The Cancer Epidemic as a Social Event

By Robert Chernomas, PhD
and Lissa Donner

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Dedicated to Fred Chernomas and Evelyn Ste. Croix, a victim dear to each of us, among the many dear to us all.

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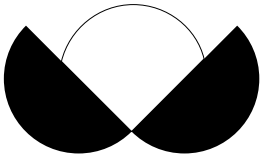

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Let every death that is clearly traceable to a dangerous trade be made manslaughter, for which the owners...are to be punished by imprisonment... and ways will soon be found to carry away or utilize the noxious gases, and provide the automatic machinery to carry and pack the deadly white lead and bleaching powder; as would certainly be done if the owners' families, or persons of their own rank of life, were the only available workers. Even more horrible than the white-lead poisoning is that by phosphorus, in the match factories. Phosphorus is not necessary to make matches, but it is a trifle cheaper and a little easier to light (and so more dangerous), and is therefore still largely used; and its effect on the workers is terrible, rotting away the jaws with the agonizing pain of cancer followed by death. Will it be believed in future ages that this horrible and unnecessary manufacture, the evils of which were thoroughly know, was yet allowed to be carried on to the very end of this century, which claims so many great and beneficent discoveries, and prides itself on the height of civilization it has attained.

—Wallace, A. R., (1898) *The Wonderful Century: Its Successes and Failures*

'...it seems to me that if you wait until all the frogs and toads have croaked their last to take some action, you've missed the point...'

—*One Frog Can Make a Difference – Kermit's Guide to Life in the 90's,* R.P. Riger, Jim Henson Productions Inc. 1993

I. The Cancer Epidemic

> *After decades of misleading assurances of major progress in the war against cancer the National Cancer Institute and the American Cancer Society in a stunning reversal admitted that the incidence of cancer is expected to double by 2050.* (Epstein, et al, IJHS, 32 (4): 669-707, 2002).

It is hard to imagine someone living in Canada today that has not lost someone important to them from cancer. One hundred years ago knowing anyone who had cancer would have been unusual. What happened?

Pneumonia, measles, cholera, diarrhoea and enteritis dominated the nineteenth century mortality statistics in countries like Canada and the US. Even by the early twentieth century, heart disease and cancer were not among the leading causes of death. In 1921, cancer killed 6.6% of males and 8.6% of females in Canada.[1] By 1957 cancer and cardiovascular disease (heart disease and stroke) accounted for 60% of all deaths in Canada, while infectious diseases accounted for 10% of all deaths. By 1985, deaths from infectious diseases had dropped to about 4%, while cancer and cardiovascular disease were responsible for about 70% of all deaths. Cancer now kills 27% of men and 23% of women in Canada[2]. What has caused this shift?

In 2003, an estimated 139,900 Canadians will be newly diagnosed with cancer and 67,400 Canadians will die of cancer.

In 1999, Canadians lost 932,000 potential years of life due to cancer. This includes 15,000 potential years of life lost due to childhood cancers. Cancer is the leading cause of potential years of life lost in Canada.(*Canadian Cancer Statistics, 2003*)

Is this phenomenon simply the result of people living longer? Is it that life expectancy has dramatically improved and therefore people live long enough to acquire chronic disease? The evidence belies this view of both longevity and chronic disease. It is true that at the turn of the nineteenth century life expectancy in the industrialised capitalist countries was around fifty years whereas presently it is over seventy years. However, these numbers exaggerate the real improvement in the life expectancy of adults. Life expectancy is calculated as an avergage, and much of the increase is accounted for by the dramatic *decrease* in infant mortality that took place during that period, the result of improvements to working conditions and living conditions. In Canada, deaths in infancy decreased from 9% in 1921 to less than 1% in 1985. During this same time, women's deaths from pregnancy and childbirth decreased from 2.8% to 0.02%.[3]

Is the increase in cancer the result of an aging population? *Cancer incidence* is the number of new cases of cancer diagnosed in any year. The *age standardized* incidence of cancer allows us to answer the question, "how much of this change is due to factors other than an aging population", since it accounts for changes that have occurred over time in the age distribution of the population. **The answer is that from 1970 to 1998, after controlling for aging, the incidence of cancer in Canada increased by 35% for men and 27% for women.**

One in every 2.4 Canadian males (41.2%) will develop cancer and one in every 3.6 (27.4%) will die from it. One in every 2.7 Canadian females (37.6%) will develop cancer and one in 4.3 (23.1%) will die from it.[4]

What is cancer?

Cancer is a group of diseases in which abnormal cells in some organ or tissue go out of control – growing and increasing in number.

Normally, the cells in the body grow and reproduce themselves, generally at the same rate at which old cells die. When cells grow out of control and form a mass, the mass is called a tumour. There are two types of tumours: benign and malignant. Benign tumours grow and enlarge only at the site where they began. Malignant or cancerous tumours can also invade and destroy the normal tissue around them and spread to other parts of the body.

Distant spread of a cancer occurs when malignant cells detach themselves from the original or primary tumour and are carried to other parts of the body, causing more tissue damage. When this happens, the cancer is said to have metastisized. When tumours affect organs such as the lungs, liver or brain, the damage and loss of organ function eventually cause death.

Cancer usually takes many years to develop. Exposures to carcinogens today will still be causing cancers many years in the future.

American data show a similar trend. In 1900 cancer was the eighth-leading cause of death in the United States, responsible for less than 4% of all deaths.[5] Cancer now strikes 44% of men and 38% of women in the US and is responsible for approximately one quarter of US mortality. [6]

From 1950 to 1998, in the US the overall incidence of cancer rose about 60%. These rates are age adjusted — 50 year old men and women in 1950 are compared to 50 year old men and women in 1990, so that living longer cannot explain this phenomenon. Breast cancer has grown by 60%, prostate cancer by 200%. In the U.S., childhood cancers have increased by 26% and are the number one killer of children, after accidents.[7]

From 1992 to 1999 in the US the incidence of lung cancer in men has decreased, while predominantly non-smoking cancers have continued to increase, including malignant melanoma, 18%, leukemia, 18%, breast, 7%, kidney, 14%, bone and joint, 20% and thyroid cancer, 22%.[8]

The table below shows the changes in the age standardized incidences of total cancers and the three leading causes of cancer in Canada for males and females from 1974 to 1998.[9] These data are presented as the number of cases of cancer per 100,000 people; these are not the actual number of cases.

Also noteworthy is the 49.1% decrease in cervical cancer among women during this time, due mostly to the prevention of cervical cancer through increased screening for pre-cancerous changes to the cervix.

Age Standardized Cancer Incidence Trends - New Cases per 100,000					
	Males				
	All Cancers	All Cancers Except Lung	Prostate	Lung	Colorectal
1974	359.8	290.8	60.0	69.0	51.6
1998	445.8	366.5	113.7	79.3	61.8
% change 1974 to 1998	**23.9%**	**26.0%**	**89.5%**	**14.9%**	**19.8%**
	Females				
	All Cancers	All Cancers Except Lung	Breast	Lung	Colorectal
1974	294.9	280.9	88.3	14	45.2
1998	345.4	302.5	102.6	42.9	43.6
% change 1974 to 1998	**17.1%**	**7.7%**	**16.2%**	**206.4%**	**-3.5%**

II. Cancer as a Social Event

The mainstream medical perspective is that disease comes from elements of nature, carried by germs and/or genes and governed by natural/medical "laws", or that possibly and partially, disease is the inevitable result of industrialisation and badly chosen lifestyles. Where nature cannot be found at fault, individuals' lifestyles and personality types can. Overeating and drinking and Type "A" personalities take up where bacteria and bad genes leave off. The dominant view of cancer prevention has focused almost exclusively on individual lifestyle changes. This view of disease takes the capitalist system of production and distribution as efficient and given, with only an occasional nod at its disease-generating effects. The treatment strategy that follows from this theory of disease, preoccupied with the search for bad genes, viruses and bacteria, and "magic bullets", is to kill them or re-engineer them and/or a to use a "magic scalpel" to remove the results.

The leading alternative perspective argues that the cancer epidemic can largely be explained by carcinogens added to our food, air, water and consumer products by corporations. Cancer is the result of complex interactions among environmental and occupational carcinogens, tobacco, genetics, distress, dietary fat (notably saturates and trans-fats which increase the levels of unhealthy LDL cholesterol in the blood) and economic inequality.

This paper will argue that cancer is predominately structured and influenced by social conditions, not by "natural" laws, and that consequently, changes in social conditions are necessary to prevent cancer. Cancer is not the result of irresistible laws governed by nature, nor of some inevitable technological imperative independent of socially determined political and economic factors. It follows that the primary means of reducing and effecting the character of cancer is to change the working and living conditions of the population.

This is consistent with the population health approach, widely accepted by researchers and policy makers in Canada. However, primary cancer prevention (other than through individual actions such as smoking cessation and reduced exposure to the sun) is a topic typically ignored by the population health mainstream. Instead, it has focused more on the behavioural determinants of health (such as personal health practices and coping skills and social support networks), and less on the structural determinants of health (such as income and social status and employment and working conditions).

How then can we explain the change in the dominant disease form, and the cancer epidemic? The answer is shaped in large part by the different means by which capitalists make profits at different stages in the history of capitalism.

III. Capitalist Economics and Cancer

It is profit that enables capitalists to own factories, stores, mines, and to sell cars, computers, gas and food. It is their objective to keep their labour and material costs, taxes and environmental costs to a minimum — the higher these are the lower their profits, everything else being equal — putting them in conflict with workers, environmentalists and citizens in general. It is not a moral or ethical question, it is a necessity if they are to make profit in a world they share with workers (who they are in opposition to with respect to the share of the value added produced), environmentalists (who they are in opposition to with respect to the earth), citizens (expecting social programs) and other capitalists (who compete over price and market share). These profits enable them to engage in capital flight, capital strikes, and campaign contributions, and power over the media-culture and the academy. Capitalism is not a personal but a social power.

In the 19th century low wages, a prolonged working day and child labour as means of expanding profits ran up against inflexible limits. Workers demanded higher wages, a shorter working day, a prohibition on child labour, and better working conditions in the factories and mines. These limits restricted increases in the rate of profitable accumulation to increases in population growth, since additional labour hours were the only source of additional profits. The historical role of capitalism was to overcome these limits.

Class struggle was a significant force behind a new emphasis on the development of productivity through ever more advanced technological and management techniques. Rising wages, shorter hours and a labour supply restricted by child labour laws made it ever more imperative to find other means of lowering costs. Without lowering costs and increases in productivity, workers would be capturing an ever-greater share of the value added in production.

The other side of the equation for the capitalist was competition with other capitalists. Lower-cost capitalists will drive higher-cost capitalists from the market by lowering prices and/or by having more profits to invest for the next round of production and sales. Being pushed from below (workers), while being squeezed from the sides (other capitalists) is what drives the system to ever greater increases in productivity and lower cost commodities.

The "circuit of capital" demands that capitalists first must be concerned with acquiring the least expensive inputs in production they can in producing their products. Second, they must make use of these inputs, labour, machines and materials in a production process that ensures a competitive price in the market place. Next they must be able to market these products in order to be able to sell them.

The genius of capitalism is a set of property rights and laws of motion that has created the unprecedented wealth of the last few centuries of human existence. They have accomplished this by driving down the costs of production in large part by increasing productivity, resulting in a proliferation, for some, of an abundance of historically unprecedented consumer goods and services. The question is what are the costs of allowing capitalists to determine the inputs, production and marketing of this largesse.

The capitalist who was able to introduce techniques that lowered unit labour costs un-

der these conditions would have profits available to invest in new techniques that would enable him/her to compete successfully with rivals, as well as to continue to expropriate increasing proportions of surplus from labour. By substantially decreasing the labour time needed to make, and therefore the value of, articles of primary necessity through productivity increases, capitalism reduced the part of the working day during which it was producing the equivalent of wages. This generated surplus forever — greater investments in private and public enterprises at the same time as making rising wages possible. Capitalism's laws of motion generate economic growth.

The primary means by which this increase in productivity takes place is through mechanisation. In the twentieth century, mechanisation for the cost-minimizing, profit-maximising capitalist firm has tended to generate a more energy-and chemical-intensive production process, which in turn has resulted in significant changes in the quality of air and water and of the food that people consume. This marks a historically significant transformation, particularly with respect to the context for disease. In part, this transformation led to the productivity/ wage increases that made possible improvements in health and the decline in the effects of infectious diseases. In the hands of cost-minimising/profit-maximising capitalists this transformation also resulted in the creation of the "age of chronic disease."

Individual capitalists must be preoccupied with costs of production per unit of output with a regulatory environment for labour and the environment that promotes lowering these costs. Unit labour costs and regulation must enable them to compete with other capitalists in other countries with respect to a regime of accumulation. The structural position of capitalists in society requires such a preoccupation. This often means dumping carcinogens into our air, water, and food — because the alternative would be more expensive — and to discredit and disempower those who challenge their capacity to do so. The capitalist is preoccupied with the cost of producing and selling products. The problem is that these "direct" private costs are only a fraction of the social costs. The direct and indirect costs of their inputs, production process and marketing include in addition to the direct costs of the product the loss of life, illness, loss of work and leisure time, medical costs, and environmental damage.

Measuring the real costs to society of this economy, in which individual enterprise are focused on minimizing costs and maximizing profit, is left to labour, organizations, environmentalists, public health workers, independent scientists and academics. Challenging the production of cancer in the name of economic efficiency is both an economic and political process, often carried out at the level of the state, the workplace and the community.

Dr. Samuel Epstein, author of *The Politics of Cancer Revisited* gave a very clear example of how this system works in a 1999 speech in Hamilton:

> *I remember having got DDT off the market in 1969 as a key expert against USDA and then proceeded to work with the EPA (Environmental Protection Agency) in getting its replacement, chlordane…off the market. But that took eighteen months of work in which the industry hired its consultants and so called experts from all over the world and you're faced with a barrier of 20 or 30 people and a barrier of attorneys going at you day and night. But I remember one evening…sitting and having a drink with the chief Shell attorney, and I said, 'You know, why in the devil do you proceed with this nonsense because you know you're going to lose?' He said, 'My dear chap, you*

really don't know what you're talking about. Let me explain the realities to you.' He said, 'Do you know how much it costs for us to litigate and play games with you in court per annum?' I said no, and he said, 'Well, about two and a half million, bringing everybody and all our experts to court...' He said, 'Do you know how much money we make by selling our product [the pesticide chlordane] while we're in court with you? About $65 million. It's time you grew up Sam.[10]

According to Health Canada, for the year 1993, cancer cost approximately $16.2 billion, comprising direct costs of $3.5 billion and indirect costs of $12.7 billion[11]

According to the National Institute of Health in the US, the overall cost for cancer for 2000 was approximately $180 billion: $60 billion for direct medical costs, $15 billion for indirect costs of lost productivity due to illness and $105 billion for indirect costs of lost productivity due to premature death.[12]

These costs of cancer are only a fraction of the real costs of the carcinogens produced and distributed by corporations, as many such toxins are also associated with cardiovascular and other chronic diseases. Corporate accounting does not calculate the real value of the economic and human loss of the toxins they add to our lives. Occasionally trial lawyers, unions, environmentalists, public health workers and government agencies and their economists do.

IV. What Causes Cancer?

We now know that the development of cancer is a complex, multi-step process. Cancer is believed to begin with damage to the DNA of cells by an agent called an *initiator*. Initiators include environmental and occupational exposures to carcinogens, lifestyle factors such as smoking, diets high in certain fats and genetic factors.

Cells damaged by cancer initiators may remain passive for a number of years. Exposure to *promoters,* which may be other agents or the compound effect of exposures to a number of agents over time, is thought to cause the damaged cells to mutate, setting off the uncontrollable growth of cells that characterize cancer.

But cancer is also caused by lack of political will.

> *The tragedy of benzene is that it has taken so long for science to be translated into protective action. Many thousands of workers and other persons in nations around the world have suffered unnecessarily and died prematurely while regulatory agencies, industry and the courts debated the carcinogenicity of benzene and argued about the need for protective regulation. In the current era of global proliferation of toxic chemicals and hazardous technologies, all who are involved in the production and use of benzene have a heavy responsibility and a duty to protect their workers and the general public against this highly toxic and carcinogenic compound. The debate over whether benzene is carcinogenic has long since ended, and controversy about the need to protect humans against benzene must not continue.* (Dr. Philip Landrigan, Chair of Community Medicine at Mount Sinai Hospital, New York Editor-in-Chief, American Journal of Industrial Medicine, quoted in Toronto Cancer Prevention Coalition, *Preventing Occupational and Environmental Cancer: A Strategy for Toronto*)

Benzene (classified by the International Agency for Research on Cancer as a confirmed human carcinogen)[13] is but one example of a carcinogen allowed to be released into our environment, by a regulatory system, which places profits ahead of human health. In 2001, over 1,185,000 kilograms of benzene were released into the Canadian environment.[14] At the same time, the Canadian Council of Ministers of the Environment reported on their progress in reducing the use of benzene in Canada by 30% from 1995 to 2000.[15] Clearly, we need stronger action and a fundamental change in approach.

> *A new approach is required to avoid repeating the cycle of unnecessary suffering and premature deaths resulting from exposure to hazardous substances such as benzene, tobacco smoke or asbestos. Currently, substances are assumed to be harmless until proven otherwise. In the interest of protecting our health, we must adopt an approach rooted in the right to a clean and safe environment in the workplace and the community.* (Toronto Cancer Prevention Coalition, *Preventing Occupational and Environmental Cancer: A Strategy for Toronto*, page 9)

The system that provided the wherewithal to overcome infectious disease did so at a price.

It transformed food, water, air and the labour process into mediums for heart disease and cancer. By introducing more mechanised/intensive production processes capitalism transformed the context for disease. It has transformed our food, water, air and work process in unprecedented way and has created an historically unique disease pattern.

One measure of this is the amount of cancer-causing chemicals released into the environment each year. Each year, medium and large sized Canadian companies are required to report emissions of carcinogens to the reported to the National Pollution Release Inventory**. In 2001, Canadian industries reported the release of 18,455,237 kilograms of known carcinogens into our air, soil and water.**[16]

David Bennett has referred to these producers, who seek to avoid the effective regulation of the production, use and disposal of carcinogens as the "merchants of cancer". They operate from the unstated moral premise that it is acceptable to use carcinogens as long as the risks are acceptable and the benefits are high. They then invoke their own "experts" to show that the risks are minimal and the benefits obvious. Therefore, regulation of carcinogens to prevent cancer is not necessary.[17]

There is a progressive, alternative approach to cancer prevention, based on the presumption that if a carcinogen can feasibly be eliminated from the environment, it should be. Our approach gives priority to publish health.

Cancer in our Environment, Homes and Workplaces

The World Health Organization estimates that 20% of cancers are genetic in origin and that 80% are environmentally based. This is good news, because it means that 80% of cancers are preventable.

In 1978, the U.S. National Institute of Occupational Safety and Health (NIOSH) estimated that 20 to 40% of all cancers were occupational in origin. Outraged, the American Industrial Health Council, an industry-funded organization, hired its own expert, Dr. R. Stallones, to refute this finding. But it couldn't

Prostate Cancer

Prostate cancer is the most commonly diagnosed cancer in men. In 1999, 16,168 Canadian men were diagnosed with prostate cancer and 3,601 died as the result of this disease. Together these men lost 32,000 potential years of life. The incidence of prostate cancer has increased steadily over the last several decades. This trend is not due solely to aging, since from 1974 to 1998 the age standardized rate of prostate cancer increased by 90%.[1]

There are many causes of prostate cancer, including genetic factors, which may account for 5 to 10% of cases.[2] In the US, Black men are at highest risk and Aboriginal men at the lowest risk. Inherited factors and an aging population alone cannot explain the rapid rise in prostate cancer during the last fifty years. One or more things in the environment and/or lifestyle have also changed. This is supported by the fact that Asian men living in Asia have a markedly lower risk of developing prostate cancer, but when they move to Western countries, their risk of prostate cancer sharply increases.

Known environmental risk factors for prostate cancer include red meat consumption, dietary fat, cadmium, and pesticide exposures. New research suggests that exposures in early childhood and in utero to chemicals which mimic estrogens (such as plasticizers) may play a role in the development of prostate cancer.[3]

1 *Canadian Cancer Statistics*, 2003
2 Collaborative on Health and the Environment, *Prostate Cancer: What we know*
3 Schettler, T., *Prostate cancer*

be done. Instead, he concluded that 20% of all cancers were work related.

Yet many authorities (including, for example, Cancer Care Ontario in its publication *Ontario's Cancer Prevention Blueprint 2000)*[18] continue to state that occupation only accounts for 5% of all fatal cancers, thus diminishing the public's sense of the importance of these issues and contributing to the myth that cancer pre-

Breast Cancer

Breast cancer is the most commonly diagnosed cancer in women; almost one-third of newly-diagnosed cancers in women are cancers of the breast. In 1999, 18,023 women were diagnosed with breast cancer and 4,672 died as the result of contracting breast cancer. That year alone, Canadian women lost 91,000 potential years of life due to breast cancer. The incidence of breast cancer has been steadily increasing in Canada and other industrialized countries. This increase is not due solely to aging, since from 1974 to 1998, the age standardized rate of breast cancer increased by 16.2%. About 99% of breast cancer occurs in women, but breast cancer is more likely to be fatal among men.[1]

There are many causes of breast cancer and the majority of breast cancers cannot be explained by the currently acknowledged risks.[2] While genetic links to breast cancer have received much attention both in research and among the public, the BRCA1 and BRCA2 genes, which increase susceptibility to breast cancer, are present in less than 10% of women diagnosed with breast cancer.[3] Women have been historically underrepresented in occupational cancer studies. Overall, the literature suggests an association between nursing and higher breast cancer risk.[4] There is also a dietary connection to breast cancer. Eating a diet high in animal fat has been linked to breast cancer in pre-menopausal women.[5]

One of the strongest risk factors for breast cancer among middle aged and older women is estrogen exposure. Estrogens occur naturally in women's bodies and are responsible for the development of secondary sexual characteristics. But exposure to estrogens, and to endocrine disrupting chemicals that mimic estrogen, increase the risk of cancer.

> *New evidence strengthens the association between compounds that mimic these natural estrogens, such as hormone replacement therapy and oral contraceptives, and increased risk of breast cancer… Other compounds with estrogenic activity such as drugs like diethylstilbestrol (DES), plastic additives like bisphenol-A (BPA), polyvinyl chloride (PVC) (found in many consumer products), fuels such as benzene, and some pesticides like dieldrin have all been found to increase the risk of breast cancer. Synthetic chemicals strongly linked to breast cancer through experimental evidence include: organic solvents (used in many manufacturing processes, including the manufacture of computer components), polycyclic aromatic hydrocarbons (PAHs) (produced from combustion of fuels, including gasoline, diesel, and heating oil, cigarettes and other tobacco products, or by grilling meats and fish at high temperature) and 1,3 butadiene (a by-product of internal combustion engines and certain industrial processes).*[6]

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1 Solomon, *Breast Cancer and the Environment*

2 Brophy et al, "Occupational History of Cancer Patients in a Canadian Treatment Center and the Generated Hypothesis Regarding Breast Cancer and Farming," page 350.

3 ibid

4 Ho, C., "Is working in healthcare a risk factor for breast cancer?", *Occupational Medicine Clinical Update*, page 2

5 Cho, E., et al *Premenopausal fat intake and risk of breast cancer*

6 Evans, N. *State of the Evidence: What is the Connection Between Chemicals and Breast Cancer?*, page v

vention is primarily a matter of individual responsibility, not collective will.

As the Canadian Auto Workers have stated:

> *Scientific evidence demonstrates that blue collar workers are bearing a disproportionate share of the cancer burden. Workers in certain carcinogen laden industries area contracting cancer at rates well beyond those experienced by the general population. At least 60 different occupations have been identified as posing an increased cancer risk. Studies show that the auto industry is producing laryngeal, stomach and colorectal cancers along with its cars. The steel industry is producing lung cancer along with its metal products. Miners experience respiratory cancers many times higher than expected. Electrical workers are suffering increased rates of brain cancer and leukemia. Aluminum smelter workers are contracting bladder cancer. Dry cleaners have elevated rates of digestive tract cancers. Firefighters contract brain and blood-related cancers at many times the expected levels. Women in the plastics and rubber industry are at greater risk for uterine cancer and possible breast cancer. The list goes on and on.* (CAW, *Cancer Causing Substances: A Worker's Guide to Understanding and Eliminating Them from the Work Environment*, page 2)

While industrial workers are at higher risk, occupational cancer is not a problem only for blue-collar workers. For example, the International Agency for Research on Cancer has classified the work of hairdressing and barbering to be probably carcinogenic. Laboratory technicians, pathologists and others who work in medically related occupations may be exposed to formaldehyde, an IARC probable human carcinogen. Ironically, nurses and other health care workers who work with cancer treatment (chemotherapy) drugs, may, as a result, be at higher risk for cancer themselves.

Nor are our homes are not a safe refuge from carcinogens. Carcinogens can enter our homes in many ways. Some of these are:

- **contaminants in drinking water**, such as arsenic and trihalomethanes, which are formed when the chlorine added to most Canadian drinking water comes into contact with organic materials.

- **pesticides and herbicides** which are used on lawns and gardens, as well as in farming, where they end up in our food supply. The herbicide 2,4-D has been classified by the IARC as a possible human carcinogen. One of the Canadian brands of 2,4-D is sold as some forms of Roundup®, manufactured by Monsanto. Monsanto also sells "Roundup Ready"® seeds for canola, soybeans and other crops, promoted as "genetically modified to be tolerant to in-crop applications of Roundup® herbicide." (See http://www.monsanto.com/ag/_asp/monsanto.asp). Despite consumer complaints, Canadian legislation does not require the labelling of genetically modified foods such as canola oil produced from the plants grown from these genetically modified seeds. Monsanto was also the company behind the unsuccessful campaign to introduce a growth hormone (Posilac®) into Canada's milk supply by allowing it to be used to increase milk production in dairy cows. Health Canada banned bovine growth hormone, not because of its potential risk to humans, but because of the increased risk of udder infections in dairy cows treated with this drug.

- **cosmetics**, which may contain carcinogens including DEA (diethanolamine), formalde-

hyde and talc contaminated with asbestos. Women in particular are at risk, since they tend to use more lotions and cosmetics than men. Long term use of permanent hair colouring products has been linked to an increased risk of bladder cancer among both users and the hairdressers who apply these chemicals. The Breast Cancer Action Coalition has pointed out that many cosmetic companies (including Avon, Revlon and Estée Lauder) try to mask their use of carcinogens with corporate "pink ribbon" campaigns that promise customers buying their products, that a portion of the sale will go toward "the fight against breast cancer".[19] Why not just take the carcinogens out of their products?

Corporations and their economists point out how the capitalist market system provides choices, as the essence of freedom and democracy. Yet in reality, most of us are exposed to carcinogens at work, in the environment and at home, not as the result of individual choices. This is demonstrated by a recent study led by researchers at the Mount Sinai School of Medicine in New York, in collaboration with the Environmental Working Group and Commonweal. Nine volunteers were tested for the presence of chemicals, pollutants and pesticides in their blood and urine. One of the volunteers was the PBS journalist Bill Moyers. None of the volunteers work with chemicals on the job. Yet their bodies contained an average of 91 compounds, most of which did not exist 75 years ago. In total the nine subjects carried 76 chemicals linked to cancer in humans or animals (an average of 53 each).[20]

Cancer and Food

While there has been increased media coverage recently of the dangers of a high fat diet, these have actually been documented for over forty years. Blumenfeld provides an account of how our meat, eggs and vegetable oils have been changed. [21]

Fat has been qualitatively transformed and its intake in this century has increased both absolutely and as a proportion of our food intake. The food industry has transformed the old type of animal fats into a new type, which is remarkably efficient at increasing saturated fat and cholesterol in our blood.

Why did the food industry transform our daily food intake into a high proportion mixture of saturated fat and cholesterol? The reason is that it was found to be less expensive to keep cattle, hogs, and chickens in a stall, away from exercise, making it easier to feed and fatten them, than to allow them to roam the range. Instead of rooting for their food and slowly growing into marketable animals, animals are force-fed grains spiked with chemicals. This process of "producing meat" also changes the partially unsaturated fats into a hard, white, and much more saturated fat. In the days when there were "free range" hogs, scientists used lard as a source of unsaturated fats in laboratory experiments. Rooting for food meant soft and unsaturated lard, but "scientifically" fed hogs become extremely heavy hogs whose lard becomes supersaturated fat.

The priming of hens means restricted movement by housing them in cubicles while feeding them scientific mixtures designed to produce the maximum number of eggs per day-regardless of quality. The results are abnormal eggs with supersaturated-fat.

In this age of processed foods, hydrogenated vegetable oils have become a ubiquitous feature of our diets. Industrial chemists have changed unsaturated vegetable oils into a new artificially saturated vegetable oil, through hydrogenating the oils. This is done in order to extend the shelf

life of foods containing these oils. This process hardens the oil into synthetic hard solid fat, which will not spoil. This creates trans-fats, a major contributor to coronary disease.

While there has been much publicity recently about the dangers of a high fat diet and its connection to both cancer and cardiovascular disease, much less public attention is given to the known carcinogens in our food supply, or to the contamination of animal fat with carcinogenic pesticide residues.[22] Changing our diets to reduce fats and increase fruit and vegetable consumption is clearly a good thing. For example, recent studies have linked dietary fat to both prostate[23] and breast cancer[24]. However, fat is not the only thing that should be reduced in our diets. We need to eliminate carcinogens in food. Take the case of dioxins. Classified by the International Agency for Research on Cancer as a confirmed human carcinogen, these compounds are released into the environment, yet they are not even included in the National Pollution Release Inventory.

Here is part of the International Agency for Research on Cancer's description of dioxins (PCDDs)

> *PCDDs are ubiquitous in soil, sediments and air. Excluding occupational or accidental exposures, most human exposure to PCDDs occurs as a result of eating meat, milk, eggs, fish and related products, as PCDDs are persistent in the environment and accumulate in animal fat… Infants exposed to PCDDs and PCDFs through breast milk exhibit alterations in thyroid hormone levels and possible neurobehavioural and neurological deficits.*[25]

Carcinogens in food include growth hormones (such as Carbadox, used in pork production and Revlar, used in beef production) and nitrites used in preserved meats such as hot dogs to keep them looking pink and fresh longer. The nitrites combine with amines which are naturally present in the meat to form N-Nitrosodimethylamine, classified by the IARC as probable human carcinogen. Studies have linked consumption of hot dogs more than once per week to increased brain cancers and leukemia in children. Children whose mothers ate hot dogs more than once per week while they were pregnant have also been found to have increased rates of cancer.[26]

Changing our diets to eat more fruits and vegetables and less fat is usually portrayed as a matter of individual choice. There is some truth to this, but factors such as economic disparity mean that some individuals have more choice in the matter than others. And the issue is not merely one of personal nutirition — significant economic benefits have accrued to companies that manufacture and sell cancer promoting foods.

V. Cancer And Class, Gender And Race

Most published cancer data describe risks to the population as a whole. General statistics like this about cancer risk are misleading for five reasons:

- Most medical research has been done on groups of men. The ways in which toxic substances may operate differently in women's bodies is rarely considered. Given what is known about the connections between hormone disrupting chemicals and cancer, especially breast cancer, it is urgent that studies include both males and females.

- Data about general risk in the population minimize the risk to workers who are exposed to carcinogens on the job. Cancer registries do not include occupational history information, which would be vital to understanding the risks to particular groups of workers.

- Little research is done about the interactions between occupational and other carcinogens. For example, smokers have about 10 times the risk of developing lung cancer as non-smokers, but smokers who work with asbestos have about 50 times the risk of developing lung cancer.

- Similarly, data about the risk of cancer in the general population underestimates the risks to those who live in nearby the sources of carcinogens in the environment. These tend to be people in poorer neighbourhoods.

- Little research has been done on the effects of these substances on children, who are particularly vulnerable, because their bodies are still developing.

At the beginning of the 20th century infectious diseases were the great killers, and age-adjusted mortality was higher in the lower classes. At the beginning of the 21st century, heart disease and cancer are the major killers, yet it is still true that those with lower incomes will die younger and experience more illness during their lives.

Recent Canadian research on mortality across income groups in larger Canadian cities has found income-related disparities in health status from 1971 through 1996. These income disparities existed for overall mortality rates as well as for specific disease categories including circulatory disease, cancer, respiratory disease and injuries. [27]

In 1996, an estimated 23% of the potential years of life lost before the age of 75 in Canada was attributable to income differences, second only to cancer which is accountable for about 31% of potential years of life lost. [28]

The reasons for the connection between income and health are complex and the subject of much research. The link between low income and poorer health is especially important for women, since they earn on average, less than men. In 1999, Canadian women had a poverty rate over 30% higher than that of men.[29]

What we do know is that low income earners and their families are more likely to be exposed to carcinogens. They are more likely to work in industrial jobs where carcinogens are used in the production process, less likely to have union representation to enforce existing occupational health and safety legislation and

more likely to live in neighbourhoods close to sources of environmental pollution.

Recent immigrants and people of colour are at particular risk because of lower incomes and structural discrimination which often excludes them from higher-paying, lower risk occupations.

Men's and women's experiences of cancer also differ. Men are more likely both to contract cancer and to die as a result of it. Cancer rates have also increased more among men than among women. From 1974 to 1998, the age standardized incidence of cancer among Canadian women increased by 17.1%, while it increased by 23.9% for men. (See Figure 1 on page 3 above for more detailed information.). However, lung cancer tells a different story. Although the overall incidence of lung cancer increased by 20% from 1974 to 1998, it increased by 17% among men and by 206% among women. Much of this increase has been attributed to increased smoking among women. Social pressures on girls and young women to remain thin encourage them to begin smoking, since cigarettes are an appetite suppressant. However, this increase also coincides with women's entry into occupations from which they had previously been excluded, such as the auto, steel and mining industries. The contribution of women's increased exposures to occupational exposures is not known.

VI. The Cancer Institutions

Critics of the war on cancer argue that it has largely been a failure. The widespread belief that we are making progress against cancer is an illusion. The vaunted increases in five year survival rates are misleading according to the critics because they now count things that are not cancer and because they are able to diagnose real cancer at an earlier stage, people appear to survive longer. Except for a few rare types of cancer, medicine can't claim any improvements in prognosis for patients with the most common forms of the disease. There are a handful of successes in cancer treatment but these are among relatively rare forms of cancer. Environmental, social and lifestyle factors appear to be much more important influences than medical care.[30]

Mainstream medicine places the blame for cancer on lifestyle and genetics - and emphasizes research into changes at the individual level, treatment, and genetic screening as the solutions. It identifies symptoms and treats them, while largely ignoring the root causes of disease. We believe that successful cancer prevention requires a very different approach.

Epstein refers to National Cancer Institute (NCI) and the American Cancer Society (ACS) as the "cancer establishment". He asks if 80-90%, of human cancer is determined environmentally and thus theoretically avoidable through prevention, why is the cancer establishment fixated on damage control, diagnosis and basic genetic research and is indifferent, if not sometimes hostile to cancer prevention, that is getting carcinogens out of the environment? He accuses the two main US institutions responsible for cancer treatment and research in the US, The American Cancer Society and The National Cancer Institute, of conflicts of interest. He suggests that the direction taken by the drug industry, the mammography industry, the pesticide industry and other such industries influence the two institutions.[31]

These two institutions had approximately $4.2 billion and $800 million budgets in 2002, respectively. Epstein argues that they are fixated on screening, diagnosis, and treatment at the expense of primary prevention. For the "cancer establishment" encouraging lifestyle changes to the exclusion of environmental and occupational changes has been their historic mission.

He also argues that decades-long silence on a wide range of avoidable causes of cancer has encouraged, tacitly if not directly, "powerful corporate polluters and industries manufacturing carcinogenic products." This silence on avoidable causes of cancer reflects denial of citizen's right to know, thereby sacrificing citizens' health and welfare to powerful corporate interests.

Epstein accuses the NCI in large measure for the faulty science on the basis of which regulatory decisions are becoming increasingly subverted by special interests. The Cato, Hudson and Life Sciences Institutes along with the Harvard Center for Risk Analysis claim that carcinogens do not pose a significant hazard, and in so doing help to limit or stall the regulation of carcinogens and other public health hazards.

Another ominous development is the growing influence of industry-sponsored journals. Editorial boards of journals sponsored by pharmaceutical and petrochemical companies are dominated by "industry-affiliate lawyers and scientists, including former senior NCI staffers." [32]

The Canadian situation has, sadly, been quite similar. Research into primary prevention of

cancer remains woefully under-funded. But pressure from environmental groups, unions and others concerned with cancer prevention has begun to make a difference. The Canadian Strategy for Cancer Control does include reference to primary prevention, including issues such as diet, physical activity, smoking, sun exposure and exposure to occupational and other environmental carcinogens.[33] The Strategy includes an active Working Group on the Prevention of Occupational and Environmental Cancers, in which labour and the environmental movement are represented.

The Canadian Cancer Society has also begun to change. Unlike its American counterpart, the CCS now supports the use of the *precautionary principle*[34] in order to prevent cancer. But their approach is inconsistent in acknowledging the importance of primary prevention. For example, their literature on breast cancer does not include reference to any possible environmental risk factors.[35]

VII. The New "Cancer" Institutions?

In a PBS documentary called Trading Democracy, Bill Moyers suggests that "when the North American Free Trade Agreement became the law of the land almost a decade ago, the debate we heard was about jobs." "One provision was too obscure to stir up controversy. It was called Chapter Eleven, and it was supposedly written to protect investors from having their property seized by foreign governments. But since NAFTA was ratified, corporations have used Chapter Eleven to challenge the powers of government to protect its citizens, to undermine environmental and health laws, even attack our system of justice."[36]

Here are three examples of how Chapter 11 has been used to undermine health:

- The Ethyl Corporation, an American manufacturer of a gasoline additive (MMT), considered by the Canadian government to be carcinogenic and banned, sued the Canadian government under Chapter Eleven. The Ethyl Corporation claim was launched in 1996 and settled in 1998 after the Tribunal made three awards. As part of the settlement, the Government of Canada removed the ban, was forced to issued a statement that there was no evidence of harm caused by the product and paid the company approximately $20 million (Canadian). MMT is banned in many US states and in Europe.[37]

- Methanex, a Canadian company that is the world's largest producer of methanol, the key ingredient in the gasoline additive MTBE (methyl tertiary butyl ether). In 1995 MTBE began turning up in wells throughout California, and by 1999 had contaminated thirty public water systems. The state ordered that the additive be phased out, after some research linked it to cancer and other human health problems. Methanex filed suit under NAFTA's Chapter Eleven, seeking $970 million in compensation for loss of market share and, consequently, future profits. This case has not been settled yet.

- An American company called Metalclad tried to bulldoze over the protests of both state and local governments in Mexico to reopen a toxic waste dump that many citizens feared was making them sick, in particular from carcinogens. When Metalclad was stopped by the local town council the company invoked Chapter Eleven and was awarded $16 million in compensation from the Mexican government and was allowed to continue with their operations.

The Bush Administration, along with the Canadian government, are now in negotiations to expand this NAFTA investor provision to 31 more countries in the hemisphere, through the so-called Free Trade Area of the Americas (FTAA).

But there is an alternative: Canada could take a different position. The British Royal Commission on Environmental Pollution recent report *Chemicals In Products* Safeguarding *The Environment And Human Health*, proposed a radically different approach for the UK and the EU, one where public health would take precedence over free trade. The authors state that:

In appropriate cases both the UK and the EU should make use of the powers already available under WTO rules to restrict the marketing or use of dangerous substances or products containing them even at the risk of challenges by oversees suppliers that such measures are indirectly discriminatory.[38]

Instead, the Canadian government continues to export cancer-causing asbestos from mines in Québec. Canada is the world's largest second largest exporter of asbestos, exporting about 96% of the asbestos mined here. The Government of Canada has used the WTO to try to stop other countries from banning the importation of Canadian asbestos. Seven of the top ten markets for Canadian asbestos are developing countries, which are thus being set up for asbestos related cancers that they will not be able to afford to treat[39]. The Canadian government regularly grants money to the Asbestos Institute to help sell Canadian asbestos abroad, while, closer to home, acknowledging that it is a carcinogen and spending millions of dollars to remove it from the Parliamentary buildings in Ottawa

The increased power of corporations at the expense of citizens' rights and health has not stopped at the borders of North America. With the introduction of the World Trade Organization in 1995 European, Asian and North American corporations now have evolving Chapter Eleven power over governments all over the world.

NAFTA's Chapter Eleven and the WTO protect corporate profits at the expense of human health. They stop governments from using the best science available, and the precautionary principle, to protect the health of their citizens.

Historically the tobacco, lead and asbestos industries claimed immunity for themselves and their products because absolute proof of the relationship of their products to cancer could not be made. The ability and willingness to conceal and distort information regarding the health effects of their products have allowed corporations to damage public health for years. They conceal knowledge, hire scientists to create contrary opinions and public relations spins, to create a sense of uncertainty. Now NAFTA and the WTO provide corporations with unprecedented power to pursue these goals.

VIII. Real Cancer Prevention

Over thirty years ago, a physician trying to explain the dilemma of medical practice said:

> *"You know", he said, "sometimes it feels like this. There I am standing by the shore of a swiftly flowing river and I hear the cry of a drowning man. So I jump into the river, put my arms around him, pull him to shore and apply artificial respiration, and then just as he begins to breathe, another cry for help. So back in the river again, reaching, pulling, applying, breathing and then another yell. Again and again, without end, goes the sequence. You know, I am so busy jumping in, pulling them to shore, applying artificial respiration, that I have no time to see who the hell is pushing them all in."(*K. Zola. "Helping—Does it Matter: The Problems and Prospects of Mutual Aid Groups" Address to the United Ostomy Association, 1970.)

In this way, the practice of medicine has changed little in the past thirty years. The Canadian health care system does a very good job of delivering health care services with equity, efficiency and efficacy. In our determination to protect and extend Medicare, however, we must remember that cancer, and chronic diseases such as cardiovascular disease, will only be reduced through prevention, and not through treatment of those already ill.

The systemic transformation of our food and environment that launched the cancer era has not evolved without resistance. A small (relative to the resources poured into magic bullet solutions) but tenacious research and policy enterprise has gone into prevention and public health policy and implementation. The occupational health, environmental, nutrition and women's health movements have been effective in promoting legislative and regulatory changes. After years of lobbying by the anti-smoking and public health movements, the federal and provincial governments are now acting to constrain the tobacco companies, motivated in no small measure by the huge costs to the medicare system of tobacco related illnesses.

Real cancer prevention will require real social, political and economic change. Traditionally, industry has argued that for each carcinogen, there is a safe level of exposure. Yet the current state of scientific knowledge does not allow us to make such predictions. Our guiding principle should be that the safest exposure is no exposure to carcinogens. We must shift our thinking from an assumption that chemicals are safe until proven guilty to one in which we act to protect public health even in the face of uncertainty. We must consider the complete "life cycle" of carcinogens – from manufacture, through use, to disposal. Real cancer prevention will also require us to understand and take action on the socio-economic factors that influence what appear to be individual lifestyle choices. We will have to systematically scrutinize the health effects of economic and social policies, public and private.

> *This crisis must be addressed by beginning now to implement the precautionary principle as a matter of public policy. Under this principle, evidence of harm, rather than definitive proof of harm, is the trigger for policy action. In addition, the precautionary principle mandates that the burden of proof with*

regard to chemicals rests with the manufacturers to demonstrate that the substances are safe, rather than with the public to show that they are harmful. Finally, the precautionary principle rests on the democratic principle that government officials are obligated to serve the public's interest in human health and environmental protection.[40]

The City of Toronto Cancer Prevention Strategy summarizes the key elements necessary in cancer prevention. These are:

1. **The Precautionary Principle** - When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.

2. **The Weight of Evidence Approach** - When assessing the health risks associated with a product of activity, all of the combined results of many kinds of research investigating harm or potential harm should be included.

3. **Pollution Prevention** - It is cheaper and more effective to prevent environmental and human health damage than to attempt to manage or cure it.

4. **Just Transition** - Workers and communities have the right to both economic security and a healthy environment for themselves, their families and future generations. They should not have to choose between paying the bills and their own health, or the health of their children.

5. **Community Right to Know** - Community members, workers and consumers have a right to know about the environmental and occupational risks to which they are exposed and to participate in making the decisions that affect their health.[41]

Such an approach, focused on primary pollution prevention, would not only help to prevent many cancers, it would also help to prevent other pollution-related diseases, notably some respiratory and cardiovascular diseases.

Two good examples of this approach in action are the Prevent Cancer Campaigns of the Canadian Labour Congress and the Canadian Auto Workers Union. For example, the CAW has been successful in negotiating a major change with Ford Canada, substituting a canola based product for the carcinogenic metalworking fluids previously used in their engine plants.

We can win the war against cancer. The best available research is necessary, but not sufficient, for our victory. Cancer research is designed and undertaken, and the results published and acted upon, in a deeply political context. The social, political and economic changes necessary to win the war against cancer will require more than research alone. It will also require collective action, the uniting of movements that have operated for the most part independently. The combined wisdom and skills of activists in the environmental, occupational health, women's health and nutrition movements will be needed to successfully challenge the status quo and to insist that science, the state and corporations operate in the public interest. That is what is needed to stem the cancer tide that is sweeping across Canada and beyond.

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3 Nagnur and Nagrodski, op. cit.

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13 See http://www.iarc.fr

14 Data are from http://www.pollutionwatch.org/country.do

15 See http://www.ccme.ca/assets/pdf/bzph1ntnlsmry_15jan02_e.pdf

16 Data are from http://www.pollutionwatch.org/country.do Note that these data include only 266 substances included in the 2001 NPRI and includes only those businesses that used at least 10 tonnes of a listed substance in the year.

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40 Evans, N. *State of the Evidence: What is the Connection Between Chemicals and Breast Cancer?*, page vi

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