BACKGROUND:

In 1993, the International Union, United Automobile, Aerospace & Agricultural Implement Workers of America (UAW) petitioned OSHA to take emergency regulatory action to protect workers from the risks of occupational cancers and respiratory illnesses due to exposure to metalworking fluids. Subsequently OSHA's Priority Planning Process report then identified exposure to metalworking fluids as worthy of Agency action. The Assistant Secretary for OSHA asked the National Advisory Committee on Occupational Safety and Health (NACOSH) for recommendations on how to proceed. NACOSH recommended that OSHA form a Standards Advisory Committee (SAC) to address the issues relating to occupational exposure to metalworking fluids. The Secretary of Labor signed the charter establishing this SAC on August 28, 1997. The Advisory Committee was comprised of representatives from unions, university and NIOSH public health officials, and large and small employers from affected industries. The Standards Advisory Committee submitted their Final Report to Assistant Secretary Charles Jeffress in July, 1999. The following is a Summary submitted as part of this Final Report.

***DISCLAIMER*:**

SUMMARY

FINAL REPORT
of the
OSHA METALWORKING FLUIDS STANDARDS ADVISORY COMMITTEE

Submitted by

Dr. Maura J. Sheehan, C.I.H
Chairperson
7/15/99

SUMMARY of the
RECOMMENDATIONS
of the
OSHA METALWORKING FLUIDS
STANDARDS ADVISORY COMMITTEE

The OSHA Metalworking Fluids Standards Advisory Committee recommends that OSHA act to mitigate the adverse health effects associated with exposure to metalworking fluids (MWFs). This decision is based on the demonstrated health effects: asthma, hypersensitivity pneumonitis, other respiratory disorders and dermatitis. In the opinion of the committee, each of these health effects is a material impairment of health, presents a significant risk, and occurs throughout the industry. The committee also recognizes that there are other health conditions, including cancer, related to MWF exposure for which the evidence is still evolving. The details of the committee's deliberations about health related issues can be found in Chapters Two and Eight of this report.

The committee supports the use of a defined occupational exposure limit and unanimously supports the use of systems management to control exposure. The committee unanimously recommends that the scope of any OSHA action include fluids used in the machining environment including the operations of cutting, machining, grinding and honing. While the committee recommends that the scope be limited to these operations and their fluids, the exclusion of other metalworking fluids or related processes or environments does not imply the lack of a potential problem in these related fluids, processes or environments. Further information about the scope of any OSHA action can be found in Chapter One of this report.

The committee recommends that OSHA promulgate a comprehensive 6(b) standard to protect employees from the adverse effects of MWFs and material impairment of health. Dissenting minority opinions to this recommendation that address non-regulatory alternatives are summarized in Attachment #1. The deliberations of the committee and majority and minority views on specific issues are stated in the body of the report. Specific discussions of OSHA actions are in Chapter Five of this report.

The committee recommends that a standard for MWFs should include a permissible exposure limit (PEL), systems management, medical surveillance and training. This approach for a standard should control exposure and achieve a meaningful reduction of disease.

The committee recommends a new 8 hour time weighted average PEL of 0.4

mg/m^3 thoracic particulate (0.5 mg/m^3 "total" particulate). The scientific rationale for the recommended PEL is based on studies of asthma and diminished lung function. This research is provided in the NIOSH Criteria Document, and in the record and report of this committee. Current OSHA regulations and existing consensus standards do not address the exposures that occur in the contemporary MWF environment. The TLV® for mineral oil mist and the Particulates Not Otherwise Classified (PNOC) PEL are not appropriate, or adequate for currently used MWFs and the complex MWF environment. Additional information on the deliberations about an exposure limit is provided in Chapters Two and Five of this report.

In addition to a PEL, the committee recommends systems management of the MWF environment to further protect employee health. Systems management includes a comprehensive programmatic approach with enclosure, ventilation, fluid management and other actions to control exposure and minimize contact with the fluid. Systems management discussions are found in Chapter Three, and the committee's Best Practice for Systems Management is in Chapter Six of this report.

The committee recommends an active medical surveillance program as an essential component of the proposed 6(b) standard. Since there is evidence of adverse health effects below the PEL, medical surveillance provides a safety net for those individuals exposed to MWFs. Medical surveillance allows early detection of adverse health effects, and leads to better health outcomes. Key characteristics of an effective medical surveillance program are detailed in Chapter Eight of this report.

The committee notes that training and outreach activities are essential components of any action involving MWFs. Training of employees about MWFs is essential and part of OSHA's role. As noted in Chapter Nine of this report, other individuals need better information to effect the changes needed in workplaces using MWFs.

The recommended PEL, a systems management approach, active medical surveillance and training are technologically and economically feasible for employers affected by this recommendation. While the recommendations are technologically and economically feasible, the committee recognizes that the recommendations are substantial and will require a phase in period. The details of the discussions and evidence reviewed about technological and economic feasibility are found in Chapters Three and Four of this report.

Because the problem is clearly recognized, and feasible solutions are identified, the committee recommends that OSHA promulgate this standard with all deliberate speed. More than a million workers are exposed to MWFs, urgent action is needed.

SUMMARY of the
DELIBERATIONS
of the
OSHA METALWORKING FLUIDS
STANDARDS ADVISORY COMMITTEE

Committee Organization and Activities

The OSHA Metalworking Fluids Standards Advisory Committee (MWFSAC) was formed on 8/28/97, the date the committee's charter was signed by the Secretary of Labor. The 15 members and 2 alternates of the committee are listed in Attachment #2 of this report. Alternates were included in all discussions, but did not vote. The activities of the committee are defined in the charter which is discussed in Chapter One of this report, and is found in Attachment # 3. All deliberations were conducted at ten public meetings throughout the United States. Work groups made up of committee members and alternates visited work sites and gathered other information for the committee to review. This final report is the product of the committee's deliberations. This committee report is submitted by the committee chairperson to the Assistant Secretary of Labor for OSHA on July 16,1999, seven days after the adjournment of the last meeting of the committee. The information reviewed, concerns noted, views expressed, and decisions made by the committee are included in this report.

Scope of any OSHA Action

The committee did not vote on the scope of the fluids but a general consensus developed. The committee recommends that the scope of any OSHA action includes that subset of metalworking fluids that are also known as metal removal fluids. These fluids are those used in traditional operations on metal including cutting, machining, grinding and honing. The fluids and the environment they are in have to be considered together due to the changing nature of the fluids as they are used in their environment.

The rationale for this approach includes: the need to clearly differentiate the types of fluids involved, and the knowledge base available for health effects, exposure levels, exposure assessment methods and/or control. The exclusion of any related fluid, process or environment does not imply the lack of a potential problem in these related fluids, processes or environments.

Health Issues

Dermatitis

The *majority* opinion of the committee is that dermatitis is known to be associated with exposure to MWFs. *Thirteen (13) members* held this majority opinion. Members cited their own experiences: working with individuals who had dermatitis, treating employees with dermatitis, and observations at a MWF plant visited by the work groups. In addition, presentations by dermatologists, Adams and Lusniak, and

machinist, Gauthier; the NIOSH Criteria Document and other literature; and letters sent by small business were noted as evidence. Dermatitis from MWF is a material impairment of health.

The *minority* opinion of the committee was the evidence on dermatitis was equivocal. *Two (2) members,* Burch and Howell, held this minority opinion. These members noted their own experiences and stated that dermatitis is associated with poorly managed fluids. Manufacturers test and produce fluids that when new, generally do not cause dermatitis.

In discussion, two members, Teitelbaum and Mirer noted that all MWFs can cause dermatitis. Two other members, Day and McGee explained that all MWF plants they have been in had workers with dermatitis. Two members, Cox and Burch stated that although there are dermatitis problems, these problems are controllable.

Acute and Chronic Respiratory Effects

The *majority* opinion of the committee was that acute and chronic respiratory effects are known to be associated with exposure to MWFs. *Thirteen (13) members* held this majority opinion. Members cited the epidemiological studies, the limited toxicology studies and their own experiences: in plants, in discussions with workers and in clinical practice. Presentations by Rose, Fennelly, Eisen, Hodgson, Fennelly's patient, the NIOSH Criteria Document and papers by Kennedy were noted as additional evidence. Data from Wegman (Wegman,1998), and Rosenman (1998) were cited. One member, White, stated that there was some evidence to support the association of acute and chronic respiratory effects and MWFs. Another member, Cox indicated that there was no evidence in small plants, although there was in large ones.

The *minority* opinion of the committee was the evidence was equivocal. *One (1) member,* Howell, held this minority opinion. Concerns were expressed about the categorization of fluids, and other confounders in the studies. Risk ratios were close to one, making them vulnerable to confounders. The relevance of some of the health endpoints was questioned.

One member, Burch, had no comment.

In discussions, two members, O'Brien and Sheehan, explained that the effects were associated with end-use fluids. One member, McGee, noted that there was more evidence for acute effects than chronic effects. One member, Mirer, explained that HP is more associated with in-use water- based fluids and asthma is associated with all MWFs. This same member, Mirer, viewed that material impairment of health related to respiratory problems is more associated with water-based fluids.

Cancer

The committee addressed skin cancer and cancer at other sites as separate

issues. The opinions were separated into evaluating "old formulations" versus "current formulations".

Skin Cancer

The *majority* opinion was that skin cancer is known to be associated with exposure to old formulations of MWFs. *Ten (10) members* held this majority opinion. The opinions were mixed for current formulations of MWFs. White believed that old formulations were a problem. Two members, Lick and Teitelbaum, believed there was no evidence for current formulations. Three members Sheehan, Mirer, and Frederick, viewed evidence for current fluids as equivocal. One member, Anderson, thought it was reasonably anticipated that there was evidence for current fluids. Three members, Wegman, Newman, and Day believed there was known evidence for old and current formulations. Chapter Five of the NIOSH Criteria Document was cited. Issues such as the difficulty of assessing the effects of current exposure due to the latency period and the possible presence of co-carcinogens and promoters were noted.

The *minority* opinion was that the evidence was equivocal for old formulations. *Three (3) members,* Burch, Cox, and Howell held this minority opinion. As noted above, the opinions for current fluids were mixed. The members who presented the minority view on the older formulations believed there was no evidence for current formulations.

Two members, O'Brien and White did not think they had adequate information to make a decision on the issue of skin cancer.

Cancer at Other Sites

The *majority* opinion was that old formulations of MWFs are known to cause cancer at various sites. *Ten (10) members* held this majority opinion. Epidemiological studies, MSDSs, and the NIOSH Criteria Document were cited.

The *minority* opinion was that the information on the older formulations was equivocal. *Three (3) members,* Burch, Howell, and Lick held this minority opinion. The inconsistencies among the epidemiological studies regarding sites were noted for a rationale.

Two members, Cox and White had no opinion.

The *committee was split* on the issue of cancer related to current formulations of MWFs. Four members, O'Brien, Lick, Teitelbaum, and Frederick viewed that evidence was equivocal for current formulations. Four members, Day, Newman, Sheehan, and Anderson, viewed the evidence as reasonably anticipating cancer associated with current fluids. Three members, Howell, Cox, and Burch thought there was no evidence that currently formulated MWFs cause cancer. Three members, Wegman, Mirer, and McGee noted that prudence dictates that we view current formulations as carcinogenic,

and one, White, had no opinion. Latency periods, and reductions in nitrosamines and PAHs were noted as a rationale and concern.

Technological Feasibility

Permissible Exposure Limit (PEL)

The *majority* viewed that the recommended PEL was technically feasible. *Twelve (12) members* held this majority opinion. Day, Teitelbaum, Mirer and O'Brien cited their own experiences, presentations before the committee, site visits, the machine tool builders discussion and data provided by industry as a basis for this decision. The downward trend in exposures with time, the evaluation of controls study done by Hands *et al,* and the NIOSH Small Business study were also noted by O'Brien as a rationale. O'Brien and Mirer urged more effective use of general ventilation to achieve the targeted PEL. O'Brien noted that straight fluids are more difficult to control and opined that anti-mist additives may be helpful to control exposure in small business.

The *minority* opinion was that although the PEL could be achieved with new equipment, it could not be with old, existing equipment. *One (1) member,* Howell, held this minority opinion.

Burch focused on the technical feasibility of measuring exposures at the PEL and thought it was feasible. He did not have enough information to determine the feasibility of a PEL. Cox could not separate technical feasibility from economic feasibility, noting that some companies would be more able than others to comply based on their financial condition.

Systems Management

All 15 members viewed that systems management was technically feasible. Members cited the presentations, site visits and their own experiences as contributing to this decision.

Medical Surveillance

The *majority* explained that medical surveillance, as defined by the best practices document prepared by the committee, was technically feasible. *Twelve (12) members* held this majority opinion. Newman based this decision on his own experience developing programs for businesses. Sheehan cited the long track record for these types of tests. McGee urged training of workers about medical surveillance.

The *minority* opinion on the technical feasibility of medical surveillance was that the program specified in the best practices document prepared by the committee was not technically feasible. *Three (3) members,* Burch, Cox, and Howell held this minority opinion.

Economic Feasibility

Permissible Exposure Limit (PEL)

The *majority* viewed that achieving the PEL was economically feasible. *Twelve (12) members* held this majority opinion. O'Brien cited data submitted by Ford and an Office of Technology Assessment report. Mirer viewed the Ford data as a high estimate, noting that many exposures at Ford were below 0.5 mg/m^3. Mirer stated that small companies would have lower ventilation system costs and that all companies would benefit from less expensive improvements in general ventilation. Sheehan noted that not every work station has to be improved for the overall exposure to be reduced and urged a focus on the worst machines. Day explained that companies find the money when OSHA puts pressure on them. Lick and White stated that achieving the PEL was economically feasible with enough time allowed to phase in changes.

The *minority* stated that achieving the PEL would be very expensive and economically infeasible. *Two (2) members,* Burch and Cox held this minority opinion. Burch cited the evidence provided by Ford (Henry, 1998) and the American Automobile Manufacturer's Association (Felinski,1998).

There was *one abstention,* Howell, who noted that there was not adequate information to reach a decision on the question of the economic feasibility of a PEL.

In discussions, White stated that the costs could be on par with the proposed ergonomics standard. Cox cited small business problems with cash flow and tax laws related to regulatory compliance. Lick estimated that ventilation costs for some small businesses would be a few thousand dollars. There was general agreement that more information is needed on this issue.

Systems Management

All 15 members viewed that systems management was economically feasible. The committee stated that it was economically infeasible not to do systems management. O'Brien cited clear economic benefits of systems management including: reduced painting, reduced accidents due to slippery surfaces, and improved retention of employees. White cited Gauthier's presentation as showing cost effectiveness of systems management. Mirer noted that systems management may enhance exposure reduction and provide jobs.

Medical Surveillance

The *majority* thought that medical surveillance as outlined in the best practices document was economically feasible with some limitations. *Twelve (12) members* held this majority opinion. Members noted the per test costs, and their own experiences with medical surveillance as rationale. White cautioned that his decision was based on the high threshold defined for economic feasibility.

The *minority* stated that the medical surveillance as outlined in the best practices document was not economically feasible. *Three (3) members,* Burch, Howell, and Cox

held this minority opinion. Burch noted that the cost would depend on the level of detail required. Howell refined his minority opinion that some degree of medical surveillance was economically feasible but not the one stated in Chapter Eight of this committee report.

The need for a Permissible Exposure Limit, PEL.

The *majority* opinion was that a MWF PEL as an 8 hour time weighted average was needed. *Twelve (12) members* held this majority opinion. O'Brien cited the inappropriateness of the TLV for mineral oil mist with no additives. This TLV was based on the health effect of lipid pneumonia and did not represent MWFs used today. Wegman was concerned that the current Particulates Not Otherwise Classified (PNOC) designation was inadequate. Newman cited the number of health effects that cause material impairment of health, burdening the American worker.

The minority opinion was that OSHA needed to prove by a risk assessment that a new PEL was needed. *Three (3) members,* Cox, Burch, and Howell held this minority opinion. Cox noted that a PEL probably was needed. Howell thought there should be a lower exposure guide for metal removal fluid mist. The lack of significant risk and the linkage of many problems with operational factors and not MWFs were given as rationale. A voluntary approach was stressed.

Recommended PEL

The *majority* viewed that the evidence pointed to 0.5 mg/m^3 "total" particulate. Ten *(10) members* held this majority view. O'Brien explained that 0.4 mg/m^3 measured as thoracic particulate is a better surrogate. Members cited studies on diminished lung function and the NIOSH Criteria Document. Members urged that the value be based on an OSHA Risk Assessment. Mirer, Teitelbaum, Day, Newman and Wegman noted that a PEL of 0.5 mg/m^3 "total" particulate will not completely protect health. Wegman emphasized that a PEL will not protect the skin.

The *minority* viewed the value as either between 0.5 and 1.0 mg/m^3, or 1.0 mg/m^3. *Three (3) members,* White, Howell, and Lick, held this minority view. They also urged that the value be based on an OSHA Risk Assessment. Howell and White recommended a voluntary application of these values. Howell stressed the importance of fluid management and noted that a PEL of 0.5 mg/m^3 alone cannot protect against vapor or biological entities.

Two members, Cox, and Burch, did not have an opinion on what value should be proposed.

In discussion, four members, Cox, Howell, O'Brien, and Sheehan, noted that a higher PEL could be listed for straight fluids. Sheehan and Howell based their opinion on the health data, while O'Brien and Cox recognized the feasibility issues. Lick noted that a dual standard would be difficult to address in plants with multiple fluid types.

Action Level

The *majority* stated there should be an action level. *Twelve (12) members* held this majority opinion. The rationale for an action limit includes concerns about the variability of exposure levels in industrial processes and of sampling techniques. A random sample as high as one half the PEL predicts that exposures greater than the PEL will occur. Triggers are needed for sampling as well as other actions such as medical surveillance in order to protect workers.

The *minority* opinion was that there should not be an action level. *One (1) member,* Howell, held this view. Sampling and analytical problems at lower than the PEL were cited. Voluntary approaches were emphasized.

Two members, Burch, and Cox had no comment on an action level.

Recommended Action Level

The *majority* viewed that 0.25 mg/m^3 should be used as the action level. *Eight (8) members* held this view. This opinion was based on the traditional statistical approach of using half the PEL value. Mirer noted an earlier vote on best practice for exposure assessment listing the action level as half the PEL. Mirer explained that an action level detects and prevents over-exposure. Sheehan was concerned about whether the sampling and analytical method could address values in this range.

A minority viewed that the committee should not "tie OSHA's hands" by providing a specific action level. *Three (3) members,* O'Brien, Wegman, and Teitelbaum, held this opinion. O'Brien, Teitelbaum and Wegman were concerned about residual risk at 0.25 mg/m^3 and Wegman asked that OSHA figure out better ways of addressing this issue.

Howell had *another minority view* and thought the number should reflect the limits of the sampling and analytical method.

Lick expressed a *different minority opinion,* noting that the action level should be 0.5 mg/m^3, since the action level becomes a *de facto* PEL. Lick also noted the concerns about the sampling and analytical method and that without other components, a PEL and/or action level would fail.

There was some general consensus that OSHA should identify alternate triggers for action instead of an action level.

Burch and Cox did not comment on the value proposed for an action level.

Short Term Exposure Limit (STEL)

The *majority* viewed that there was inadequate evidence to support a STEL.

Twelve (12) members held this majority opinion. Members were concerned about short term high exposures. They noted anecdotal evidence of complaints of respiratory irritation for short term high exposures. The concept of real time monitoring to determine short term exposures was supported by members to provide information on these conditions. Burch noted that short run operations with a lot of opening and closing of doors produce peak exposures while continuous operations would have less of a problem with peak exposures.

Three members, Teitelbaum, Day, and McGee had no opinion or comment.

Is more than a PEL necessary?

All 15 members noted the importance of including more than an exposure limit in any OSHA action concerning MWFs. Howell explained that the combination of systems management and medical surveillance would accomplish more than a PEL. White, Cox, Howell and Burch noted that a regulatory approach should not be used.

All 15 members clearly stated that systems management is essential. White noted that a PEL would go a long way to improve current conditions, but systems management was needed to protect against problems such as dermatitis. Burch noted that endotoxin could not be addressed with a PEL, but systems management would reduce this problem. Mirer explained that design criteria for equipment, process control to reduce misting, and fluid management should be the three major components of systems management and also urged the inclusion of general ventilation. White, Cox, Howell and Burch noted that a regulatory approach should not be used.

There was some debate, but no consensus, about whether the specifics of systems management should be laid out by OSHA. O'Brien urged complete flexibility while Sheehan urged defined, quantitative criteria. Newman suggested defined criteria with some flexibility built in for emerging technological improvements. The committee's view of best practice for systems management can be found at the end of Chapter Six.

The *majority* stated that medical surveillance was needed. *Eleven (11) members* held this majority opinion. White, Newman and Mirer noted that medical surveillance would capture problems not addressed by a PEL and systems management. Mirer recommended active medical surveillance and noted that there will still be problems of under-reporting of health problems. A detailed rationale for medical surveillance and the committee's recommendation for best practice for medical surveillance can be found at the end of Chapter Eight of this report.

The *minority* was not against all medical surveillance, but did not support the best practices version of a medical surveillance program as found in Chapter Eight of this report. *Four (4) members,* Cox, Howell, Burch, and White held this view. Cox urged a common sense approach to medical surveillance especially for small business. Howell, Burch, Cox and White cautioned against using medical surveillance as part of a

regulation. The ORC version of a voluntary medical monitoring program was put forth as an alternative by some of those in the minority.

The Action OSHA Should Take.

All 15 members agreed that OSHA should act to address the issue of MWFs.

The *majority* voted that an OSHA standard for MWFs is needed. *Eleven (11) members* held this majority opinion. Anderson, O'Brien, Sheehan, and Wegman stated that the standard should include a PEL, systems management and medical surveillance. O'Brien viewed that the specifics of the systems management should be in a non-mandatory appendix. Mirer explained that the most critical parts of a standard are the PEL and exposure monitoring portions.

Members provided some rationale for choosing a standard. Mirer noted the wide range of epidemiological studies. Mirer stated that a standard is needed for exposure reduction, medical surveillance and the commitment to spend the money needed to accomplish these objectives.

McGee noted that a standard would promote compliance by employers and employees. Day cited his own experience noting that employers only pay attention to standards. Teitelbaum urged OSHA to provide a special emphasis program and cited inadequate MSDSs for MWFs. Lick opined that in time, a guideline might work, but at this time, only a standard would accomplish what is needed in industry.

The *minority* voted that OSHA should publish guidelines for MWFs instead of a standard. *Four (4) members,* Burch, Cox, Howell, and White held this minority opinion. Howell and White noted the complexity of promulgating a standard on MWFs. Burch explained that OSHA would have to prove a clear cut risk for a standard. White opined that although the whole compilation of health effects is compelling, only a few studies can be used in risk assessment. Howell and White explained that a guideline could be implemented much quicker than a standard. White noted that industry has shown in the ORC document that it is willing to act. Howell urged adoption of a non-regulatory approach for users and product stewardship by suppliers. The cost burden of a standard concerned White. Burch urged sensible action, acknowledging that good employers will follow a guideline, while the bad ones will play the odds of an OSHA inspection. Howell and White urged partnerships and cooperative efforts, and Cox provided examples of such in his organization. Burch noted that over time, purchases of new machine tools will result in lower exposures.

The issue of interim guidelines was discussed but not resolved by a vote. Howell, Day and Sheehan thought interim guidelines until a standard is promulgated would be a good idea. Sheehan opined that the committee could release its report as guidelines if OSHA does not act in a timely manner. White suggested guidelines with

the threat of a standard if guidelines did not work, and gave examples of guidelines that work.

Teitelbaum and Mirer strongly disagreed with interim guidelines. Mirer explained that OSHA resources needed for standard promulgation would be used to develop the guideline. Mirer urged the committee to disregard the time it takes to develop a standard. Lick explained that OSHA could contract someone to develop a guideline.

Systems Management

As noted earlier in this summary, the committee unanimously supports the use of systems management of MWFs. Details about this issue can be found in Chapters Three and Six of this report. At the end of Chapter Six is the committee's recommendation for best practice systems management.

Exposure Assessment

The committee reviewed many different studies and heard testimony regarding the different sampling and analytical techniques that can be used for MWFs. There are advantages and disadvantages associated with each method. The committee accepted the best practice exposure assessment program provided in Chapter Seven of this report. This assessment program provides different sampling and analytical options to the employer and allows for professional industrial hygiene judgement. In addition, a qualitative assessment tool is provided at the end of Chapter Seven. The purpose of this tool is to provide additional guidance for good industrial hygiene judgement and good business management. The qualitative assessment tool allows employers, especially small businesses, who are reasonably expected not to have excessive exposures to avoid unnecessary air sampling. This approach is believed to be a reasonable way of enhancing the technological and economic feasibility of the actions recommended in this report while continuing to protect the workers who are exposed to MWFs.

Medical Surveillance

Medical surveillance has been discussed in previous sections of this summary and is recommended by the committee. A detailed rationale for medical surveillance and the committee's recommendations for best practice are found in Chapter Eight of this report.

Training

As noted in this summary, the committee wholeheartedly supports training and outreach. The majority views that this should be part of a standard, while the minority views this should be part of a voluntary action. Details of how this can be accomplished in either context are found at the end of Chapter Nine.