



NOT a flower shop

*Exploring
breast cancer
risk and gender
bias in the
automotive
plastics parts
industry in
Ontario*

By Mary-Louise Leidl

The contours of Windsor-Essex County resemble the shape of a tightly closed fist. The most southerly county in Ontario, it lies at the heart of the Great Lakes Basin, almost completely surrounded by water. The Detroit River separates the county's metropolitan centre, the City of Windsor, from its American cousin, Detroit (a.k.a. Motor City, U.S.A.), Michigan. To the south stretches the vastness of Lake Erie, and to the north, the shallow and much smaller Lake St. Clair, itself a mere 65 kilometres downriver from the industrial city of Sarnia and Ontario's aptly named "Chemical Valley."

Windsor-Essex County is a study of contrasts. Known as the "Smog Capital of Canada," Windsor also has days when its skies show off the deepest blue. Freighters chug up and down the waterways, ensuring a steady exchange of goods between Canada, the United States, and other global markets, while smaller pleasure craft drift with the breeze. Industry hugs the shorelines, yet the flat and fertile county boasts not only the highest concentration of greenhouses on the continent but also the greatest number of tool and die manufacturers in the country—it is both the tomato capital and the automotive capital of Canada.

Jim Brophy and Margaret Keith have studied occupational and environmental health, specifically the links between cancer risk and occupation, for more than three decades. They are the former executive director and former research coordinator, respectively, of the Occupational Health Clinic for Ontario Workers (OHCOW) of Sarnia-Lambton, and are currently adjunct professors at the University of Windsor. Their research, advocacy and publishing activities are extensive, helping us to better

"Well I know firsthand when you go and you're first diagnosed with cancer, they never asked where you worked. They want to know if you smoked, if you had stress in your life, if you drink... they don't ask me where I live... they never asked me where I worked all those years."

– National Network on Environments and Women's Health (NNEWH) focus group participant

understand how hazardous substances are affecting the health and well-being of women and men working in industrial and other settings.

In 2012, UBC Press will publish *Consuming Chemicals: Law, Science and Policy for Women's Health*, edited by D.N. Scott. Much of the material used in this article is drawn from the chapter entitled "Plastics Industry Workers and Breast Cancer Risk: Are We Heeding the Warnings?" written by Brophy, Keith, and fellow researchers Robert DeMatteo, Michael Gilbertson, Andrew Watterson and Matthias Beck. As well, Brophy and Keith have teamed up with the National Network on Environments and Women's Health (NNEWH), a Canadian projects-based research centre, to complete and disseminate their work. Quotations are drawn from a recent interview with Brophy and Keith and their work with a NNEWH-funded focus group study.

Keith and Brophy's earlier research suggests that women working in the areas of automotive manufacturing, farming and health care are experiencing increased rates of breast cancer—in some cases more than triple the risk. But the scientific and medical communities have shown too little interest to definitively link the disease with occupational hazards, despite these and other earlier studies.

"There has been very, very little research done in this area of occupationally related breast cancer. There have been a few researchers who have written about the fact that women have been excluded from so many occupational health studies. Women are still somehow not considered to be an important workplace population to study, and so we don't know enough about their risks."

–Margaret Keith

But with their latest findings Brophy and Keith hope to change all that. Engaged activist researchers in the health and safety movement since the late 1970s, the Windsor-based couple continues to listen to and advocate for women who work in some of the unhealthiest occupational environments in the country. Their current research focuses on the links between breast cancer and the working conditions of the blue-collar women who handle one of the most toxic arrays of man-made substances in the world: plastics. Their research takes them to the centre of Canada's automotive industry, Windsor-Essex County, Ontario.

"We have the life histories of almost 2,200 women that live in Essex County, and it's an unbelievable story that they have to tell. We need to listen to the populations at risk and not just dismiss their comments. The general public is far ahead of the cancer establishment, which seems to feel perfectly comfortable about the seemingly benign role of the environment, and its effects, while the average person says 'Of course this is having an impact.'" – Jim Brophy

Car culture

The global auto industry is growing. In 2010, well over 77 million vehicles were built worldwide, a 26 per cent increase over the previous year. Ranking eleventh in the world, Canada's auto industry produced more than 2,070,000 motor vehicles in 2010, a 39 per cent increase over 2009 levels. Essex County alone is home to over 500 manufacturing plants, directly and indirectly feeding the auto industry.

The average automobile today contains from 120 to 150 kilograms of plastic parts. The plastics industry in Canada is also growing, generating almost \$21 billion every year and employing over 90,000 workers. Women make up 37 per cent of the plastics workforce, more than in any other manufacturing industry. Of the plastics industry overall, about 18 per cent is devoted to manufacturing auto parts. Despite this, there is a downtrend in plastics auto parts manufacturing in Canada.

"In the last five to 10 years there has been tremendous de-industrialization going on in Canada, particularly in Ontario, the heartland of manufacturing in this country, where hundreds of thousands of industrial jobs have left. And these workers are left literally in fear. They face the insecurities of precarious employment. They just don't know from one minute to the next whether their jobs are there or not, and that makes health and safety seem like a luxury that nobody can afford. We don't agree with that, but we understand that it's the real experience that they are having." – Jim Brophy

In Essex County alone, there are over 20 plastic auto parts plants, most of them small to medium-sized firms. Of its workforce, 60 to 80 per cent are women.

These women are part of a skilled labour force; many of them have worked in the plastics industry for years, and hold a wide range of jobs, yet they have little to no union representation. Working conditions reflect this fact—the automotive plastics plants are often described by workers as hot, smelly and smoky, producing a “toxic soup” of chemicals that spew, drift and plume from the various processes required to make the numerous plastic components needed to build a new vehicle.

And women are getting sick: asthma, headaches, nausea, nosebleeds, vertigo, and the list goes on. More distressingly, women are experiencing reproductive disorders, miscarriages and cancer, particularly breast cancer.

Rising ‘C’ rates

Since the late 1960s, the incidence of breast cancer has risen steadily in Canada. Although women are more likely to die from lung cancer or heart disease, breast cancer is the most commonly *diagnosed* cancer among women in this country. According to Statistics Canada, breast cancers account for 30 per cent of all new cases (excluding non-melanoma skin cancer) with the highest rates among women 60 years and older, but it is also now the most common form of cancer diagnosed in young adults and the leading cause of cancer deaths in this population.

About 23,400 women will be diagnosed with breast cancer this year, and over 5,000 women will die from it. In Ontario 9,000 women will be diagnosed with this disease and 1,950 will not survive. Canada has the second highest rate of breast cancer in the world, after the United States. It is an epidemic by anyone’s definition.

“I worked in the plastic plant for five years and then developed breast cancer when I was 32. There are six or seven breast cancers that we know of. They are all younger than 50.”

– NNEWH-funded focus group participant

The cancer establishment (the current medical, governmental and corporate complex) would have the public believe that the increasing rates of breast cancer are to be blamed on genetics or what are called lifestyle choices: poor diet, the excessive consumption of alcohol, smoking and a lack of exercise. However, U.S. government reports from as early as the late

1970s suggest that at the time up to 40 per cent of cancers could be related to exposure to six substances in the workplace. Yet regulatory agencies, then as now, continue to turn a blind eye while cancer agencies focus on what are called “modifiable lifestyle factors,” placing the onus of prevention on individuals.

“I think that the results from our breast cancer studies should add weight to the fact that we can’t wait any longer to regulate and control these exposures. In fact, we should have banned these substances and we need to revisit all government regulations based on their effect to mimic the hormone system. This is going on in Europe.” –Jim Brophy

The chemical connection

But research on the history of breast cancer’s rise and the rate of women entering the workforce reveals a more compelling picture. Since the 1970s, and for a brief period during the Second World War, women left the confines of the home to find work in the public sphere. As well, many women took on jobs in plants and factories, settings formerly dominated by men. Coinciding with this shift, from the 1940s on, science and industry began introducing thousands of new chemicals into the environment.

Today, more than 90,000 man-made chemicals contaminate the planet’s air, water and soil, our homes and workplaces, and our bodies. The majority of these substances have never been tested. In fact, the Environmental Protection Agency, the U.S. organization set up to protect the health of American citizens and the environment, has banned only five chemicals in the last 25 years. A 2007 report compiled by the Massachusetts-based Silent Spring Institute identifies at least 216 chemicals associated with an increase in mammary gland tumours. Meanwhile, breast cancer has doubled in one generation, and the list of chemicals just keeps growing.

Plastics are chemical substances derived from petroleum. Like gasoline, diesel fuel, and asphalt, the raw materials needed to produce plastics are the end products of the distillation of crude oil. Refineries both distill and separate crude into various components, or fractions, which are used to make more than 2,500 substances and chemicals used in home and industry. Acrylonitrile, styrene and vinyl chloride are just

three chemicals used in the plastics industry. They are made up of repeating chains of monomers (units of molecules) that are joined together in a process that transforms them into polymer resins, such as acrylonitrile-butadiene-styrene (ABS), polystyrene (PS), and polyvinyl chloride (PVC).

But plastics are not benign substances. Many of them are known carcinogens, mutagens and endocrine-disrupting chemicals (EDCs), substances that interfere with the normal functions of hormones throughout the body and contribute to the development of breast cancer as well as neurological and reproductive disorders. EDCs can have an effect at extremely low doses, in some cases as low as parts per trillion.

“These chemicals that mimic estrogen or other hormones have the biggest effect not at high levels, but at the very lowest levels. If the timing is right, the exposure can be very small, and have the most dramatic effects. None of that has been accounted for at all in these substances, so it’s not just that women in the plastics industry are getting exposed to polyvinyl chloride or acrylonitrile or styrene, which have been shown to be mammary carcinogens in animal studies, it’s that they are getting exposed to chemicals that also mimic estrogen.”

– Margaret Keith

The changing lists of ingredients used to manufacture plastics also make it very difficult to know what specifically increases breast cancer risk. Additives, some of which have been historically included in plastics making, metals such as lead and cadmium, plasticizers such as di-ethylhexyl phthalate (DEHP), and flame retardants such as polybrominated biphenyls (PBB) and diphenyl ethers (PBDE), are but a few of the chemicals classified by the International Agency for Research on Cancer (IARC) as either known or possible carcinogens and as endocrine disruptors.

Polycyclic aromatic hydrocarbons (PAHs), formaldehyde, and solvents such as benzene and toluene are other chemicals that may also initiate breast cancer and mimic estrogen. Not only that, but the synergistic affect of these chemicals on health in general, and breast cancer in particular, is unknown and could be enormous.

“We have found that so often when we are doing these talks, and even when we’ve been doing focus groups we get people saying ‘Oh my gosh I had no idea that the stuff could be so dangerous. I knew people were getting sick, I knew I had headaches, but I didn’t know it could increase my risk of breast cancer. I didn’t know that these things were estrogenic.’” – Margaret Keith

A plastic world

Plastics fall into two main categories: thermoplastic resins that can be repeatedly softened and reshaped using heat and pressure, and thermoset resins that can be permanently set using a chemical reaction. Both are heavily used in the auto parts industry and undergo various processes to make the dozens of items found in a car, such as seats, dashboards, bumpers, and numerous engine components. These substances arrive at the auto plastics plants in the form of powders, pellets and liquids.

Workers are handling these substances over and over again, absorbing, inhaling and ingesting them via skin, lung and mouth. On any given day a worker may pour these chemicals from bag to container, blend and mix additives, melt resins, and/or force the heated resins into various shapes using processes such as injection moulding, extrusion, blow moulding, compression moulding and calendaring. All these processes expose workers to a range of compounds in the form of fumes and gases, smoke and vapours, dust and particulate matter.

“There would be lots of fumes. The safety alarms were shut off. We ran polyvinyl chloride, lead and chromium and silica—all designated substances. And we had no control program... that is why we wanted ventilation. We were told, ‘You don’t work in a flower shop.’”

– NNEWH-funded focus group participant

Is it no wonder then that we are seeing an epidemic in breast and other cancers? Women are especially vulnerable to chemical exposure due to their smaller body size, greater amounts of fatty tissue (where toxins tend to accumulate), the sensitivity of their unique hormonal and reproductive systems, and heart function. Women in the plastics plants are putting their health, and lives, at risk.

“We heard about so much more than just breast cancer. There were lots of concerns about breathing problems, and reproductive issues, about miscarriages or infertility. So many of them talked about headaches and sore throats and feeling dizzy or faint. A lot of them talked about how terrible the smell and the smoke was, and sometimes they would have to go running outside to get fresh air if there was some malfunction, which would happen frequently in the process of heating plastics.”

– Margaret Keith

New studies connect the dots

Having reviewed the scientific literature on occupation and cancer incidence to date, Brophy and Keith are conducting primary research using worker- and community-based research techniques, including the use of focus groups (where participants describe their personal stories) and hazard mapping (a technique of mapping workplace settings that show how they contribute to disease and other health conditions).

The workplace can be particularly hazardous in the auto industry and the manufacturing of plastic parts is no exception. Brophy and Keith reviewed industry and government hygiene inspection reports, noting the reliance on air monitoring to prove safety. But air sampling the plant’s work areas does not tell the real story of what workers are being exposed to. In fact, earlier studies indicate through blood and urine samples that the body burden (the total amount of a toxic substance that can be detected in the body at any given time) of workers exposed to chemicals such as acrylonitrile, styrene, phthalates, brominated fire retardants and bisphenol A, all used in the plastic auto parts industry, is far greater than in the general population.

“We got a very good education through this last study... We came to understand even better what the process is. We now know what a plastics plant looks like, what the machines are like, what they do, whether there’s the potential for exposure to different parts of the plastics components, where the dust and vapors and glues are... it’s been a real eye opener.”

– Margaret Keith

Monitoring air quality does not protect workers. Rather, so-called “safe” levels are set according to what is economically viable for industry. As well, a lack of material safety data sheets (the information sheets that accompany chemical substances) when they are available, are either incomplete or unintelligible, according to workers. Machine malfunction and equipment failure are common and contribute to workplace hazards, as do inadequate safety gear and lack of proper ventilation. For example, according to the forthcoming book, *Consuming Chemicals: Law, Science and Policy for Women’s Health*, an industrial hygiene report of 1990 stated that: “Exposures to volatile organic compounds from spray glue operations are high and workers will require respiratory protection when working in east booth. Currently the exit for the booth exhaust fan is inside the plant and the air is re-circulated.”

Gender and class consciousness

Brophy and Keith suggest that gender bias plays a role in whether women workers are protected from the myriad substances and processes they are exposed to while on the job. In the plastics industry, women tend to dominate the machine operating and decorating divisions while men work primarily in maintenance and skilled trades. According to participants of the NNEWH-funded focus group study, the one plastics plant that had a predominately male workforce also had a state-of-the-art ventilation system. Class discrimination may also play a part—the population of Windsor-Essex County is primarily a blue-collar one, and working class women are seemingly invisible

“It’s this horrendous social class bias that dominates public health research and policy. We have pesticide bylaws for urban populations, for instance, because of the harm of pesticide exposure, particularly for children, but not a word about the more highly exposed agricultural community. They have far more exposures that we have... Why is this ignored? Because once you start to explore the working environment, you’re ultimately challenging the power relations in our society and vested interests that dominate and control government policy and cancer investigations, and regulations. So the risks in the workplace are kept off the public’s radar.” – Jim Brophy

when it comes to safeguarding their health and well-being in high-risk occupations.

Despite some union activism, over the decades little has changed for women working in the plastic auto parts industry. But if women and future generations are to be protected, then there must be a concerted and collective effort on the part of government, industry, unions and workers to bring these changes about. Testing protocols need to be improved, regulatory standards and guidelines need to be re-evaluated, and further research on the synergistic effect of chemical mixtures on the human body need to be conducted.

According to Brophy and Keith's research, no plastics worker ever received compensation for developing breast cancer. From a public policy standpoint, they ask: What should we do in the face of scientific uncertainty and incomplete knowledge?

"We've got to stop these exposures, put two and two together. We do know that there are carcinogens, and some of them are mammary carcinogens, as well as endocrine disruptors in these workplaces. We know that people are being exposed through these various work processes, that's very clear. And if you follow the precautionary principle you would say 'Okay, there is every reason to suspect that these people are at risk from these exposures, so we need to do something to minimize or eliminate these exposures.' And that's where you need the public pressure because it isn't going to happen without it." –Margaret Keith

It is the union activists of Windsor-Essex County, as well as its advocacy researchers, who have put the issue of occupational health on the map in Canada. Many factors have shaped and influenced Windsor activists, such as their proximity to industrial Detroit and roots that go back to the first French settlers. There is also a long history of labour and civil rights actions, from the historic Ford Motor Company strike to involvement with the Underground Railway. Brophy says, "It is this group and not the medical or health professionals that has identified the adverse health impacts of workplace exposures and demanded that these conditions be changed."

During the 1980s and 1990s, Windsor was one of the centres in Canada of occupational health organizing in general and cancer prevention in particular. So it is not surprising that the first place in Canada to have a local cancer treatment centre gather the occupational histories of its cancer patients was in Windsor.

Brophy and Keith are currently compiling their most recent research for publication in a peer-reviewed journal. Says Keith, "We are hoping that our findings will add weight to the mounting evidence of harm from workplace exposures, particularly in the area of breast cancer."

Mary-Louise Leidl is a Vancouver Island-based freelance writer with a wide range of interests that include health and the environment, food, travel and photography.

For more information:

National Networks on Environment and Women's Health (NNEWH) website; in particular the section on Chemical Exposures and Women's Health: www.nnewh.org

Chemical Exposure and Plastics Production: Issues for Women's Health: A Review of Literature, prepared by Robert Dematteo, NNEWH, December 2011. <http://www.nnewh.org/overview.php?section=4>

Consuming Chemicals: Law, Science and Policy for Women's Health, edited by D.N. Scott. UBC Press, publication pending.

Sex, Gender and Chemicals: Factoring Women into Canada's Chemicals Management Plan (2011), report published by NNEWH about the federal government's Chemicals Management Plan (CMP), and how it is not doing enough to prevent Canadians, especially women, from chronic low-dose exposures to toxic substances: www.nnewh.org/images/upload/attach/NNEWH_chemicals_report_for_web.pdf

Hormones and Endocrine-Disrupting Chemicals: Low-Dose Effects and Nonmonotonic Dose Responses, journal article by Vandenberg et al. in *Endocrine Reviews*, March 2012: <http://edrv.endojournals.org/content/early/2012/03/14/er.2011-1050.full.pdf+html>

CWHN collection of resources on women's health and the environment: <http://cwhn.ca/en/resources/primers/environment>