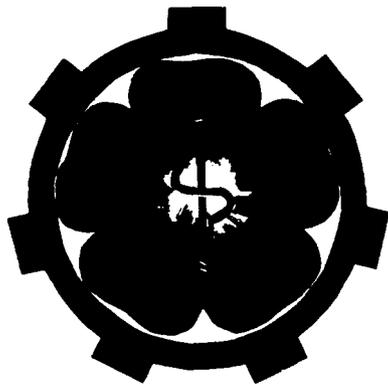


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# ALBERTA OCCUPATIONAL MEDICINE NEWSLETTER

## EDITORIAL COMMENTS

Our lead article for this issue is by Dr. Gary Liss, medical consultant with Ontario's Ministry of Labour. Dr. Liss has a background in both occupational medicine and epidemiology, and provides a concise update on the health effects of welding. His article is one of several produced by the Ontario Occupational Disease Panel; though the Panel is no longer active, most of its reports can be viewed at the website of the Canadian Centre for Occupational Health and Safety ([www.ccohs.ca/odp/](http://www.ccohs.ca/odp/)).

We have also included some short articles from Alberta WCB's newsletter, WCB Health Care Matters, that we feel are relevant for practicing physicians, in particular a short description of how claims are initiated and handled after the receipt of the Doctor's First Report. As well, have a look at the WCB's new (relatively) website at [www.wcb.ab.ca](http://www.wcb.ab.ca).

Lastly, an update on our recently published article "Fetotoxic Chemicals in the Workplace: a Draft Guideline for Physicians". This article was reviewed by the Committee on Reproductive Care of the Alberta Medical Association, who encouraged that we submit it to the Clinical Practice Guidelines Committee for further development and dissemination. It will also be used as part of the University of Alberta's rural CME program for northern Alberta physicians, and we have had several requests for it through the Occupational

Health Clinic at the University of Calgary.

We hope you enjoy this issue of the Newsletter, and to all, a very Happy Holiday Season.

Kenneth Corbet, MD, FRCPC  
Editor

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## HEALTH EFFECTS OF WELDING AND CUTTING FUME - AN UPDATE

by Gary M. Liss, MD, FRCPC\*

In 1985, this author prepared a document on the Health Effects of Welding and Cutting Fume, and in 1995, was asked by the Occupational Disease Panel to update the document. As in the initial review, this report is limited to effects associated with the gaseous and particulate components of the fume. For each outcome, recent findings are summarized and consistency was sought with the evidence noted in the earlier report.

Welding is an important occupational activity, in part because from 0.2 to 2.0% of the working population in industrialized countries has been reported to be engaged in welding. Although there are a vast number of

processes, it has been estimated that shielded metal arc welding (SAW, also known as manual metal arc welding, MAW) and gas metal arc welding (GAW or metal inert gas welding) applies to mild steel (MS), stainless steel (SS) and aluminium account for combinations practised by 70% of welders. The welding environment is very complex, with the presence of numerous gaseous and particulate components. The consumable is the major source of fume, although exposures extraneous to the process itself can be generated, such as decomposition products from chlorinated hydrocarbons or metal coatings. As a result of the multiple exposures, in general it is not possible to attribute health effects to specific fume contaminants or welding processes.

Welders continue to suffer both acute and chronic health problems that appear to be associated with work. With respect to acute effects, as found prior to 1985, acute intoxications continue to be observed, consisting mostly of case reports of lead intoxication, and upper and lower respiratory tract inhalation (bronchitis, pneumonitis) which may be process- or metal- dependent (cadmium, decomposed chlorinated hydrocarbons, coatings on metal). Severe cases of pneumonitis from inhalation of welding fume, such as that due to cadmium, may cause permanent sequelae or fatalities. The report of increased mortality among welders due

Prepared in the Department of Community Health Sciences, Faculty of Medicine  
The University of Calgary, through funding by The Workers' Compensation Board - Alberta

to pneumonia documented in the early time period have also been confirmed since 1985, and prompted one group of investigators (Coggon et al, 1994) to conclude that "there are strong grounds for the classification of lobar pneumonia as an occupational disease in welders". Metal fume fever (MFF) is an acute febrile illness of short duration due to inhalation of freshly generated fume that affects important proportions of welders (up to 30% in some estimates) and results from the inhalation of freshly formed oxides, most commonly that of zinc. The cause is not known but the syndrome resolves leaving no apparent chronic disorder. A new finding which was reported by Blanc et al (1993) suggested that various cytokines released from pulmonary cells may be involved in the pathogenesis of MFF.

Compared to the knowledge base in 1985, there is now evidence for acute (short-term) changes in pulmonary function among welders, that appear to be related to exposure (that is, present in groups with higher exposure or the absence of ventilation systems). A case of asthma was recently described by Vandenplas et al (1995) associated with GMAW on MS, which was confirmed on inhalation challenge with both late and dual reactions. Hendrick (1996) reported (in abstract form) that there was increased nonspecific methacholine reactivity among welders. Occupational asthma was also reported more frequently among welders than among the working population in general, in the Surveillance of Work-Related and Occupational Respiratory Diseases (SWORD) scheme in the United Kingdom (Meredith et al, 1991). The incidence of asthma among welders in one prospective study (Wang et al, 1994) was similar among MS Vs SS welders. However, because the incidence of asthma observed in this study was not much different than that estimated in the general population, the evidence for an association with asthma cannot be considered conclusive.

For the studies of non-malignant respiratory diseases (symptoms, pulmonary function) and lung cancer, the quality of the studies was rated independently by two reviewers. With respect to chronic health effects, given the respirable nature of welding fume, chronic non-malignant respiratory

disease continues to be an important focus of attention. Fourteen new studies were identified. Longitudinal studies have now been reported (as recommended in 1985); thus, the available studies are not all cross-sectional with the inherent weaknesses of this study design although the presence of confounders (especially smoking) still plagues the interpretation of these studies. Some but not all studies continue to demonstrate an increased prevalence of symptoms (chronic bronchitis as well as other symptoms) among welders compared to referents. While non-smokers were affected in some studies, there was evidence for an interaction with smoking in those reports where examined, with greater effects seen among smokers. Welders developed some respiratory symptoms (although not chronic bronchitis) more frequently than controls in 2 or 3 longitudinal studies. One study (Groth, 1989) found dose-response relationships for pulmonary symptoms among both smokers and non-smokers. Similarly, there is evidence from some but not all of the recent studies for enhanced deterioration of pulmonary function among welders compared to referents, involving the small airways somewhat more frequently than the large airways, and again with greater effects observed among smokers in some studies. These changes were not seen consistently across studies, however. In one study, obstructive changes were seen more frequently among older smoking welders than controls but restrictive changes were more prevalent among non-smoking welders. Enhanced deterioration of some pulmonary function measures was seen in all 3 longitudinal studies. Summarizing this issue, Wanders et al (1992) examined "medical wastage: among shipyard welders and controls (shipwrights and engine filters at the same shipyard) as part of a 40-year cohort study. Medical wastage was defined as leaving for medical reasons under the Disability Act. Invalidity pensions, death, and voluntary discharge for medical reasons. The only diagnostic category of medical wastage that was significantly different between the two groups was for non-malignant respiratory disease (greater among welders), with an adjusted incidence density ratio of 4.2 (95% confidence interval [CI] 2.4 - 7.4). The

authors concluded that it underscores the "need to reduce the large excess of respiratory diseases among shipyard welders". Overall, the evidence is somewhat better than that existing a decade ago.

As was found prior to 1985, there continue to be case reports documenting pulmonary fibrosis among welders, but these have now been shown to occur in the absence of silicosis. However, there are still no studies of the incidence of fibrosis among welders. Siderosis, a pneumoconiosis due to pulmonary deposition of iron particles, appears as nodular radiodensities on chest x-ray. Siderosis itself is usually considered to be benign, without fibrosis, and if fibrosis is present, is considered to be due to exposure to other dusts, such as crystalline silica. However, one epidemiological study by Funahashi et al (1988) involved histological examination of lung tissue obtained from 10 symptomatic welders with abnormal radiographs. They found evidence of interstitial pulmonary fibrosis that was moderate to pronounced in five and this did not appear to be related to co-existing silicosis.

With respect to non-respiratory chronic effects, an increased prevalence of neuropsychiatric symptoms has been reported among welders, but confirmation with objective neuropsychological tests is required. Most of the new studies of renal function continue to provide little evidence of renal function abnormalities among welders. However, a recent report by Nuyts et al (1995) from Belgium found an increased risk of chronic renal failure associated with exposure to welding fumes (odds ratio (OR) 2.1, 95% CI 1.1-4.01, but a dose-response relationship was not demonstrated. Some but not most studies of semen quality found a deterioration among welders. However, the studies suffer from weaknesses in methodology including low response rate and possible recall bias. There is limited evidence that the risk of Wilms' tumour is increased among the offspring of welders.

The recent in vitro studies continue to show that SS fume (particularly MMA/SS

welders (who are most intensely exposed to chromium), consisting of chromosomal aberrations and DNA-protein cross-linking. The implications of these markers of genotoxicity for disease is uncertain at present.

With respect to cancer, associations with several types of non-respiratory cancer have been reported but there is little evidence that these findings are related to time since first exposure or to duration of employment, and will need to be confirmed.

Given the respirable nature of the fume, and the presence in welding fume of metals known or suspected to be carcinogenic in other settings, attention has naturally been drawn to assessing the possible risk of lung cancer in welders. There is no experimental evidence documenting the carcinogenicity of welding fume. Three possible explanations for the excess of lung welding of any type; that MS welding, constitute a "hot spot" with a higher risk of lung cancer, or finally, that the increased risk may be due to the confounding effects of smoking, and possibly other carcinogens such as asbestos. Most of the epidemiological studies reported during 1985 or after, consistent with those reported previously, continue to document a small to moderate (about 30 - 40%) increase in lung cancer risk among welders. However, the findings are not consistent. The large (European) study conducted by the International Agency for Research on Cancer (IARC; Simonato et al, 1991) showed an overall increase in lung cancer mortality of 34%. However, a moderately large, well-conducted study of U.S. non-shipyard MS welders by Steenland et al (1991) found no excess (SMR 107 among welders, with SMR 117 among the comparison group of non-welders), no trend with duration of employment, and rate ratios less than 1 on internal comparisons (0.90, 95%, CI 0.60 - 1.36 for welders overall; 0.66 (0.33 - 1.30) for welding 10-20 years; and 0.65 (0.29 - 1.42) for welding greater than 20 years). This study was ranked as the best in quality, and was probably the one with the least potential for exposure of subjects to asbestos.

The studies of SS welders have been limited by small population size, and other than one very small study from

Sweden by Sjogren et al (1987) have not shown increases in lung cancer mortality that are greater than those among MS welders in the same cohorts. Lung cancer risk among SS welders in the IARC study was not related to cumulative exposure. Thus, although it is known that there is exposure to hexavalent chromium in this group, that welders absorb hexavalent chromium, that SS welding fume is mutagenic, and that this exposure is documented to cause increased risks for lung cancer in other industries, the evidence for SS welding to date as a cause of lung cancer is unclear. Future reports may clarify this.

With respect to confounding exposures, there is evidence from a number of studies that welders are exposed to asbestos based on finding mesotheliomas in these cohorts (especially at shipyards). Of the studies providing data on smoking prevalence, there is evidence that welders smoked more than the general population in the U.S., Sweden, France, and Norway, and smoked more than internal controls in a German study. However, these differences in smoking prevalence are unlikely to explain more than a 20% increase in risk.

IARC (1990) concluded that there is inadequate evidence for the carcinogenicity of welding fumes and gases in animals and limited evidence in humans, with a classification of Group 2B (possibly carcinogenic to humans), which means "a positive association was found for which a causal interpretation is considered to be credible, but chance, bias or confounding could not be ruled out with reasonable confidence". Given the evidence for confounding exposures, this would appear to be the case. In a recent case-control study by Jäcke et al (1994), the OR for lung cancer among welders was reduced (from 1.5 to 1.2) when adjusted for asbestos. In order to clarify this issue, case-control studies within the existing cohort studies should be undertaken, in order to examine the association of lung cancer with welding, including detailed exposure regarding MS Vs SS, while controlling for smoking and asbestos.

Taken as a whole, there continues to be evidence that exposure to welding fumes and gases that existed under past

and perhaps current conditions is associated with certain acute and chronic health problems among welders including relatively common conditions such as pneumonia, metal fume fever, non-malignant respiratory disease, and possibly lung cancer and other conditions. A number of new outcomes have been observed which had not been described a decade ago.

Reprinted with permission from the *Spring 1997* (Vol. 12, #1) issue of *liaison*, The newsletter of the Occupational and Environmental Medical Association of Canada.

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\* Medical Consultant, Ontario Ministry of Labour; Assistant Professor, University of Toronto.

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## WCB Alberta News

### Medical Advisory Guidelines

In 1995, WCB Medical Services began developing its medical advisory guidelines using a process that included extensive review of clinical research followed by the drafting of comprehensive research background papers.

The guidelines are not rigid rules, but data that medical advisors must consider in conjunction with their own clinical judgement and the medical information specific to each claim.

Individual medical advisory guidelines will be available on the WCB's website, [www.wcb.ab.ca](http://www.wcb.ab.ca) in the Fall of 1998, or they can be purchased from the WCB by calling (403) 498-4829.

\* \* \* \*

**What happens after a claim is filed?**

As a health care provider, do you wonder how your services fit into the WCB's claim process? Are you unsure how to respond when injured workers ask you what happens after their claims are filed?

From the outside, the Workers' Compensation Board (WCB) can seem complicated with its numerous processes, procedures, units and departments. But the organizational structure and operating systems enabled the WCB to efficiently handle more than 118,000 new claims last year.

When an injury report is submitted, the Registration team establishes a claim number. The claim number indicates the report has been registered and categorized, it does not mean the claim has been accepted. A claim is categorized as: No Lost Time when the worker has not missed time from work beyond the day of the accident, or as Lost Time when the worker misses time from work longer than the day of the accident.

After a claim is registered, the WCB's operating system sorts it by injury type. A No Lost Time claim is handled by the Short Term Claims unit. This unit also receives 90 percent of newly registered Lost Time claims.

The Short Term Claims unit consists of three work teams who decide whether a claim is acceptable. When a claim is accepted, this unit determines the first benefits and services the injured worker may receive. In the Short Term Claims unit:

1. The No Lost Time Adjudication team deals with No Lost Time claims.
2. The Adjudication I team issues benefits on simple, uncontested Lost Time claims.
3. The Adjudication II team handles complex Lost Time claims involving:
  - repetitive strain injuries;
  - delays by a worker in reporting to their employer and/or in seeking medical attention;
  - employers contesting the validity of the claim.

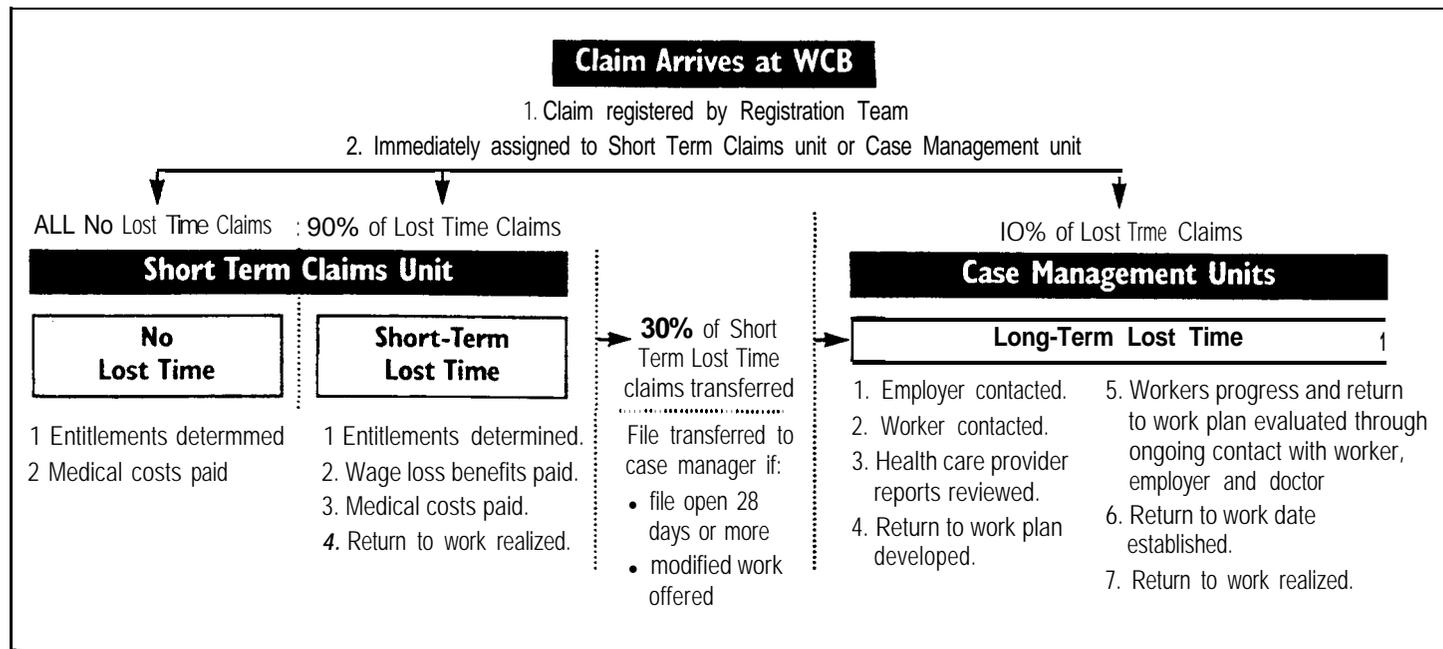
If the worker can return to work within 28 days from the date of injury, the claim is closed in the Short Term Claims unit. If the injured worker is offered modified work, or misses work for more than 28 days, the claim is transferred to a case manager in a Case Management unit for more specialized support and assistance. Case Management units consist of 23 teams of case managers grouped according to region, employer or injury type.

When a Lost Time claim is transferred from the Short Term Claims unit to the Case Management units, a case manager reviews the benefits and services the adjudicator in Short Term Claims started as a first step in developing return to work plans. Then the case manager consults with the injured worker, the employer and health care provider(s) to finalize the plan and decide whether the worker needs additional benefits and/or services.

Case management teams also handle the remaining 10 percent of newly registered Lost Time claims that involve occupational di-seases, severe burns, head and spinal cord injuries, and fatalities. When one of these claims is received from the Registration team, a case manager determines the entitlements and issues benefits. In all cases except fatalities, the case manager develops a return to work plan in consultation with the worker, employer and health care provider(s), and coordinates benefits and services that support the plan.

For more information regarding the claims process, call the claims information line: Edmonton, (403) 492-3800 or Calgary, (403) 517-6000.

*Reprinted with permission from WCB Health Care Matters, Summer 1998 (Vol. 2, No.2).*



# UPCOMING COURSES

## Seminars in Occupational Health and Medicine

(Occupational Health II - MDSC 645.11)

Department of Community Health Sciences, University of Calgary

Coordinator: Dr. Ken Corbet  
Dates: Winter Session 1999 - January through April 1999  
Time: Wednesday evenings, 1900 - 2130 hours  
Place: Room TBA, Heritage Medical Research Building

This seminar-based course is offered to physicians and nurses practicing occupational health on a full or part-time basis; graduate students in occupational health sciences (with permission); and other occupational health professionals. Final selection of topics will be based on a pre-course educational needs assessment of participants.

Ten sessions are planned, each session will include: 1-2 review articles for pre-reading by participants; a review of the topic by an invited speaker; and discussion of cases or issues presented by the speaker and participants.

This course may be taken for university credit or as an audit through the Department of Community Health Sciences. Application will be made for Continuing Medical Education credits. Enrollment is limited to 16 persons.

For further information call (403) 220-3362 or E-mail [blaikie@ucalgary.ca](mailto:blaikie@ucalgary.ca)

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## SOUTHERN ALBERTA OCCUPATIONAL MEDICINE PAGE

<http://www.med.ucalgary.ca/oemweb/>

This website provides a variety of learning resources in occupational medicine to assist undergraduate students, medical residents, and practicing physicians in Alberta.

developed by:

**The Department of Community Health Sciences**

**The BACS Learning Centre**

**Faculty of Medicine  
The University of Calgary**

*with the support of a Medical Education Grant from*

**The Workers' Compensation Board Alberta**

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a selection of links to governmental agencies, academic institutions, and specific topics in occupational medicine

*Have a browse and send your comments to*

*[blaikie@acs.ucalgary.ca](mailto:blaikie@acs.ucalgary.ca)*

# UPCOMING CONFERENCES

## CANADA:

- **Whiplash Associated Disorders**

A world congress for Health care, traffic safety, auto engineering and insurance professionals.

February 7-11, 1999

Vancouver, BC

Contact:

Phone: (604) 684-4148; Fax: (604) 684-6247

E-mail: [info@whiplash99.org](mailto:info@whiplash99.org)

Web: <http://www.whiplash99.org/index.htm>

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- **1999 American Industrial Hygiene Conference & Exposition**

Co-sponsored by American Industrial Hygiene Association and ACGIH

June 5-11, 1999

Toronto, Ontario

Contact:

AIHCE

2700 Prosperity Ave., Suite 250

Fairfax, VA 22031

E-mail: [infonet@aiha.org](mailto:infonet@aiha.org)

Fax-on-demand: (703) 641-4636

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- **Medical-legal Aspects of Work Injuries - 4th International Congress**

June, 6 - 9, 1999

Toronto, Canada

Contact:

Institute for Work & Health

250 Bloor Street East, Suite 702

Toronto, Ontario M4W 1 E6

Phone: (416) 927-2027 ext.21 31;

Fax: (416) 927-4167

Web: [www.iwh.on.ca/work99.htm](http://www.iwh.on.ca/work99.htm)

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- **4th ICOH International Conference on Occupational Health for Health Care Workers**

September 28-October 1, 1999

Montreal, Quebec

Contact:

4th ICOH HCWs Conference Secretariat

5100 Sherbrooke Street, east, Room 950

Montreal, Quebec, H1V 3R9

E-mail: [icoh1999@asstsas.qc.ca](mailto:icoh1999@asstsas.qc.ca)

Web:<http://www.santepub-mtl.qc.ca/icoh1999/anglais.html>

## INTERNATIONAL:

- **Eighth Annual Workers' Compensation and Occupational Medicine Seminar**

March 24, 25, 26, 1999

San Diego, California

Contact:

SEAK, Inc. - Medical and Legal Information Systems

PO Box 729

Falmouth, MA 02541

Phone: (508) 457-1111; Fax: (508) 540-8304

Web: <http://www.seak.com/semocmed.htm>

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- **XVth World Congress On Occupational Safety and Health: Safety, Health and Environment - A Global Challenge**

(Organized by the Ministry of Labour of Brazil, the International Labour Office (ILO), and the International Social Security Association (ISSA), Geneva)

April 12-16, 1999

Sao Paulo, Brazil

Contact:

Secretaria do XV Congresso Mundial Sobre

Seguranca E Saude no Trabalho

Fundacentro

Rua Capote Valente, 710

05409-002 - Sao Paulo - SP

Brasil

Web: [http://turva.me.tut.fi/cis/world\\_congress/](http://turva.me.tut.fi/cis/world_congress/)

*NOTE: The 4th International Film and Video Festival on Occupational Safety and Health will be held within the framework of the Congress.*

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For a more complete listing of conferences, check our website at

[www.med.ucalgary.ca/oemweb/meetconf.htm](http://www.med.ucalgary.ca/oemweb/meetconf.htm)