MICHIGAN ENVIRONMENTAL SCIENCE BOARD

FIRE FIGHTER AND CANCER INVESTIGATION PANEL
MEETING SUMMARY
THURSDAY, MARCH 4, 1999
COURTYARD BY MARRIOTT
7799 CONFERENCE CENTER DRIVE
BRIGHTON, MICHIGAN

PANEL MEMBERS PRESENT
Dr. Lawrence J. Fischer, Chair
Dr. Raymond Y. Demers
Dr. G. Marie Swanson
Dr. Ralph H. Kummler
Mr. Keith G. Harrison, Executive Director

DEQ/OSEP SUPPORT STAFF PRESENT
Mr. Jesse Harrold, Environmental Officer
Ms. Patricia Hiner, Executive Secretary

I. CALL TO ORDER

Dr. Lawrence J. Fischer, Chair, called the meeting of the Michigan Environmental Science Board (MESB) Fire Fighter and Cancer Investigation Panel (Panel) to order at 1:15 p.m.

II. EXECUTIVE DIRECTOR UPDATE

Mr. Harrison provided a brief update on the material that had been submitted to the Panel to date.

III. PRESENTATION

Dr. Swanson presented a draft analysis that had been prepared regarding the studies on the health risks to fire fighters. She explained that the studies had first been grouped according to type. The vast majority were standard mortality ratio (SMR) studies. The total number of subjects in each study refers to the number of fire fighters considered, while the referents are the comparison group. In some cases for a SMR, mortality rates for fire fighters are compared to the rates for the general population. The epidemiological studies examined in this summary analysis did not measure any specific chemical or agent. There were some attempts to measure the amount of active duty and exposure times along with the general job classification. However, they did not measure any other risk factors or possible non-fire fighting exposures. In the analysis, the number of incident cases and deaths as well as the source of death information were noted. In general, the data were from official death certificates, rather than retirement files or other sources. The analysis also lists the results from each study, for each site, and states whether statistical significance was measured and what confidence interval was established. In addition, the analysis states whether dose

response was measured. The majority of the studies attempted to do this by examining the increased level of risk of specific cancers by increased number of years on the job, or years since first employment as a fire fighter.

An important consideration regarding the statistical significance of these studies is that most of them are dealing with very small numbers of subjects. Also, some found an increased risk compared to the general public, but not compared to police. The proper group for comparison should be established. Putting all cancers together gives greater numbers of subjects, but studies of specific sites usually have less than 20 cases and often less than ten. Study number 12 of the analysis shows an increased risk of brain tumors, both with less than 20 years latency and more than 20 years latency, with three cases in each category. The finding of cancer in both groups could be due to variable exposures. It is also possible that the younger fire fighters have exposures to more fires.

Dr. Swanson stated that she tried to be objective and balanced in her analysis. She characterized the body of available literature as providing good directions about where further studies should be conducted. For example, the correlation between diesel exhaust and lung cancer could be studied for this population. While the incidence of lung cancer does not appear to be particularly high among fire fighters, measurements of specific factors could yield better information. Dr. Swanson added that it could be considered biased reporting to exclude the studies that were not statistically significant. Chronic disease assessment is more difficult than that for infectious disease. The usual criteria for causality assume that a particular exposure is going to produce a particular outcome. However, cigarette smoke or other hazardous substances have been known to produce a variety of cancers and other results.

IV. PANEL DISCUSSION

Dr. Demers stated that it is possible that exposures have changed for the worse in recent decades due to modern plastics. This might explain the apparent discrepancy of younger fire fighters having greater exposure than older fire fighters. He added that he did not think asbestos was going to be an important factor in this group compared to others who had high daily exposure.

Dr. Fischer questioned the exposure measurements and whether the chemicals of concern were able to penetrate protective equipment. Dr. Kummler responded that two studies had demonstrated exposure to various metabolites during training exercises. Mr. Harrison said that the exposure to chemicals also occurs when the protective equipment is not being worn, such as just after a fire. Dr. Demers added that fire fighters do not have a stable work environment, and so it is not possible to accurately measure particulates or other substances in the air. Also, the difficulty of breathing through a protective device during times of heavy exertion tends to limit their use.

Dr. Demers mentioned that the typical cohort study takes known exposures and then follows people over time to record the outcomes. A case control study divides the subjects into those with and those without the disease, and then goes back to look at

the exposure. The problem with many of the studies on fire fighters is the lack of data on exposures. However, there is some evidence that the total cancers are elevated in spite of what could be considered a healthy worker effect.

Dr. Demers continued that there are various problems with mortality studies. For example, the cause of death is often not accurately specified. Some tumors listed as the cause of death are actually metastases from other sites. Brain and lung are common metastatic sites. Incidence studies would provide useful additional information. Most states have population-based cancer registries where research can be done using new diagnoses of cancer, rather than waiting for mortality results. One study, which did look at incidence, was done in Australia, study number seven of Dr. Swanson's analysis. This study did not find a significantly elevated overall risk for brain tumors.

Dr. Fischer questioned whether there was a known rationale for the risk of brain cancer. Dr. Swanson noted that although elevated risk is linked to radiation exposure, there is not a lot known about this disease. In addition, death certificates that list a brain tumor as cause of death might not distinguish between primary and metastatic cancer. Dr. Fischer added that animal models are not useful for determining the rationale for cancer incidence in a particular human organ.

Dr. Fischer asked whether the results of Dr. Swanson's summary analysis were comparable to those obtained by others who had reviewed the studies. Dr. Swanson replied that she had not read the other reviews in order to avoid potential bias while completing hers. Dr. Kummler stated there are differences, although the brain studies are consistently high, Dr. Fischer suggested that the reviews, such as those by Howe, Golden, and Guidotti, should be examined further along with the analysis by Dr. Swanson for consistency. Dr. Fischer added that Dr. Sheila Zahm had indicated in October that she felt the studies available showed some cause for concern, although the statistical significance was not present. Mr. Paul Hufnagel (Michigan Professional Fire Fighters Union) stated that the large study in Philadelphia with which Dr. Zahm was involved had not yet been published.

Dr. Fischer noted that most fires today involve burning polyvinyl chloride. He questioned whether this produced vinyl chloride, possibly leading to cases of angiosarcoma. Dr. Kummler responded that chlorinated radicals would be produced. Dr. Demers added that a small percentage of heavily exposed workers developed liver cancer. He stated that while it might be possible for short, high-dose exposures to also cause damage, it was not likely that fire fighters would show cases of sustained heavy exposures.

Dr. Swanson mentioned that the broader area of risk assessment included hazard identification which could be separated from the issue of quantitative risk assessment. She stated that none of the studies could be used to form a quantitative risk assessment, and that hazard identification for brain and stomach cancer were suggestive, rather than definitive.

Dr. Kummler stated that he was persuaded by the data that there are occupational

effects, but there are no studies that give a good cause and effect relationship and so allow quantification of the risk. He questioned that statistical significance is used to measure the quality and acceptability of a study, and yet those studies that did not demonstrate statistical significance are still included in the summary analyses. Dr. Swanson reiterated that it would be a biased analysis to leave them out.

Another problem, as noted by Dr. Swanson is that none of the studies included confounders, such as smoking. This makes it impossible to determine whether excess risk was due to occupational exposure or other risk factors. Mr. Harrison noted that this related to the last part of the Governor's charge which asked about "confounding factors such as smoking, frequency and duration of exposure to hazardous substances, and the use and non-use of hazardous material personal protection equipment." Dr. Fischer stated that for smoking and other confounders, there was not enough information to be able to consider them in the analysis. Dr. Demers clarified that it was possible to say that certain cancers, such as lung, kidney and bladder, might be influenced by smoking. Brain and stomach cancers would be less impacted. Dr. Fischer asked whether smoking caused cancer or merely exacerbated the risk. Dr. Swanson replied that there was evidence that smoking could function as both an initiator and a promotor in lung cancer.

Dr. Demers stated that there was good indirect evidence that exposures of fire fighters include carcinogens. Dr. Kummler added that it was possible to make some reasonable guesses at the levels, although it was not possible to determine the actual exposures.

Dr. Demers said that protection from exposure was an important issue to discuss. He stated that previous presenters to the panel had vividly described what was feasible. Dr. Kummler suggested that use of protective equipment should be encouraged, as it does result in a reduced risk. Dr. Demers added that the studies illustrated the uncertainty of the risks to fire fighters. For all cancers combined, the studies were divided fairly evenly as to whether there was an increased risk.

Dr. Fischer asked if there was consensus on the idea that there was a suggestion of a cancer effect, particularly for brain and bladder, in association with the occupation of fire fighting. Dr. Swanson clarified that it was brain and stomach, rather than bladder. Dr. Fischer added that if present, the effect is not strong. Mr. Harrison clarified that the nature of the studies was the problem. Dr. Swanson added that the studies do not measure strength of association. The findings are not clear, and rather than being strong or weak, are merely elevated. Dr. Demers said that there was enough evidence to suggest that there is an elevated cancer risk for these sites, and possibly others. He added that characterizing the risk as "weak" or "not strong" would seem to negate the fact that there is likely something there.

Dr. Fischer stated that although some studies indicated a statistically significant association, this did not necessarily demonstrate a strong effect. Dr. Swanson replied that this was the reason she reported that some of the studies found an elevated risk, while others did not. A few studies even found a significantly lower risk. Results of the

various studies are not highly consistent, with some finding increased risk in older fire fighters and others finding increased risk for younger fire fighters. Some of the studies did show consistency in that measures of greater exposure correlated with greater risk.

Dr. Swanson noted that since most of the data for these studies are based on existing records, rather than interviews, the Panel would only be able to make some very general statements. Dr. Fischer stated that it was his intention for the Panel to write a letter that provided the general conclusions of the Panel. Dr. Demers added that it would not be possible to provide the level of detail that they had been asked to provide.

Dr. Swanson stated that two things were quite clear. First, none of these studies have data that can be used to provide a quantitative estimate of exposure or risk. Second, none of these studies measured any exposure directly, nor did they measure any other risk factors or potentially confounding exposures. Dr. Kummler concurred.

Dr. Swanson added that for the majority of cancer sites, including all cancer combined, there is no evidence of elevated risk of cancers. She stated that there was suggestive evidence of an elevated risk for brain cancer and stomach cancer, and there are areas that would benefit from further research. In addition to brain and stomach cancer, areas that should be examined further include lung, skin, leukemias and lymphomas. Other issues to consider are the healthy worker effect, and using incidence as the focus of future research. In addition, better exposure measurements would be more informative since radical changes in exposures limit the validity of previous studies.

It was mentioned that there is no registry of fire fighters, either nationally or in Michigan. Dr. Demers stated that perhaps the Panel should recommend that strong consideration be given to work with fire fighter organizations to create a cohort for future incidence studies. Mr. Harrison noted that the Michigan Department of Community Health did have a cancer registry. Dr. Swanson added that this source did not have good occupational information. Often health insurance and other databases list claims according to the occupation of the insured person, not necessarily the patient.

Dr. Fischer noted that if the state allowed a presumption, this might create the need for a recording system of some kind as to exposures and health effects. Dr. Swanson objected to the routine collection of data as often being incomplete and inaccurate. Dr. Demers added that even when policy mandates something like reporting occupational disease, there is often a low level of compliance.

Dr. Fischer questioned the statement that fire fighters are exposed to chemicals that are carcinogenic. Dr. Kummler responded that it has been demonstrated that certain chemicals enter the body and are metabolized. These metabolites have been found in urine samples, so it is safe to say that some of these materials do get into the body.

V. PANEL ASSIGNMENTS

Dr. Fischer and Mr. Harrison would be in charge of drafting the letter to the Governor. The summary written by Dr. Swanson would be included as an appendix to the letter. Dr. Swanson would add a definition for IDR to the footnotes. Dr. Swanson said that she

would use some of the statements she had just made as points in her final summary. Dr. Demers would review the analysis by Dr. Swanson and compare it to the published review by Howe, to check for differences. Dr. Fischer said that he would work with Dr. Swanson on a few possible modifications to the statements she had made in the draft copy of her summary. Another appendix would be the material on exposures prepared by Dr. Kummler. Mr. Harrison said that he would contact Dr. Zahm to verify the status of the study that she had been working on, and whether anything had been, or would be published. He added that staff would also be periodically checking the Internet to see if there was any new information in this area.

VI. PUBLIC COMMENT

Mr. Joseph Grutza (Michigan Fire Chiefs Association) stated that firehouses are now non-smoking. Anyone wanting to smoke would have to go outside.

Mr. Paul Hufnagel stated that all public buildings in Lansing, including fire stations, have been non-smoking for the past five years. He also clarified that his union had 225,000 members, rather than the 225 that had been reported at the last meeting. He noted that along with their wellness and fitness program, the fire fighters union had been working on establishing a registry of Michigan fire fighters. This would be difficult to establish due to concerns over privacy. However, this would be a useful database for future research. Mr. Hufnagel said that he would check with people involved in the study in Philadelphia, to attempt to determine if there were more final results available.

VII. NEXT MEETING DATE

No additional meetings were scheduled for the Panel.

VIII. ADJOURNMENT

The meeting was adjourned at 2:55 p.m.

Respectfully submitted,
Keith G. Harrison, M.A., R.S., Cert. Ecol.
Executive Director
Michigan Environmental Science Board