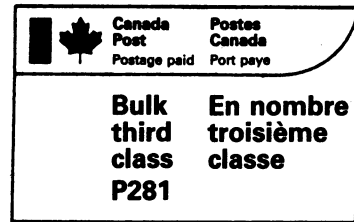
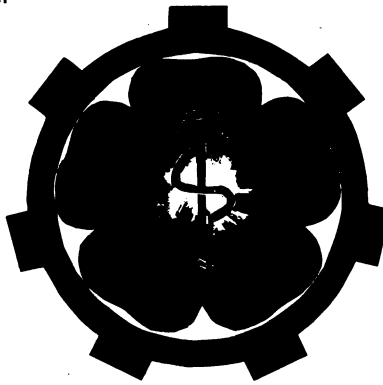


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ALBERTA OCCUPATIONAL MEDICINE NEWSLETTER

EDITORIAL COMMENTS

This first issue of the sixth volume of the Newsletter brings with it news of current activity in Occupational Medicine in Alberta. Many new publications have recently become available, and are outlined here. In addition, Tee Guidotti has presented reports of occupational meetings both locally and farther afield.

We received many requests for further information as a result of Bill Csokonay's earlier article on pretravel advice. This issue discusses in some detail the medical management of workers who have returned from abroad, and will, we hope, be equally valuable.

Don Johnston's recent talk to the Alberta Institute of Agrology takes a provocative look at pesticide use, and questions the current "wisdom" on the subject of their usefulness — and harmfulness. Tee Guidotti has provided us with information on two conferences — one international, one local — of interest to occupational medicine.

There are several announcements of upcoming events scattered through this issue — please check through the pages, as some may well be of interest to you. If you wish further information on any of the content of the Newsletter, please contact the editorial office, and we will try to direct you to sources which may expand upon the issues raised (briefly) in these pages.

Heather Bryant, MD, PhD, FRCPC.

* * *

NEW PUBLICATION FOR PHYSICIANS FROM ALBERTA OCCUPATIONAL HEALTH AND SAFETY

Since the last issue of the Newsletter, several new Guidelines have been published by Alberta Community and Occupational Health. These include three additions to the Medical Guideline series. These excellent, short Guidelines are aimed at the physician with no special training in occupational medicine who wishes further information on particular work-related medical issues. The new guidelines are:

34. **The Impaired Worker**
This includes a definition of the impaired worker, and a useful review of detection. A brief review of the problems of drug screening is included. Finally, suggestions for dealing with an impaired worker are outlined. This Guideline is of most value to physicians with some responsibility in an actual worksite.
36. **Medical Assessment of the Pregnant Worker**
This is a very useful document on an increasingly important subject. Its 20 pages include a consideration of health and safety issues, workplace environmental hazards, and assessment of the pregnant worker. The reference list is useful and up-to-date.
37. **First Aid Training**
This brief (5 page) document outlines qualifications for emergency, standard, and advanced first aiders.

All of these Guidelines are free of charge, and can be obtained by writing to:

Alberta Community and Occupational Health
 10709 Jasper Avenue
 Edmonton, Alberta
 T5J 3N3

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INFORMATION FOR WORKERS FROM ALBERTA COMMUNITY AND OCCUPATIONAL HEALTH

These bulletins follow a format similar to that of the popular Guidelines, but their target audience is the worker. Newly available are:

- AIDS and the workplace
- Health effects of solvent exposure
- Eye injuries on the worksite
- What to do if you think you have health problems from your work
- What your doctor needs to know about your job
- Noise at work.

Copying these publications for use by patients or workers is encouraged. They are available from:

Alberta Community and Occupational Health
 10709 Jasper Avenue
 Edmonton, Alberta
 T5J 3N3

**Prepared in the Department of Community Health Sciences, Faculty of Medicine
 The University of Calgary, through funding by Alberta Community and Occupational Health**

MEDICAL EXAMINATION AND SCREENING OF WORKERS AFTER OVERSEAS ASSIGNMENTS

William M. Csokonay, M.D., C.C.F.P.,
D.T.M. & H. (Lond.), F.R.C.P.*

In a previous article (Volume V, No. 3), pretravel assessment for workers travelling or employed abroad was discussed. Worthy of some comment are examinations and screening of business travellers after arrival home. It is often surprising that in many cases those easily labelled on first impression as "working well but worried" have had extensive and varied exposures abroad, and do merit more than reassurance alone.

Many organizations follow a prescribed format for such examinations which generally reflect the geographic travels for the individual, the possible infectious/communicable diseases endemic to those areas, the length of stay abroad, and any specific work-related hazards inherent in the job. In general, this type of evaluation is requested or recommended because of:

- (a) **an illness acquired abroad** - either resolved, with concerns about whether communicability remains, or other questions regarding treatment or lack of treatment abroad; or because of ongoing symptoms
- (b) **an illness with onset after arrival home** - (e.g., fever, diarrhea, etc.)
- (c) **known or suspected contact with an infectious disease abroad** - (e.g., Sexually Transmitted Diseases)
- (d) **"periodic examination" requested/required by contract/policy in a well individual** - but for whom there may have been some risk of travel-related exposure.

While there are no legislated requirements which apply to the individual for examination on return to Canada, certain occupational groups should be encouraged to consider an examination where an illness or exposure has occurred, and where possible dissemination to others in the workplace may be a concern. This would include health care workers and those in the food industry, for example.

It has been the opinion of some experts that exposure histories should also dictate the type of, and intensity of, examination and screening for travellers returning home. In addition to standard medical interview, there are certain questions which may provide clues in revealing possible exposure to disease endemic in another geography including: sources of water consumed and its treatment/non-treatment; skin exposure to fresh water rivers/lakes in known schistosomiasis-endemic areas; walking/working barefoot; recreational and sexual activities; food

sources; animal/arthropod contact, and illness in coworkers/family members who accompanied, or in local populations. In brief, the medical examination and screening can therefore be modified to reflect a number of potential risk factors for the individual:

Short Term Traveller: - Travel history, exposures
- Standard medical interview
- In most who are well, routine lab investigations are not necessary
- Stool examinations for C&S and O&P (once) might be considered

Longer Term Traveller
(e.g., 3 months): - Travel history, exposure history
- Standard medical interview
- Consider complete blood count, eosinophil count, SMA-12, Mantoux Test and Stool examination for C&S (once) and O&P (twice)
- Special testing for tropical parasites also considered based upon geographic travel, exposure and clinical symptoms

Very often the returned traveller will have concerns related to parasitic infection acquired abroad. A syndromic approach suggested by Shafraan and Chow may be useful to pursue, but it is worthwhile to consider that most parasitic infections are asymptomatic, and one may have to rely on history and knowledge of the geographic distribution of health hazards and disease in foreign countries. Table 1 summarizes the geographic distribution of selected potential health hazards described by both Centres for Disease Control and World Health Organization in 1987.

Of these, the following conditions are worthy of some comment:

MALARIA

There currently is no single test which provides sufficient sensitivity to rule out recent exposure (or latency) to malaria in the absence of clinical symptoms. Travellers who have lived/ worked in malaria

endemic areas should be instructed to promptly report any occurrence of fever/flu-like symptoms so that blood films (thick and thin) may be taken, and if positive, treatment given. Primaquine in a dose of 15 mg daily for 14 days should also be given following treatment to attempt eradication following an acute attack or relapse of *vivax* or *ovale* malaria, after screening for G-6-PD deficiency. Primaquine should also be considered for terminal prophylaxis for persons who have had prolonged exposure in malaria-endemic areas. Since most malarious areas of the world (except Haiti) have at least one species of relapsing malaria, travellers to these areas do have some risk of acquiring either *P. vivax* or *P. ovale* — unfortunately, it is difficult to quantify this risk. When used for terminal prophylaxis, primaquine is administered, usually in conjunction with chloroquine, during the last two weeks of the six week prophylaxis period following termination of exposure in an endemic area.

GASTROINTESTINAL PARASITES

An often-asked question relates to the indications for treatment of the various intestinal protozoa reported by the laboratory to the physician. While the presence of these organisms does imply past exposure to fecally contaminated food or water (or possible sexual exposure for some), vigorous chemotherapeutic treatment is not always indicated, especially in the asymptomatic individual (Table 2). Group 1 may account for intermittent loose stools, but are usually asymptomatic commensals with no invasive potential and can be left untreated—likely to be excreted with time. Group 2 are often considered pathogenic/potentially invasive or communicable, but even this group may not always require treatment with metronidazole and/or lumenicidal agents. In general, where symptomatic, or where there is concern regarding the epidemiologic setting for further transmission (e.g., food handlers), treatment is indicated, and guidelines are available in the literature or from the author. Group 3 are considered possibly pathogenic when present in great numbers, or in those with compromise of immune mechanisms. No ideal treatment regimens have as yet been established but metronidazole might again be considered for those with diarrhea and heavy infections with *B. hominis* or *D. fragilis*.

HIV INFECTION

An often expressed concern of the traveller/worker upon return is the possibility of HIV exposure as a result of sexual or other circumstances abroad (most often in those working in Subsaharan Africa).

Thorough evaluation through clinical history and examination should be offered and those patients with valid reasons to suspect possible HIV infection must receive both pre-test and post-test counselling. Most important is to assure confidentiality — no employer in this country, to the author's knowledge, has any requirement for routine HIV-1 antibody testing for expatriates returning home, nor for any reporting of test results to management or the organization.

References available on request.

**Director, International Travel and Immunization Clinic, The University of Calgary and Clinical Assistant Professor, Departments of Community Health Sciences and Microbiology and Infectious Diseases, Faculty of Medicine, The University of Calgary.*

* * *

UPCOMING CONFERENCES

The Canadian Occupational Health Association 1988 Conference theme is "APPLYING WHAT WE KNOW". It will take place November 8-10, 1988 in Ottawa, under the sponsorship of the Medical Services Branch, Health and Welfare Canada. For further information contact:

Dr. John Kirkbride
Occupational Health Unit
Medical Services Branch
Health and Welfare Canada
Tunney's Pasture
Ottawa, Ontario
K1A 0L3

* * *

Table 1
Geographic Distribution of Selected Potential Health Hazards

REGION	
North Africa	Arthropod-borne diseases unlikely, except for focal areas. Foodborne and waterborne diseases are endemic (dysenteries and diarrheas, typhoid, hepatitis A, schistosomiasis in Nile delta and valleys. Alimentary helminthic infections, brucellosis and giardiasis common.
Sub-Saharan Africa	Arthropod-borne diseases are a major cause of morbidity, including malaria (esp. severe <i>falciparum</i> form), filariasis, foci of onchocerciasis, cutaneous and visceral leishmaniasis, trypanosomiasis, yellow fever, and tungiasis. Foodborne and waterborne diseases are highly endemic including schistosomiasis, alimentary helminths, diarrheas and dysenteries. Polio is widespread, and epidemic meningococcal meningitis has occurred. Certain arenaviral hemorrhagic fevers have occurred, as well as Lassa fever.
South Africa	Arthropod-borne diseases such as malaria, plague, tick-bite fever and typhus (mainly tick-borne) have been reported. Foodborne and waterborne diseases are common in some areas, particularly amebiasis and typhoid.
Central America	Foodborne and waterborne diseases are common. Rabies is widespread in animals (usually dogs and bats). Malaria exists in all of the countries, but confined to a few areas in Costa Rica and Panama and the west coast of Mexico. Dengue fever may be contracted, especially during the months of July, August and September in some areas of Mexico.
Caribbean	Malaria occurs in endemic form only in Haiti and the western part of the Dominican Republic. Bancroftian filariasis occurs in Haiti and some other islands. Outbreaks of dengue fever occur in the area. Bacillary and amebic dysenteries are common.
Tropical	Malaria (<i>falciparum</i> , <i>vivax</i> and <i>malariae</i>) occurs as does American
South America	trypanosomiasis (Chagas' disease) and the leishmaniasis. Others include filariases, yellow fever, dengue, viral encephalitis, bartonellosis (Oroya fever). Foodborne and waterborne diseases are common.
East Asia	Malaria primarily occurs only in the southern provinces of China. Filariases are reported from China and Republic of Korea. Epidemics of dengue fever, hemorrhagic fever with renal syndrome, and Japanese encephalitis may occur. Foodborne and waterborne diseases and viral hepatitis are common.
Southeast Asia	Arthropod-borne diseases are an important cause of morbidity, including malaria, filariasis. Japanese encephalitis, dengue and dengue hemorrhagic fever can occur in both urban and rural areas. Foodborne and waterborne diseases are common, as well as alimentary helminths.
Mid South Asia	Arthropod-borne diseases are endemic in all countries including malaria (except Maldives), filariases, leishmaniasis. Foodborne and waterborne diseases are common, especially cholera, watery diarrheas, dysenteries, typhoid, viral hepatitis and helminthic infections.
West South Asia	Arthropod-borne diseases are not widespread risks. (No malaria in Kuwait, Bahrain, Cyprus, Israel, Jordan, Lebanon or Qatar). Foodborne and waterborne diseases are a major hazard in most countries.
Oceania (Melanesia and Micronesia-Polynesia)	Arthropod-borne diseases occur in many islands. Malaria is endemic in Papua/New Guinea. Neither malaria nor <i>Anopheles</i> mosquitoes are found in Fiji. Filariasis is widespread, but prevalence varies. Foodborne and waterborne diseases are commonly reported.

Table 2
Intestinal Protozoa Commonly Reported

Group 1:	<i>Amebae</i>	Entamoeba hartmanni Endolimax nana Entamoeba coli Iodamoeba butschlii	Comment: Nonpathogenic Noninvasive "Commensal" life cycles
	<i>Flagellates</i>	Chilomastix mesnili	
Group 2:	<i>Amebae</i> <i>Flagellates</i> <i>Ciliates</i>	Entamoeba histolytica Giardia lamblia Balantidium coli	Comment: Pathogenic or potentially invasive and/or communicable
Group 3:	<i>Amebae</i> <i>Sporozoa</i>	Blastocystis hominis Dientamoeba fragilis Cryptosporidium species	Comment: Potential pathogens (when present in heavy numbers) (cryptosporidia in immunocompromised hosts)

AOHS MID-YEAR MEETING IN EDMONTON "A NEW LOOK AT HEALTH PROMOTION"

Despite nasty weather 20 members and guests showed up for the mid-year meeting in Edmonton of the Alberta Occupational Health Society on June 8, 1988. Following a presentation by Janet McBean and Katherine Cormie of the Health Promotion Division of the Edmonton Board of Health (EBH), an open discussion explored new and innovative concepts of health promotion and its links to occupational health and safety.

Health promotion was seen as more than a collection of participatory services to reduce personal health risks and to enhance individual well-being. It was also perceived as a movement to insist on a healthy environment and to reshape the options in daily life so that the healthy choice is the easy choice. Health promotion should not be placed in a conflict with hazard control activities in the workplace; rather, health promotion can be a powerful facilitating movement empowering health professionals, workers and concerned managers to persuade management to go even further in occupational health and safety. The key is to recognize that the worker is also a person who lives in the community. Health promotion logically should follow the worker home and apply equally to workplace hazards as well as personal risk factors.

A model program developed by the EBH coordinated health promotion activities for employees of numerous small businesses in the Strathcona district. This program of necessity blended community and worksite health promotion activities, with considerable success. One essential lesson learned was that to be effective, the facilitator must be humble and learn from the managers of small business — packaged solutions and preconceived notions fare poorly in the competitive and rapidly changing world of small enterprises. Community-based health promotion programs with outreach into workplaces may be an attractive model for the future, as they have the potential to encourage healthful living both at home and at work and can be close to community roots. The Strathcona experiment was a learning experience for all involved and one of the few to mix community and worksite health promotion activities.

The Annual Meeting of the Alberta Occupational Health Society is scheduled for November 18, 1988 in Calgary, at the Marlborough Inn (convenient to the airport). A full day of speakers and activities is on the agenda. An outreach meeting is also planned for Fort McMurray in the Fall.

- Submitted by Dr. Tee Guidotti

OCCUPATIONAL HEALTH IN THE 1990's: DEVELOPING A PLATFORM FOR DISEASE PREVENTION

CONFERENCE REPORT: January 21-23, 1988, Washington D.C., Sponsored by the New York Academy of Sciences

Tee L. Guidotti, M.D., M.P.H.,
C.C.B.O.M.*

This conference was convened to discuss new opportunities for leading the occupational health effort in North America into the next decade. The emphasis of the meeting was on greater innovation and more thoughtful regulation. This meeting was one of the most optimistic and dynamic in recent years. Participation in the meeting was balanced among labour, corporate, government and academic sectors.

A major preoccupation was reform of the worker's compensation and the tort liability systems in the United States. The workers' compensation system is widely regarded as having been framed in a simpler era in which the tort process was not working to the advantage of the claimant. It was perceived to have bogged down in procedure and legal assumptions that it was designed to avoid. The proposed concept of boards of experts to agree on causation and level of impairment by a process of consensus was considered likely only to improve the situation temporarily, because such boards are seen to be prone to the same pressures affecting the present adjudication process. A more fundamental reform might be adoption of the German system in which the insurance boards occupy a much more central role in the system and have stronger incentives towards promoting prevention.

Other ideas for workers' compensation reform included 100 percent replacement of lost earnings, adoption of a prescribed list of occupational diseases based on evidence derived from epidemiologic studies, deepening the incentive system under the experience rating system, a network of independent occupational health services for early detection and management of occupational diseases, and greatly increased public awareness of the system so that occupational health problems can be dealt with earlier and cases can be sorted out on their merits before they become so complex. The system in the Philadelphia area was praised, not for any great innovation, but because the system was being made to work as it was originally intended with claims expedited more smoothly. Several speakers vigorously defended tort action as the ultimate resort for the claimant, pointing out that in the absence of the threat of tort action employers are far less likely to be cooperative with the workers' compensation system.

Innovations by the State of New York in its occupational health efforts came under particular scrutiny. This state has recently completed an extensive review of its needs and resources, leading to highly specific recommendations:

1. A network of clinical consultation centres for the diagnosis and **prevention** of occupational disease, to be integrated with the existing medical care system and to be provided with capabilities of occupational hygiene.
2. Strongly increased surveillance efforts based on linkage of computer data and application of the strategy of "sentinel events" in occupational health. (A sentinel event is the identification of a case or cluster of cases indicative of a much larger problem in the community.)
3. A distinguished task force to discuss the state situation in occupational health and to review the agenda for reform.
4. A major effort to improve and increase the level of training in occupational health in medical schools.

Of these recommendations, enhanced surveillance capabilities and the network of occupational health centres received the most attention. Indeed, many speakers consider that these two approaches alone were important enough to be the centerpieces of development in the 1990's.

The eighteen-year history of the U.S. Occupational Safety and Health Administration was reviewed. The following recommendations were made to rejuvenate OSHA:

1. A concerted effort to document and evaluate occupational disease and injuries in the workplace, through enhanced surveillance and a network of occupational health consultation centres.
2. A return to more vigorous standards-setting, with the emphasis placed on "generic" standards (covering broad issues in occupational health or classes of chemicals or other exposures that are similar) and performance standards rather than narrow criteria standards.
3. An enhanced compliance agenda, with return of active enforcement, and, if necessary, increased use of criminal sanctions for flagrantly dangerous abuses.
4. A new technology alert program to anticipate future problems before they arise.

CHEMICALS AND THE FOOD CHAIN

5. Public discussions involving labour, industry, and government, rather than discussions behind closed doors.
6. The introduction of medical removal provisions, to withdraw the worker from hazardous environments without loss of pay.
7. A research program focused on the introduction of alternative technologies that reduce risk from industrial processes and create economic incentive to develop safer production procedures.
8. The use of on-site inspectors during the normal work process in selected industries and companies.

A feeling expressed by a number of speakers was that the Occupational Safety and Health Act of 1970 had not achieved its potential in the United States. Another act of far-reaching significance has been introduced in the U.S., and is now being considered by the Senate. It would require the notification of individual workers identified by an expert panel on the basis of epidemiologic studies as being at significantly elevated risk of serious health problems as a result of a known exposure. Those workers so identified would not only be notified individually but the responsible employer would be required to arrange for surveillance of their health. In order to meet the requirements of the bill, which is expected to pass, the U.S. National Institute for Occupational Safety and Health has established a surveillance system called the "Sentinel Event Notification System for Occupational Risks" (SENSOR) to improve the quality of data received on occupational diseases. This system operates with technical support from a network of participating health care providers, including consultation clinics and academic centres.

In summary, the general sense of the meeting was that the retreat from regulation had created an intolerable situation but that further regulation must be better thought through than in the past. Improvement of systems for gathering information and identifying occupational disease were considered essential to future efforts. There is an urgent consensus that the entire occupational health and safety system requires rethinking but that creative change is within our ability. (The proceedings will be published by the New York Academy of Sciences.)

**Professor of Occupational Medicine; Head, Occupational Health Program, Department of Health Services Administration and Community Medicine, Faculty of Medicine, The University of Edmonton, Edmonton, Alberta.*

(Text of a talk given to the Alberta Institute of Agrologists, March 7, 1988)

J. Don Johnston, M.D., M.Sc.*

Chemicals in the food chain and the implication that modern farming practices are largely to blame is a concern for agrologists as much as anyone. This presentation will focus on the disease which gets most of the attention: cancer. Other health concerns, such as possible reproductive effects and allergies, are not addressed, because there is little scientific evidence linking appropriate use of agricultural chemicals with these problems. Concerns about the use of agricultural chemicals, especially their effects on the environment, have not been ignored but are beyond the scope of this review.

THE MEDIA

The mad hatter in Alice in Wonderland declared that when he said something three times it was true. We have read and heard hundreds of times that we are being poisoned by the air we breathe, the water we drink and the food we eat. Books like *The Poison Conspiracy* by Karl Grossman endorse the view that we are in big trouble because of man-made chemicals, "the merchandising of poison has become a huge global growth industry . . . the world is being poisoned . . . life is being lost on a wide scale . . . We are people in Poisonland." The 1979 television program "A Plague on our Children" reported that "one hundred pesticides suspected of being carcinogenic are still in use". Even Jane Fonda in her workout book states that "Few people need convincing these days that we are in the midst of a cancer epidemic."

Have we succumbed to the hatter and believe these claims? Or are the claims true even if only once stated?

CANCER AND NUTRITION

Before addressing the validity of the claims about chemicals poisoning us, especially chemicals in the food chain, it is important to review the basics about diet and health — not the specifics about vitamins, minerals and protein, but the evidence that dietary habits can affect the health of a specific population. For example, colon, stomach and breast cancer are common human cancers with widely different rates in different populations. The Japanese experience a very high rate of stomach cancer when compared with North Americans. They also have low rates of colon and breast cancer compared to North Americans. Studies on the children of migrants from Japan show that they become more like North Americans in their cancer rates. If we learn about the causative agent(s), presumably we could lower the cancer rates in both countries. Other evidence which supports dietary factors in the causation of disease comes

from studies of Seventh Day Adventists. They have lower incidences of most diseases, particularly when compared with groups which eat a high fat, high protein diet. Hence, through the study of human populations there is evidence that diet plays a role in disease. It is this evidence that makes it imperative that we study diet in our quest to improve health, especially since dietary interventions tend to be preventive and much more efficacious than the curative measures taken after disease is manifest.

THE OTHER MEDIA

Are we being poisoned out of existence? Are farmers contributing to this poisoning by their continued use of chemical fertilizers and pesticides?

There is another side to the story but one that isn't told as often as that of the doom-sayers. The winner of the 1970 Nobel Peace Prize for pioneering the Green Revolution, Norman E. Borlaug, Ph.D., addresses this in his introduction to Elizabeth Whelan's book, "Toxic Terror". He points out that it is the use of new strains of plants, fertilizers and pesticides that allow the United States to feed its 230 million people. This productivity also feeds some of the rest of the world and allows the United States to save from development wilderness areas which would have been lost without the improvements brought to agriculture by science. "Had the yields of 1938-40 persisted, in order to have produced the 1978-80 harvest, it would have been necessary either to have plowed up approximately 73 percent of America's permanent pasture and grazing lands or to have converted 61 percent of the forest and woodland to cropland." He also points out that we have banned a number of good pesticides because of the cancers they produce in rats or mice when given in very high doses. Yet we ignore the fact that nature produces chemicals which are far more carcinogenic, and that we eat them every day.

NATURE'S PESTICIDES

Apparently the large amounts of pesticides synthesized in plants protect the plants from the hordes of bacteria, fungi and insects. The varieties of these toxins have been studied by organic chemists for over a hundred years but it is only recently that studies of the toxicological properties have begun in earnest. One of the results of these studies could be the introduction of the natural pesticide production capability into the genetic properties of plants which could grow better with the protection of the natural pesticide. These natural pesticides, ranking among the most potent toxins known, are found in abundance in our diet. Dr. Bruce Ames of the Department of Biochemistry, University of California, Berk-

ely, estimates that our daily intake of these naturally occurring toxins is at least 10,000 times higher than the dietary intake of man-made pesticides. The natural pesticides are found in just about every fruit and vegetable grown, from peanuts to wheat. Unlike most synthetic pesticides, natural pesticides are seldom halogenated. It is presumed that the natural pesticides are less harmful to man than synthetic products but research into the health effects of low level exposures to both is lacking.

FOOD PREPARATION AND CANCER

If the natural pesticides don't provide enough to worry about, then one can add the carcinogens produced in food preparation, especially the cooking of meats, browning of breads or caramelizing of sugars. Included under this heading are the cancer-causing nitrosamines which are found in bacon, or the precursors, nitrates, found in lettuce and celery.

Fortunately it appears that we are able to repair the daily damage caused by these natural and man-made carcinogens. We also get protection from foods having chemicals which have an anti-cancer capability. Compounds like carotene and ascorbic acid are in this category and it is for this reason that we have dietary recommendations to eat fruit and vegetables.

A large scale cohort study began in Japan in 1965 to study the influence of diet and lifestyle on health. Over 250,000 adults have been followed for 16 years and the results indicate that vegetable consumption is associated with a low cancer incidence.

AGRICULTURAL CHEMICALS IN FOOD

Most of the naturally occurring pesticides tend not to persist too long in the environment while man-made pesticides like dichlorodiphenyltrichloroethane (DDT) may last for years. More topical than DDT however is Dioxin. Dioxins are a family of chemical compounds found in nature when organic matter is burned when chlorine is present and as by-products of chemical reactions in the production of the antibacterial hexachlorophene and the herbicide 2,4,5-T. Most of the 50 or more dioxins are considered harmless, but one 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), is considered a carcinogen. Like other dioxins, it is fat soluble and resistant to metabolic breakdown. Hence it can be found in fats long after ingestion. It, and other industrial chemicals like polychlorinated biphenyls (PCB's), are found just about everywhere in trace amounts. No one should be surprised by this for any compound that isn't readily broken down should be found somewhere. The concern of course is that we might accumulate enough of these compounds over time to affect our health. Two ongoing studies in Michigan should provide some of the answers. One involves 1500 farm families exposed to PCB's

during the 50', 60's and early 70's from silos contaminated with PCB's. The other involves 4000 residents exposed to high levels of polybrominated biphenyls (PBB's) from contaminated animal feed. These studies are evaluating the cancer, reproductive and developmental status of the exposed populations.

The cancer scare is simply a scare and not a fact. Life expectancy in 1900 was 47.3 years. In 1940 it 62.9 years and by 1982 had risen to 74.5 years. As the population ages we will have more cancer because cancer is a disease of aging and almost all will develop cancer if we live long enough. The cumulative cancer risk increases with approximately the fourth power of age.

It is not clear whether there are any health effects from the minute amount of agricultural chemicals in food. It is clear however that nitrogen fertilizers can add enough nitrates to the ground water to cause death. In South Dakota an infant died in the summer of 1986 from methemoglobinemia. This was caused by nitrates in the farm's well water, likely contaminated by the runoff from the surrounding fields and a feedlot. The natural high nitrate concentration in much of the West's water makes the use of high nitrate fertilizers dangerous in some areas.

Surely, one could argue, the return to old ways must be safer. Composting and the use of animal and human waste for fertilizer should help. The author isn't knowledgeable about the effects of these practices on production when compared with the use of man-made fertilizers. It is clear from Swiss studies, however, that composting and other recycling practices are gradually concentrating poisonous metals like cadmium and arsenic. The origin of these toxins may have been from industrial pollution or agricultural practices years ago, but their concentration in the food chain is increasing. Interestingly, the levels of arsenic found in plants grown in composted soil are less than the levels of arsenic in pricey seafoods like scallops and lobsters. In these creatures the arsenic may even be a necessary nutrient and occurs naturally.

THE RISKS

From the above one can conclude that we have much to learn. Overuse and misuse of agricultural chemicals is wasteful and dangerous. Proper use may be no more harmful than traditional farming methods. The science of assessing risk is in its infancy. The communication of risk is in utero. We have been misled into thinking that whatever is natural is good and that which is synthetic is bad. Tobacco is natural, and it undoubtedly causes harm.

Detecting a substance doesn't equate to risk. Much money is spent detecting compounds like PCBs and Dioxins that could be better spent on research in the field of natural pesticides and genetics.

The Dioxin scare, according to a review in Chemical and Engineering News, has cost over one billion dollars. If we have learned nothing else from dioxin, it is that our communication of risk is driven by a public perception that equates chemical use with morality. On an overpopulated planet we can't afford to squander our resources worrying about the carcinogen of the week while whole continents are being consumed. Nor can we permit the diversion of our energies from known health hazards. One need only recall the fuss about the PCB spill on an Ontario highway in 1986 to illustrate the point. The media and politicians got a week's activity out of this chemical which has likely never caused a death in North America. Far greater benefit could have come from using the same resources to prevent the ten automobile deaths due to alcohol misuse, or the 100 tobacco related deaths across Canada that week.

We must attempt to get the best available information to assist in producing wholesome foods in a non-polluting way. Progress will continue to be a combination of the old with the new.

**Clinical Assistant Professor, Department of Community Health Sciences, Faculty of Medicine, The University of Calgary and Medical Director, Dome Petroleum Limited, Calgary, Alberta.*

UPCOMING COURSES

Occupational Epidemiology:

A five-day course at the University of Utah, to take place Sept. 19-23, 1988. For further information, contact:

RMCOEH/Continuing Education
Registration Coordinator
University of Utah
Bldg. 512
Salt Lake City, UT 84112
U.S.A.

Hazardous Goods: The Banff Workshop:

Oct. 18-21, 1988, sponsored by the Banff Centre School of Management, and Danatec Educational Services Ltd. For further information, contact:

Felicity Edwards, Program Manager
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