Canada Post Postage paid / Postes Canada Port payé
Bulk third class P281 / En nombre troisième classe

Vol. II, No. 1

Spring, 1984

ALBERTA OCCUPATIONAL MEDICINE NEWSLETTER

EDITORIAL COMMENT:

In this issue an attempt was made to gather readable material from the subdisciplines of Community Health Sciences: included are topics from areas of public health-international health, environmental health, occupational health and occupational dermatology. The editor wishes to thank Dr. J. Markham for his kind words in the last issue at the time of his leaving for private practice, and to assure him that the editorial staff will attempt to continue the same high quality and tone that he pursued.

The readership is invited to communicate with the editor regarding requests for particular topics that might be reviewed in the newsletter, suggestions for future issues, or questions in any areas of any of past issues that might be answered by the contributing authors.

W.M. Csokonay, MD, CCFP(C), DTM&H

CALGARY HOSTS XI INTERNATIONAL CONGRESS FOR TROPICAL MEDICINE AND MALARIA 16 - 22 SEPTEMBER, 1984

The XI International Congress for Tropical Medicine and Malaria will be held in Calgary from September 16 through 22, 1984. This meeting will bring together researchers, practitioners, nurses, engineers, planners of health care services and administrators from all parts of the world, to discuss topics of global interest and concern.

This Congress represents a rare opportunity for Canadian Health Care Delivery personnel from all backgrounds to come together and exchange information with personnel from different geographies, and perspectives.

Further information may be obtained by contacting the Congress Directorate, the Conference Office, The University of Calgary, Calgary, T2N 1N4 (403-284-5051)

INTERNATIONAL HEALTH—OCCUPATIONAL MEDICINE TOPICS

Advising and Preparing Employees for International Travel and Postings Abroad in Developing Countries

From time to time, in various learned and lay literature, one is confronted by yet another set of recommendations for travel abroad, as well as for prolonged stays or postings of corporate or contract employees and possibly their families to tropical/developing countries. One American author recently reviewed the responsibilities of corporate medical directors in preparing employees for foreign postings — included in his review was advice on education of personnel in food selection and water precautions and treatment, immunization, malaria chemoprophylaxis (if appropriate), pre-posting medical evaluation, health considerations abroad, and so on. Missing from his list was some consideration of possible medical, psychological or family and social problems which might be revealed during either interview or examination, and which may require special consideration or may even contraindicate long term postings abroad in a developing country. The controversial nature of this statement is recognized, and a later issue of this newsletter will explore these considerations. It is not the intention of this article to provide a new set of recommendations or completely review the vast literature on prevention of disease endemic to other geographies. Probably it is of more value to discuss some of the considerations behind the current recommendations for malaria chemoprophylaxis, from a Canadian point of view.

Malaria Chemoprophylaxis

The most frequent question from medical colleagues and clientele at the International Travel and Immunization Clinic at the University of Calgary is that of what constitutes appropriate and adequate malaria chemoprophylaxis.

Confusion exists as to the nature of chemoprophylaxis for malaria, the types, areas of risk, drug availability and use of these pharmaceuticals. Certain key points that are worthwhile considering include:

1) **Nature of the visit, geographic destination, type of exposure, and length of stay** (the environmental-lifestyle-occupational factor): Key questions, such as whether the exposure anticipated will be rural or urban or both, may be of value in providing the simplest, safest and most effective drug combination. A longer duration of stay in a rural area endemic for malaria, as would occur in a field worker, might be viewed as higher risk than his/her spouse living in a nearby coastal urban centre.
2) **The host factor**: Certain travellers are thought to be at higher risk of more severe disease and its complications if malaria is contracted: those under 5 years of age, and older adults without partial immunity (only obtained by continuous exposure and even then **only partial** and interrupted by other intercurrent illness), those without spleens, pregnant women, those using certain immunosuppressant drugs such as long term steroids, and, interestingly, with those on some oral contraceptives.
3) **The availability in Canada of certain antimalarials**: a primary concern is a consideration of chloroquine resistance at the destination of the traveller or employee. Recommended for non-chloroquine-resistant areas of the world are chloroquine (Aralen) or other drugs such as pyrimethamine (Daraprim), and proguanil (Paludrine).
4) **Chloroquine resistant falciparum areas**: The choice becomes narrow — strong recommendations exist for the use

of the combination of chloroquine and Fansidar for these areas (see Chart 1), but the latter drug as a fixed combination of pyrimethamine 25 mg. and sulfadoxine 500 mg. is available for individual travellers only through physician application to Hoffman-LaRoche Pharmaceuticals Ltd. in Ontario, under authorization of the Bureau of Human Prescription Drugs, Health Protection Branch, Government of Canada. The drug is by no means experimental, and this fact should be emphasized to the patient. Of primary importance is the screening of patients for contraindications to usage. Contraindications include: those who are allergic to the components (particularly sulfa), pregnant women, particularly at term, those women who are nursing, children under 2 months of age, those with impairment of renal or hepatic function where excretion may be slower or delayed, those with known megaloblastic anemia due to folate deficiency, and possibly those on other drugs known to be antifolate in action, or who have impaired absorptive gastrointestinal illnesses who may be prone to such folate malabsorption. Fansidar is available as a prescription drug in the United States and is available over-the-counter in some countries in the tropical parts of the world. The key issue here is an effective screening process for contraindications in each patient, and an explanation as to how and why each drug is used. Fansidar was originally touted as a broadly protective drug, effective against both chloroquine-sensitive ad chloroquine-resistant strains of falciparum malaria, as well as other forms of malaria such as vivax. It has been subsequently determined that vivax malaria can and does occur in travellers using only fansidar for chemoprophylaxis. The need for double chemoprophylaxis in all chloroquine-resistant areas where vivax malaria, falciparum malaria or the other forms can co-exist is extremely important — most patients are well able to tolerate chloroquine 300 mg base weekly, and fansidar, 1 tablet weekly when taken together. (adults dosages)

Adequate explanation to the patient must also be made with regard to **Degree of protection**: no single, or combination of drug chemoprophylaxis is 100% effective. At best, the protective efficacy is about 80-90%, depending on factors such as duration of stay and intensity of exposure to mosquito vectors, and compliance with medication protocol. The importance of health education with regard to personal protective measures in all employees sent abroad cannot be over emphasized.

Malaria advice and chemoprophylaxis is really a joint responsibility of the country of origin and the country of employment and residence. A simple yet controversial statement is advocated by this author in the interest of patient protection from drug adverse effects and in consideration in those posted abroad long term — the need for, and appropriateness of chemoprophylaxis must be reassessed on a regular basis (6 monthly). For instance, if an employee is working primarily in the field outside an urban centre such as Djakarta and his family is living in urban Djakarta with essentially no extensive rural exposure in areas of more intense transmission, physicians in the country of destination might advise the family to discontinue chemoprophylaxis intermittently when seasonal transmission is low or absent. This does not imply that chemoprophylaxis can be played with — the country of origin has responsibility in advising those sent abroad as to recommended chemoprophylaxis. However, the host country has particularly relevant input in advising visitors living in the country for prolonged periods of time of the most appropriate continuing or intermittent chemoprophylaxis regimen. Needless medication usage and maximal efficacy is thus obtained. The recommendation for a six monthly complete blood count with differential is a reasonable one in those who require fansidar for prolonged periods of time — this recommendation stems from the potential (albeit remote potential) of depression of bone marrow function with leukopenia that is occasionally reported as an adverse effect. Such alternatives to fansidar as maloprim are also used in chloroquine-resistant areas — maloprim, as a combined form of dapsone and pyrimethamine, is not available in Canada, but the components individually are able to be prescribed. Available anti-malarials in Alberta which can be used for chemoprophylaxis include those listed in Chart II.

This brief update on availability of chemoprophylaxis for malaria and rationale for utilization is aimed at aiding those in industry (or in a supportive role to industry) who advise the working public destined for positions in developing tropical countries. The author wishes to invite the readership to submit questions to **Alberta Occupational Medicine Newsletter** on particular points of concern or contention. If a positive response is obtained, the author would consider including a regular column on either emporiatric (travel medicine) or international public health topical updates.

W. Csokonay, M.D.
International Travel and Immunization Clinic
Department of Community Health Sciences
University of Calgary
(References can be obtained by correspondence with the editor)

Chart I: Chloroquine Resistant Areas (FALCIPARUM MALARIA)

AMERICAS	AFRICA	ASIA
Bolivia	Comoros Islands	Bangladesh
Brazil	Kenya	Burma
Colombia	Madagascar	Cambodia
Ecuador	Sudan	China (bordering on S.E. Asia)
French Guiana	Tanzania	India (partic. N.E. portion)
Guyana	Uganda	Indonesia
Panama	Zambia	Kampuchea
Surinam	Zanzibar	Laos
Venezuela	Mozambique	Malaysia
Peru	Ruanda	Nepal (parts)
	Burundi	Nicobar
	Malawi	Pakistan (suspected in Baluchistran)
		Papua New Guinea
		Philippines
		Solomon Island (west)
		Thailand
		Vanuatu
		Vietnam

Chart II Available Antimalarials in Alberta for Chemoprophylaxis of Malaria

	Recommended Adult Dose
Chloroquine Phosphate (Aralen)	**300 mg base** weekly
Pyrimethamine (Daraprim)	25 mg/week
Proguanil (Paludine)	100-200 mg per day
Sulfadoxine 500 mg + 25 mg Pyrimethamine (in combination as Fansidar)	1 Tab weekly
Dapsone 100 mg plus pyrimethamine 12.5 mg (MALOPRIM)	1 Tab weekly

RASH STATEMENTS II

Ultraviolet Light—An Occupational Hazard

Workers for international corporations may be required to work in foreign countries. Many of these countries will be close to the equator and as physicians we must consider increased ultraviolet exposure as a potential occupational hazard. It must also be remembered that domestic outdoor workers are also exposed to the same potential risks although to a lesser degree.

Ultraviolet light is arbitrarily divided into three regions according to wavelength: UVA, UVB and UVC. UVB (290-320 nm) and UVA (320-400 nm) wavelengths both reach the earth. The acute effects of ultraviolet damage to the skin are primarily UVB in origin. The most predominant is sunburn which may vary from a uncomfortable redness to a painful blistering and scarring reaction. Chronic exposure to ultraviolet light (UVB and UVA) is responsible for "actinic damage" (wrinkling, thickening and pigmentary changes) of the skin, keratoses and the induction of both nonmelanoma and melanoma skin cancers.

Ultraviolet light is most intense between the hours of 10 a.m. and 3 p.m. Fog and clouds do not offer protection against ultraviolet light. Reflections from water, snow, sand and concrete also increase one's ultraviolet light exposure.

Workers may be assessed as to their individual susceptibility to ultraviolet induced injury. Their personal history of sunburning and suntanning following the first 30-45 minute exposure to midday summer sun is helpful in classifying them into six types of reactivity. Those with skin types I and II require the greatest protection from ultraviolet light.

Protection from ultraviolet light can be obtained by physical and chemical means. Protective clothing such as wide brimmed hats, long-sleeved shirts and long pants are obvious physical protective measures. Ultraviolet light passes through the interstitium of fabrics. It is therefore the weave of the fabric that is the most important factor to consider in selecting clothing—the tighter the weave, the greater the protection. The color and thickness of clothing are poor guides to ultraviolet protection.

Topical sunscreens are divided into two broad categories, chemical and physical. Chemical sunscreens protect the skin against actinic radiation by absorbing incident radiation while physical sunscreens reflect and scatter it. Chemical sunscreens contain UV absorbing chemicals incorporated into a cream, lotion or gel base. The most common chemicals are PABA, PABA esters, benzophenones, cinnamates, salicylates and anthranilates. Most chemical sunscreens are a mixture of these chemicals with the majority of them having either PABA or PABA esters as part of the combination. They are usually effective as an invisible thin film and are cosmetically acceptable to most patients. Physical sunscreens are usually opaque, thick and cosmetically unacceptable to many patients. Titanium and Zinc Oxide pastes are examples of these.

Manufacturers recently began labelling their products with a sun protection factor (SPF). The SPF is a number (1-15) that defines the ratio of the ultraviolet dose (calculated by time) required to produce a mild sunburn of the skin while wearing the sunscreen, to the UV dose required to produce the same sunburn without the sunscreen. The greater the number, the better the product's protection (i.e., if a patient who normally sunburns after 10 minutes of ultraviolet exposure wears a sunscreen with an SPF-15 he will not sunburn until after 150 minutes (10 x 15) of ultraviolet exposure).

Another consideration when choosing a sunscreen is the ability of the formulation to stay on the skin despite sweating and water immersion. The SPF of a sunscreen will be reduced significantly when used in these conditions. "Waterproof" sunscreens are now commercially available.

When assessing workers exposed to excessive ultraviolet light, a number of factors must therefore be considered:

1) the skin type of the individual
2) the type of environment (intensity of light, humidity, seasons, wind, etc.)
3) the practicality of protective clothing
4) the type of chemical sunscreen and its sun protection factor

Individuals with skin type I and II should rely heavily on protective clothing and chemical sunscreens with an SPF of greater than 10. The decision as to whether to use a cream, lotion or alcohol gel should generally be left to the worker, who will be able to choose the most comfortable preparation to wear. Individuals should graduate their exposure-time slowly and reapply sunscreens often when in an environment with high relative humidity or with increased perspiration. Workers that tan easily should also protect their skin. Tans are reasonable protection against the acute effects of UV exposure but are only of limited benefit in protecting the skin from the aging and carcinogenic effects.

These same principles may be used to advise an individual on his suitability for a particular occupation. During a preemployment examination, the skin type may be determined and the worker with skin type I or II could be advised against outdoor work particularly in areas of the world with a relative increase in ultraviolet light.

(Dr. Kirk Barber is the Consultant Dermatologist to the Occupational and Environmental Heath Clinic at the University of Calgary. Dermatological topics will be a regular feature of the Newsletter and Dr. Barber welcomes your questions, comments and criticisms (270-3197).)

SUN-REACTIVE SKIN TYPES

SKIN TYPE	SUNBURN AND SUNTAN HISTORY	RECOMMENDED SPF
I	Always Burn Easily; Never Tan	>10
II	Always Burn Easily; Tan Minimally	>10
III	Sometimes Burn; Tan Lightly	8-10
IV	Rarely Burn; Tan Well	6-8
V	Rarely Burn; Tan Darkly	4
VI	Never Burn; Deeply Pigmented	N/A

From the Journals — Article Review
Occupational Health in China[1]

China's ongoing modernization campaign has in the past and continues to require intensified industrialization, which has resulted in increased occupational health problems. Christiani's article provides a detailed account of China's current occupational health problems and her attempts to address them. The author's report is based on a one year experience in China in co-operative research projects, educational work and extensive site visits to occupational settings.

China's population has almost doubled in thirty years, and while economic development has been remarkable, the standard of living has not risen beyond that of providing basic necessities. There has been a rapid and varied expansion of industry since 1976, with a noticeable emphasis on the development of "collective" light industry within communes, focusing primarily on consumer goods in the last three years. New occupational hazards and issues are steadily emerging in this process.

Current major occupational health problems as identified by Chinese specialists are: occupational lung disease, industrial chemical poisoning, pesticide poisoning, heavy metal poisoning, physical hazards, and occupational cancer. The article discusses each of these problems, and gives examples of relevant research being conducted in each area. Research has involved large retrospective studies of asbestosis, ongoing surveys in cotton dust-related disease, and studies to establish standards for compounds in the growing plastics and synthetic fiber industries. Effective control programs are emerging which have shown dramatic reduction in prevalence of many occupationally related diseases.

Control of occupational hazards in China is described as having a seven-pronged approach: engineering controls; personal protective equipment and hygiene; worker education; preventive diagnosis; professional training; and workers' compensation. The general approach in industry is to develop performance standards and to require compliance through engineering

controls. There are also moves to establish laws for enforcement procedures. Since retrofitting of old factories and modernization of whole industries will take time and is costly, heavy emphasis is being placed on personal protective equipment as an interim measure. A long established branch system of antiepidemic stations is beginning to assume the role of worker education and preventive diagnosis in occupational health. There is now occupational health training for nurses, and a strong emphasis in the training of primary care workers.

The reviewer's impression of this well-written article is that of China's intensity of effort to improve workers' health and to establish a modern occupational health program within the constraints of the country's level of economic development. It is a comprehensive and well documented article, with 21 of the 26 references research papers written in China.

Sheila A. Robinson, BScN, MA
Department of Community Health Sciences
University of Calgary

REFERENCES

[1]Christiani, David C. M.D. MPH., *Occupational Health in the People's Republic of China.*; AJPH 1984 January; vol. 74, no. 1:58-84.

PERSPECTIVES: CARBON-MONOXIDE — WHO OWNS THE "PROBLEM"?

The division between occupational medicine, environmental health, and public (community) health has been regarded as indistinct and somewhat artificial. That these boundaries could be acting to influence the nature of research studies is not often considered.

A study of the health effects of many physical or chemical agents, whether due to exposure to noise, lighting, lead or asbestos, might first begin with an examination of the effects of exposure at the worksite. But, to be comprehensive, such a study should further include the health consequences of other exposure settings, such as the home and the general community and, as well, consider the interrelation of many other social and economic factors. Failure to take into account the multivariate nature of the situation may result in faulty reasoning and erroneous conclusions.

This potential "confounding" may in part be due to the compartmentalization already referred to. This division may be contributing to a perplexing situation for the researcher trying to decide who really "owns the problem", and, in particular, who should be approached for funding of an investigation; also, the disciplines themselves may not recognize a comprehensive study as having particular relevance.

A study of the health effects of carbon monoxide (CO) would seem to be an excellent example of such a situation. Like noise, lighting, lead, or asbestos, CO is ubiquitous, and its effects on an individual's wellbeing and performance may be found to be more diverse and universal than might be immediately suspected.

It is generally held that carbon monoxide affects humans solely through anoxia, forming a strong bond with the hemoglobin molecule, and thereby affecting oxygen transport to the tissues in a number of ways[1]. A less common tenet, however, is that CO damages the tissues in a more direct fashion through reaction with cytochrome oxidase[2].

A variety of symptoms have been linked to carboxyhemoglobin (COHb) levels; however, there is evidence that a bolus effect also exists. Exposures to high concentrations of carbon monoxide can lead to sudden onset of coma, followed by death without intervening symptoms. Low concentrations of COHb (<10%) are not believed to elicit subjective response except in hypersusceptible individuals[3]. However, it has been suggested that physiological changes may be present at every level of exposure, and that detection of these changes is solely dependent upon the sensitivity of instrumentation[4]. Furthermore, behavioral toxicologists have frequently reported findings which demonstrate a reduction in vigilance and reaction time, and the depression of complex intellectual behavior at levels far below this "safe" concentration of COHb[5]. It has been estimated that carboxyhemoglobin has a half-life of four to five hours. If low-level effects do exist, it is possible that an individual could be compromised before arriving at the worksite because of exposure to carbon monoxide in the home or on the way to work; also, exposure in the occupational setting might continue to affect him after hours. Accidents occurring in that individual might not be attributed to CO-intoxication, and those occurring off the job site would not likely be identified as work-related.

It has been estimated that most people in our society spend 80-90% of their lives indoors, whether at home, at work, or in other pursuits. Energy conservation measures have stressed a tightening of structures and the reduction of fresh air changes per hour. Unlike many other contaminants, carbon monoxide cannot be removed from interior environments by air-cleaning methods, but must rely on ventilation. The potential therefore exists both for a build-up of CO and for long periods of exposure indoors. Carbon monoxide is legitimately one of the contaminants of concern to those researchers exploring the relatively new area of indoor air pollution.

Carbon monoxide has been implicated in atherogenesis, cardiovascular disease[6], poor fetal development[7], and the incidence of vehicular accidents[8]. Moreover, ambient CO levels have been associated with increased mortality in a study of community air pollution[9]. This asphyxiant has been reported to cause more industrial deaths than all other toxic gases combined, but clearly it may be far more of a hazard than the reported available statistics would suggest.

Exposure to carbon monoxide is therefore of concern to each of occupational, environmental, and public health disciplines. However, through informed awareness of the scope of this contaminant, comprehensive investigation from each perspective has the potential to complement and expand present understanding. When the individual is regarded as existing in a dynamic state with his working as well as with his general living environment, each viewpoint can only augment the state of knowledge and perspective of the others.

Peggy M. Watson
Graduate Student
Department of Community Health Sciences
Faculty of Medicine
University of Calgary

References Available on Request

NOTICE BOARD
UPCOMING MEETINGS — CONFERENCES

American Occupational Health Conference, AOMA, c/o 2340 S. Arlington Heights Rd., Arlington Hts, IL 60006, April 28-May 4, 1984.

International Conference: Occupational Ergonomics, The Conference Office, Human Factors Association of Canada, P.O. Box 1085, Stn. B., Rexdale, Ontario, May 7-11, 1984.

Canadian Public Health Association Annual Meeting - Health Kaleidoscope, c/o Drs. E. Love, G. Bonham, Department of Community Health Sciences, University of Calgary, June 26-28, 1984.

Canadian Society for Tropical Medicine and International Health Programs, June 25-27, 1984, Calgary, Alberta.

XXI International Congress on Occupational Health, Dublin Ireland, Sept. 9-14, 1984.