

DRAFT.

National Occupational and Environmental Carcinogen Surveillance Unit Proposal

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Many cancers linked to environmental or workplace exposures can take decades to develop, so primary prevention efforts for these cancers must take place 10 to 40 years before a potential diagnosis. For example, despite over 30 years of effort to reduce and restrict people's exposure to asbestos, the rates of cancer related to this carcinogen continue to increase. Many occupational and environmental carcinogens are widely recognized because of the efforts of organizations such as the International Agency for Research on Cancer (IARC) and the U.S. National Toxicology Program. However, a lack of data on who is exposed to these carcinogens may hamper efforts to prevent related cancers. By systematically identifying who is exposed to these known carcinogens, we can develop effective strategies to prevent carcinogen-related cancers in workplace and community environments. This process of carcinogen surveillance can be used to set priorities for policy or prevention-related activities, monitor trends in exposure, set research priorities, and share research findings with policy makers and the public.

CAREX, the International Information System on Occupational Exposure to Carcinogens, was developed by the Finnish Institute for Occupational Health (FIOH) as part of a European Union effort to estimate the burden of occupational cancer [Kauppinen et al, 2000]. Its purpose was to produce estimates of the number of people with potential workplace exposure to definite (Category 1), probable (Category 2A), and selected possible (Category 2B) workplace carcinogens, as classified by the International Agency for Research on Cancer in 1995. Initially, CAREX was only used to develop and store exposure estimates for the European Union and the United States. More recently, it has been used to estimate the number of workers exposed to carcinogens in the Baltic countries, the Czech Republic, and Costa Rica, and to aid in estimating the global burden of exposure to occupational carcinogens.

In the late 1990s, we started a pilot project that used the CAREX model to estimate exposure to workplace carcinogens in British Columbia, and were subsequently funded by WorkSafe BC to continue the project. Several years later a similar initiative received funding from the Ontario Workplace Safety Insurance Board. We supported this project by assisting with exposure assessment. These projects have received considerable attention from advocates of cancer prevention. The Canadian Strategy for Cancer Control recognized the need for a national program like CAREX. There has also been interest in the development of a similar program focused on environmental carcinogens. We are therefore proposing the creation of a National Occupational and Environmental Carcinogen Surveillance Unit (NOECSU).

The proposal to create NOECSU is still under development, but this document is being written to provide individuals and groups who will be associated with it, either as advisors or partners, with a summary of the proposal as it currently stands. The primary objective of NOECSU is to develop robust estimates of the number of Canadians exposed to carcinogens in the workplace or the community environment. The unit will have 4 primary projects, briefly discussed below.

Canadian Workplace Carcinogen Exposure Surveillance Project (CWCESP)

Objective: to develop robust estimates of the number of Canadians exposed to workplace carcinogens.

Design: CWCESP will be based generally on the modified CAREX model from the BC and Ontario CAREX projects. The information system will provide estimates of the number of people

occupationally exposed by province and industry sector. Where possible, these estimates will be based directly on Canadian data sources such as the CWED (see below) and any data indicating level of exposure will be summarized. In the absence of hard data, experts in exposure will make estimates. Additional IARC Category 1 and 2A carcinogens with a potential for occupational exposure that have been identified after CAREX was originally created will be added. We are also considering expansion of the original list to include IARC 2B (possible) carcinogens that are common in Canada.

Canadian Workplace Exposure Database (CWED)

Objective: to develop a national database with all workplace exposure data collected by public agencies and other organizations (data from WorkSafe BC and the Ontario Ministry of Labour is available now, but public agencies and other organizations with substantial exposure databases will also be approached to contribute).

Design: Apart from feeding quantitative data to the CWCESP, CWED will also act as a surveillance and research tool. In combination with CWCESP, it will help identify groups in need of exposure assessment or high priority groups for prevention activities. Data from CWED may also be used for assessing exposure for epidemiologic studies and risk assessment. To facilitate outside access and use of this database, we will make it available in aggregate form over the web and allow access to the underlying data, with the data providers' permission, through the UBC Population Health Learning Observatory (<http://www.phlo.ubc.ca>), funded by the Canadian Foundation for Innovation.

Canadian Environmental Carcinogen Exposure Surveillance Project (CECESP)

Objective: to develop robust estimates of the number of Canadians exposed to environmental carcinogens by province and, where possible and appropriate, by Census Division.

Design: Unlike CAREX, we do not have an established model to follow and the approach may need to evolve based on the data available and the nature of the carcinogens. Many exposures may be appropriate to present geographically (such as particulate air pollution, chlorination by-products, radon, and arsenic in drinking water). Other primary exposure routes such as food or consumer products may be assessed differently and an alternative model focusing on the identification of high-risk sub-groups may be used. As with CWCESP, estimates will be based directly on Canadian data sources when possible, any data indicating level of exposure summarized, and in the absence of hard data, experts in exposure will make estimates. Initially, we will begin with a relatively short list of environmental carcinogens that are common in Canada. Efforts are currently underway to identify priority carcinogens that also represent the diversity of environmental exposures in terms of routes of exposure (i.e. air, water, soil, food, and consumer products).

Canadian Carcinogen Exposure Resource Centre (CCERC)

Objective: to identify and store sources of exposure information used by both the environmental and occupational projects.

Design: The resources will include publications, publicly available reports, web-based resources, and actual data sets referenced in the CWCESP and CECESP. In the case of datasets we will provide a full description including data available, time and geographic coverage, and access information. In addition to providing transparency to the CWCESP and CECESP, the resources could be used by others for public education, surveillance, risk assessment, and research.

Knowledge Transfer and Exchange (KTE)

Objective: to develop a collaborative network that facilitates KTE at the provincial and national levels and supports the overarching goal of NOECSU to provide data to policy makers essential for developing prevention strategies.

We have begun developing this network already and to date have confirmed participation from the WorkSafeBC/UBC-CHSPR Partnership (<http://www.soeh.ubc.ca/research/worksafebc>) and the Occupational Cancer Research and Surveillance Project of Cancer Care Ontario (<http://www.cancercare.on.ca/documents/Occupreport2006.pdf>). Other organizations we will be approaching to participate in our KTE network include the PHAC National Collaborating Centre for Environmental Health and the provincial CSCC environmental or occupational committees. While we focus on KT at the policy level, we are also committed to making NOECSU available to the public. To support public access to our data and the many data sources that we draw from, we will be developing a Resource Centre within NOECSU that will be accessible through a number of formats including the Internet.

NOECSU Structure

NOECSU will be based in the School of Occupational and Environmental Hygiene at the University of British Columbia (<http://www.soeh.ubc.ca>). Paul Demers will be the Scientific Director. The staff will include an executive director with expertise in KTE, an occupational hygienist, an environmental scientist, a database manager, an occupational hygiene technician, a GIS technician, and a communications assistant. In addition, we will recruit new students to the area of cancer prevention by providing funding for up to 3 candidates to develop innovative projects that further the objectives of the unit. To maintain strong ties with the Canadian Strategy for Cancer Control we are proposing the National Environmental and Occupational Exposures Committee of the CSCC act as the National Advisory Committee for NOECSU. We will also create a Scientific Advisory Panel consisting of national experts in occupational and environmental exposures who will provide input regarding the validity of the exposure assessment approaches and priorities.

Table 1: IARC Human Carcinogens (Group 1)

Category	Agents, groups of agents, mixtures, exposure circumstances
Industrial Chemical	4-Aminobiphenyl (Vol. 1, Suppl. 7; 1987)
Metals	Arsenic and arsenic compounds (Vol. 23, Suppl. 7; 1987)
Fibres Dust	Asbestos (Vol. 14, Suppl. 7; 1987)
Pharmacological	Azathioprine (Vol. 26, Suppl. 7; 1987)
Industrial Chemical	Benzene (Vol. 29, Suppl. 7; 1987)
Industrial Chemical	Benzidine (Vol. 29, Suppl. 7; 1987)
Combustion Product	Benzof[a]pyrene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Metals	Beryllium and beryllium compounds (Vol. 58; 1993)
Pharmacological	N,N-Bis(2-chloroethyl)-2-naphthylamine (Chlornaphazine) (Vol. 4, Suppl. 7; 1987)
Industrial Chemical	Bis(chloromethyl)ether and chloromethyl methyl ether (technical-grade)(Vol. 4, Suppl. 7; 1987)
Pharmacological	1,4-Butanediol dimethanesulfonate (Busulphan; Myleran) (Vol. 4, Suppl. 7; 1987)
Metals	Cadmium and cadmium compounds (Vol. 58; 1993)
Pharmacological	Chlorambucil (Vol. 26, Suppl. 7; 1987)
Pharmacological	1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (Methyl-CCNU; Semustine) (Suppl. 7; 1987)
Metals	Chromium[VI] (Vol. 49; 1990)
Pharmacological	Ciclosporin (Vol. 50; 1990)
Pharmacological	Cyclophosphamide (Vol. 26, Suppl. 7; 1987)
Hormone	Diethylstilboestrol (Vol. 21, Suppl. 7; 1987)
Microbiological	Epstein-Barr virus (Vol. 70; 1997)
Mineral	Erionite (Vol. 42, Suppl. 7; 1987)
Hormone	Estrogen-progestogen menopausal therapy (combined) (Vol. 72, Vol. 91; in preparation)
Hormone	Estrogen-progestogen oral contraceptives (combined) (Vol. 72, Vol. 91; in preparation)
Hormone	Estrogens, nonsteroidal (Suppl. 7; 1987)
Hormone	Estrogens, steroidal (Suppl. 7; 1987)
Hormone	Estrogen therapy, postmenopausal (Vol. 72; 1999)
Industrial Chemical	Ethylene oxide (Vol. 60; 1994)
Pharmacological	Etoposide in combination with cisplatin and bleomycin (Vol. 76; 2000)
Industrial Chemical	Formaldehyde (Vol. 88; in preparation)
Metals	Gallium arsenide (Vol. 86; 2006)
Microbiological	Helicobacter pylori (infection with) (Vol. 61; 1994)
Microbiological	Hepatitis B virus (chronic infection with) (Vol. 59; 1994)
Microbiological	Hepatitis C virus (chronic infection with) (Vol. 59; 1994)
Microbiological	Human immunodeficiency virus type 1 (infection with) (Vol. 67; 1996)
Microbiological	Human papillomavirus types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59 and 66 (Vol. 64, Vol. 90; in preparation)
Microbiological	Human T-cell lymphotropic virus type I (Vol. 67; 1996)
Pharmacological	Melphalan (Vol. 9, Suppl. 7; 1987)
Pharmacological	8-Methoxypsoralen (Methoxsalen) plus ultraviolet A radiation (Vol. 24, Suppl. 7; 1987)
Pharmacological	MOPP and other combined chemotherapy including alkylating agents (Suppl. 7; 1987)
Pharmacological	Mustard gas (Sulfur mustard) (Vol. 9, Suppl. 7; 1987)
Industrial Chemical	2-Naphthylamine (Vol. 4, Suppl. 7; 1987)
Radiation	Neutrons (Vol. 75; 2000)
Metals	Nickel compounds (Vol. 49; 1990)
Diet	N'-Nitrosornicotine (NNN) & 4-(N-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone (NNK) (Vol. 37, Suppl. 7, Vol. 89; in preparation)
Microbiological	Opisthorchis viverrini (infection with) (Vol. 61; 1994)
Hormone	Oral contraceptives, sequential (Suppl. 7; 1987)
Radiation	Phosphorus-32, as phosphate (Vol. 78; 2001)
Radiation	Plutonium-239 and its decay products (may contain plutonium-240 and other isotopes), as aerosols (Vol. 78; 2001)
Radiation	Radioiodines, short-lived isotopes, including iodine-131, from atomic reactor accidents and nuclear weapons detonation (exposure during childhood) (Vol. 78; 2001)
Radiation	Radionuclides, a-particle-emitting, internally deposited (Vol. 78; 2001)
Radiation	Radionuclides, b-particle-emitting, internally deposited (Vol. 78; 2001)
Radiation	Radium-224 and its decay products (Vol. 78; 2001)
Radiation	Radium-226 and its decay products (Vol. 78; 2001)
Radiation	Radium-228 and its decay products (Vol. 78; 2001)
Radiation	Radon-222 and its decay products (Vol. 43, Vol. 78; 2001)
Microbiological	Schistosoma haematobium (infection with) (Vol. 61; 1994)
Fibres Dust	Silica, crystalline (inhaled in the form of quartz or cristobalite from occupational sources) (Vol. 68; 1997)
Radiation	Solar radiation (Vol. 55; 1992)

Table 1: IARC Human Carcinogens (Group 1, cont.)

Category	Agents, groups of agents, mixtures, exposure circumstances
Fibres Dust	Talc containing asbestiform fibres (Vol. 42, Suppl. 7; 1987)
Pharmacological	Tamoxifen (Vol. 66; 1996)
Industrial Chemical	2,3,7,8-Tetrachlorodibenzo-para-dioxin [1746-01-6] (Vol. 69; 1997)
Pharmacological	Thiotepa (Vol. 50; 1990)
Pharmacological	Thorium-232 and its decay products, administered intravenously as a colloidal dispersion of thorium-232 dioxide (Vol. 78; 2001)
Pharmacological	Treosulfan (Vol. 26, Suppl. 7; 1987)
Industrial Chemical	Vinyl chloride (Vol. 19, Suppl. 7; 1987)
Radiation	X- and Gamma (g)-Radiation (Vol. 75; 2000)
Microbiological	Aflatoxins (naturally occurring mixtures of) (Vol. 56, Vol. 82; 2002)
Diet	Alcoholic beverages (Vol. 44; 1988)
Diet	Areca nut (Vol. 85; 2004)
Diet	Betel quid without tobacco (Vol. 85; 2004)
Industrial Chemical	Coal-tar pitches (Vol. 35, Suppl. 7; 1987)
Industrial Chemical	Coal-tars (Vol. 35, Suppl. 7; 1987)
Pharmacological	Herbal remedies containing plant species of the genus <i>Aristolochia</i> (Vol. 82; 2002)
Industrial Chemical	Mineral oils, untreated and mildly treated (Vol. 33, Suppl. 7; 1987)
Pharmacological	Phenacetin, analgesic mixtures containing (Suppl. 7; 1987)
Diet	Salted fish (Chinese-style) (Vol. 56; 1993)
Industrial Chemical	Shale-oils (Vol. 35, Suppl. 7; 1987)
Combustion Product	Soots (Vol. 35, Suppl. 7; 1987)
Diet	Tobacco, smokeless (Vol. 37, Suppl. 7, Vol. 89; in preparation)
Fibres Dust	Wood dust (Vol. 62; 1995)
Exposure Circumstance	Aluminium production (Vol. 34, Suppl. 7; 1987)
Metals	Arsenic in drinking-water (Vol. 84; 2004)
Exposure Circumstance	Auramine, manufacture of (Suppl. 7; 1987)
Exposure Circumstance	Boot and shoe manufacture and repair (Vol. 25, Suppl. 7; 1987)
Exposure Circumstance	Chimney sweeping (Vol. 92; in preparation)
Exposure Circumstance	Coal gasification (Vol. 34, Suppl. 7, Vol. 92; in preparation)
Exposure Circumstance	Coal-tar distillation (Vol. 92; in preparation)
Exposure Circumstance	Coke production (Vol. 34, Suppl. 7, Vol. 92; in preparation)
Exposure Circumstance	Furniture and cabinet making (Vol. 25, Suppl. 7; 1987)
Exposure Circumstance	Haematite mining (underground) with exposure to radon (Vol. 1, Suppl. 7; 1987)
Combustion Product	Involuntary smoking (exposure to secondhand or 'environmental' tobacco smoke) (Vol. 83; 2004)
Exposure Circumstance	Iron and steel founding (Vol. 34, Suppl. 7; 1987)
Exposure Circumstance	Isopropyl alcohol manufacture (strong-acid process) (Suppl. 7; 1987)
Exposure Circumstance	Magenta, manufacture of (Vol. 57; 1993)
Exposure Circumstance	Painter (occupational exposure as a) (Vol. 47; 1989)
Exposure Circumstance	Paving and roofing with coal-tar pitch (Vol. 92; in preparation)
Exposure Circumstance	Rubber industry (Vol. 28, Suppl. 7; 1987)
Exposure Circumstance	Strong-inorganic-acid mists containing sulfuric acid (occupational exposure to) (Vol. 54; 1992)
Combustion Product	Tobacco smoking and tobacco smoke (Vol. 83; 2004)

Table 2: IARC Probable Human Carcinogens (Group 2A)

Category	Agents and groups of agents
Industrial Chemical	Acrylamide (Vol. 60; 1994)
Diet	Adriamycin (Vol. 10, Suppl. 7; 1987)
Hormone	Androgenic (anabolic) steroids (Suppl. 7; 1987)
Pharmacological	Aristolochic acids (naturally occurring mixtures of) (Vol. 82; 2002)
Pharmacological	Azacitidine (Vol. 50; 1990)
Industrial Chemical	Benzidine-based dyes (Suppl. 7; 1987)
Pharmacological	Bischloroethyl nitrosourea (BCNU) (Vol. 26, Suppl. 7; 1987)
Industrial Chemical	1,3-Butadiene (Vol. 71; 1999)
Pesticide	Captafol (Vol. 53; 1991)
Pharmacological	Chloramphenicol (Vol. 50; 1990)
Industrial Chemical	a-Chlorinated toluenes (benzal chloride, benzotrichloride, benzyl chloride) and benzoyl chloride (combined exposures) (Vol. 29, Suppl. 7, Vol. 71; 1999)
Pharmacological	1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea (CCNU) (Vol. 26, Suppl. 7; 1987)
Industrial Chemical	4-Chloro- <i>ortho</i> -toluidine (Vol. 77; 2000)
Pharmacological	Chlorozotocin (Vol. 50; 1990)
Pharmacological	Cisplatin (Vol. 26, Suppl. 7; 1987)

Table 2: IARC Probable Human Carcinogens (Group 2A, cont)

Category	Agents and groups of agents
Microbiological	<i>Clonorchis sinensis</i> (infection with) (Vol. 61; 1994)
Combustion Product	Cyclopenta[<i>cd</i>]pyrene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Combustion Product	Dibenz[<i>a,h</i>]anthracene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Combustion Product	Dibenzo[<i>a,f</i>]pyrene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Industrial Chemical	Diethyl sulfate (Vol. 54, Vol. 71; 1999)
Industrial Chemical	Dimethylcarbamoyl chloride (Vol. 12, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	1,2-Dimethylhydrazine (Vol. 4, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	Dimethyl sulfate (Vol. 4, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	Epichlorohydrin (Vol. 11, Suppl. 7, Vol. 71; 1999)
Pesticide	Ethylene dibromide (Vol. 15, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	<i>N</i> -Ethyl- <i>N</i> -nitrosourea (Vol. 17; 1987)
Pharmacological	Etoposide (Vol. 76; 2000)
Industrial Chemical	Glycidol (Vol. 77; 2000)
Metals	Indium phosphide (Vol. 86; 2006)
Diet	IQ (2-Amino-3-methylimidazo[4,5- <i>f</i>]quinoline) (Vol. 56; 1993)
Microbiological	Kaposi's sarcoma herpesvirus/human herpesvirus 8 (Vol. 70; 1997)
Metals	Lead compounds, inorganic (Vol. 87; 2006)
Pharmacological	5-Methoxypsoralen (Vol. 40, Suppl. 7; 1987)
Industrial Chemical	4,4'-Methylene bis(2-chloroaniline) (MOCA) (Vol. 57; 1993)
Industrial Chemical	Methyl methanesulfonate (Vol. 7, Suppl. 7, Vol. 71; 1999)
Pharmacological	<i>N</i> -Methyl- <i>N'</i> -nitro- <i>N</i> -nitrosoguanidine(MNNG) (Vol. 4, Suppl. 7; 1987)
Industrial Chemical	<i>N</i> -Methyl- <i>N</i> -nitrosourea (Vol. 17; 1987)
Diet	Nitrate or nitrite (ingested) under conditions that result in endogenous nitrosation (Vol. 94; in preparation)
Pharmacological	Nitrogen mustard (Vol. 9, Suppl. 7; 1987)
Industrial Chemical	<i>N</i> -Nitrosodiethylamine (Vol. 17; 1987)
Industrial Chemical	<i>N</i> -Nitrosodimethylamine (Vol. 17; 1987)
Pharmacological	Phenacetin (Vol. 24, Suppl. 7; 1987)
Pharmacological	Procarbazine hydrochloride (Vol. 26, Suppl. 7; 1987)
Industrial Chemical	Styrene-7,8-oxide (Vol. 60; 1994)
Pharmacological	Teniposide (Vol. 76; 2000)
Industrial Chemical	Tetrachloroethylene (Vol. 63; 1995)
Industrial Chemical	<i>ortho</i> -Toluidine (Vol. 77; 2000)
Industrial Chemical	Trichloroethylene (Vol. 63; 1995)
Industrial Chemical	1,2,3-Trichloropropane (Vol. 63; 1995)
Industrial Chemical	Tris(2,3-dibromopropyl) phosphate (Vol. 20, Suppl. 7, Vol. 71; 1999)
Radiation	Ultraviolet radiation A (Vol. 55; 1992)
Radiation	Ultraviolet radiation B (Vol. 55; 1992)
Radiation	Ultraviolet radiation C (Vol. 55; 1992)
Ind Chem	Vinyl bromide (Vol. 39, Suppl. 7, Vol. 71; 1999)
Ind Chem	Vinyl fluoride (Vol. 63; 1995)
Ind Chem	Creosotes (Vol. 35, Suppl. 7, Vol. 92; in preparation)
Combustion Product	Diesel engine exhaust (Vol. 46; 1989)
Diet	Hot mate (Vol. 51; 1991)
Pesticide	Non-arsenical insecticides (occupational exposures in spraying and application of) (Vol. 53; 1991)
Industrial Chemical	Polychlorinated biphenyls (Vol. 18, Suppl. 7; 1987)
Exposure Circumstance	Art glass, glass containers and pressed ware (manufacture of) (Vol. 58; 1993)
Exposure Circumstance	Carbon electrode manufacture (Vol. 92; in preparation)
Metals	Cobalt Metals with tungsten carbide (Vol. 86; 2006)
Exposure Circumstance	Hairdresser or barber (occupational exposure as a) (Vol. 57; 1993)
Exposure Circumstance	Petroleum refining (occupational exposures in) (Vol. 45; 1989)
Radiation	Sunlamps and sunbeds (use of) (Vol. 55; 1992)

Table 3: IARC Possible Human Carcinogens (Group 2B)

Category	Agents and groups of agents
Diet	A-alpha-C (2-Amino-9H-pyrido[2,3-b]indole) (Vol. 40, Suppl. 7; 1987)
Industrial Chemical	Acetaldehyde (Vol. 36, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	Acetamide (Vol. 7, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	Acrylonitrile (Vol. 71; 1999)
Diet	AF-2 [2-(2-Furyl)-3-(5-nitro-2-furyl)acrylamide] (Vol.31, Suppl. 7; 1987)
Microbiological	Aflatoxin M1 (Vol. 56; 1993)
Industrial Chemical	<i>para</i> -Aminoazobenzene (Vol. 8, Suppl. 7; 1987)
Industrial Chemical	<i>ortho</i> -Aminoazotoluene (Vol. 8, Suppl. 7; 1987)
Pharmacological	2-Amino-5-(5-nitro-2-furyl)-1,3,4-thiadiazole (Vol. 7, Suppl. 7; 1987)
Pharmacological	Amsacrine (Vol. 76; 2000)
Industrial Chemical	<i>ortho</i> -Anisidine (Vol. 73; 1999)
Metals	Antimony trioxide (Vol. 47; 1989)
Pesticide	Aramite® (Vol. 5, Suppl. 7; 1987)
Industrial Chemical	Auramine (technical-grade) (Vol. 1, Suppl. 7; 1987)
Diet	Azaserine (Vol. 10, Suppl. 7; 1987)
Industrial Chemical	Aziridine (Vol. 9, Suppl. 7, Vol. 71; 1999)
Combustion Product	Benz[<i>j</i>]aceanthrylene (Vol. 92; in preparation)
Combustion Product	Benz[<i>a</i>]anthracene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Combustion Product	Benz[<i>b</i>]fluoranthene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Combustion Product	Benz[<i>j</i>]fluoranthene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Combustion Product	Benz[<i>k</i>]fluoranthene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Industrial Chemical	Benzofuran (Vol. 63; 1995)
Combustion Product	Benz[<i>c</i>]phenanthrene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Industrial Chemical	Benzyl violet 4B (Vol. 16, Suppl. 7; 1987)
Industrial Chemical	2,2-Bis(bromomethyl)propane-1,3-diol (Vol. 77; 2000)
Pharmacological	Bleomycins (Vol. 26, Suppl. 7; 1987)
Diet	Bracken fern (Vol. 40, Suppl. 7; 1987)
Industrial Chemical	Bromodichloromethane (Vol. 52, Vol. 71; 1999)
Diet	Butylated hydroxyanisole (BHA) (Vol. 40, Suppl. 7; 1987)
Industrial Chemical	beta-Butyrolactone (Vol. 11, Suppl. 7, Vol. 71; 1999)
Diet	Caffeic acid (Vol. 56; 1993)
Industrial Chemical	Carbon black (Vol. 65, Vol. 93; in preparation)
Industrial Chemical	Carbon tetrachloride (Vol. 20, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	Catechol (Vol. 15, Suppl. 7, Vol. 71; 1999)
Pesticide	Chlordane (Vol. 79; 2001)
Pesticide	Chlordecone (Kepone) (Vol. 20, Suppl. 7; 1987)
Industrial Chemical	Chlorendic acid (Vol. 48; 1990)
Industrial Chemical	<i>para</i> -Chloroaniline (Vol. 57; 1993)
Industrial Chemical	3-Chloro-4-(dichloromethyl)-5-hydroxy-2(5 <i>H</i>)-furanone (Vol. 84; 2004)
Industrial Chemical	Chloroform (Vol. 73; 1999)
Industrial Chemical	1-Chloro-2-methylpropene [513-37-1] (Vol. 63; 1995)
Pesticide	Chlorophenoxy herbicides (Vol. 41, Suppl. 7; 1987)
Industrial Chemical	4-Chloro- <i>ortho</i> -phenylenediamine (Vol. 27, Suppl.7; 1987)
Industrial Chemical	Chloroprene (Vol. 71; 1999)
Pesticide	Chlorothalonil (Vol. 73; 1999)
Combustion Product	Chrysene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Industrial Chemical	CI Acid Red 114 (Vol. 57; 1993)
Industrial Chemical	CI Basic Red 9 (Vol. 57; 1993)
Industrial Chemical	CI Direct Blue 15 (Vol. 57; 1993)
Industrial Chemical	Citrus Red No. 2 (Vol. 8, Suppl. 7; 1987)
Metals	Cobalt and cobalt compounds (Vol. 52; 1991)
Metals	Cobalt sulfate and other soluble cobalt(II) salts (Vol. 86; 2006)
Industrial Chemical	<i>para</i> -Cresidine (Vol. 27, Suppl. 7; 1987)
Diet	Cycasin (Vol. 10, Suppl. 7; 1987)
Pharmacological	Dacarbazine (Vol. 26, Suppl. 7; 1987)
Pharmacological	Dantron (Chrysazin; 1,8-Dihydroxyanthraquinone) (Vol. 50; 1990)
Diet	Daunomycin (Vol. 10, Suppl. 7; 1987)
Pesticide	DDT [<i>p,p'</i> -DDT, 50-29-3] (Vol. 53; 1991)
Industrial Chemical	<i>N,N'</i> -Diacetylbenzidine (Vol. 16, Suppl.7; 1987)
Industrial Chemical	2,4-Diaminoanisole (Vol. 79; 2001)
Industrial Chemical	4,4'-Diaminodiphenyl ether (Vol. 29, Suppl. 7; 1987)
Industrial Chemical	2,4-Diaminotoluene (Vol. 16, Suppl. 7; 1987)
Combustion Product	Dibenz[<i>a,h</i>]acridine (Vol. 32, Suppl. 7; 1987)

Table 3: IARC Possible Human Carcinogens (Group 2B, cont)

Category	Agents and groups of agents
Combustion Product	Dibenz[a,h]acridine (Vol. 32, Suppl. 7; 1987)
Combustion Product	7H-Dibenzo[c,g]carbazole (Vol. 32, Suppl. 7; 1987)
Combustion Product	Dibenzo[a,h]pyrene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Combustion Product	Dibenzo[a,i]pyrene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Pesticide	1,2-Dibromo-3-chloropropane (Vol. 20, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	2,3-Dibromopropan-1-ol (Vol. 77; 2000)
Industrial Chemical	Dichloroacetic acid (Vol. 84; 2004)
Pesticide	<i>para</i> -Dichlorobenzene (Vol. 73; 1999)
Industrial Chemical	3,3'-Dichlorobenzidine (Vol. 29, Suppl. 7; 1987)
Industrial Chemical	3,3'-Dichloro-4,4'-diaminodiphenyl ether (Vol. 16, Suppl. 7; 1987)
Industrial Chemical	1,2-Dichloroethane (Vol. 20, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	Dichloromethane (methylene chloride) (Vol. 71; 1999)
Industrial Chemical	1,3-Dichloropropene (technical-grade) (Vol. 41, Suppl. 7, Vol. 71; 1999)
Pesticide	Dichlorvos (Vol. 53; 1991)
Industrial Chemical	1,2-Diethylhydrazine (Vol. 4, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	Diglycidyl resorcinol ether (Vol. 36, Suppl. 7, Vol. 71; 1999)
Diet	Dihydrosafrole (Vol. 10, Suppl. 7; 1987)
Industrial Chemical	Diisopropyl sulfate (Vol. 54, Vol. 71; 1999)
Industrial Chemical	3,3'-Dimethoxybenzidine (<i>ortho</i> -Dianisidine) (Vol. 4, Suppl. 7; 1987)
Industrial Chemical	<i>para</i> -Dimethylaminoazobenzene (Vol. 8, Suppl. 7; 1987)
Pharmacological	<i>trans</i> -2-[(Dimethylamino)methylimino]-5-[2-(5-nitro-2-furyl)-vinyl]-1,3,4-oxadiazole (Vol. 7, Suppl. 7; 1987)
Industrial Chemical	2,6-Dimethylaniline (2,6-Xylidine) (Vol. 57; 1993)
Industrial Chemical	3,3'-Dimethylbenzidine (<i>ortho</i> -Tolidine) (Vol. 1, Suppl. 7; 1987)
Industrial Chemical	1,1-Dimethylhydrazine (Vol. 4, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	3,7-Dinitrofluoranthene (Vol. 65; 1996)
Industrial Chemical	3,9-Dinitrofluoranthene (Vol. 65; 1996)
Combustion Product	1,6-Dinitropyrene (Vol. 46; 1989)
Combustion Product	1,8-Dinitropyrene (Vol. 46; 1989)
Industrial Chemical	2,4-Dinitrotoluene (Vol. 65; 1996)
Industrial Chemical	2,6-Dinitrotoluene (Vol. 65; 1996)
Industrial Chemical	1,4-Dioxane (Vol. 11, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	Disperse Blue 1 (Vol. 48; 1990)
Industrial Chemical	1,2-Epoxybutane (Vol. 47, Vol. 71; 1999)
Industrial Chemical	Ethyl acrylate (Vol. 39, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	Ethylbenzene (Vol. 77; 2000)
Pharmacological	Ethyl methanesulfonate (Vol. 7, Suppl. 7; 1987)
Pharmacological	2-(2-Formylhydrazino)-4-(5-nitro-2-furyl)thiazole (Vol. 7, Suppl. 7; 1987)
Microbiological	Fumonisin B ₁ (Vol. 82; 2002)
Industrial Chemical	Furan (Vol. 63; 1995)
Diet	Glu-P-1 (2-Amino-6-methylidipyrido[1,2- <i>a</i> :3',2'- <i>d'</i>]imidazole) (Vol. 40, Suppl. 7; 1987)
Diet	Glu-P-2 (2-Aminodipyrido[1,2- <i>a</i> :3',2'- <i>d'</i>]imidazole) (Vol. 40, Suppl. 7; 1987)
Industrial Chemical	Glycidaldehyde [765-34-4] (Vol. 11, Suppl. 7, Vol. 71; 1999)
Pharmacological	Griseofulvin [126-07-8] (Vol. 79; 2001)
Industrial Chemical	HC Blue No. 1 [2784-94-3] (Vol. 57; 1993)
Pesticide	Heptachlor (Vol. 79; 2001)
Pesticide	Hexachlorobenzene (Vol. 79; 2001)
Industrial Chemical	Hexachloroethane (Vol. 73; 1999)
Pesticide	Hexachlorocyclohexanes (Lindane) (Vol. 20, Suppl. 7; 1987)
Industrial Chemical	Hexamethylphosphoramide (Vol. 15, Suppl. 7, Vol. 71; 1999)
Microbiological	Human immunodeficiency virus type 2 (infection with) (Vol. 67; 1996)
Microbiological	Human papillomavirus types 6 and 11 (Vol. 90; in preparation)
Microbiological	Human papillomavirus genus beta (some types) (Vol. 90; in preparation)
Industrial Chemical	Hydrazine (Vol. 4, Suppl. 7, Vol. 71; 1999)
Pharmacological	1-Hydroxyanthraquinone (Vol. 82; 2002)
Combustion Product	Indeno[1,2,3- <i>cd</i>]pyrene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Diet	Iron-dextran complex (Vol. 2, Suppl. 7; 1987)
Industrial Chemical	Isoprene (Vol. 60, Vol. 71; 1999)
Diet	Lasiocarpine (Vol. 10, Suppl. 7; 1987)
Metals	Lead (Vol. 23, Suppl. 7; 1987)
Industrial Chemical	Magenta (containing CI Basic Red 9) (Vol. 57; 1993)
Radiation	Magnetic fields (extremely low-frequency) (Vol. 80; 2002)
Diet	MeA- α -C (2-Amino-3-methyl-9H-pyrido[2,3- <i>b</i>]indole) (Vol. 40, Suppl. 7; 1987)
Hormone	Medroxyprogesterone acetate (Vol. 21, Suppl. 7; 1987)

Table 3: IARC Possible Human Carcinogens (Group 2B)

Category	Agents and groups of agents
Diet	MelQ (2-Amino-3,4-dimethylimidazo[4,5-f]quinoline) (Vol. 56; 1993)
Diet	MelQx (2-Amino-3,8-dimethylimidazo[4,5-f]quinoxaline) (Vol. 56; 1993)
Pharmacological	Merphalan (Vol. 9, Suppl. 7; 1987)
Pharmacological	2-Methylaziridine (Propyleneimine) (Vol. 9, Suppl. 7, Vol. 71; 1999)
Diet	Methylazoxymethanol acetate (Vol. 10, Suppl. 7; 1987)
Combustion Product	5-Methylchrysene (Vol. 32, Suppl. 7, Vol. 92; in preparation)
Industrial Chemical	4,4'-Methylene bis(2-methylaniline) (Vol. 4, Suppl. 7; 1987)
Industrial Chemical	4,4'-Methylenedianiline (Vol. 39, Suppl. 7; 1987)
Metals	Methylmercury compounds (Vol. 58; 1993)
Industrial Chemical	2-Methyl-1-nitroanthraquinone (uncertain purity) (Vol. 27, Suppl. 7; 1987)
Industrial Chemical	N-Methyl-N-nitrosourea (Vol. 4, Suppl. 7; 1987)
Pharmacological	Methylthiouracil (Vol. 79; 2001)
Pharmacological	Metronidazole (Vol. 13, Suppl. 7; 1987)
Microbiological	Microcystin-LR (Vol. 94; in preparation)
Pesticide	Mirex (Vol. 20, Suppl. 7; 1987)
Diet	Mitomycin C (Vol. 10, Suppl. 7; 1987)
Pharmacological	Mitoxantrone (Vol. 76; 2000)
Diet	Monocrotaline (Vol. 10, Suppl. 7; 1987)
Pharmacological	5-(Morpholinomethyl)-3-[(5-nitrofurfurylidene)amino]-2-oxazolidinone [3795-88-8] (Vol. 7, Suppl. 7; 1987)
Pharmacological	Nafenopin (Vol. 24, Suppl. 7; 1987)
Industrial Chemical	Naphthalene (Vol. 82; 2002)
Metals	Nickel, Metallic and alloys (Vol. 49; 1990)
Pharmacological	Niridazole (Vol. 13, Suppl. 7; 1987)
Industrial Chemical	Nitrolotriacetic acid and its salts (Vol. 73; 1999)
Industrial Chemical	5-Nitroacenaphthene (Vol. 16, Suppl. 7; 1987)
Industrial Chemical	2-Nitroanisole (Vol. 65; 1996)
Industrial Chemical	Nitrobenzene (Vol. 65; 1996)
Combustion Product	6-Nitrochrysene (Vol. 46; 1989)
Pesticide	Nitrofen (technical-grade) (Vol. 30, Suppl. 7; 1987)
Combustion Product	2-Nitrofluorene (Vol. 46; 1989)
Pharmacological	1-[(5-Nitrofurfurylidene)amino]-2-imidazolidinone (Vol. 7, Suppl. 7; 1987)
Pharmacological	N-[4-(5-Nitro-2-furyl)-2-thiazolyl]acetamide (Vol. 7, Suppl. 7; 1987)
Pharmacological	Nitrogen mustard N-oxide (Vol. 9, Suppl. 7; 1987)
Industrial Chemical	Nitromethane (Vol. 77; 2000)
Industrial Chemical	2-Nitropropane (Vol. 29, Suppl. 7, Vol. 71; 1999)
Combustion Product	1-Nitropyrene (Vol. 46; 1989)
Combustion Product	4-Nitropyrene (Vol. 46; 1989)
Industrial Chemical	N-Nitrosodi-n-butylamine (Vol. 17, Suppl. 7; 1987)
Industrial Chemical	N-Nitrosodiethanolamine (Vol. 17, Suppl. 7, Vol. 77; 2000)
Industrial Chemical	N-Nitrosodi-n-propylamine (Vol. 17, Suppl. 7; 1987)
Diet	3-(N-Nitrosomethylamino)propionitrile (Vol. 85; 2004)
Industrial Chemical	N-Nitrosomethylethylamine (Vol. 17, Suppl. 7; 1987)
Industrial Chemical	N-Nitrosomethylvinylamine (Vol. 17, Suppl. 7; 1987)
Industrial Chemical	N-Nitrosomorpholine (Vol. 17, Suppl. 7; 1987)
Industrial Chemical	N-Nitrosopiperidine (Vol. 17, Suppl. 7; 1987)
Industrial Chemical	N-Nitrosopyrrolidine (Vol. 17, Suppl. 7; 1987)
Industrial Chemical	N-Nitrososarcosine (Vol. 17, Suppl. 7; 1987)
Microbiological	Ochratoxin A (Vol. 56; 1993)
Industrial Chemical	Oil Orange SS (Vol. 8, Suppl. 7; 1987)
Pharmacological	Oxazepam (Vol. 66; 1996)
Fibres Dust	Palygorskite (attapulgite)(long fibres, > 5 micrometres)(Vol. 68; 1997)
Pharmacological	Panfuran S [794-93-4] (containing dihydroxymethylfurazirine) (Vol. 24, Suppl. 7; 1987)
Pharmacological	Phenazopyridine hydrochloride (Vol. 24, Suppl. 7; 1987)
Pharmacological	Phenobarbital (Vol. 79; 2001)
Pharmacological	Phenolphthalein (Vol. 76; 2000)
Pharmacological	Phenoxybenzamine hydrochloride (Vol. 24, Suppl. 7; 1987)
Industrial Chemical	Phenyl glycidyl ether (Vol. 47, Vol. 71; 1999)
Pharmacological	Phenytoin (Vol. 66; 1996)
Diet	PhIP (2-Amino-1-methyl-6-phenylimidazo[4,5-b]pyridine) (Vol. 56; 1993)
Pesticide	Polychlorophenols and their sodium salts (mixed expo.) (Vol. 41, Suppl. 7, Vol. 53, Vol. 71; 1999)
Industrial Chemical	Ponceau MX (Vol. 8, Suppl. 7; 1987)
Industrial Chemical	Ponceau 3R (Vol. 8, Suppl. 7; 1987)

Table 3: IARC Possible Human Carcinogens (Group 2B)

Category	Agents and groups of agents
Industrial Chemical	Potassium bromate (Vol. 73; 1999)
Hormone	Progestins (Suppl. 7; 1987)
Hormone	Progestogen-only contraceptives (Vol. 72; 1999)
Industrial Chemical	1,3-Propane sultone (Vol. 4, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	beta-Propiolactone (Vol. 4, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	Propylene oxide (Vol. 60; 1994)
Pharmacological	Propylthiouracil (Vol. 79; 2001)
Fibres Dust	Refractory ceramic fibres (Vol. 43, Vol. 81; 2002)
Pharmacological	Riddelline (Vol. 10, Suppl. 7, Vol. 82; 2002)
Diet	Safrole (Vol. 10, Suppl. 7; 1987)
Microbiological	<i>Schistosoma japonicum</i> (infection with) (Vol. 61; 1994)
Pesticide	Sodium <i>ortho</i> -phenylphenate (Vol. 73; 1999)
Fibres Dust	Special-purpose fibres such as E-glass & '475' glass fibres (Vol. 81; 2002)
Diet	Sterigmatocystin (Vol. 10, Suppl. 7; 1987)
Pharmacological	Streptozotocin (Vol. 17, Suppl. 7; 1987)
Industrial Chemical	Styrene (Vol. 60, 82; 2002)
Pesticide	Sulfallate (Vol. 30, Suppl. 7; 1987)
Pharmacological	Surgical implants and other foreign bodies (Vol. 74; 1999):
Industrial Chemical	Tetrafluoroethylene (Vol. 19, Suppl. 7, Vol. 71; 1999)
Industrial Chemical	Tetranitromethane (Vol. 65; 1996)
Pharmacological	Thioacetamide (Vol. 7, Suppl. 7; 1987)
Industrial Chemical	4,4'-Thiodianiline (Vol. 27, Suppl. 7; 1987)
Industrial Chemical	Titanium dioxide (Vol. 47, Vol. 93; in preparation)
Pharmacological	Thiouracil (Vol. 79; 2001)
Industrial Chemical	Toluene diisocyanates (Vol. 39, Suppl. 7, Vol. 71; 1999)
Pharmacological	Trichlormethine (Trimustine hydrochloride) (Vol. 50; 1990)
Diet	Trp-P-1 (3-Amino-1,4-dimethyl-5H-pyrido[4,3-b]indole) (Vol. 31, Suppl. 7; 1987)
Diet	Trp-P-2 (3-Amino-1-methyl-5H-pyrido[4,3-b]indole) (Vol. 31, Suppl. 7; 1987)
Industrial Chemical	Trypan blue (Vol. 8, Suppl. 7; 1987)
Pharmacological	Uracil mustard (Vol. 9, Suppl. 7; 1987)
Industrial Chemical	Urethane (Vol. 7, Suppl. 7; 1987)
Metals	Vanadium pentoxide (Vol. 86; in preparation)
Industrial Chemical	Vinyl acetate (Vol. 63; 1995)
Industrial Chemical	4-Vinylcyclohexene (Vol. 60; 1994)
Industrial Chemical	4-Vinylcyclohexene diepoxide (Vol. 60; 1994)
Pharmacological	Zalcitabine (Vol. 76; 2000)
Pharmacological	Zidovudine (AZT) (Vol. 76; 2000)
Industrial Chemical	Bitumens, extracts of steam-refined and air-refined (Vol. 35, Suppl. 7; 1987)
Diet	Carrageenan, degraded (Vol. 31, Suppl. 7; 1987)
Industrial Chemical	Chlorinated paraffins of average carbon chain length C12 and average degree of chlorination approximately 60% (Vol. 48; 1990)
Diet	Coffee (Vol. 51; 1991)
Industrial Chemical	Diesel fuel, marine (Vol. 45; 1989)
Combustion Product	Engine exhaust, gasoline (Vol. 46; 1989)
Industrial Chemical	Fuel oils, residual (heavy) (Vol. 45; 1989)
Industrial Chemical	Gasoline (Vol. 45; 1989)
Diet	Pickled vegetables (traditional in Asia) (Vol. 56; 1993)
Industrial Chemical	Polybrominated biphenyls (Vol. 41, Suppl. 7; 1987)
Pesticide	Toxaphene (Polychlorinated camphenes) (Vol. 79; 2001)
Microbiological	Toxins derived from <i>Fusarium moniliforme</i> (Vol. 56; 1993)
Metals	Welding fumes (Vol. 49; 1990)
Exposure Circumstance	Carpentry and joinery (Vol. 25, Suppl. 7; 1987)
Exposure Circumstance	Cobalt Metals without tungsten carbide (Vol. 86; 2006)
Exposure Circumstance	Dry cleaning (occupational exposures in) (Vol. 63; 1995)
Exposure Circumstance	Printing processes (occupational exposures in) (Vol. 65; 1996)
Pharmacological	Talc-based body powder (perineal use of) (Vol. 93; in preparation)
Exposure Circumstance	Textile manufacturing industry (work in) (Vol. 48; 1990)

Notes on categories

Diet: Dietary agents and naturally occurring contaminants (excludes pesticides)

Industrial Chemical: Industrial chemicals and related contaminants or by-products (excludes pesticides)

**Meeting of the National Committee on Environmental and Occupational
Exposures (NCEOE) – December 11th, 2006 (8:00am-5:00pmEST) - Ottawa
South Way Inn – Capital Room**

Agenda

Chair: Mr. Larry Stoffman

8:00am	Refreshments
8:30am	1.0 Welcome & Review of Agenda –Larry Stoffman
8:45am	2.0 Update on the PP-AG & CSCC – Barb K/Larry
Strategic Planning - NCEOE Budget and Proposed Core Activities	
9:15am	3.0 Overview- Larry Stoffman
	4.0 CAREX O and E – Paul Demers, Larry, and committee discussion
10:15am	Health Break
10:30am	5.0 TUR Conference and Follow-Up – Larry, Paul, Andy King, Alan Abelsohn and all
11:00am	6.0 WHMIS and MSDS Project – Larbi, Larry and all
12:00pm	LUNCH
1:00pm	7.0 NGO Support
2:00pm	Health Break
2:30pm	8.0 Occupational History & Medical Education - Jim, Gary, Paul, all
3:30pm	9.0 Communications strategy: all <i>ONTARIO RIGHT-TO KNOW</i>
4:30pm	10.0 Other Business <i>CCS LABELING</i> Chemicals policy REACH and CEPA gap analysis : Conference Update - Sarah Miller
5:00pm	11.0 Adjournment

