Background

CAREX Canada is the only national surveillance system of its kind in Canada, focusing on exposures to carcinogens in workplace and community environments. By integrating and distilling data collected by federal, provincial and territorial agencies, the CAREX project offers insights into which substances pose the greatest risk to Canadians and serves as an important resource for efforts to reduce or eliminate exposures to those substances.

The World Health Organization estimates that globally, 19% of all cancers are attributable to the environment, including the work setting, resulting in 1.3 million deaths each year. The only way to reduce these cancers – and to minimize their impact – is to reduce the associated exposures.

The name “CAREX” stands for “CAR”cinogen “EX”posure and comes from a project developed by the Finnish Institute of Occupational Health looking to estimate exposures to known and suspected carcinogens in workplaces. WorkSafeBC funded a pilot CAREX project in 2003 at the University of British Columbia, and since 2007, the national project has been funded by the Canadian Partnership Against Cancer. What’s unique about CAREX Canada is that it includes an environmental focus, expanding the capacity of the project to identify exposures in both workplaces and communities.
With over 70 known and suspected carcinogens in our database of profiles and exposure estimates, the CAREX Canada project is the result of a collaborative effort among many team members. Past contributors are too numerous to mention here but are listed on our website under About Us. Current staff members, who have been involved in the activities highlighted in this Annual Report, include:

Staff

Hugh Davies, Principal Investigator, University of British Columbia
Paul Demers, Scientific Director, Occupational Cancer Research Centre
Calvin Ge, Occupational Exposures Researcher, University of British Columbia
Perry Hyttad, Environmental Exposures Researcher, University of British Columbia

Alison McKenzie, Occupational Exposures Researcher, Occupational Cancer Research Centre
Anne-Marie Nicol, Executive Director, University of British Columbia
Alison Palmer, Communications Director, University of British Columbia
Cheryl Peters, Occupational Exposures Advisor, University of British Columbia

Karla Poplawski, Environmental Exposures Researcher, University of Victoria
Eleanor Setton, Environmental Exposures Advisor, University of Victoria
Basil Veerman, Environmental Exposures Researcher, University of Victoria

Message from the Scientific Director

This past year marked a transition for the CAREX Canada project from a knowledge generation endeavour into a knowledge translation and exchange effort. After five years of intensive work, our project has become an established resource on exposures to known and suspected carcinogens in workplace and community environments in Canada. With renewed support from the Canadian Partnership Against Cancer we’re now working to share this resource with those working in cancer prevention.

In April 2012, we began our renewed, five-year mandate to translate our results. We’ve engaged advisors to help us best target our efforts, are working hard to update and enhance our resources, and are publishing our results in peer-reviewed journals. We’ve reached out and engaged in dialogues with government agencies, the Canadian Cancer Society and other not-for-profit organizations, and various stakeholders via tailored and topic-specific webinars, conference presentations, face-to-face meetings, and working groups.

From these stakeholders we’ve sought feedback on our tools and ideas around how they might be applied. What we’ve found – and as you’ll see in this report – is that groups are using our data to identify high risk groups, set priorities for prevention and identify exposure data gaps. There are many other potential applications to explore with users as we continue on our new mandate.

We look forward to the coming years of making Canadians’ exposures to occupational and environmental carcinogens a priority in prevention work. As our renewed funding attests, we have a unique set of resources to offer and a unique opportunity to put them into action for reducing the risk of cancer.

Sincerely,

Paul Demers, Ph.D.
Scientific Director, CAREX Canada
Director, Occupational Cancer Research Centre, Cancer Care Ontario

Dr. Paul Demers
29,177 visits to our website, a 42% increase from last year

20 reports and official documents referencing CAREX resources in the past year

156 followers on Twitter (@CAREXCanada), a 70% increase from last year

468 quarterly e-Bulletin subscribers

45 requests for information requests breakdown: 40% government, 23% NGOs and associations, 13% media, 13% industry and unions, 11% academic

225 individuals who attended the 16 targeted knowledge translation events put on by CAREX such as webinars and face-to-face meetings

102 letters sent out to Deputy Ministers, Workers’ Compensation Board Presidents and Chief Medical Officers of Health informing them about CAREX resources and tools

80 signups to the five one-hour webinars offered on various CAREX topics

1,180 individuals engaged through 20 conferences and workshops attended by CAREX, at which staff made 30 presentations on various topics

5 comprehensive training videos created and added to our website

5 followers on Twitter (@CAREXCanada), a 70% increase from last year

202 reports and official documents referencing CAREX resources in the past year

2012-2013 by the numbers
Highlights

Building Capacity

Piloting province-specific workshops in Ontario

In early March, 2013, the CAREX Canada team traveled to Toronto to present two workshops on Tools for Exposure Surveillance in Ontario, one for an environmental audience and one for an occupational audience. These workshops were an opportunity to showcase our tools and provide a hands-on experience to individuals working in cancer prevention in Ontario. Attendees represented various organizations, including Ontario Ministries of the Environment, Health and Long-term Care and Labour, the Canadian Cancer Society – Ontario Division, Canadian Auto Workers Union, and others.

The workshops were a pilot event to build capacity for using CAREX tools and resources in provincial-level cancer policy and prevention work. The workshops were presented with support from our partner the Occupational Cancer Research Centre and a Dissemination Grant from the Canadian Institutes of Health Research.

Enhancing our Resources

Expansion of database on workplace exposures begins

CAREX Canada’s occupational exposures team was awarded an operating grant through the Workers’ Compensation Board of Manitoba last year to expand the Canadian Workplace Exposure Database (CWED) with data from Manitoba Labour and Immigration’s Workplace Safety and Health Division. The CWED currently houses thousands of measurements of exposure to known and suspected carcinogens in Canadian workplaces. These additional measurements will allow us to refine our occupational exposure estimates in the future and better identify vulnerable worker populations that are highly exposed.

Our occupational team is currently working with two other provinces, Saskatchewan and Alberta, to incorporate more data into the CWED and is investigating potential contributions from the Atlantic provinces as well. For more information about the CWED, visit the Occupational Approach page under Profiles and Estimates on our website.

“IT was excellent to see so much availability and ease of access to data on carcinogen exposures.”

Workshop attendee
In late January 2013, the CAREX Canada team assembled individuals working in First Nations environmental health from across the country in Vancouver for an interactive workshop on approaches to CAREX training specific to First Nations. Workshop participants, including a local Elder, shared diverse perspectives around mechanisms and models for developing First Nations training on CAREX information and tools, potential key audiences for the training, and key characteristics of other successful training programs for First Nations groups.

The group, now officially CAREX’s First Nations Knowledge Transfer and Exchange Advisory Committee, will meet in early spring 2013 to prioritize the users and dissemination initiatives identified and agree on a knowledge translation strategy.

“Seeking Guidance
First Nations Knowledge Translation and Exchange Advisory Committee struck

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“This was a great start to educating First Nations communities about existing and anticipated risks of cancer.”
Committee member

The Committee was created in partnership with the Spatial Sciences Research Lab at the University of Victoria, the Assembly of First Nations (AFN) Environmental Stewardship Unit, and the First Nations Environmental Health Innovation Network (FNEHIN). Funding for the workshop came through a Dissemination Meeting Grant from the Canadian Institutes of Health Research.

Forging Partnerships
Working group created with WorkSafeBC

CAREX has now established a formal working group with WorkSafeBC’s Prevention and Occupational Disease Initiatives team to help mobilize CAREX data and tools, and share knowledge and expertise around workplace exposures to carcinogens. To start, our occupational exposures team provided B.C.-specific data on the numbers of workers exposed to carcinogens by industry and occupation. This information helped WorkSafeBC to prioritize their strategic planning on occupational cancer prevention.

The WorkSafeBC team also incorporated CAREX resources into their new occupational disease portal within the WorkSafeBC website, which serves as a one-stop-shop for resources on occupational exposures and associated diseases. The various links to CAREX throughout the new portal are proving useful to visitors; since the launch of that new portal in February, our website referral traffic from WorkSafeBC went up 171%.

“Our partnership with CAREX is helping to enhance our ability to identify and profile risk exposures to carcinogens – and ultimately help to prevent occupational disease.”
Colin Murray
Senior Manager of Prevention and Occupational Disease Initiatives, WorkSafeBC

Our latest initiative through the working group brings data visualization experts from WorkSafeBC’s Business Information and Analysis team into the partnership. Together, we’re working to create an online version of our eWORK tool, which will help to mobilize this new platform for exploring our results database.

Colin Murray
WorkSafeBC

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Colin Murray
WorkSafeBC
This map summarizes the results of Health Canada’s Cross Canada Radon Survey (Phase I), showing the percentage of home radon measurements in each health region above the current Canadian guideline.

Our estimates indicate that exposure to radon is one of the biggest priorities for environmental exposure reduction in Canada. A naturally-occurring radioactive gas produced as uranium breaks down in soils and rock, radon can accumulate in homes. Health Canada data shows that radon exposure is the second leading cause of lung cancer after smoking and is linked to approximately 16% of lung cancer deaths in Canada; in 2006 this amounted to an estimated 1,900 deaths. Given the significance of this exposure for cancer prevention, the CAREX Canada team has actively communicated radon exposure results to policy makers and health professionals across the country.

We have promoted awareness of radon exposures at academic conferences such as the Canadian Public Health Association 2012 Annual Conference, as well as a national meeting of air quality professionals, NGOs and the building industry organized through the B.C. Lung Association. CAREX expertise has also been integrated into radon-specific reports for Chief Medical Health Officers and the Canadian Association for Radon Scientists and Technologists.

The map above is available on our website under the Provincial Tables and Maps tab of our radon Environmental Estimate.
CAREX Canada is helping the BC Cancer Agency Research Centre's genetics group to explore links between the signatures of lung cancer tumors – the identifiable characteristics that distinguish one tumor from another – and different exposures to carcinogens. This collaboration was sparked after an in-person CAREX presentation to BC Cancer Agency researchers last spring.

Our team conducted an environmental exposure assessment on radon and air pollution for lung cancer cases in BC based on residential postal codes. The cancer genetics group, led by Dr. Wan Lam, is now using this information to determine whether the tumor signatures they’ve identified might be linked to specific carcinogen exposures. The group also hopes to take this work to the patient level; the exposure-specific signatures could help to identify indicators for improved cancer screening and treatment options.

Prevalence of Exposure to Solar Ultraviolet Radiation on the Job in Canada

Over one third of all newly diagnosed cancers in Canada in 2010 were skin cancer, despite the fact that skin cancer is largely preventable by limiting ultraviolet radiation (UVR) exposure. Our occupational exposures team was able to estimate the prevalence of this exposure for outdoor workers and found that solar UVR exposure is occurring on a large scale in Canadian workplaces. The results, published in the May/June 2012 issue of the Canadian Journal of Public Health, indicated that over 1.5 million Canadian workers are exposed to solar UVR at work, and approximately 897,000 of these workers were flagged as having “high exposure” (outdoors 75% of the workday). The largest occupational groups were farmers, construction labourers, and landscapers. Proportions of the workforce exposed by province ranged from 6.9% of workers exposed in Ontario to 17.3% in Prince Edward Island.

These exposure estimates serve as a support for primary skin cancer prevention efforts by helping to target high-risk groups, set priorities, and improve risk assessment. A link to this article is available on our website under Publications.

Risk-based indicators of Canadians’ exposures to environmental carcinogens

Our environmental exposures team published the results of their risk-based approach to estimating exposures in the February 2013 issue of Environmental Health. Using lifetime excess cancer risk as an indicator, which shows how many additional cases of cancer would be expected in a population of one million people given average exposure conditions in 2006, they identified a series of priority exposures for Canada. Priorities were identified as carcinogens with moderate to high data quality and lifetime excess cancer risk greater than 1 per million; they include: benzene, 1,3-butadiene and radon in outdoor air; benzene and radon in indoor air; and arsenic and hexavalent chromium in drinking water. Important data gaps were identified for asbestos, hexavalent chromium and diesel exhaust in outdoor and indoor air, while little data were available to assess risk for all substances in dust, food and beverages.

This publication provides a source of evidence for prioritizing future data collection and exposure assessment. A link to this article is available on our website under Publications.
Our occupational exposures team is currently beta-testing eWORK, a new tool that will allow users to conduct custom queries of the CAREX Canada results database. A Microsoft Excel-based tool, eWORK will make it easy for interested users to explore the CAREX exposure estimates and results in a variety of ways; the tool can be used to answer questions such as, what are the most prevalent carcinogen exposures for workers in the oil and gas industry? How many people are exposed to wood dust in B.C.? And what jobs have particularly high exposures to crystalline silica dust in Canada? We are currently seeking beta-testers to provide feedback on the tool and training manual so that we can continue to improve usability and functionality.

Our environmental exposures team spent this past year beta-testing the new CAREX Canada eRISK tool, a database application created for the environmental indicators. This tool is intended to provide a screening-level risk assessment for exposures to various known and suspected carcinogens in the CAREX database. Using lifetime excess cancer risk as the indicator, it allows users to explore the CAREX data (as of 2006), to create new estimates using their own local data, to explore the sensitivity of the estimates to the input data, and to develop scenarios based on past or future predicted measured levels. It can also provide a starting point for local-scale assessments and identify exposure pathways of interest for further investigation.

Updates on resources and tools

Visit the Training tab of our website to gain access and training on eWORK, eRISK and the Emissions Mapping Project.

eRISK – Screening-level risk assessment tool

eRISK

Calculate potential lifetime excess cancer risk using data collected by CAREX Canada or your own data and scenarios.

Version 1.0

Step 1. Create or Open Project and Choose Carcinogen
Step 2. Enter LifeStage Characteristics
Step 3. Enter Environmental Concentrations
Step 4. Enter Food Concentrations
REPORT 1: Lifetime Excess Cancer Risk
REPORT 2: Data Details
NOTES

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EMP – Dynamic maps of environmental quality across Canada

The Emissions Mapping Project (EMP) – launched last fall – is another new tool that allows users to visualize sources and concentrations of known and suspected carcinogens in the Canadian environment using Google Earth. Features of the tool include a ranking system that allows users to compare air emissions between watersheds, provinces, health regions and major cities. The tool also shows how different sources contribute to the rankings, and provides information on sources and levels of known and suspected carcinogens in outdoor environments. The EMP is hosted as its own website, complete with tutorials and how-to resources, at the Spatial Sciences Research Lab at the University of Victoria. It was made possible with additional support from the Canadian Institutes of Health Research.

Profiles and estimates – Managing and maintaining CAREX resources

In order to ensure that CAREX Canada data and resources are up-to-date, our team reviews carcinogen profiles and estimates on an ongoing basis.

Diesel engine exhaust, trichloroethylene (a metal degreaser) and polychlorinated biphenyls (PCBs, used to manufacture electrical equipment) were upgraded to known carcinogens given sufficient evidence of their carcinogenicity in humans. Several polycyclic aromatic hydrocarbons (PAHs, by-products of fuel burning) were reclassified to probable and possible carcinogens. New profiles were created for TCDD (a by-product of burning and chemical synthesis) and sulfuric acid mists (a by-product in industries such as pulp and paper processing).

As part of our regular review of exposure estimates, the CAREX occupational team also updated the exposure levels estimates for lead, nickel, chromium, styrene, formaldehyde, and benzene. These levels estimates are a complement to the exposure prevalence estimates in our carcinogen database.

More information about the methods used to estimate exposure levels can be found under the methods tab, a new feature of our website added for each known or suspected carcinogen in the CAREX database.

The environmental exposure estimates, which currently reflect 2006 exposure measurements, will be updated next year to incorporate data for 2011 from Environment Canada’s National Pollutant Release Inventory and National Air Pollution Surveillance Program. The updated profiles and exposure estimates are available via the Profiles and Estimates tab of our website.
To support our knowledge translation mandate, we assembled a new CAREX Canada Knowledge Translation Advisory Committee, which met for the first time in early February 2013. Composed of members from across the country with a broad range of backgrounds and experience, the Committee is helping to guide our knowledge translation strategy, ultimately helping to target our efforts to put CAREX resources and tools into action for cancer prevention in Canada.

Advisors

Sarah Bowen  
Associate Professor, Department of Public Health Sciences, School of Public Health, University of Alberta

Gillian Bromfield  
Director, Cancer Control Policy, Canadian Cancer Society

Patrick Fafard  
Associate Professor, Graduate School of Public and International Affairs, University of Ottawa

Jon Kerner  
Senior Scientific Advisor for Population Health & Knowledge Management, Canadian Partnership Against Cancer (CPAC)

Tracy Leach  
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Larry Stoffman  
Labour Consultant, LDS Occupational Health and Safety Ltd.

Eleanor Westwood  
Manager - Communication, Canadian Centre for Occupational Health and Safety (CCOHS)

Activities

The following one-hour webinars were offered on various CAREX topics. Recordings of these sessions are available under the Training tab of the website:

- Overview, October 25, 2012
- Environmental Estimates, November 8, 2012
- Occupational Estimates, November 22, 2012
- Emissions Mapping Project, January 24, 2013
- eRISK Tool, February 28, 2013

Three workshops on Tools for Exposure Surveillance, which included hands-on training for attendees and dialogue around potential applications, were piloted in Ontario with support from a Dissemination Grant from the Canadian Institutes of Health Research:

- Environmental Workshop, March 4, 2013, Toronto, ON
- Occupational Workshop, March 5, 2013, Toronto, ON
- Cancer Care Ontario, Occupational Cancer Research Centre, March 5, 2013, Toronto, ON

A list of conference presentations is available on our website under the Publications tab.
CAREX Canada is supported by the Canadian Partnership Against Cancer, an independent organization funded by the federal government to accelerate action on cancer control for all Canadians. Several activities described within this report were made possible through additional support from the Canadian Institutes of Health Research, the Government of Canada’s health research investment agency.

Acknowledgements

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