are optimally targeted, an internal HSE workshop was convened to provide a forum for the sharing of latest views on the issue, in particular, to review recent research and to determine where risk management efforts may be best focused and how they should be manifest. This report provides a summary of the main discussion points in the workshop and outputs from two syndicate sessions.

Main Findings

Recent isocyanate-related research carried out across both HSE and HSL constituencies was reviewed and issues arising discussed. Syndicate group discussed the following three broad themes:

- Whether the science underpinning HSE policy/law is complete
- Whether existing HSE policy/law is right
- What partnerships need to be developed in order to deliver targets

Feedback from the discussion centred on the following required outputs:

- A list of three top questions still needing to be addressed
- A list of alternative approaches that could be used to implement policy
- Recommendations as to how law could be enforced more effectively
- A list of important partnerships and how they could be forged (if not already in place)

A final session developed action plans aimed at addressing the problems associated with isocyanate exposure that would be to be implemented by HSE over the short as well as medium-longer term. Specifically, each syndicate group recommended two short term and two longer term actions with the following recorded for each action identified:

- What the objective aims to achieve
- How the objective is to be achieved
- What resources are required
- Who the HSE “owner” should be
- How success is to be evaluated
- What partnerships (if any) would need to be forged

INTRODUCTION

In October 2001, the Health and Safety Commission (HSC) agreed a target of reducing the incidence of asthma caused by exposure to substances in the workplace by thirty per cent by 2010. Given that isocyanates are the most significant cause of occupational asthma in the UK, it is reasonable to postulate that much success in reducing disease incidence may be achieved by focusing attention on users of isocyanates both directly and indirectly via third party stakeholders. In order to ensure that future exposure management strategies associated with isocyanates use are optimally targeted, an internal HSE workshop was convened to provide a forum for the sharing of latest views on the issue of isocyanates exposure, in particular, to review recent research and to determine where risk management efforts may be best. This report provides a summary of the main discussion points in the workshop and outputs from two syndicate sessions. A list of workshop attendees can be found in Appendix A.

In the UK, the occupational group most at risk to isocyanates exposure are paint sprayers, particularly those working in motor vehicle repair (MVR). A recent IOM study has estimated that there are approximately 6,000 MVR repairers in the UK, around 2,600 of which employing less than 10 people (commonly termed small-medium sized enterprises or SMEs). In larger MVR businesses the appropriate control hardware (spray booth and air-fed RPE) is in place but may not be maintained properly. Appropriate PPE and RPE may also be available but not properly used due to lack of training or information. Even for larger companies using bespoke spray-bake booths, personal exposure can still occur because of poor design, poor maintenance and inappropriate work practices. In general, in smaller MVR businesses, spray-bake booths are not affordable and use of other control measures such as PPE is poor. These businesses also tend to carry out less two-pack isocyanates spraying than large companies and do no, or very little, baking post-spraying. These businesses also tend to use non-standard spray equipment in second hand local exhaust ventilation booths or home made booths. None of these measures are effective in reducing the exposure of the sprayers or preventing leakage of isocyanates into the surrounding areas. Home made booths tend to be rooms with large doors, to allow cars vehicles in, and axial fans in the walls. Spray-spaces are often quite sophisticated but none are as effective as spray-bake booths at reducing the exposure of the sprayer or preventing leakage of isocyanates into the surrounding area. Many SME workers spray in an open workshop and anecdotal evidence suggest that such spraying may be done only in the evenings when no one else is around. Apart from the sprayers, other workers in SME MVR premises may be put at risk because control measures, particularly the non-standard ventilation controls, do not prevent the spread of isocyanates-containing paint aerosol as effectively as spray-bake booths.

Isocyanates have recently been put on the agenda of the Scientific Committee for Occupational Exposure Limits (SCOLE). This is attributable in the main to pressure from an ad-hoc working group in Luxembourg who expressed concern about the different OELs used for di-isocyanates and mono-isocyanates. This calls into play a number of issues, namely, 1) our ability to undertake airborne measurements of individual isocyanates, and 2) what is known about the sensitising potency of different isocyanates. The current UK MEL for isocyanates derives from a previous control limit, and hence is not based on a post-COSHH WATCH/ACTS review. The value has remained unchanged for many years. In view of the transition to the new WEL system, the MEL has recently been flagged up for review.

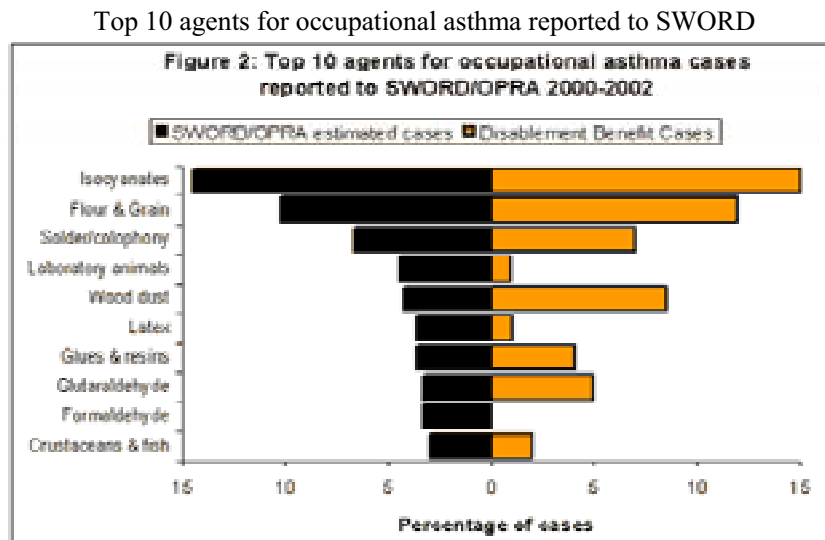
There is currently no UK guidance for isocyanates exposure although there are “accepted codes of practice” to meet the legal requirement of the 1974 Health and Safety at work Act. HSE has recently produced new guidance and information sheets for Isocyanates (EH16). There are five COSHH essentials worksheets designed for use by the MVR:

1. Isocyanates exposure from small tasks-flattening, SMART repair, welding, etc
2. Isocyanates exposure from brush or roller application of two-pack products
3. Isocyanates exposure from cleaning two pack spray guns
4. Isocyanates exposure from mixing two pack paints
5. Isocyanates exposure from spraying two-pack products in spray/bake booth

Special 408 is the COSHH essentials worksheet which explains the value of biological monitoring using urine samples to monitor exposure of employees working with isocyanates. The analytical methods used to measure isocyanates exposure via biological monitoring are based on published work by Williams *et al* (1999) and are recommended by HSE as the established technique for biological monitoring of isocyanates in the workplace. In addition, there are several FOD Sector Information Minute series (SIMs). These are open government information documents but do not represent a legal framework. For example, SIM 03/2000/18 is one such document issued through the Shipbuilders and Ship repairers Association. This SIM is applicable to marine coatings containing isocyanates and summarises guidance developed by the British Coatings Federation.

Both SWORD/OPRA and DWP Industrial Injuries scheme figures implicate isocyanates exposure as the factor accounting for the highest proportion of new cases of occupational asthma (see Figure 1). Disablement benefit first became payable for occupational asthma in 1982 in respect of a specified list of substances. However, the breakdown figures for every year show a downward trend for cases claiming benefit (see Table 1). Taken at face value the data in Figure 1 suggests that the incidence of occupational asthma caused by isocyanates has remained fairly consistent over the last six years. However, such an inference should be made with caution because of two main reasons, firstly, because there is likely to be a substantial time-lag between the onset of symptoms and the presentation to a specialist secondary care physician¹, and secondly, because there is likely to be significant variation both geographically and temporally in the threshold for diagnosis of occupational asthma and for reporting cases of the condition to SWORD.

Figure 1



Data from SWORD, HSE website

¹ Recent work has shown that the mean referral time from the onset of symptoms is about 4 years, but can be as high as 28 years (HSL/MU/03/02)

Liss and Tarlo (2002) evaluated the impact of a medical surveillance programme in Ontario, Canada that was introduced for workers exposed to diisocyanates in 1983. No mandatory surveillance programme was in place for other occupational respiratory sensitisers. They reviewed changes in incidence and severity of compensated claims for occupational asthma due to diisocyanates compared with other causes. Numbers of claims for occupational asthma induced by diisocyanates ranged from 9 to 15 per year in 1980-83, increased up to 55 to 58 claims per year in 1988-90, then fell to 19 to 20 claims per year by 1992-93. In contrast yearly numbers of claims for occupational asthma due to other causes increased up to 1985-87 then remained relatively stable (see Figure 2). Duration of symptoms for occupational asthma induced by diisocyanates was shorter than for other claims and there were fewer hospital admissions among those with occupational asthma induced by diisocyanates than among those with occupational asthma induced by other causes. Occupational asthma from all causes was diagnosed earlier in claims for 1987-93 compared with 1980-86, and indicators of severity of asthma were also milder in accepted claims during 1987-93 than in earlier claims. Liss and Tarlo concluded that although engineering and industrial hygiene measures may have contributed to these changes, their findings were also consistent with a contribution from the medical surveillance programme for workers exposed to diisocyanates. In addition, health education of workers regarding occupational asthma and isocyanates and increased awareness of the condition by physicians could have contributed to this decline.

Interestingly, a similar decline has been observed in the UK in the number of individuals in receipt of Industrial Injuries benefit (see table 1).

Figure 2
Accepted claims for diisocyanates-induced asthma and accepted asthma claims from other causes, by year of onset in the Ontario programme

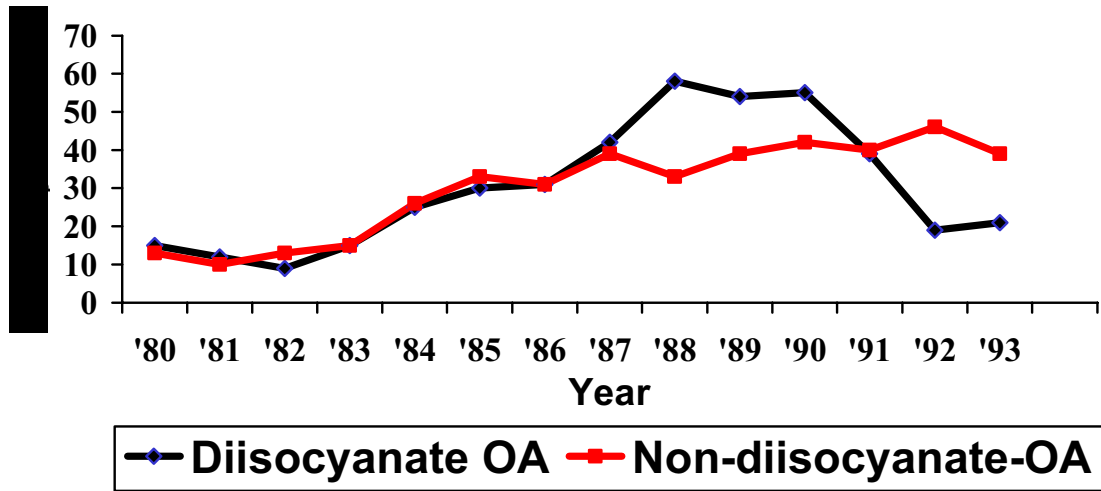


Table 1
Number of individuals in receipt of Industrial Injuries benefit as a result of isocyanate asthma

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Reported cases of disability claimants	95(8)	121(8)	108(15)	121(6)	98(11)	83(7)	49(7)	26(3)	28	33(2)	22(6)	22(6)

*Figures in bracket shows female workers
Data from Table IIS08, Sword, HSE

Over the last ten years, HSE has committed considerable resource to isocyanates issues including development of measurement techniques, limit setting, enforcement, control strategies, workplace exposure studies etc. However, the decline in incident cases achieved in Canada has yet to be realised.

REVIEW OF RECENT ISOCYANATES RELATED RESEARCH

Studies carried out jointly by HSE and HSL's Biological Monitoring Section investigated the effectiveness of control measures aimed at reducing isocyanates exposure by measuring isocyanates metabolites in urine from samples taken from MVR workers. The urine samples from exposed individuals was monitored for 10 working days and any positive results investigated for links with failure in exposure control or failure to follow standard operating procedures. HSE and HSL's Biological Monitoring Section also worked jointly on a study investigating the application of biological monitoring of isocyanates for FOD surveillance of paint sprayers. A further HSE-HSL study involved an investigation of the relation between isocyanates exposure and the current MEL for isocyanates. The adequacy of different types of exposure controls was investigated by relating measured exposure levels to the MEL for isocyanates. Of the 6000 MVR businesses operating in the UK, the workers perhaps most at risk to isocyanates exposure and hardest to reach are those working for the 2600 SMEs, where less than 10 people are employed. Work carried out by HSL's Biological Monitoring Section with IOM involved a longitudinal survey of isocyanates exposure and use of exposure control and health surveillance in over 100 SME MVR's. The study demonstrated that workers relied on RPE, that there was generally a poor awareness of the toxic effects of isocyanates exposure, and that 26% of repairers had no health surveillance. However, over the 2 years of the survey, raised awareness of the isocyanates issue resulted in a drop from 50% to 30% in detectable levels of isocyanates in samples of urine taken from workers.

A three year programme of work (commonly referred to as the Star Chamber Bid) to be delivered by HSE's occupational hygiene specialists with support from HSLs' FSSU and the MVR industry, is due to commence in 2004. The work will follow on from the launch of new guidance by HSE on the control of isocyanates, will focus on non-trade association MVR businesses and will audit use of isocyanates against pre-defined criteria. Necessary enforcement action will then be taken if deemed necessary. MVR workers at SMEs as well as stakeholder organisations (for example, paint suppliers, booth manufacturers and installers, spray gun suppliers, RPE suppliers and trade and training organisations) will be accessed through the running of between 25 and 30 geographically based technical seminars over three years. HSEs W&SW Health Team, together with HSLs FSSU, are currently undertaking a study which aims to assess the risks from exposure to isocyanates during MVR work in a selection of small businesses. The study also aims to identify, amongst small MVR premises in particular, the factors that may create effective exposure control measures and occupational health surveillance. Various studies have investigated isocyanates control measures in MVR and their effectiveness in large-medium sized businesses but very few have focused on SMEs, more than likely because of the difficulty in gaining access to such businesses. The W&SW Health Team Project is unique in that it is attempting to get a general view of isocyanates exposure and control measures and standards of occupational health surveillance in an important but under-investigated but high risk group within the MVR industry.

HSLs Organic Measurement are currently investigating isocyanate exposure, emission and control in small MVR premises using spray spaces. The work is being carried out for compliance monitoring but the results will also inform industry of best control practice. A relatively new area of concern is the use of isocyanates-based paints in small area repair (i.e. SMART repairs). This involves the repair of stonechips, scratches, dents and similar small areas of bodywork often by mobile workers and without the use of a spraybooth or similar facility. The actual risks have not been evaluated but there is anecdotal evidence that whole body panels are being resprayed using this technique without the use of adequate controls. In common with most ship coating work, SMART repairs are usually carried out in dry dock by contractors who also carry out coating for other industries. Because of this, it is often difficult to trace cases of ill

health and hence determine the scale of any effects. Currently, when carrying out SMART repairs using isocyanates-based paints, HSE recommends control approach “R”, which is respiratory protective equipment with engineering control (see control guidance sheets MR04 and MR05). In order to fully evaluate this advice, HSE requires firm scientific evidence of the potential for exposure to isocyanates aerosol and vapour inhalation during SMART repair spraying and through touch-up using roller brush. This is being addressed through a study carried out by HSLs Organic Measurement together with FSSU and HSEs FOD Wales, Midland and South West Devon, Specialist Group. Work, currently ongoing, involves the monitoring of SMART spraying during a series of simulation experiments (including paint spraying and brush and roller touch up simulations). SMART spraying will also be monitored at a number of MVR sites during a routine working day. Sprayers will be fit tested for PPE and PPE (as recommended under MRO4 and MR05) at HSLs test room. The study will provide insight into exposure levels in the industry under typical operation conditions and arrangements. HSE are also working with HSLs Organic Measurement on the development of methods for analysis of isocyanates monomer (i.e. methyl-isocyanates and isocyanic acid) from sanding of isocyanates based paints. The study will initially involve a review of the scientific literature followed by laboratory experimentation. In the laboratory-based part of the study, SMART spraying and sanding will be simulated and exposure to isocyanates monitored by the sampling of air near the sanding process using a filter/impinger method. Air samples will then be analysed for isocyanates monomer in solution and on filters samples. Organic Measurement are also investigating new methods for development tasks so that HSE can meet its enforcement order. This will involve developing methods for sampling isocyanates, surface monitoring and production of operation procedures. The project will investigate whether existing HSE measurement methods are effective by utilisation of new approaches, technology and equipments. As occupational asthma is a commission priority, HSE requires rapid, comprehensive and reliable measurement services. This project will investigate any existing measurement problems areas. HSLs Organic Measurement is also investigating the application of modern mass spectrometric techniques in the identification of biocide compounds such as isocyanates in a joint project with Sheffield Hallam University. The main focus of the study will be the Time-of-Flight Mass Spectrometry (ToF-MS) technique coupled with Liquid Chromatography and Matrix Assisted Laser Desorption (MALDI).

EVALUATION – CURRENT POSITION

Key Points

Research carried out by HSE/HSL and others to date has contributed much to current knowledge regarding the issue of isocyanates exposure and occupational asthma.

Both SWORD and DWP Industrial Injuries scheme figures implicate isocyanates exposure as the factor accounting for the highest proportion of new cases of occupational asthma (see Figure 1). Isocyanates account for around 15% of all new cases, while flour and grain, the second most important exposure, account for 10%. However, bearing in mind the fact that the bulk of cases reported to SWORD stem from patients presenting at a relatively small number of what are frequently referred to as “specialist occupational” respiratory secondary care departments, judging the importance of isocyanates as a cause of occupational asthma based on such figures is likely to be very sensitive to changing reporting patterns within these departments and local factors such as the prevalence of motor vehicle repair enterprises locally. As reporting patterns change, for example as more and more respiratory consultants feed data into the SWORD surveillance scheme, as is gradually occurring, and as medical personnel change, the importance of isocyanates exposure as a cause of occupational asthma relative to other causes may well change also.

The findings of work being carried out by HSL’s Medical Unit Section, in particular, the UK wide survey of secondary care resources available for diagnosis of occupational respiratory disease, will support the argument for the establishment of a UK wide network of specialist occupational health medical departments, able to provide bespoke services in the diagnosis and treatment of diseases such as occupational asthma. This will aid the widening in geographical spread of hospitals reporting to SWORD, which is an attractive trend, since, with more consultants from more hospital respiratory departments reporting to SWORD, data trends will provide a truer picture of the main causes of occupational respiratory disease for the UK as a whole. It follows that disease prevention strategies devised on the basis of SWORD figures are then likely to be more optimally targeted.

The findings of studies involving the biological monitoring of MVR workers exposed to isocyanates, currently being carried out by HSL’s Biological Monitoring Section, will aid the development of guidance for effective, workable, sustainable control measures, that is, control measures that people can use and which will work day to day, whenever workers are potentially exposed to isocyanates. The results of studies involving biological monitoring of MVR workers for isocyanates also demonstrate its potential application in health surveillance. This would necessarily require the adoption of a limit value. Under the assumption that zero exposure to isocyanates is a reasonable and realistic target (defined in BATNEEC terms) for industry to be expected to meet, the operation of a zero limit for isocyanates with regards biologically detectable isocyanates would be consistent with the former assumption.

The isocyanates exposure monitoring currently being carried out by HSL’s Organic Measurement Section will contribute to the optimisation of extraction conditions in home made paint spray spaces with the intention of recommending best practice for the MVR industry as a whole. The work being carried out by HSL’s Organic Measurement on the application of modern mass spectrometric techniques in the identification of compounds such as isocyanates will lead to a much less labour intensive method of analysis. It follows that this would allow a more rapid, routine method of analysis to the benefit of monitoring and controlling exposures.

SYNDICATE SESSIONS

Syndicate Session One

Syndicate Groups are detailed at Appendix B. the first syndicate discussion centred on the following three issues:

- Whether the science underpinning HSE policy/law is complete
- Whether existing HSE policy/law is right
- What partnerships need to be developed in order to deliver targets

Each Group was asked to report back on the discussion, with particular reference to the following requirements:

- Identify the top research questions still needing to be addressed
- Produce a list of alternative approaches that could be used to implement policy
- Make recommendations as to how law could be enforced more effectively
- List important partnerships and suggest how they could be forged (if not already in place)

Syndicate Session Feedback

For clarity, the feedback from both Groups has been combined

A Top questions to address

How big a problem is occupational asthma caused by isocyanates?

In order to properly address this question, two further issues were identified as pertinent, 1) against what “gold standard” should cases of occupational asthma be diagnosed, as there was consensus agreement that no such standard exists currently, and 2) that there was a need for benchmark prevalence statistics against which success of future actions could be effectively judged. Inherent in this is the correct interpretation of existing routine health data with an awareness of the data limitations. Furthermore, key to good prognosis (avoiding sensitisation) is minimising length of time exposed, bearing in mind this, can biological monitoring be used as an early exposure detection measure, or perhaps cytokine activation used as a biomarker of early effects of exposure.

What codes of practice are currently used by inspectors to judge compliance?

Two issues were discussed relating to the application of current existing codes of practice, 1) how effective current inspecting protocols were in judging adequacy of procedures, i.e. sprayer/mixing operations, equipment maintenance and testing, health surveillance, and identifying non-compliance, and 2) how uniformly applied were current inspecting protocols by inspectors.

What is the relative importance of respiratory and dermal exposure in sensitisation?

It was generally agreed that confusion relating to the relative importance of respiratory and dermal exposure in sensitisation to isocyanates meant that HSE advice regarding the use of half masks and visors was inconsistent. In addressing this issue, it was agreed that consensus opinion regarding the science needed to be reached so that the most appropriate exposure control measures, in terms of providing optimum protection against the risk of sensitisation, were being advocated/used.

What is effective control?

In order to answer, need to further address the following – Identification of circumstances under which workers get sensitised to isocyanates (what are the significant pathways of exposure, is it certain tasks, is it certain safety inadequacies/breaches, is existing PPE/RPE adequate, are peak exposures more significant than cumulative chronic exposures?). There is a need to undertake measurements of the magnitude of exposure in work environments with effective control (to define what is reasonably practicable in terms of control) and a need to understand the relation between human factors and exposures (i.e. behaviour patterns and perception of risk versus exposure)

B Alternative approaches to policy implementation

The possibility of product substitution was initially considered but deemed not to be a viable option.

Regulation of isocyanates use via authorisation scheme

It was felt that due consideration needed to be given to the potential application of policies that “ensured” rather than merely “encouraged” best codes of practice. It was envisaged that one way of ensuring best codes of practice was through the introduction of a certification of isocyanates users scheme and an authorisation scheme (enforced by the EA/LAs) for businesses using particularly large quantities (for example > 2 tonnes) of isocyanates.

Supplier side leverage

Addressing the issue of isocyanates exposure via policies targeting the suppliers of isocyanates, and other third parties, rather than targeting MVR businesses directly, was discussed. This was suggested to be achievable, for example, through the introduction of requirements for product and equipment suppliers to display safety information and simplified health warnings on products and equipment. In addition, it was suggested that the establishment of supplier associations and certification schemes emphasising and rewarding good practice, as well as the establishing a requirement for customer care services and even training in use associated with isocyanates products and equipment, may all be an effective method of exerting supplier side leverage. In addition, there may be opportunities for effective intervention through the PPE/RPE route.

Alternative, improved lines of communication

The possible advantage of using alternative approaches for communicating HSE policy and advice regarding isocyanates use to those used traditionally was discussed. Related to this, a need was identified to establish more accessible information sources for use by isocyanates users, for example, workplace safety advisors, a small business portal, advice lines (currently being piloted in Scotland), adaptation of topic packs and additions to the MVR Forum website. In addition, the potential usefulness of collecting email addresses for inclusion in COIN to aid communications was raised.

Training

Training was seen as an important factor in the promulgation of good control. Of particular interest would be the opportunity to influence providers such as Learn Direct, or the syllabus for any NYQ qualifications in “paint spraying”.

C Recommendations for more effective law enforcement

More effective enforcement of existing legislation

Perhaps an obvious and tried and tested method of more effectively enforcing law but one deemed in discussions to require consideration none-the-less, is to increase the number of MVR inspections both in terms of coverage and frequency. This was accepted to inevitably require recruitment of more health and safety inspectors and therefore to have cost implications but was believed to have the potential to provide the necessary results to rationalise the expense.

Refinement of existing legislation

Possible refinements of existing legislation considered in discussions included the introduction of biological monitoring as a legal requirement and, to simplify enforcement, the adoption of a zero limit for exposure. Also, the possibility of an authorisation/certification scheme regulated by EA/LA was discussed.

Better sources of information

It was felt that more effective enforcement could be provided by more effective briefing of inspectors particularly regarding what effective control is. This could be achieved via training, topic pack on Internet etc. In addition, better information for workers would help them in discussions with their employer, their GP etc.

High profile prosecutions

This was seen to be an important tool in demonstrating the requirements under law for effective control of exposure.

D Important partnerships

Environment Agency/Local Authorities - who are likely to be in more regular contact with MVR traders due to obligations under environmental legislation (Part A and Part B process regulation).

Other isocyanates users in non-MVR sectors – thereby promoting the sharing of expertise in safer use (BATNEEC) with a view to reducing exposures in a cost effective manner.

Other potential partner included:

- Trade associations/trade publications
- Paint manufacturers/formulators
- Booth/spray gun manufacturers
- PPE/RPE suppliers
- Trade unions
- Training providers
- Environmental regulators (EA/LA)
- Physicians/patient groups
- Personal injury lawyers
- Insurance companies
- HSEs Asthma Board

ACTION PLANNING

The objective of the third workshop session was to identify a set of actions addressing the problems associated with isocyanates exposure to be implemented by HSE over the short as well as medium-longer term. Specifically, each syndicate group reported back to workshop delegates two short term and two longer term actions with the following recorded for each action identified:

1. What the objective aims to achieve
2. How the objective is to be achieved
3. What resources are required
4. Who the HSE “owner” should be
5. How success is to be evaluated
6. What partnerships (if any) would need to be forged

Syndicate Group 1 also discussed the existence of any read-across to other issues. Again, the feedback from both Syndicate Groups has been combined for clarity.

Short term actions

To increase awareness of the role of isocyanates exposure in occupational asthma in employers/employees using personal injury lawyers

This action aims to promote an increased awareness of the role of isocyanates exposure in occupational asthma in personal injury lawyers, and of the potential for compensation claims, with a view to the issue being actively marketed by legal firms. Legal firms could then become an important source of statistics on the prevalence of isocyanates asthma for HSE. The marketing by legal firms would raise awareness of isocyanates-induced asthma probably more effectively than HSE activities. This would motivate employers to ensure good controls, rather than risking compensation claims. It is envisaged that approach of legal firms would be undertaken by HSEs Solicitors Office. The main resource requirement is an appropriate article for approaching legal firms (drafted by HSEs Solicitors Office), then for the Solicitors Office to meet representatives of firms (with technical input from HSE medics/scientists as required). Legal adverts in the media could be used to show the relative uptake by legal firms, while action statistics from Trade Associations could be used to monitor the MVR industry response. The main partnerships required for such an action would be the Solicitors Office and the Trade Associations. It is worth noting that the workshop viewed such an action to be relevant not only to the issue of occupational asthma and isocyanates exposure but also to other causes of the condition.

Topic pack on isocyanates for inspectors

This action aims to explicitly outline standards expected of the MVR industry in relation to operations (i.e. sprayer/mixing operations, equipment maintenance and testing, health surveillance etc.) so that inspection/enforcement may be consistent and targeted. It is envisaged that HSEs Health Unit is best positioned to produce a topic pack after consultation with the Body Shop Working Group and the MVR Forum. The main resource requirement is a topic pack produced by the Health Unit. Any evaluation of success of the action would need to determine the benefits of the topic pack to the inspectors, i.e. with respect to their ability to assess standards within the MVR industry (survey of opinions of inspectors), and the benefits conferred in terms of better control of workforce exposures (perhaps in form of before/after intervention type study). The main partnerships would be the Body Shop Working Group and the MVR Forum. It is worth noting that the workshop viewed such an action to be specific only to isocyanates.

What causes exposure and how best to control it?

It was felt that the evidence base for some of the control measures recommended was not sufficiently strong. In particular, better understanding of the causes of exposure and what constitutes effective control would help to “slay the myths” (e.g. the use of half-masks). This action could be achieved by focused field research and case studies involving measurement, and biological monitoring in particular. Behavioural issues could also be reviewed. The owner for this work would be CSD3 and field hygienists, and any work would require HSL and field hygiene input. Success would be shown by the identification of where failure in control occurs and the identification of effective control measures in a range of exposure scenarios. In order to achieve these outcomes, partnerships would have to be made with the MVR Sector, with LA enforcers and FOD Specialist inspectors.

Longer term actions

A publicly available spray booth specification

The aim of this action is to develop a public protocol consistent with COSHH 2004, detailing minimum specifications/safety standards for the design, use and maintenance of spray booths. It is envisaged that a similar protocol to that developed for asbestos may be used as a framework. It was suggested that T Taylor could act as HSE representative to a BSI publicly available Standard Committee. This action, directed by FOD CSD3A, would be best funded by the HSE research budget. Any evaluation of success would need to focus on the comprehensibility and usability of the protocol by booth testers/users, and the benefits conferred in terms of compliance with *de facto* standards (i.e. the number of improvement notices served) and better control of workforce exposures (perhaps in form of before/after intervention type study).

Working practices, patterns of behaviour and beliefs in MVR industry workers

The aim of this action is to investigate working practices, patterns of behaviour and beliefs in MVR industry workers with a view to identifying key exposure pathways and popular conceptions/misconceptions. This could be best carried out through a survey of MVR workers funded by the HSE research budget. The workshop agreed that work should take the form of an ethnographic qualitative study. Ethnographic interviewing allows the researcher to understand the world as seen by the respondent within the context of his everyday life. Interviews must be structured to allow people to express topics of interest to them. Worker terminology and beliefs are important. It is no use just sticking to pre-defined questions. The research methods must allow for direct verbatim quotes from workers to be collated. Ethnographic methods produce qualitative data that provide depth and detail through direct quotation and careful descriptions of situations, events, people and interactions. Michael Topping (of CFPU) would be an appropriate owner to drive the action forward. Evaluation could be via a scientific paper illustrating evidence for a contribution to knowledge in the area. The main research findings could then be used to direct future HSE policies. Critical appraisal of research report findings could be carried out by a HSE team including CSD 1 and 3, Mark Piney, Bob Daunton, Andrew Lake, John Powell – and any others with knowledge of isocyanates and MVR. The ability to successfully identify causes of failure to control exposure should also be an evaluation criterion.

It is worth noting that syndicate group 1 identified two other immediate actions in Session 2; firstly, it was felt that HSE providers of analytical services in isocyanates measurement should be informed/reminded of the requirement to measure total isocyanates as opposed to just monomer through the BOHS; and secondly, that HSE was minded to view a nil result from biological monitoring as reasonably practicable in MVR.

Change in control culture

The aim of this action would be to achieve effective and consistent control that results in a reduction in cases of occupational asthma. In order to achieve this it was agreed that a better understanding of the industry “culture”, and of what constitutes good control is needed. A number of potential areas for intervention were identified, particularly the supply chain, occupational health providers, training providers (e.g. NVQ’s). The owner for any work in this area would be Policy, and would involve many parts of HSE in delivering the desired outcomes (FOD, CSD, HSL, Occupational Hygiene). Evaluation would be through a range of endpoints including benchmarking and monitoring throughout the course of the project using biological monitoring and other appropriate techniques. The partnerships required to effectively deliver this project would be extensive, and would require significant resource.

APPENDIX A

1. Michael Topping, HSE
2. Mark Piney, HSE
3. Maureen Meldrum, HSE
4. Andrew Garrod, HSE
5. Colette Nimbley, HSE
6. Andrew Lake, HSE
7. Bob Daunton, HSE
8. Roger Rawbone, HSE
9. Nerys Williams, HSE
10. Andrew Curran, HSL
11. Steven Naylor, HSL
12. Helen Chambers, HSL
13. John Cocker, HSL
14. Duncan Rimmer, HSL
15. Paul Evans, HSL

APPENDIX B

Syndicate Group1

1. Maureen Meldrum (Chair)
2. Andrew Garrod
3. Helen Chambers
4. Colette Nimbley
5. Andrew Lake
6. Bob Daunton
7. Steven Naylor
8. Nerys Williams (2nd syndicate session only)
9. Michael Topping (2nd syndicate session only)

Syndicate Group 2

1. Andrew Curran
2. John Cocker
3. Duncan Rimmer
4. Roger Rawbone
5. Mark Piney (Chair)
6. Nerys Williams (1st syndicate session only)
7. Paul Evans