“The Symbolic Disease of Our Time”

BREAST CANCER

Morag Parnell
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1. **INTRODUCTION**

Even with my limited personal resources, it is easy to find enough evidence to convince me that the degraded state of our environment is damaging our health, and seriously threatening the health and viability of future generations, and should, and could, be dealt with by urgent and major intervention.

There are many good reasons for being concerned about breast cancer, one being the rising incidence, another the insufficient interest and concern from policy makers for being ‘tough on the causes’ of cancer. Attitudes persist in the public, professional and political minds that getting cancer is either an unfortunate life-event, bad luck, or it is ‘your’ or ‘my’ responsibility, fault, because I didn’t do, or I did, something, which led to the illness. Too often measures for prevention extend mainly, if not solely, to tackling personal lifestyle factors. Of course, such factors have a role: a healthy lifestyle and a robust immune system protect against illness, including cancer.

But having said and done all that, even the healthiest of us is at risk when we are exposed to hundreds of toxic chemicals every day and in every place, substances that cause cancers, genetic mutations, congenital abnormalities, and disrupt our hormone systems. We should take note that breast cancer incidence rates are slightly higher in the more affluent social groups, who have a better record for diet, exercise, smoking and alcohol, although their mortality rates are lower.

Toxic Daily Intake levels, Permissible Toxic Releases into the environment and Residue Levels have been steadily reduced in past decades as a result of increasing knowledge and concern about the effects of toxic chemicals. Some of the worst known offenders have been banned in the North, and the recent UN Stockholm Conference of 90 Nations in May 2001 agreed to a worldwide ban of 12 of these. But that leaves hundreds that have not even been tested, far from eliminated, and this is reflected in the increasing incidence of most cancers.

Cancer has been described as an epidemic, or as a silent emergency happening in every town and village. It is a result of the way we live, work, produce, consume and throw away. It will affect 1 in 3 people in our lifetimes, and 1 in 4 of us will die from it. And it is getting worse. Women in the UK have a lifetime risk of breast cancer of 1 in 9; in the US it is 1 in 8.

Substances suspected of, or known to damage health, including causing cancer, are widely used. Most did not exist before 1950. Many respected sources estimate that 80% to 90% of cancers are the result of living and working in a degraded environment. (1)

**Scottish Executive Cancer Plan 2001**

On July 3rd 2001, The Scottish Executive published its plans for Cancer Care in Scotland. (2). There are many good things in the report, and without doubt, there is a commitment to improve Scottish cancer services:

- for earlier detection
- for improved treatment facilities
- for fairer and easier access to treatment, eliminating inequalities and providing for consultation with patient groups.

Some are dissatisfied with the amount allocated, and would like to see more resources and a long-term commitment to improving staffing. Considering the ever-rising incidence of the disease and the long term under investment, this is a valid criticism.
When it comes to discuss prevention, the document is far from satisfactory. It says prevention “usually requires people to change their lifestyles”. Yes, indeed. Personal habits such as smoking, diet, exercise, alcohol consumption and sunbathing are important. But to say, as it does in the report, that “most cancers in this area have been addressed and risks eliminated in terms of occupational or environmental exposures, such that their contribution to such exposures is now very small”, is irresponsible and dangerous. And to say that a “small number of cancers related to such exposures still occur, for example, mesothelioma as a consequence of past exposure to asbestos” is too dismissive of a serious on-going problem, even if it does say it will support those bodies already involved in research.

Currently, asbestos kills 3000 people in the UK each year. The TUC is campaigning for an end to asbestos use worldwide. Britain banned its use in 1999, but it is estimated that about 85% of commercial properties in the UK contain asbestos.

There is general disappointment about the failure to go ahead with a tobacco-advertising ban in Scotland.

**Women’s Concerns**

“Breast cancer remains a major public health issue in the UK, and incidence and mortality in Scotland remain high compared with other European countries”. (4)

For many years, women here, in the US and many other countries, have campaigned for better resources to deal with breast cancer, for improved delivery of services and for positive action to eliminate environmental carcinogens.

There are very good reasons for women’s concerns. The incidence has increased steadily by between 1% and 2% per year over the last half of the last century, in spite of billions of dollars and pounds spent on research and in developing new treatments. Much of the research has gone into seeking a cure, as yet elusive, for better treatments, and now into biotechnology - into the cellular mechanisms of the disease, and for genetic testing. Early detection and better treatments have become confused with prevention and primary prevention of the disease has come a poor second for resources. This research has been driven overwhelmingly by the pharmaceutical industry, and latterly also by biotech industry, thus diverting attention and resources away from dealing with the disease at source.

This involvement is also seen in the generous funding for Breast Cancer Awareness Month given by ICI. (the year of this report is 1997. ICI is now Zeneca). During that year ICI earned $300 million from sales of acetochlor (an organochloride pesticide), and $470 million from the sale of tamoxifen (a drug used in the treatment of breast cancer). At the same time a Canadian subsidiary of ICI was found to be responsible for about 30% of the pollution of the heavily polluted St. Lawrence River. (5)

**WEN’s Campaign: Putting Breast Cancer on the Map (6)**

In November 2000 The Women’s Environmental Network held a Forum at the House of Commons to discuss what further measures could be taken to prevent breast cancer. This followed the first phase of an imaginative project ‘Putting Breast Cancer on the Map’, in which women from all over the country fed in local information about the incidence of breast cancer and suspected sources of pollution in their localities, drawing their own maps, often in a very creative way. (6) Funding has now been secured for the next phase of the project.

Helen Lynn of WEN told the Forum that “although a great deal remains to be known, we do know enough about the contamination with cocktails of chemicals of our environment, our homes, workplaces, the air we breath, the food we eat and the water we drink, to be justifiably concerned about their effects on our health”.

Author Diana Ward, who was diagnosed with breast cancer seven years ago said -
“I’ve come to view breast cancer as the symbolic disease of our time: the disease that symbolises more than any other the risks that women are exposed to simply by living in a seriously degraded environment.”

She echoes what Terry Tempest Williams wrote in her book ‘Refuge, an Unnatural History of Family and Place’. She wrote of her membership of the Clan of the One Breasted Women and said - “Most statistics tell us that breast cancer is genetic, hereditary, with rising percentages attached to fatty diets, childlessness, or becoming pregnant after thirty. What they don’t say is that living in Utah may be the greatest hazard of all”. She lived downwind from the Nevada nuclear testing site.

Prof Klim McPherson of the London School of Hygiene and Tropical Medicine pointed out that the laudable objective of our health campaigns are demand-led for better treatments. But this pushes prevention into second place.

Prof Charles Coombes, Director of the Cancer Campaign Laboratory recommended good diet, greater breast awareness and more genetic screening as ways to reduce deaths. But when all that is done, he said, reduction in breast cancer incidence would result from cleaning up the environment.

Prof Andrew Watterson of Stirling University spoke of the triple jeopardy for women in home, workplace and environment. Standards for acceptable exposures are often based on white males. It would be a sensible policy if we were to use the precautionary principle to eliminate known and suspected carcinogens.

It is long past the time to have recognition of the environmental links with breast cancer and to speak up for our daughters and sons, and our grandchildren.

It is clear that what applies to breast cancer is valid for other cancers and for the damage done by endocrine disrupting chemicals (EDCs). For this reason, it is necessary for any discussion to include all cancers and the effects of EDCs. WEN’s Forum and its continuing work provide us with a good launch pad to campaign in Scotland for a similar approach to cancer prevention. The strength of the WEN campaign is that it directly involves women in a powerful way.

**Research**

However there have been some positive spin-offs from the research. Early detection and better treatment in recent years has brought about a significant reduction in death rates. The five-year survival rate for breast cancer is now more than 70%, and the ten-year survival is about 59%. (4)

This is a very welcome improvement, but perhaps we should also look behind the statistics to see the reality of ‘survival’, and the quality of life it offers to many women. It is not always the same as cure. The incidence is still rising, and as Helen Lynn of the Women’s Environmental Network said, “women would rather not have first hand experience of breast cancer in the first place.”

Another positive aspect is that the research into the mechanisms of the disease has given clues as to how it may develop, and what may be causing it. While many may quite rightly say that it is not necessary to focus on mechanisms in order to campaign successfully, it can be helpful to understand mechanisms where it leads to understanding causal links. It is therefore important to recognise the relationship of cancer, and many other illnesses, to environmental carcinogens, endocrine disrupting chemicals, ionising radiation, stress and poverty if we are to take effective action to stop the continuing unacceptable toll of disease and premature deaths.

**Cancer and Industrial Pollution**

In spite of the lack of major funding by public and private bodies, there is a large and growing volume of evidence that creates a very strong case for now giving much more attention and resources to collecting and collating this evidence of the links between cancers and industrial pollutants, and acting upon it with some urgency.
The evidence comes from a wealth of independent population studies, animal studies, work-place data, laboratory work, and not to be dismissed, anecdotal evidence. There is, without doubt, cause for concern. Indeed, we cannot wait. Too many are getting this disease; too many are dying prematurely.

There are many opposed to pursuing this course, and are demanding definitive proof of the links between environmental agents and disease before taking action. It is no more than a recipe for inaction. In such a situation obtaining absolute proof is impossible and unethical. To devise the necessary experiments would involve deliberately exposing one section of a population to the suspect agents, while protecting another from them for comparison, something that would in any case be impossible because of the ubiquity of pollutants in our environment. We are all exposed.

Many factors are involved in causing any illness, but the overwhelming factors are social and environmental. These are the very ones that can be eliminated. The major social causes, poverty and inequality, have now reached the political agenda, twenty-two years after the Black Report. This is arguably the most important health document of the 20th century. (7)

The environmental factors in ill health are in turn overwhelmingly man-made, and are a result of our chosen path of industrial development, in which we have made a Faustian bargain, forfeiting our health in exchange for dubious and, for most people in the world, elusive benefits of material wealth.

There are some less obvious reasons for concern, but ones about which we should be on our guard: unelected bodies, the World Trade Organisation (WTO), with the General Agreement on Trade and Services (GATS), have taken on the role of deciding - amongst other things - whether or not we are allowed to uphold standards and rules which our national governments have agreed about working conditions and environmental standards, and to decide if they satisfy the terms of trade laid down by these bodies. The WTO has given itself the power to impose fines or sanctions on the ‘offender’. (Note the dispute between the US and the EU over hormone-treated beef). (8) This inevitably is the slippery slope towards the lowest common denominator.

How does this stand beside the Government’s own publications on the hazards of environmental chemicals? In the DEFRA report (9) there are detailed arguments for the control in production and use of chemicals. For example, where a chemical has been shown to be harmful, risk reduction measures will be implemented; less harmful substances will be substituted; information will be made publicly available; and the Rio Precautionary Principle of 1992 will be observed. (10) The problem lies not in the recognition of the hazards, but in the lack of firm proposals and timescales for legislation to deal with them.

**Genes and Environmental Pollution**

It is probably true to say that most people are concerned about the idea of ‘designer babies’, however unlikely it would be to be able to ‘select’ the desired characteristics, simply because of the fluid way in which the thirty thousand or so genes interact to produce the several hundred thousand proteins needed by our bodies, and the important influence of environment in producing the complex phenomenon called behaviour. (11)

Yet we are exposing our children before and after birth to a host of agents, which can alter gene expression and alter DNA, with disastrous outcomes. The effects are permanent, and cannot be altered. Yet there is little or no public debate going on, and only a handful of the most damaging chemicals have been withdrawn, after pressure from public campaigns.

**Genetic Engineering**

It should not be beyond our human ingenuity to reverse most of our man-made mistakes. However, that may not be possible with the newer technologies of the late 20th and the 21st centuries. Genetic engineering biotechnology is implicitly unpredictable and uncontrollable, and carries with it many hazards including the possibility of:

- new pathogens
- new virulences, new toxins and allergens
- inducing cancer. (12)

The combination of genetics, nanotechnology (the manipulation of matter at atomic level) and robotics - along with the almost incredible increase in computing power predicted in the next three decades - is set to give us artificial life forms capable of self-replication. Like GMOs, once in the open environment, they will not be capable of recall. (13)

We already know enough to start to take action now.

**Breast Cancer: The Symbolic Disease of Our Time**

This report was written as a resource for women, to stimulate discussion, and to use in campaigning for prevention of a preventable disease.

The first part is to give some of the background to the problem; the second part gives an overview of how this disease develops in our bodies, and its relationship with how we live our lives at a personal level; part three raises the problems of how our lives are affected by factors largely beyond our personal control, and offers some suggestions about the way to proceed as rapidly as possible to reverse the damage.

Many people are working on alternative ways of living and working which will be safer, and at the same time more satisfying, and we all need to be involved.

It may be a huge task, but it is not particularly difficult.

It just needs the political will to do it.

**References**


(2) Cancer in Scotland: Action for Change. Published by the Scottish Executive.

(3) Health and Safety Executive Report. (2001)

Also Trades Union Congress and Scottish TUC campaigns (2001), to reduce asbestos exposure, which say “asbestos is the biggest occupational health problem ever encountered in the UK, and it is a problem that is set to get worse over the coming twenty years or so”. There have been 1800 deaths in Scotland in the past four years, 1/3 of them mesotheliomas, the rest other lung cancers. Environment News, September 2001 reported the Berlin Congress of the European Respiratory Society of 24th Sept: stricter exposure standards have helped reduce the number of asbestos related diseases, but there has been an alarming increase which is likely to continue until 2010-2020, especially in poorer countries. This is because of the long time between exposure and the appearance of the disease (as with all cancers). It also claims that any level of exposure increases the risk of lung cancer.

(4) Information and Statistical Division of the NHS
The Black Report was published in 1979. It was commissioned by the previous Labour administration to report on the state of the Nation’s health, and the problems therein. When it was published the administration had changed to a Conservative one, and only a few hundred copies of the Report were released. However, its contents became generally available when Peter Townsend and Nick Davidson, two members of the original Commission, published the findings as a paperback Penguin titled ‘Inequalities in Health’. It showed the major role played by poverty and inequality in determining health, and in particular stated clearly that the elimination of child poverty would make the greatest contribution to improving the nation’s health.

Further information is available from The World Development Movement, and the Third World Network and its magazine Third World Resurgence

Department of the Environment and Rural Affairs. Sustainable Production and Use of Chemicals. A Strategic Approach

The Rio Precautionary Principle: In order to protect the environment the precautionary approach shall be widely applied by states according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. Rio Summit 1992

See Institute of Science in Society Newsletter 9/10

See Mae-Wan Ho Genetic Engineering, Dream or Nightmare, and various articles in Institute of Science in Society Newsletters.

Bill Joy, senior scientist at Sun Microsystems in the US, warned of this in a long article in the IT journal ‘Wired’ in April 2000, and again in Resurgence magazine Aug/Sept 2001 issue. He calls for international regulations, similar to those for Nuclear, Biological and Chemical weapons, to be introduced to control these new developments.
2. **USING OFFICIAL NUMBERS**

When we find that the *incidence or death rates* for an illness show a wide variation over time or in its geographical distribution - especially if that illness is dangerous, widely prevalent, or both, and is one for which there is no known cure - it makes good sense to find out as much as we can about the differences in the circumstances in which the disease occurs:

- who gets it and who doesn’t
- where does it occur and where is free from it
- what are the common factors
- what are the differences.

We can look at different countries and compare them.

We can compare various places within countries.

We can examine the changes that have taken place that may be associated with an increase or a decrease in the incidence of a disease.

We can consider the work people do, the ways in which they live and the conditions in which they live. This can then go on to consider individual life styles, medical histories and possible exposures.

This is the kind of sleuthing which can throw some light on possible causes of the illness, many of which may be capable of being remedied.

*Scotland*

**Table: Death Rates in Scotland 1950-1999 (1)**

The overall breast cancer crude death rates in Scotland per 100,000 person years at risk is as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950-55</td>
<td>31</td>
</tr>
<tr>
<td>1979</td>
<td>43.9</td>
</tr>
<tr>
<td>1986</td>
<td>49.6</td>
</tr>
<tr>
<td>1991</td>
<td>48.5</td>
</tr>
<tr>
<td>1993</td>
<td>48.5</td>
</tr>
<tr>
<td>1996</td>
<td>45</td>
</tr>
<tr>
<td>1998</td>
<td>43.3</td>
</tr>
<tr>
<td>1999</td>
<td>43.9</td>
</tr>
</tbody>
</table>

This table shows a huge rise in death rates from the fifties through the eighties and early nineties, followed by a decrease in the late nineties*. There is still a large difference between the late nineties and the fifties. The fifties figures were not insignificant!

*For reasons see below
The following tables are taken from the ISD of the NHS

*Table Cancer Registration Statistics Scotland, and shows incidence for 1997, deaths for 1999 and deaths, risk and survival rates from 1986-1995.*

<table>
<thead>
<tr>
<th>Summary statistics (Click on the name for definition &amp; more information)</th>
<th>Period</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rank</td>
<td>1997</td>
<td>1</td>
</tr>
<tr>
<td>Relative frequency</td>
<td>1997</td>
<td>25.5%</td>
</tr>
<tr>
<td>Registrations</td>
<td>1997</td>
<td>3 374</td>
</tr>
<tr>
<td>Deaths</td>
<td>1999</td>
<td>1 129</td>
</tr>
<tr>
<td>% Risk</td>
<td>1986-95</td>
<td>5.5%</td>
</tr>
<tr>
<td>- up to age 64 yrs</td>
<td>1986-95</td>
<td>7.9%</td>
</tr>
<tr>
<td>10 year % change</td>
<td>1986-95</td>
<td>+27.4%</td>
</tr>
<tr>
<td>Cases diagnosed</td>
<td>1991-95</td>
<td>92.7</td>
</tr>
<tr>
<td>Relative survival %</td>
<td></td>
<td>82.1</td>
</tr>
<tr>
<td>- 1 year</td>
<td></td>
<td>75.3</td>
</tr>
<tr>
<td>- 3 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 5 years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 'Registrations' shows that **in 1997 there were 3,374 new cases of breast cancer in women. In 1999 there were 1129 deaths.** (There were 7 male deaths, not shown in this table).

- 'Rank' shows that Breast cancer is the most commonly occurring cancer amongst women in Scotland.

- 'Relative frequency' shows that breast cancer accounts for 25.5% of all female cancers in Scotland.

- '10 year % change' shows that breast cancer incidence increased by **27.4% over the period 1986 to 1995.** Part of this increase has been attributed by some sources to the introduction of the national breast-screening programme although its significance is an area of dispute by others.

- The **% risk** is the average calculated for a ten- year period. This can be misleading. Because the incidence has been rising, the current risk is therefore higher. The overall lifetime risk of a woman in the UK getting breast cancer is commonly given as **1 in 12,** a figure close to the 7.9%, the average risk given in the table for the period 1976-1995. It is follows that the risk is now greater than 1:12. (2)

What is probably the most disturbing figure in the above table is the **27.4% rise in the incidence over the past ten years.** Compare this with the **12.9% increase for all cancers over the same period.**
The new registrations for breast cancer rose from 98.7 per 100,000 in 1986 to 119.7 per 100,000 in 1995. The total number for 1986-88 is 8,688 and for 1992-94 is 9,294.

The improvement in the 5-year survival rates is very much to be welcomed. This has risen from 66.3% in 1986-88 to 75.3% in 1991-95.

The 10-year survival rate has risen from 45.0% to 57.7%. The reasons given are earlier diagnosis as a result of greater breast awareness, mammography, and improved treatment.

The overall picture is disturbing. While any improvement in survival is to be welcomed, it is distressing to see the steady increase in the number of new cases year by year.

Over the same period there are other very disturbing figures:

- Lung cancer registrations are down 15.5% for men, they are up by 18.1% for women.
- Prostate cancer has risen by 48.8%.
- Oesophageal cancer has risen by 49.0% in men and 47.7% in women.
- Non-Hodgkin Lymphoma, a cancer of lymphatic tissues, has risen by 36.2% in women.

Table: Proportion of Female Deaths, Various Causes showing the proportion of deaths from various causes. Notable is the high proportion of deaths due to all cancers in women in their prime years shown in red. The figures are for the year 1999. 

![Chart showing female deaths by cause and age group]
Table: Breast Cancer and Age

The incidence of breast cancer rises with age as shown in the following graph.

Figure 13.5 Age-specific incidence rates
per 100 000 person-years at risk: period 1986-95

Table: Breast Cancer and Social Class Breast cancer shows an unusual feature. Unlike most other cancers, its incidence is higher in social classes 1, 2, and 3 than in 4, 5 and 6. Prostate and testicular cancers, also hormone related, show a similar pattern.

Figure 13.6 Incidence rates by Carstairs deprivation category
Age-standardised incidence rates per 100 000 person-years at risk (European standard population); by deprivation category: period 1986-95
Where mapping of cancer incidence and death rates is carried out, the highest figures tend to be in the most heavily industrialised areas. The distribution is, however, becoming more diffuse as urbanisation spreads, populations become more mobile, agriculture becomes more industrialised and pollution spreads via wind, water and food.

Higher death rates also in general reflect poorer access to health services, to levels of deprivation and general health.

The official report suggests that the figures are difficult to interpret because of differences in uptake of screening. This is debatable as being the whole or even a small part of the story. We need further analysis that will look at small area statistics, and look for ‘hot spots’ and clusters’ within these areas –

- clusters - are where a higher than usual number of cases occur in a small defined area e.g. a street or workplace
- a hotspot - is where there is a number of clusters in one defined area.

It should at the same time look for possible environmental sources of cancer-causing agents. The official commentary at least acknowledges that, in the case of migrant studies, environmental factors are more important than genetic ones. Tracking down these environmental factors is what WEN’s ‘Putting Breast Cancer On The Map’ project set out to uncover, allowing women to do this in their own areas, with interesting preliminary results. This type of study needs to be followed up by large-scale government sponsored and funded studies, involving health workers, patient groups trade unions and community organizations.

*The map below shows breast cancer incidence rates in Scotland by Health Board Area. (1)*

*We need an explanation for the wide variations shown.*
International Comparison

“Breast cancer remains a major public health issue in the UK and incidence and mortality rates in Scotland remain high compared with those in other European countries.

In recognition of this, breast cancer remains a priority for the NHS in Scotland and health boards are required to develop strategies for breast services.

Each year just over 3,000 women in Scotland are diagnosed as having breast cancer; 79% of them are over 50 years of age.

There are approximately 1,200 deaths annually although five-year survival continues to improve”. (1)

Table: International comparisons of incidence\(^1\) and mortality\(^3\) rates for Breast Cancer, 1988-1992 (incidence) and 1988-1994 (mortality)

<table>
<thead>
<tr>
<th>Country</th>
<th>Incidence per 100,000</th>
<th>Mortality per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>US, SEER: White</td>
<td>90.7</td>
<td>26.9</td>
</tr>
<tr>
<td>Netherlands (1989-1992)</td>
<td>79.6</td>
<td>26.6</td>
</tr>
<tr>
<td>US, SEER: Black</td>
<td>79.3</td>
<td>26.4</td>
</tr>
<tr>
<td>France, Bas-Rhin</td>
<td>78.8</td>
<td>26.4</td>
</tr>
<tr>
<td>New Zealand: Non-Maori</td>
<td>77.2</td>
<td>26.4</td>
</tr>
<tr>
<td>Switzerland, Vaud</td>
<td>77.2</td>
<td>25.8</td>
</tr>
<tr>
<td>Denmark</td>
<td>73.3</td>
<td>22.9</td>
</tr>
<tr>
<td>Sweden</td>
<td>72.9</td>
<td>22.6</td>
</tr>
<tr>
<td>Scotland</td>
<td>72.7</td>
<td>22.1</td>
</tr>
<tr>
<td>England &amp; Wales (1988-1990)</td>
<td>68.8</td>
<td>21.8</td>
</tr>
<tr>
<td>Australia, Victoria</td>
<td>66.7</td>
<td>19.9</td>
</tr>
<tr>
<td>Finland (1987-1992)</td>
<td>65.0</td>
<td>19.7</td>
</tr>
<tr>
<td>Germany, Saarland</td>
<td>61.5</td>
<td>17.4</td>
</tr>
<tr>
<td>Norway</td>
<td>54.2</td>
<td>16.7</td>
</tr>
<tr>
<td>Spain, Zaragoza (1986-1990)</td>
<td>40.4</td>
<td>16.2</td>
</tr>
<tr>
<td>Singapore: Chinese</td>
<td>39.5</td>
<td>13.0</td>
</tr>
<tr>
<td>Japan, Osaka</td>
<td>24.3</td>
<td>7.1</td>
</tr>
</tbody>
</table>

\(^1\) Cancer Incidence in Five Continents, Vol. VII
\(^2\) SEER Cancer Statistics Review 1973-92
\(^3\) World Health Organization (WHO) Databank except where indicated
\(^4\) Standardised to the World Standard Population

The questions which arises from these tables are:

- What is affecting women in the US so much more than women in Scotland to make the incidence of breast cancer so much higher, and both of these higher than Japanese women?
- Why are death rates in Scotland, with a lower incidence, higher than in the US?

The USA
Cancer rates in our country have been following closely behind those in the US, and so it is interesting to look at some of the figures from there. Current estimates are that about 1 in 8 women in the United States (approximately 12.8 percent) will develop breast cancer during her lifetime. In 1960 the estimate was 1 in 20. (3)

(Based on cancer rates from 1995 to 1997.)

Among the racial/ethnic groups studied, white, Hawaiian and black women have the highest levels of breast cancer risk. Asian/Pacific Islander and Hispanic women have a lower level of risk; their chance of developing breast cancer is less than two-thirds that of white women: the incidence in white American women is 4 times that of American Korean women. Death rates are higher in black women than in white. (3)

“These probabilities are based on population averages. An individual woman’s breast cancer risk may be higher or lower, depending upon a variety of factors, including family history, reproductive history, and other factors that are not yet fully understood.” (3)

**Table: Cancer Worldwide** shows the difference in incidence of cancers (amongst other illness), between the developing world and the developed world.
It shows a steady overall average death rate between 1985-1997 of 21% in the developed world, compared with a rising rate of 6% in 1985 through 7% to 9% in 1997 in the developing world.

We note that the figures are averages for a number of countries in each category, and this conceals variations between individual countries, and within countries. Some other sources show:

- The industrialised world with 1/5 of the world’s population has ½ of the world’s cancers.
- Highest rates are in North America and Europe, with the US having the highest rates of all.
- Medium rates are for Southern Europe and Latin America
- Lowest are for Africa and Asia. (4)
- Rates in the US are 30 times those for parts of Africa.
- Rates in the US are 5 times those of Japan. (3)
- The gaps are narrowing as countries adopt the industrialised processes of the North.

Immigration studies show that Japanese women emigrating to the US and N America acquire the same rates as the indigenous populations within two generation.

Similar results have been shown for Asian and N African emigrants, where there are low rates, to Israel, where the rate is double that of North African countries, and for Polish women to the US and Italian women to Australia.

In Israel, in the early 70s, DDT came under suspicion for being linked to breast cancer, and so it was banned. Following this it was observed that breast cancer rates were falling, in spite of changes in childbearing, e.g. later pregnancies, fewer children, and in adopting richer fattier diets, which according to received wisdom should have increased the risk. (3)

Figures released by the International Agency for Research on Cancer in France on 1st September 2001, are as follows:

- 10 million new cases of cancer worldwide in the past 12 months
- 6 million deaths over the same period
- a global increase of 22% since 1990
- the disease set to increase by 50% over the next two decades
- 22 million people diagnosed with cancer in the past five years still suffer from it. (5)

**Conclusion**

It is clear that cancer is not distributed in a random fashion, neither in individual countries nor across the world, nor over time.

As the overall rates are increasing it cannot be seen as due only to an ageing population, not that we should accept cancer as a normal adjunct to ageing. There is the evidence of the sharp increases in cancer in younger age groups and in childhood cancers. The variations in incidence over time and place suggest that we should examine more closely the common factors and the differences that could be responsible for such distribution. Many clues lie within the information above.


References


(2) The current updated rate for the UK as at Autumn 2001 is 1:9.

(3) The US National Cancer Institute.


(5) Reported by Ananova News Service. Figures were published in the monthly journal The Lancet Oncology http://www.ananova.com/news, Sept 01
3. **SOME CLUES FROM HISTORY AND LITERATURE**

It has been easier to get information about all aspects of health since the middle of the last century when a better collection of statistics by both Government and Non-Government bodies began. Earlier there were some statistics to go on, e.g. it was noted that in 1900 cancer deaths in the US were 4% of total deaths, while today they are about 25%. But by and large, we have to rely on studies, writings, reports and observations by people working in various fields in earlier times.

**During the 19th century** the science of toxicology came into its own because of the concern felt over the obvious and immediate effects of toxic substances on workers in certain industries. Studies done then, and to a large extent now, tend to concentrate on the effects on men of working age.

As early as 1546 it was observed that miners of uranium-bearing ores in Central European mines frequently developed fatal lung disease. From 1897 up until the 1930s the association between uranium bearing ores and lung cancer was well established. In spite of that, large-scale uranium mining started up in the 1940s to meet the demand for a-bomb material, and later for the nuclear power programme.

**Concern grew during the 20th century** as it became clear that cancer rates were rising rapidly. It also became clear that the rise followed the curve of rising industrialisation (or as some have described it, rising prosperity, GDP, or development).

In an interesting and well-referenced paper Zac Goldsmith gave an account of studies going back into the 19th century. Below is some of what he wrote.

- In 1960 Vilhjalmur Stefanson published a study of the North American Eskimos. He wrote: “What are the conditions peculiar to civilized peoples and absent from primitive races which are associated with its prevalence and increase in the former, and its almost entire absence or relative infrequency in the latter? Cancer is unquestionably rare in native races.”

- In his introduction to the book, Rene Dubois, Professor of Microbiology at the Rockefeller Institute for Medical Research said: “History shows that each type of civilization, like each social group and each way of life, has diseases which are peculiar to it…. From this broad survey there emerges the impression that certain diseases such as dental caries, arteriosclerosis and cancers are so uncommon among primitive people as to remain unnoticed - at least as long as nothing is changed in their ancestral way of life.”

- In 1908 a report by Dr Charles Powell concluded, “the various influences grouped under the title of civilization play a part in producing a tendency to cancer.”

- In 1913 Albert Schweitzer said “On my arrival in Gabon I was astonished to encounter no case of cancer”.

- In 1914 Dr WS Bainbridge in his book, *The Cancer Problem* wrote: “With changed environments there came an increase in susceptibility to cancerous disease, this susceptibility becoming more marked as civilization develops.”

- In 1915 the Prudential Insurance commissioned a report on cancer. The author of the report, Frederick Hoffman, of the American Society for the Control of Cancer studied thousands of reports, and all available data. He concluded that “The rarity of cancer among native men suggests that the disease is primarily induced by the conditions and methods of
living which typify our modern civilization”, and further “the negative evidence is convincing, that in the opinion of qualified medical observers, cancer is exceptionally rare among primitive peoples.”

- **As a result of his review of the literature**, Steffanson also remarked: “From East to West the Medical Missionaries all looked for cancer, and they never found it among the primitive, although they found it among the modernised.”

**DES (Diethylstilboestrol).**

*Between 1940 and 1970, when it was banned for human medical use, five million women were treated with DES.* (3)

It was believed to prevent miscarriage, and later to ‘improve’ pregnancy, even in women with no previous history of miscarriage, or the threat of it. There was little evidence to support this belief. It was also used for more trivial reasons e.g. as a breast enhancement cream. (It has also been used as a growth enhancer in cattle).

There were no immediate serious side effects that gave cause for concern. It was many years later, when daughters of these pregnancies developed a rare form of vaginal cancer (several were found in one clinic) that suspicions were aroused. The association was made with their mothers’ treatments during pregnancy - according to one source, it was a mother’s questions about her treatment in her pregnancy that drew attention to it. Doctors uncovered a range of reproductive and other abnormalities in both daughters and sons.

Some researchers have found an increased rate of breast cancer in later years in the mothers treated. More recent research has shown an increase in the number of premature births, spontaneous abortions and ectopic pregnancies in women who had previously been treated with DES.

**The Growth of the Nuclear Industry**

Volumes have been written on the association of ionising, and the suspicion of an association of non-ionising radiation, with cancer and other forms of illness. Here is a small selection (see also below-Radiation Risks):

**Dr Alice Stewart** is remarkable for her work in relating cancers and other abnormalities to low dose exposure to ionising radiation. Among other things, she will be remembered for her work on the results of the Hiroshima bomb, and on the exposure of the foetus to x-rays. At first the medical establishment ridiculed her for her assertion that childhood cancers could be due to maternal exposure to x-ray during pregnancy. Later x-rays in pregnancy were banned except in life-threatening circumstances! She contends that all childhood cancers are the result of pre-natal exposures.

**Studies following the Hiroshima bomb** found that girls who were under five years of age at the time of exposure were ten times as likely to develop breast cancer in the following decades than unexposed girls. (4)

**Dr Rosalie Bertell** catalogued and assessed the casualties of radiation-induced cancers arising from the beginning of the military and civil nuclear project. (5)

**We have many other studies on childhood leukaemia** clusters in the vicinity of nuclear installations from all parts of the world, in our own country, notably those by Professor Jim Gardner and Dr Chris Busby who showed links (. 6), although this is still a topic of fierce debate.

**The Mormon communities** in the state of Utah live relatively uncomplicated lives. Before the 1950s and exposure to fallout from nuclear testing, leukaemia was rare. By the mid 50s the rate of leukaemia was 2.5 times the national average. There were also many birth deformities.
**Terry Tempest Williams**, in her book *Refuge*, already referred to, describes the changes which took place in the health of her own and other communities as a result of living down wind of the Nevada nuclear testing site. (7)

The effects of nuclear testing in the Pacific are well documented.

**Women of the South Pacific, like Isabella Sumang of Belau**, who fought for a nuclear free constitution for their Islands, can tell us tales of the horrifying effects of the nuclear bomb tests on their unborn babies, and of multiple cases of cancers in members of their families. (8)

Studies on the victims of Chernobyl, particularly those of the children, and the work of **women like Adi Roche**, tell of an appalling toll on health and lives then, and continuing now. (9)

**The nuclear holocaust has been going on for more than 50 years** without war having been declared, (a not unusual practice these days).

**50 years ago John Higginson**, working for the United Nations at the WHO centre for Cancer Research, claimed that 80% of cancers are due to environmental causes, **and as such are preventable.** This is a figure agreed by many other sources, such as the US Department of Health and Human Sciences; a standard textbook, Human Genetics and Modern Synthesis; and the WHO.

**In 1992 sixty-five US experts** in Public Health, Industrial Medicine, Epidemiology and Cancer Medicine issued a statement highly critical of the US approach to cancer, which could equally apply here. Among other things it said “**In fact, the cancer establishment has continually minimised the evidence for increasing cancer rates which it has attributed to smoking and dietary fats, while discounting the causal role of avoidable exposures to industrial carcinogens in the air, food, water and in the workplace.**”

Along with this, a growing volume of information is being collected on the effects of **toxic chemical pollution** on wildlife and on humans.

Nobody can deny the difference in the incidence of cancers between then and now. Neither is it beyond our ken to make the connections between the factors that could be relevant. When these are also seen to fit in with what is known about the science of how cancer develops in our bodies, we have a compelling case for immediate action for primary prevention of cancer.

**References**

3. There are very many references to this. For examples, see Theo Colborn *Our Stolen Future*; various numbers of Rachel’s Environment Health News.
8. Isabella Samsung toured the UK in the late 1980s to gain support for her Island’s nuclear-free constitution, which was threatened by pressures on the Islanders to concede to American demands for part of the Island to use as a Naval base.
(9) Adi Roche of Irish CND raised more than £1 million for the Children of Chernobyl. Her account of the after effects on the children is heart rending.
4. **HOW DOES CANCER DEVELOP**

**Cell Division**

The cells in our bodies are constantly dividing. This process is controlled by genes in the cell, by neighbouring cells, and by messages from other systems in the body. It is beautifully choreographed to pass on genetic material from cell to daughter cells, to repair damaged cells, to remove those damaged beyond repair, and to instruct other cells to divide to replace them.

Tissues, which are immature or are constantly dividing, such as skin, blood, colon, lung, uterus, breast and testis, are most vulnerable to cancerous change. At particular times the breast tissue is more vulnerable, as when it is immature, or is being stimulated by sex hormones to divide rapidly. (See Box p7) (1)

Cancer develops through a number of stages.

At first the cancer is localised, but as it grows it invades surrounding tissues. Eventually cancer cells escape into blood and lymph systems and are conveyed to distant parts of the body where the cancer grows - the stage of metastatic cancer. It is therefore important to detect cancer at the earliest possible stage.

In most cases it takes many years and many steps from first exposure to a damaging agent for cancer to develop.

The cells in any tissue communicate with one another and regulate each other. When cells die, neighbouring cells divide in order to replace them, and other cells mop up the debris. Genes in the cell regulate cell division, cell death, and the removal of the detritus. Damage to these genes can affect the way in which cells divide, leading to uncontrolled cell proliferation, which is cancer.

Damage can occur from errors during normal cell division, or from any kind of stress from internal or external sources (e.g. toxic chemicals, radiation). In most cases the damaged cell is either repaired so that the cell recovers, or it is removed. When this doesn’t happen the damaged cell may go on to reproduce. It may be subjected to further damage, eventually resulting in cancerous changes appearing. (See diagram).

There are three recognised stages of cancer development.

1. The first is called **Initiation**, the initial alteration to DNA. It may stop here with no further consequences, or go on to the next stage of Promotion.

2. **Promotion**, where the damaged cell proceeds to produce abnormal proteins, including those involved in cell division. In Laboratory experiments, oestrogens and organochlorines and dioxins have been shown to enhance promotion. The latter may be mediated through immune system suppression. It is the immune system that detects the presence of abnormal proteins, and initiates the correct response to deal with them.

3. **Progression** is the stage where there is interference to the messages between the DNA and the messages it sends to and receives from the rest of the cell. Research shows that arsenic, asbestos, benzene, cigarette smoke (which includes a large number of harmful chemicals), and radiation act as cancer progressors.

Not all cancer causing agents act at all stages. As already indicated, organochlorines, and dioxins suppress the immune response. Some agents are complete carcinogens i.e. they affect all stages of
cancer development, radiation being the best known of these. Some, like dioxins, have different effects at high and low doses. (2)

Understanding these processes explains why there is no safe dose of a carcinogen. It also explains why different exposures have different effects on different people. Some with previous damage from inheritance or environment, not yet showing up as disease, may fare badly, while someone without such previous damage may escape.

It also explains why the number of cancer causing agents to which we are all exposed should concern us.

**Fingerprinting**

Not all mutagens/carcinogens cause the same damage to the DNA. Some cause alterations in the DNA; some cause disturbance of the arrangements of the chromosomes; some cause errors in the separation of the chromosomes during cell division. It is now possible for researchers to identify, in some cases, the specific damage to DNA, the genetic fingerprints referred to by Sandra Steingraber. (3)

Examples of these fingerprints are

- the presence of particular atmospheric Polycyclic Aromatic Hydrocarbon (PAH) adducts - chemical tags - in the DNA of people with lung cancer. It shows that atmospheric pollution has a role in lung cancer
- abnormal enzyme production showing as abnormal proteins in the blood of those exposed to vinyl chloride
- alterations to the arrangement of chromosomes 14 and 18 in those exposed to certain pesticides and fumigants, most frequently observed in people suffering from Non-Hodgkin’s lymphoma.

Mutations occurring in the course of normal cell division may play a part, but factors such as environmental chemicals and radiation are by far the major actors in causing cell damage.

Writing in the Institute of Science in Society Newsletter, Professor Brian Goodwin also shows that as a result of genetic engineering, there is the possible insertion of stray foreign DNA into genomes, disrupting normal function with the possibility of causing cancer, as well as other illness. He suggests that recognition of these specific fingerprints might be developed as the basis for testing chemicals for carcinogenicity. (4) (5)

**Low Dose Effects of Carcinogens**

There is disagreement amongst scientists about the effects of low doses of carcinogens. Most of our information comes from the obvious damage caused by high doses. The usual practice is to extrapolate the effect of lower doses from high doses in a linear fashion. It therefore comes about that it is denied that the large number of cases seen, e.g. leukaemias around nuclear installations, cannot be a result of ionising radiation, because the exposure dose is too low to be responsible. They suggest that other agents e.g. viruses, are solely responsible.

Closer examination of how cancer develops, and of the variability of cell sensitivity, shows that a linear model is not appropriate. The following explanation is given for what can happen. It has been called the biphasic response.

Three things can happen when a cell is exposed to a toxic substance:

- the cell can be killed outright
- it can be damaged and adequately repaired, or
• it can be damaged but not repaired and still go on to divide and reproduce itself. At high enough dosage, all cells targeted will be killed. The patient will be ill, and may die. At a lower dosage, sensitive cells will be killed, and so will not go on to develop cancer, but insensitive cells which are damaged may go on to divide and start the cancer process.

At even lower doses insensitive cells will not be damaged, but sensitive cells will be killed off, so no cancer is induced. At still lower doses, insensitive cells are unharmed, sensitive cells are not killed but are damaged and survive to go on and start the cancer process. (6)

At any one time only a small number of adult cells are in a sensitive state, when they are dividing or are still immature. Children have many more sensitive cells.

It is clear from this model that a simple linear effect does not occur, and the unexpected outcomes can be explained by the biphasic nature of the responses.
Normal Cell Division

Development of Cancerous Cells

At each cell division the damage to the DNA is passed on to the daughter cells. Each subsequent hit by an environmental carcinogen causes accumulating damage to the cells, eventually becoming sufficient to cause them to become cancerous. It may take many hits, over a variable period of time, causing widespread disruption of structure and function of genes, and instability of chromosomes. (Increasing damage represented by deepening colour, cancerous cell by black.) (After BRCERF)
References

(1) Breast Cancer Environmental Risk Factors BCERF fact sheets: the Programme of Cornell University involving the faculties and staff of Colleges of Agriculture and Life Sciences, Arts and Science, Human Ecology, Veterinary Medicine, Biological Sciences and Nutritional Science, Cornell Co-operative Extension, Cornell Medical College and Strang Cancer Prevention Centre, aimed primarily for citizens of New York State, but freely available on Cornell University web site: http://www.cfe.cornell.edu/bcerf/

(2) For a good and detailed description see The Biology of Breast Cancer, BCERF fact sheet 5.


(6) Low Dose Effects Peter Bunyard and Gerald Searle The Ecologist Vol16 No 4/5. For low dose effect of EDCs see Colborn et al, Stolen Future 1986, and World Wildlife Fund Global Toxics Programme.
When a BBC Women’s Hour survey asked women what they thought had caused their breast cancer, the women gave the following answers:

- my age
- my weight
- my diet
- I didn’t breast feed
- I had no children
- I took the Pill
- I suffered stress
- it is in my genes.

Breast cancer, like all illness, is multifactorial. So, up to a point, all the answers are correct. Yet it is disturbing that the major causes of breast cancer, the cancer-causing and hormone-disrupting chemicals in our environment, were not even mentioned.

There have been many studies to find out which lifestyle and life event factors are associated with a woman’s risk of breast cancer. Some of the evidence is conflicting, and some of the conflict arises out of the different ways in which the research was carried out.

However, there is general agreement that there is an association between breast cancer and the levels of lifetime exposure to oestrogens.

It therefore might help a woman to know something about oestrogens which could help in the kind of choices she has to make, or in knowing which public policy changes are needed to allow such choices to be made - bearing in mind that individual life choices are heavily weighted by cultural, economic and social patterns which are, by and large, taken for granted, unquestioned and accepted as the ‘norm’.

**A Bit of Basic Biology**

A living organism’s growth, development, metabolism and reproduction are governed by a number of regulatory mechanisms, involving complex interactions and feedback loops connecting every part of the whole organism.

The main lines of communication are through the Nervous System carrying fast electro-chemical signals that are processed in the brain, through the Endocrine System sending hormones and the Immune System sending antibodies, to every part of the body where they are required.

All these systems are wonderfully orchestrated, so that everything happens at the right time for the healthy metabolism, growth, development and reproduction of the organism.

**The Endocrine System** is a group of distinct glands and tissues, which secrete hormones directly into the bloodstream. (1), as shown in the diagram below:
Peripheral and Central Nervous System

Pituitary Gland

Adrenals  Thyroid  Pancreas  Ovaries or Testes  Parathyroid

Adrenalin + steroids  Growth and metabolism  Insulin production  Sex Hormones  Metabolism

All of these interact in a multidimensional way, which explains why lifestyle can have an effect on the levels of oestrogens circulating in our bodies. We shall look at some of these later.

All animals with a backbone have a similar endocrine system. It works with all the other body’s systems to maintain the body’s internal balanced state e.g. temperature, blood sugar, oxygen and carbon dioxide levels, and responds to messages like changes in temperature, hunger and fear. It reacts to stimuli from the external environment and it regulates growth, metabolism, development and reproduction.

The hormones secreted reach every part of the body, and carry the messages to the appropriate cells and thence to the appropriate genes to make the proteins needed. In other words, they are to keep us alive and healthy in a wide range of conditions. In fact, our body’s ability to do this is remarkable, and it is only when it is overwhelmed by external or internal changes that it fails.

**The Oestrogen Connection**

Many years ago, it was noticed that removal of the ovaries protected against breast cancer, and at one time this was a treatment for the disease.

Oestrogens are secreted by the ovaries, and are essential for the normal growth and development of a woman’s sexuality and reproductive system. They act primarily on those tissues that are rich in oestrogen receptors, i.e. the breast, vagina and uterus, and control ovulation, breast development, menstruation and pregnancy. They affect cell division, maturation and differentiation. Increased levels of oestrogens will therefore increase cell division, making them more vulnerable to cancer causing agents, while on the other hand, maturation and differentiation gives protection to the cells.

Like the rest of our body’s biochemistry, oestrogens work within optimum parameters. This is known as homeostasis. Too high or too low levels result in adverse effects leading to ill health. Men secrete small amounts of oestrogen, essential for their reproductive health.

It follows that as well as the exposure to known cancer causing agents, conditions and substances that increase oestrogen levels may increase the risk of developing cancer. This can come about because of lifestyles that maintain high levels of oestrogens, or delay maturation of breast cells, or where the cells are exposed to environmental agents that interfere with or mimic natural oestrogens.

In recent years there has been growing concern about this group of chemicals in our environment. The effects they exert are many and varied, and damaging. They are known as Zeno-oestrogens. (Zeno-foreign) (3)

In order to protect ourselves, we should know what these agents are, and what can be done, not just by individuals, but also by the larger body politic, to avoid them.
It would appear that cultural trends in modern society create conditions that increase the risk.

There are periods in a female’s life when she is particularly vulnerable, as shown in the box below. (4)

References
(1) For a good description see Safer Chemicals, Introduction to HDCs by Friends of the Earth. www.foe.co.uk
(2) United States National Cancer Institute Cancernet (for Doctors and Health Professionals).
(3) Rachel’s Environment Health Weekly No 575.
(4) Breast Cancer Environmental Risk Factors, Cornell University Oestrogens and Breast Cancer Risk. Explains how oestrogens work, and also the effects of the drug tamoxifen. See ref (1) of How Does Cancer Develop

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### CRITICAL PERIODS OF SUSCEPTIBILITY
- Birth to 4 years
- Puberty
- End of Puberty to 1st full-term pregnancy

### Biological Characteristics of Critical Periods
- Rapid cell division
- Breast cells have higher proportion of stem cells
- Mutations can be passed on if not repaired
- Stem cells are more susceptible to carcinogens

### AFTER 1ST FULL-TERM PREGNANCY:

**Biological Characteristics AFTER Critical Periods**
- Fewer stem cells
- Less cell division
- More cells are differentiated
- Differentiated cells repair DNA more efficiently
- Differentiated cells bind carcinogens more weakly than stem cells

BCERF files of Cornell University
6. Life Events Associated with Oestrogen Levels

**Age**

The incidence increases with age. That doesn’t make it ‘natural’. The longer you live, the longer you have been exposed to carcinogens and other toxic substances. As cancers take many years to develop, it is not surprising that cancer incidence rises with rising age. This is not a reason for accepting cancer as a disease to be expected in old age, nor at the levels we are currently seeing.

However, we are seeing an increasing and an unacceptable toll that certain cancers are taking of younger age groups. These include breast, testicular, Non-Hodgkin lymphomas, and leukaemias.

Breast cancer incidence rose by an average of between 1% and 2% per year over the last half of the last century; from 1979-1991 in England and Wales, testicular cancer increased by 55%. NHL rose in women by 36%. Many of these occurred in younger age groups.

(In the US prostate cancer rose in the same period by 90%). However welcome has been the recent large drop in mortality in testicular cancer, we cannot be complacent about its rising incidence.

**Age at Menarche and at Menopause.**

There is evidence that an early menarche and a late menopause are associated with an increased risk of breast cancer. This is thought to be because the woman is exposed to a longer period of higher levels of oestrogen.

In developed countries the average age of first menstruation is between 12 and 13 years. In non-developed, traditional societies it is nearer 15 years. Pubertal signs appear a year or so before this.

A late menarche has been seen as the most important life-event factor in protecting a girl from later breast cancer. The positive benefit is rated very high by some, equivalent to not having a positive family history.

During the period between puberty and first full term pregnancy, breast cells are dividing and maturing. Because there is still a large proportion of immature cells and because cells are more vulnerable when they are dividing, girls and adolescents are vulnerable to all those factors which can damage the cell’s DNA and chromosomes. (1)

It has long been established that height, weight and body fat all interact with body chemistry e.g. insulin, growth hormones, and so with sex hormones, to establish when puberty and menarche will occur.

We can see that diet and exercise are therefore very important in a girl’s early years.

It is disturbing to have evidence from many parts of the world of earlier pubertal changes and early menarche. For example, a 1997 study in the US of 17,000 girls found that the average starting age of puberty in Caucasian girls is 9.7 years and in African American girls is 8.1 years. This is about a year earlier than previous estimates. (2)

27% of African-American girls and 7% of Caucasian girls showed signs of pubic hair at age seven years. 77% of African American and 32% of Caucasian girls showed pubic hair and/or breast development by age nine years. (2)

Animal research shows that exposure to certain chemicals in utero can lead to earlier sexual maturity. There was an association between exposures to phthalates, found in plastics, and bisphenol-A used in
polycarbonate bottles, plastic food and drink containers, and early breast development. Both produced
an abnormal growth rate.

The authors considered this to be a serious public health problem. They looked at possible associated
factors viz., obesity, low birth weight, poor diets, lack of activity, absent fathers, a non-related male in
the house, as well as exposure to endocrine disrupting chemicals. Researchers have found a link
between both pre-natal and post-natal exposures to environmental oestrogen-like chemicals and these
changes. Considering the prevalence of these chemicals in all areas of our lives, urgent attention
should be given to this problem.

They also considered current cultural factors that expose little girls to premature sexualisation and
consequent psychological stress. (2)

Questions are raised about other factors in young peoples lives like smoking and alcohol, which are
unacceptable for other very good reasons, but also appear to have an adverse risk effect for breast
cancer.

The use of the contraceptive pill in teenagers has also come under suspicion. There are good
theoretical reasons why we should be careful about this in adolescence from the point of view of a
girl’s future health, and further research is needed.

The importance of cultural factors also needs to be urgently assessed. Parents are well aware of the
turmoil of the teens, and many are concerned about the commercial pressures on the young to take on
roles for which they are not yet equipped.

Most parents are aware of these hazards. We live in a climate where much lip service is paid to
personal responsibility for good diet, exercise etc. But at a time when children (and adults) are
constantly bombarded with adverts which are very persuasive but which contradict good practice, when
playing fields are being sold off, and good quality diets are not accessible or are too costly for large
sections of the population, or are in general of doubtful quality, policy for schools and access to good
affordable food and leisure activity for all should be high on politician’s agendas, but especially so for
those concerning our children and adolescents

**Age at First Pregnancy**

The effect of pregnancy is to cause breast cells to mature in preparation for lactation. (3)

This maturation and differentiation appears to protect the cells, making them less susceptible to
damage. Increasing numbers of children give further protection, although there appears to be an upper
limit when the risk of a large number of children at increasing age raises the risk.

**Breast Feeding**

This also confers some protection. There appears to be a minimum of three months breastfeeding
required for any effect to be measurable. Many women do not achieve this.

Evidence of the best protection was found in Chinese women who breastfed for longer periods, e.g. a
total of six years for all children combined. Their decreased risk was estimated as 63% compared with
women who had never breastfed.

There is a disturbing downside to this. Some women who have had high exposure to industrial
chemicals have been advised not to breastfeed. In some areas in the US, pregnant and lactating women
are advised not to eat fish or game from places known to have high pollution levels, and are given an
official help line to contact for advice. (4) (5)

There is general concern about this issue. All of us carry a burden of chemical contaminants, many of
which are fat-soluble and concentrate in fatty tissues like the breast. It has been suggested that some of
the protective effect of breastfeeding may be that women download this burden on to their babies.
These chemicals concentrate in body tissues as they move up the food chain, so that humans, and even more so, human babies, at the top of the food chain, receive the highest burden. However, breastfeeding is still generally considered to be the first choice as other animal’s milk, although less contaminated, lacks the other protective factors of breast milk. (6a) (6) (7) (8)

This information caused a group of well-endowed women in Germany to try to import breast milk for their babies from lactating women in far-away places where contamination was minimal or absent. If ever anything should arouse us to demand a cleaning up of our environment, this is surely it, and the breast-feeding debate should be focused on the need to eliminate toxic chemicals from our environment.

It is doubtful if anywhere on this planet is now uncontaminated by industrial pollution, even when separated from the source by time and space. For example, the group of highly toxic industrial chemicals, PCBs, (polychlorinated biphenyls, widely used as coolants and lubricants in electrical equipment, and now banned in many countries), have been found in the fat of Arctic Polar bears. They have traveled many thousands of miles from their original industrial source. They have also been found in sediments in Esthwaite Waters in England at a level corresponding to 1929, a time when they were made in the US, but long before they were ever made in this country, again having traveled thousands of miles, by way of wind, wave and food chains. However, following the recent banning in some industrialized countries of a group of persistent organic pollutants, (POPs), for example, DDT and PCBs, there was a significant reduction in the levels found in breast milk.

There is also concern about the use of soy products in baby formulas. Soy is high in plant phyto-oestrogens. While these are considered to be beneficial in adult diets, the levels are considered excessive for infants at a time when their tissues are vulnerable to circulating oestrogen. The estimates are that an infant so fed would receive about 100 times the amount of oestrogen received from breast milk, or the adult equivalent of several contraceptive pills per day. The researchers called for more reliable information on this topic. (See below for discussion of other soy products).

The trend now is for many to delay first pregnancy, to have fewer children and, at most, to have short periods of breastfeeding. The provision, or lack of it, made for women of childbearing years, both in the workplace and at home, do not make it easy for us to do otherwise. These trends are economically driven and are in some measure responsible for social and cultural attitudes towards children.

In 1992, Government spending on promoting ‘Breast is Best’ was a mere £50,000, while £12 Million was spent on advertising by the baby milk industry.

We need to give this much more attention for the important effect it can have on the health of women and children.

**Diet**

Good diets are associated with good health and a good immune system. Immune system is closely associated with endocrine system, and so with reproductive health.

Attracting most attention are fats, fibre, alcohol, body weight and plant oestrogens, known as phyto-oestrogens. (Phyto=plant).

On balance the accepted view is that high fat diets are associated with an increased risk of breast cancer. The type of fat is considered important, unsaturated fats of vegetable origin being recommended. (9) This is assuming greater importance as more evidence comes to light about the way in which intensive rearing of livestock affects the ratio fat to lean, and the ratio of saturated to unsaturated fats, compared with animals in the wild, with higher levels in the former. Similarly there are significant differences between plant products grown organically or intensively grown, not only in pesticide and other residues, but in levels of trace minerals and other elements. (10)

There are some points to be added to the fat debate:
- Weight for weight fat has a much higher calorific value - 9cals/gm compared with 4cals/gm for carbohydrate and protein, and this has to be considered in weight control. This should not make people avoid fats altogether. Fats are essential for a healthy diet.

- The Inuit have survived on very high animal fat diets, and until now, have had very low incidence of cancers.

- Are we missing the fact that many of the most damaging industrial chemicals that pollute our environment are fat soluble, get into the food chain, where they are concentrated many thousands of times. From the original concentration in the environment, this concentration could be up to a million times in some long food chains. We are at the top of food chains and so are particularly vulnerable.

- Some fats are subjected to processing which may make them hazardous, e.g. hydrogenisation.

**Smoking**

There is no question that tobacco plays a major role in lung and some other cancers, and it appears to have a role in breast cancer. Taking in such a large number of carcinogenic substances, as exist in cigarette smoke, is dangerous, and in addition to causing cancer, can have an adverse effect on the immune system and on general health.

**Alcohol**

Some studies show an increasing breast cancer risk with increasing intake. One study showed the effect was accounted for by drinking before the age of thirty. (? Before first pregnancy). However, when all the evidence was weighed up, the beneficial effects of *light consumption* of alcohol on the heart appeared to outweigh the risk for cancer. This takes into account that mortality rates for coronary heart disease are much higher at all ages than for breast cancer, although the average age at death for breast cancer is much lower. (9)

**Fibre**

High fibre diets are associated with lower levels of circulating oestrogens.

Plant Oestrogens – phyto-oestrogens have attracted a great deal of interest. They are found in about 300 plants e.g. soybeans and its products, in tofu, whole grains fruits and vegetables and some herbs and spices.

Some, but not all, studies show that women whose diets are rich in plant oestrogens have a lower risk of breast cancer. They appear to compete with a woman’s own oestrogens, (and possibly environmental oestrogens,) which are lowered, more are excreted in the urine, and menstrual cycles are longer, thus lowering total exposure to estrogen.

Women from Eastern countries, whose diets are normally high in plant oestrogens, have lower levels of circulating oestrogens, and lower rates of breast cancer, than Western women.

Chinese, Japanese and Philippine women living in the US showed a six-fold increase in breast cancer incidence in successive generations as they adjusted to US life styles. Women who emigrated to the US doubled their risk in a lifetime. We should not, however, attribute this to diet alone.

Very high levels of plant oestrogens may have some health risks e.g. reproductive problems, while low levels may protect against hormone dependent cancers like breast, testis and prostate. Interestingly, in times past, some plants were used as contraceptive pessaries.
Plant oestrogens differ from endogenous oestrogens by being more easily broken down and excreted by the body and therefore their effects are short lived.

Some animals and birds fed on high soy diets developed health and breeding problems.

It is interesting that Tamoxifen, the drug used to treat breast cancer, has effects similar to phytosterogens. However, while it may have a place in treatment, it can also have some serious adverse effects.

Phyto-oestrogens act like hormones, and as is the case with all such biochemical substances, there are optimum levels; too much or too little may be harmful. (11)

**Body Weight.**

It has been shown by some studies that weight gain just before and after the menopause increases the risk of breast cancer. The explanation given is that when ovarian oestrogen production falls at the menopause the main sources of oestrogen are then the adrenal gland and body fat. Higher body fat results in higher oestrogen levels, and so higher receptor cell stimulation in breast and elsewhere. It also means higher levels of fat-soluble industrial chemicals.

**Exercise.**

There is good evidence that exercise does reduce the risk of breast cancer in women of all ages.

There are many associated factors: women who exercise may be leaner, non-smokers, have different diets, and suffer less stress. The benefits of exercise apply to both recreational activities and to work activity. The exercise need not be excessive e.g. walking for 30 minutes three times per week.

It is known that very vigorous and prolonged exercise is associated with amenorrhoea (absence of periods).

Girls who exercise regularly are thought to have a later menarche than girls who do not.

Exercise and well-being are possibly associated with an efficient immune system. Exercise is also associated with improved bone density. (12)(13)

**The Pill**

There has been much furore in the press about the findings of numerous studies on the relationship between the contraceptive pill and breast cancer. The balance of evidence is that there is an increased risk, and it is proportional to the length of time on the pill. The age at which it is started is also important, the risk being higher if started before 25.

Pill users tend to be under 30, and many have never had a baby. (Household Survey 1989). They would be more vulnerable to breast cancer for reasons outlined above.

There is little information about the role of other hormonal contraceptives in breast cancer. (14)(15)(16)

**HRT**

Experience of the menopause varies across cultures, even within cultures. In Eastern cultures, women appear to suffer less menopausal symptoms than their Western counterparts.

Many women object to having the menopause treated as a deficiency disease, rather than a natural event that may need management.
The many studies of HRT, as for the Pill, are controversial, and there are many variations in their scope and in their composition. Overall, it can be said that there is an increased risk, some say small, and some say substantial, associated with HRT. There is consensus that the risk increases with the length of time it is taken.

As the more serious symptoms, which it is often given to prevent e.g. osteoporosis and heart disease, occur later in life, it follows that the intended treatment has to be long term, thus increasing the risk. Many are concerned for its use in these conditions, and suggest alternative less risky therapies. (15) (16) (17)

**Stress**

We know that stress causes changes in our hormonal and our immune systems, and therefore in our ability to cope with illness. There is a correlation between serious illness including cancers, and major disruptions in life, like bereavement, divorce or job loss.

Lower grade but continuous stressful situations are associated with increased rates of illness, and are becoming a major cause for concern for employees and employers. Theoretically at least, we ought to include this in our risk factors for cancer.

**Genetic Aspects**

All cancers are genetic diseases in that they are a result of damage to the genetic material, the DNA, in our cells. In some cases that damage is inherited from a parent. In such cases of breast cancer with a strong familial genetic association, some women, and a few men, inherit the altered genes, BrCa1 and BrCa2, from a parent. In women this greatly increases the risk of developing the disease, estimated to be between 56% to a very high 80%. We should, however, note that it is not the certainty of the several thousand known inherited genetic diseases, most very rare, some all too common, like cystic fibrosis, Huntingdon’s disease, or sickle cell disease. These specific inherited genetic disorders account for about 2% of all illness. (18) (19)

Perhaps we should also be investigating how the damage occurred to the parents DNA in the first place.

Researchers have found fewer cases of breast cancer, (about half), in the grandmothers of these women now carrying the BrCa genes. It may be because of their different life styles, or maybe more importantly, they lived in an environment somewhat less contaminated by radiation, chemicals, and cigarettes. (See Cathy Read, Preventing Breast Cancer).

Some men get breast cancer - in the UK several hundred cases per year – and some men carry the breast cancer genes. But there does not appear to be the same risk for men that the association with breast cancer genes confers on women. (9) (20)

In all, the carriers of those inherited damaged genes consist of about between 5% and 10% of all breast cancer cases. If we add together all the lifestyle and genetic factors known, we can account for about 30% of the risk.

The questions should be asked:

- Would these factors carry the same risk if we lived in a clean uncontaminated environment?
- Is it their interaction with environmental pollutants that is the hazard?
- Should we concentrate on changing us to suit a polluted environment, or clean up our environment to suit us?
Because our bodies are integrated systems, there will be a genetic element in all illnesses. But it is too simplistic to say that the altered ‘gene’ is ‘causing’ the cancer. As Professor Sandra Steingraber said,

“ Our bodies, too, are living scrolls of sorts. What is written there – inside the fibers of our cells and chromosomes - is a record of our exposure to environmental contaminants. Like the rings of trees, our tissues are historical documents that can be read by those who know how to decipher the code.”

and

“ They have been compared to footprints, fingerprints, graffiti, and stigmata. They have also been hailed as the jewel in the crown of molecular epidemiology and described as decoding tools by which to read the body. They are biological markers, and, defined more plainly, they are indicators of physical damage caused by the interplay between human genes and environmental carcinogens. As such, biological markers serve as both signals of past exposure and predictors of future cancers”. (21)

**Conclusion**

All the lifestyle risk factors taken together are thought to add at most 30% of the chance of getting the disease. While it is very worthwhile paying attention to that, we have to be aware of the 70% and where that risk resides. Undoubtedly the evidence suggests that the answers lie in our environments. (22)

I have spent some time on these life style factors. Some will argue that we should give these less attention and resources, and spend our time on the major culprits, the environmental agents that cause cancer.

I agree with this in principle, but with the proviso that as long as our environment is contaminated and degraded to the extent that it is, and until we can get appropriate action to clean it up, women, indeed everyone, has a right to all the available information needed to protect themselves.

It will also be a guide to the kind of public policy that is needed to achieve the optimum for each person, like:

- longer paid maternity and paternity leave
- breast feeding facilities at work
- the best child care
- access to leisure and sports facilities at school and in the community for everyone
- availability and affordability of good healthy diets
- and so on.

However, we must not allow either politicians, the cancer establishment or industry to substitute life style, for which we can be made to appear to be individually responsible, to take the place of their and our collective responsibility to create the conditions for the major changes needed to make our environment fit to live in.

Whilst we may in the short term learn something useful from these facts of life, we should not be misled into thinking that variations in oestrogen levels on their own can account for this epidemic of ever-rising cases of breast and other cancers.

It is not our bodies or ourselves that are at fault. Our normal physiology has been meticulously tailored to meet our evolving needs in an evolving environment. Yet the very rapidly changing man-made environments, which are the result of our economic activities, have left little room or time for adaptation - if indeed we can ever adapt to the onslaught of man-made industrial chemicals and radioactive isotopes, to poverty and stress, on such a scale.

The factors that influence life-style and life-chance choices are products of the ways in which a society runs its economic, social and political life. And they in turn are currently responsible for the extensive environmental destruction and pollution which we are now experiencing, and which are threatening our survival in this and many other major ways.
Health is the ultimate indicator of our success or failure, and the solutions that we seek for these health problems coincide with the solutions needed for other major issues like climate change and loss of biodiversity.

References

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(4) US National Cancer Institute

(5) BCERF Fact Sheet

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(18) US Cancer Institute Cancernet. Also discusses the risk for other cancers e.g. prostate and ovarian and Breast Cancer in men with the inherited breast cancer gene.


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7. **Environmental Hazards To Health**

As well as catastrophic events outwith our ability to control or even anticipate, there are many natural hazards to health and well-being existing around us, from poisonous plants to radon gas and cosmic radiation. We have evolved fairly successfully along with these hazards. Our senses have developed the ability to recognise and to reject them, and we learn from the experience of generations as well as from our own mistakes to be selective about what we consciously take into our bodies. Our bodies and our genomes have become very effectively primed to respond to and deal with most naturally occurring harmful substances, except in overwhelming doses.

However, our bodies’ capacity to deal with the volume and speed at which we are being surreptitiously exposed to industrial chemicals, the products of nuclear technology, and now the potential new threat of harm arising from genetic engineering, is in danger of being overwhelmed.

This is true not only for breast cancer, but for all cancers.

An important group of chemicals are known as Endocrine Disrupting Chemicals (EDCs), many of which also cause cancer. EDCs interfere with the chemical messengers that are the products of gene expression.

Indeed, it has been noted that all toxic exposure causes an alteration in gene expression. It is the method by which our bodies deal with alien substances or organisms.

One of the most disturbing pieces of evidence of harm to health to emerge over the last few decades has been the transgenerational damage caused by EDCs, where parents suffer no obvious immediate harm but their children show visible birth defects and many effects that are subtle and delayed. It makes the connection with the original toxic insult more difficult to make, unless special observation and monitoring is carried out.

**Endocrine Disrupting Chemicals**

Concern about chemical compounds which interfere with the normal function of the Nervous System, the Immune System and the Endocrine System first came under scrutiny by the scientific community in the 1960s, when problems were seen with male fish producing female proteins. The substances responsible are active at extremely small doses, parts per million, parts per billion or parts per trillion. Their effects are specific at a particular time in the development of the foetus, and as Theo Colburn puts it, it is a single hit within the right window of vulnerability.

The mother’s exposure can be at any time in her life. These chemicals can remain in her body and may affect any subsequent pregnancy.

They are persistent in the environment, are often fat soluble, and so accumulate in body tissues. They have a wide range of effects; the effects are often delayed, and can be passed on from the mother to the embryo, foetus or newborn, either in the uterus or through the breast milk. (1) (2) (3) (4)

In 1998 the WHO suspected that subtle effects from exposure to dioxins (which are both carcinogens and endocrine disruptors), could already occur in the general population at current background levels. (5) The changes caused by EDCs were first seen in a range of wildlife populations, but similar conditions are now being seen in humans.
Most of the earlier studies showed interference with oestrogens, by blocking their normal action, by increasing their normal action, or by initiating a completely new effect.

More recent research shows that EDCs can also interfere with other hormones.

- Some are anti-androgenic
- Some affect thyroid function (particularly guilty are the brominated flame retardants, used in much of our household and office equipment and in textiles) and so interfere with growth and brain development
- Some alter the production of glucocorticosteroids, (produced by the adrenal glands and which regulate protein and carbohydrate metabolism, and growth).

Possibly all hormone systems and all chemical cell messengers can be affected. The evidence available comes from a large number of laboratory studies on animals, from laboratory work with cell cultures, and fieldwork in animal and human population. Its volume is growing, and it is compelling. (1) Their conclusions are that low dose effects of EDCs have been demonstrated, but some are still reluctant to accept this. There are so many variables in the different studies carried out that it is difficult to imagine the number of factors that would need to be controlled to satisfy the purists and give them the absolute certainties they are pursuing! This is surely a situation where exercising the Precautionary Principle is overdue.

**Low-level effects.**

There has been a great deal of dispute as to how these chemicals act at the apparently vanishingly low dosages seen. The evidence from the many studies is not universally accepted, but a 36-member panel, set up to review the original papers, and reporting to the NIEHS (the United States National Institute for Environment and Health and Safety) on 14th May 2001 said that there is – ‘credible evidence that some hormone-like chemicals can affect test animals’ body functions at low levels – well below the ‘no-effect’ levels determined by traditional testing’.

They recognised that there have been conflicting views over many years, but that there is enough evidence to require further studies to be done, and for guidelines to be drawn up for industry. (6) Theo Colborn, Senior Scientist at WWF and author of Our Stolen Future and many scientific papers, stressed the following: (7)

- The special vulnerability of the embryo and foetus;
- The inadequacy and irrelevance of high dose testing for EDCs
- The different nature of ‘functional’ deficits, which have never been monitored or correlated with chemical exposures;
- The ever changing exposures to EDCs;
- The funding available has focused mainly on products already heavily regulated, e.g. DES, DDT and PCBs, and many of which are already banned in the West. However, they are still widely distributed, and persistent in the environment, and turn up far from their original sources.

Some of these chemicals have been found in breast milk in the UK. Although environmental levels of some organochloride pesticides have been dropping in recent years there is still concern that some chemicals tested, e.g. dioxins, dieldrin and lindane were still present during the 1990s, and that some exceeded WHO standards. Only a few of those currently prevalent were tested, and some tested in previous years are now banned. (8) The WWF, which reported on this in 1998, expressed concern at the
limited number of toxic substances tested and that the “sheer numbers found, and the levels of certain substances, illustrate the need for tighter controls of hazardous substances”. They were also concerned at the levels of dioxins and the pesticide dieldrin to which babies were exposed. (5) (9) (See also section on breast-feeding)

In 1998 Government funding was allocated to study a few industrial chemicals:

- bisphenol-A, used in food can linings, dental enamel treatments;
- PAHs (poly-aromatic hydrocarbons, which are the products of many combustion processes),
- phthalates which are used in food wrappings and containers, some inks and adhesives, and in many plastics, flooring materials and paints. (10) (11) (12) (13) (14)

Recently, in June 2001, following a renewed flood of interest in the United States, and the US Environment Protection Agency is asking Congress for major funding to pursue further research into hazardous chemicals in the environment.

In June also, Hilary Clinton called a hearing in New York on the environmental causes of cancer. (15) This was part of the on-going campaign to clean up Long Island, where residents have been campaigning for several years. She promised to seek considerable funding for more research, but one resident remarked that that was all they ever got, never any action to clean up. (See Case Study)

A European Conference addressed the issue in July 2001, when one of the pioneers of this research, Professor Niels Skakkebaek was a main contributor. (16)

We share a great deal with all other life forms, in our biochemistry and in our genomes. Ancient bacteria invented most basic biochemical reactions, like digestive processes, the utilisation of oxygen and of nitrogen. (17)

The recent mapping of the human genome has revealed our close relationship with other animals, and even with plants. All backboned animals have similar endocrine systems. Although we cannot extrapolate directly from other animals to ourselves, it has been found that substances known to cause cancer in humans can also cause cancer in laboratory animals.

When we see the same developmental, neurological and reproductive damage by industrial chemicals in the populations of birds, fish and mammals studied, and then observe similar effects in humans who are similarly exposed, it is reasonable to make links between the problems, and at least to address them with some urgency.

Scientists working in the field are concerned enough to call on governments - and all of us - to take heed and to take action. (18)

Genetic engineering must now be included as a hazard to health. Intrinsic to the technology itself is the danger of creating new pathogens, new virulence in existing pathogens, and by disrupting the normal working of the genome in unpredictable, unintentional and uncontrollable ways, can cause abnormal gene expression resulting in new toxins and allergens, and the possibility of inducing cancer. (19)
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(2) Introduction to HDCs: Friends of the Earth www.foe.co.uk.

(3) Physicians for Global Responsibility Boston Massachusetts. and the Public Interest Group.

(4) Report in the Chicago Tribune Dec 2000 on recent work of Frederich vom Saal.


(8) The Stockholm Convention on Persistent Organic Pollutants issued report on 23rd May 2001. Decision to ban 12 toxic substances worldwide, including pesticides, industrial chemicals and hazardous by-products of combustion. Many of the 12 already banned in the North, and others have qualifying clauses. Negotiated under the auspices of the United Nations Environment Programme and signed by 90 countries. Still to be ratified. This leaves a very long way to go!


(11) Friends of the Earth: Poisoning Our Children. The Dangers of Exposure to Untested and Toxic Chemicals.


(14) ATSDR. The US Agency for Toxic Substances and Disease Registry. A comprehensive list of industrial chemicals and their properties.


(16) European Conference reported in Chemical Awareness. Addressed by Professor Niels Skakkebaek of Copenhagen University Hospital. He called for, amongst other things, a review of maximum permissible levels.


(18) As in the declaration of US Scientists at the Wingspread Conferences between 1991 and 1996 See WWF reports (7).

8. Occupational Evidence

This is one of one of the most important sources of evidence. It is far from being fully utilised. We can read accounts of the most appalling working condition in the late 18th and early 19th centuries. Workers had no protection from highly toxic materials like lead, phosphorous, chlorine, chromium and nickel. Between 1926 and 1935 there were a million casualties and nearly 8,000 deaths in the UK mining industry alone.

Demands for change came from the Trade Unions of the time, and eventually resulted in the Factory Acts and the Mines and Quarries Acts. In 1931 regulations were introduced to try to protect workers in the asbestos industry. This was as a result of a quarter of workers showing signs of lung disease. According to one judge in a recent compensation case, no serious attempt was made to implement them. (1)

COSHH (Control of Substances Hazardous to Health) Regulations came into effect in 1990, and strengthened the already existing regulations. Under COSHH, an employer may not carry out work that exposes a worker to known hazardous substances, and must carry out an appropriate assessment of the risks and of the measures needed to eliminate or to control any such risk. It also extends the role of Trade Union Safety Reps in all aspects of safety, including access to information and training.

There is also a United Nations ‘Right to Know’ for every worker, which includes knowing about any hazardous substance handled, and the right to refuse to handle if it is known to cause injury.

Today there are 125 deaths every hour of every day across the world from workplace related illness or accidents. Each year there are about 4 million reported injuries and several hundred deaths from accidents in the UK.

It is estimated that cancer deaths as a result of workplace exposures are at least ten times the number of accidents. About 60 occupations are known to be associated with higher than average cancer rates. (2)

Much of our knowledge about the relationship between chemical exposures and ill health comes from occupational studies, one of the earliest being that of the incidence of scrotal cancer in chimney sweeps. As time goes on and there are more routes for pollution to invade our environments and as general rates of cancer rise, it becomes more difficult to pinpoint the sources, making the ‘proof’ of association more difficult.

In the days when communities were largely centred around a factory or other workplaces, when most of the employees lived locally and were seen by the same doctor, and jobs and communities were stable over longer periods, it was easier to relate illness to a possible origin in the workplace or community, e.g. typhoid to water supply, lung disease in miners.

As society has changed and populations have become more mobile and large areas are covered in travel to work, workers from the same workplace may use different medical services. There is more short-term work and people can have many jobs in a lifetime, and so may be exposed to a variety of toxic agents.

The pattern of illness in women is changing as more women enter the work force and more take on traditional male jobs.

Evidence of a problem will be diluted, and therefore easily missed, unless it is an unusually concentrated cluster, or the outcome is sufficiently unusual, as in the case of thalidomide.
A recent study claimed that women who stay at home have higher cancer rates than those who go out to work. Our homes, too, have become dangerous places. Higher levels of industrial chemicals, such as benzene, have been detected indoors than outside.

There is a long time lag between exposure to cancer causing agents and the appearance of disease - anything between ten and forty years. Of particular interest are childhood cancers, where this time lag cannot exist. The greater vulnerability of immature and more rapidly dividing childhood cells to intra-uterine exposure, and also from the previous exposures of parents, passed on directly via the placenta, or through DNA mutations in germ cells, could explain these cancers.

Dr Alice Stewart blames all childhood cancers on parental or in utero exposures. (3)

Not only are workers affected in the workplace, the wider community is also affected. This is as a result of emissions from the workplace into air, soil or water, by wastes that have to be disposed of, and in the products, which we all use.

At the same time we have seen the industrialisation of agriculture, and the use of many toxic products in the countryside, blurring the once clear distinction in cancer rates between urban and rural areas. This makes it more difficult to detect patterns of illness, and new strategies and structures are needed to collect and collate information. This is sadly lacking, except for some pilot studies done by Trade Unions in co-operation with GPs and Local Authorities, where occupational factors are included in records of illness. (2)

There are also issues of social and environmental justice, which we can see quite clearly in the patterns of illness and deaths within countries and between nations. According to a recent FoE briefing paper, 66% of the most polluting factories are in the 10% of poorest wards, and 80% in the 20% poorest. Only 8% are in the 5% of richest wards. (4)

This correlates with most health statistics, except for the anomaly of slightly, but significantly, higher incidence rates for breast and testicular cancers in more affluent groups, although they have lower death rates. (5)

**Chemical Production.**

There are about four million chemicals in the world. Half of these are man-made. Of these, about 70,000 to 80,000 are in regular commercial use.

Of the 45,00 toxic chemicals listed by the American National Institute for Occupational Safety and Health (NIOSH) in 1980, 2,500 were identified as carcinogens, 2,700 as mutagens, and 370 as teratogens. They found that less than 7,000 had been adequately tested. (6)

There is little to choose between the terms carcinogen and mutagen. Cancer-causing agents act at the level of the genome. They damage DNA causing mutations, and are therefore mutagens; they disrupt the arrangements of the chromosomes, or disrupt the normal division of chromosomes during cell division.

Mutagens may or may not cause cancer, but can cause damage that will be transmitted to the next generation of cells and be part of the cancer process. Mutations are nearly always deleterious.

Teratogens are agents that interfere with the development of the foetus and cause congenital malformations and disease. EDCs are teratogens.

Production in the US of industrial synthetic chemicals, such as in plastics, detergents, solvents, pesticides, increased 500 times, from 1 billion pounds in 1940 to 500 billion pounds in the 1980s. (7) Each year about 1,000 new chemicals are invented. Only a small number of these are tested for carcinogenicity, and very few for their hormone disrupting effects. Thousands of chemicals are already listed as carcinogens, potential carcinogens, mutagens or reproductive toxins. (8) (9) (10), (11), (12).
**Testing**

The FoE publication on Chemicals quotes the US EPA (Environmental Protection Agency) on testing, and says “no basic toxicity information i.e. neither human health nor environmental toxicity, is publicly available for 43% of the high volume chemicals manufactured in the US, and that a full set of basic toxicity information is available for only 7% of these chemicals.”(11)

The US National Toxicology Programme tests only a few dozen new chemicals each year, in isolation, and only for cancer effects.

Permitted Levels are not the same as safe levels. They are the levels calculated to allow an ‘acceptable’ number of damaged people without too great a cost to the industry. Allowing a level of exposure that could lead to injury or death of perhaps 1 in 100,000 could come to mean 2,000 injuries or deaths in a population of 200 million. It is a trade-off between what industry is prepared to afford, without being too costly and so losing too much profitability, and what the public will allow, or perhaps will not be alarmed by, or perhaps not even notice.

This is very important when it is known that there is no threshold level below which we can say that a cancer-causing agent has no effect. It is also virtually true for EDCs.

Because some chemicals accumulate in body tissues, measuring levels in air soil and water will not be enough to detect the true levels affecting people from past and present exposures. Measuring current levels in body tissues may not give a true picture of past exposures, nor will it indicate whether the exposure occurred at a particularly vulnerable time in a person’s life.

These permitted levels are calculated for exposures to single substances only, yet we are exposed to large numbers of different chemicals in varying combinations. The effects of this multiple exposure can be cumulative or synergistic between toxic chemicals, between toxins and other non-toxins, including those of our own body chemistry, or can be the effects of break down products, which are often more damaging than the original substance.

The tests to determine tolerable levels of exposure are usually based on the effects on young healthy males, but in the real world there are women, pregnant women, the foetus, children, the elderly, and those with illness or sensitivities, any of whom could show a very different outcome. We need to give thought to different conditions and levels of general health especially of children, when applying our standards in developing countries.

People are continuously or repeatedly exposed to toxins.

Professor Vyvyan Howard calculated the impossibility of testing for the effect of multiple exposures. To test even 1000 of these chemicals at standard unique dosage in combinations of three, would need 166 million different experiments. Even if each experiment took only one hour, and employed 200 laboratories full time, it would take over 180 years. That is not taking into account varying dosages. (13)

It is therefore very difficult to set ‘acceptable’ levels for exposure to toxic substances. We need to err very much on the side of caution

One would be really surprised to think that anyone would manipulate exposure levels, yet it appears that it does happen. In May 1998 the WHO set new levels for dioxins. These are extremely toxic by-products of many industrial processes and of waste incineration. The levels were calculated, as is the usual practice, by taking the lowest dose that produced an ill effect on animals, and dividing it by 100. This time, it was reported, it was divided by 10, because the lower figure would have caused much of our food to be labelled contaminated. (14)

Dioxins and furans are included in the list of 12 chemicals to be banned following the Stockholm Convention agreed in May 2001, but still to be ratified. (15)
It should be noted that chemicals are not routinely tested for their hormone disrupting effect. It is overdue that we have new standards and new testing procedures, as every one of us is at risk from ever increasing exposure to harmful substances. This is at its most urgent in view of the possible effects on the next generation.

The only real solution for these classes of substances is to phase them out, or substitute safe alternatives, wherever this is possible. Where it is not, we must all be involved in the discussion about the proper course of action. We have to decide whether the risks involved are justified for what we perceive to be the needs and wants of our modern societies.

Some of these are trivial and deceptive: whiter than white paints and washing powders; faster drying inks and varnishes; preservatives for longer shelf life; chemicals and hormones for faster, but not necessarily better, growth of crops and animals; brighter colours to entice us; artificial flavours to tempt us; drip-dry and permanent crease to flatter us; false promises of an easier life from using all the chemical products to clean and cook for us; at first ‘free’ then ‘cheap’ and now ‘clean’ electricity from nuclear technology; or nuclear bombs to ‘protect’ us; feeding the world and curing all known diseases, promising longevity and even immortality from genetic engineering; encouraging us to work even harder to get the money to buy all those promised delights, which will save time, and leave us more time to work harder to get the money to buy….. and all the while having potentially serious side effects.

We might reflect on what scientist and author Dr John Goffman wrote, “If you pollute when you do not know if there is any safe dose, you are performing improper experimentation on people without their informed consent. When you do know that there is no safe dose with respect to causing extra cases of deadly cancers, then you are committing premeditated random murder”. (16)

The burden of proof of safety, and liability for adverse outcomes, must be on those who create and market these chemicals.

The scale of the problem is enormous. Agents capable of causing harm are found everywhere: at home, at work in the office, factory or on the farm, in the air, soil, water and in our food. They come from plastics, pesticides, pharmaceuticals, household and personal care products; they are by-products of industrial processes and incineration, and hazardous and municipal waste sites.

It appears at times to be an insoluble problem. I fear that many politicians will find it difficult to take on the comprehensive and long-term view needed. But when the stakes are as high as the future physical, mental and intellectual health and even lives of our children, and ever-increasing incidence of cancers and other illness in all populations, with the final demise of the human species lurking in the background, there cannot be any question of what should be done.

The lists on pages 53-56 give a small and very incomplete selection of where and what can be harming us.

References

(1) Professor Jim Jeffrey The Ecologist Vol 16 No 4/5 1986.

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Friends of the Earth: Poisoning Our Children: The Dangers of Exposure to Untested and Toxic Chemicals www.foe.co.uk/saferchemicals.


Professor Vyvyan Howard. The Ecologist Vol27 No


See Ref (8) Environmental Evidence.

Dr John Goffman, Professor Emeritus of Molecular Cell Biology University of California, and author of Preventing Breast Cancer.
9. Radiation Risks

As early as the mid-16th century fatal lung disease was associated with the mining of uranium-bearing ores, and from the 19th century onwards the prevalence of lung diseases was marked in uranium miners in many parts of Europe. In spite of this, there was a huge increase of uranium mining in the 1940s to meet the demands of atomic bomb production.

In one US uranium mining operation about 4,000 lung cancer deaths per annum were recorded in the surrounding communities. In addition to this there were hazards from arsenic, cyanide, cadmium, lead, mercury, selenium and molybdenum used in the processing.

In 1931 the International Commission for Radiological Protection set the level of exposures for workers at 73 rems per annum. By 1996 this had been reduced to 2 rems p.a. (A rem is a measure of radioactivity). (1) For the general population the level was 0.5 rem in 1977 falling to 0.1 in 1990.

The National Radiation Protection Board concedes that there is no basis for the assumption that there is a threshold level below which the risk of the induction of cancer in humans would be zero.

When clusters of childhood and other cancers appeared around nuclear installations, neither of which were there previously, commonsense tells us that there is likely to be a connection, particularly if the substances released are known to cause cancer.

Yet we have a situation where official establishment bodies tell us that the exposures to ionising radiation are not responsible, because they are too low! (For an explanation see ‘the Effects of Low-Level Exposures’ on p25 and p41, unfortunately not generally accepted by established bodies.) The same people are willing to accept the effects of naturally occurring radon gas, and of cosmic radiation. Exposure to radon gas may well induce cancers. Its risk is calculated at 0.2%. Compare this with the 33% risk from other sources. However, in the ground radon decays and is absorbed into the surrounding rock. Its average migration is estimated to be six metres. It follows that rocks or ores, which carry any radioactivity, are best left in the ground.

Human beings have evolved along with these natural sources of radiation, and our bodies have developed mechanisms for repairing the damage they cause, unless the doses received are too large, or there are other factors involved. In addition, radon behaves differently to man-made radio-nucleotides. Radon and its decay products do not lodge long-term in our bodies, and its radioactivity is relatively short-lived.

Man-made radioactive products have long half-lives. It takes up to tens, hundreds or thousands of years for half their radioactivity to decay. They also have an affinity for certain body sites because of their similarity to some constituents of our body chemistry, e.g. strontium 90 is similar to calcium and lodges in bone; iodine 131 concentrates in the thyroid gland; caesium 137 favours the liver and muscles. (2)

Plutonium, the most dangerous of all, has a half-life of thousands of years. It can be ingested or inhaled, and will lodge in body tissues where it will continue to emit radioactive α-particles for the rest of our lives, with the almost certainty of causing cancer or genetic damage.
The effects of radiation will depend on the length of time of exposure, whether it has an additive or synergistic effect with other agents; or whether there has been previous damage from previous exposures or from inherited mutations.

Atmospheric atomic weapons testing took place between 1955 and 1963, when it was stopped as a result of the concern about the disturbingly high levels of strontium 90 being recorded across the world, and rising infant deaths. We have recently had newspaper reports telling of secret testing of the bones and teeth of dead children in the sixties, to determine the level of their exposure to strontium 90.

In the years following the tests, the rise in childhood leukaemia was greatest in the areas of highest rainfall: Wales had 72% more leukaemias and a total of 313% more childhood cancers than East Anglia. Both Scotland and Wales, with high rainfall, were also found to have overall increased cancers, and overall, a fourfold increase in rates of childhood leukaemia.

The largest increase ever of breast cancer was subsequently recorded in the women who were lactating during in the 60s. (3)

**Radiation is a known cause of cancer.**

Breast tissue appears to be particularly sensitive to radiation, possibly because of its vulnerable position on the surface of the body, as are testes, and because it is regularly subject to cell division as a result of cyclical stimulation from circulating oestrogens.

Women who were exposed to x-rays for various diagnostic or therapeutic reasons, e.g. fluoroscopic examination, (continuous filming procedures), during treatment for TB, had a twenty-four times the risk of breast cancer than women who had not undergone the procedure. Studies of A-bomb survivors from Hiroshima and Nagasaki found that children who were five years and under when exposed to the fallout had ten times the risk of later developing breast cancer than women who were over fifty years at the time. It was also found that breast cancer was more often induced than other forms of cancer, about 2.5 times. (4)(2)

Up until the 1960s, X-rays were used for a variety of pelvic examinations in pregnancy. It was the work of Alice Stewart that exposed the dangers in this. She had to fight hard and long to have her work accepted by the medical establishment. She later said -

“from these studies we have learnt, first, that all childhood cancers have foetal origins, and secondly, that sensitivity to the cancer induction effects of radiation is much higher towards the beginning than the end of the prenatal period. From a recent Japanese survey we have also learnt that the effects of pregnancy X-rays on childhood cancers are exactly matched by the effects of background radiation. Therefore, although late effects of the Chernobyl accident will not be indistinguishable from other (universal) effects of natural radiation and nuclear weapons tests they will certainly include extra cancer deaths and even more insidious damage to the pool of human genes”

A study of 32,00 cases showed that childhood leukaemia was twice as common in children whose mothers had been exposed to x-rays in pregnancy. (New England Journal of Medicine.)

Rosalie Bertell has shown the expected numbers of cancer cases from exposure to ionising radiation. She calculated the risk to the world’s population from radiation-induced cancers. Her figures were based on official radiation risk estimates of the IRCP (International Commission on Radiological Protection), and UNSCAR (the United Nations Scientific Committee on the Effects of Atomic radiation.) She came up with the following numbers of cancers induced:

- From bomb production and testing: 385 million;
- From bomb and plant accidents: 9.7 million;
- Routine discharges from power plant: 6.6 million; 5 million of these in nearby populations);
- Total fatalities: 175 million.
- We can add to these 235 million with genetic damage, causing a range of diseases, and 588 million children born with malformations. (5)
A team of researchers led by Prof Alec Jeffrey looked for genetic fingerprints in the children of Chernobyl. They found that evidence of the damage caused by radiation had been underestimated by a factor of 10,000 by our National Radiation Protection Board. Findings of the Medical Research Council supported Jeffrey’s findings. They found “alarming damage to cells at the smallest dosage imaginable”. (6)

We can add to this the personal testimonies of people like Jean Emery of CORE, writing of her many friends who worked at Sellafield, and who suffered early deaths. She quoted the figure of seven times the national rate of multiple myeloma among workers at Sellafield.

Dr John Goffman calculated that between 66% and 75% of new cases of breast cancer are the results of exposure to radiation, medical x-rays included.

**Electro-magnetic fields**

Some studies have found an association between these fields and increased rates of miscarriage, cancers, childhood leukaemia, and an increased incidence of breast and brain tumours in power line workers. Even if not conclusive, such studies indicate the need for further investigation. (7) (8) (9)

The jury may still be out, but considering the extent to which people are exposed to a range of electrical appliances - radios and TVs, computers, printers, copiers, power lines and phone masts, we need more action, and we need to exercise the precautionary principle.

**Mammography**

Many have expressed concern about the regular exposure of breasts to X-rays. As a result the dose used has been reduced to the absolute minimum. But as we do not know of a minimum dose of radiation that may be safe, it must be the decision of each woman to weigh up the value of this means of early detection, and the risk that it carries.

Some people, (mostly professionals), are now having second thoughts about Breast Self-Examination, preferring that examinations be left to the professionals.

The reason given is that BSE creates too much concern and investigations of innocent breast lumps, an argument that is equally applied to mammography. On the other hand, there are those who wish women to have the knowledge, and the autonomy and the right to exercise it in the ways that they decide. (10) There is evidence that regular BSE, along with CBE (clinical breast examination) carried out annually by specially trained nurses, can be effective in early detection. It has the added advantage of giving women access to information about the other important aspects of breast cancer detection and prevention. Women deserve more information about the drawbacks of mammography.

In spite of the debate over mammography, 90% of breast lumps are found by women themselves, or their partners. (11)

We should not think that the hazards from radiation belong to a dangerous past. Many of the radio-nucleotides released in the past, persist for thousands of years in contaminated land and water, and we are constantly having reports at home, and from all over the world, of leaky reactors. And there is the ever-present threat of another Chernobyl...

Most of us, at one or more times in our lives, are exposed to X-rays or radio-treatments. There is the insoluble problem of nuclear waste, and the low level exposure of workers and communities near nuclear installations. Leaving aside, but only for the moment, the ever present threat from nuclear weapons, the world, and every one of us, is very much at risk from radioactivity.

A recent relaxation of a EU Directive on the regulation of low-level radioactive waste disposal, allowed the waste to be recycled into some domestic products (12). This is reminiscent of the scandal surrounding the use of dioxin-contaminated incinerator ash for roads and pathways, and for making breezeblocks for house building. (13) (14)
References


(4) Matt Henry: The Ecologist Vol 29 No 7 on Alice Stewart


(6) Published in Nature and quoted by Dr Chris Busby in The Ecologist Vol 28 No2.

(7) Friends of the Earth Scotland Briefing Paper.

(8) Microwave News.

(9) Ecologist Vol 31 No8 Oct 2001 ‘Hold that Call’.

(10) Canadian Breast Cancer Coalition’s response to an article in the Canadian Medical Journal.

(11) One excellent source of such information is a recent paper in the International Journal of Health Services Vol.31 No 3, by Samuel Epstein, Rosalie Bertell and Barbara Seaman, ‘The Dangers and Unreliability of Mammography: Breast Examination is a Safe Effective and Practical Alternative’. See also Cathy Read Preventing Breast Cancer.

(12) European Directive 96/29 Euratom. Allows low-level nuclear waste, including machinery, glass, metal containers, clothing, and concrete, to be recycled into domestic goods.


(14) Communities Against Toxins
**Some Common Products - known or suspected of being carcinogens, endocrine disruptors or both**

- Plastics, their production use and their disposal. If incinerated, dioxins and furans are produced. Carcinogens and EDCs.

- Detergents soaps and shampoos, hair dyes. Carcinogens and EDCs.

- Lindane based lice shampoos can cause a range of disorders, and are linked to cancer. *

- Household cleaning products; solvents, paints e.g. many carpet and upholstery cleaners contain perchlorethylene, a known carcinogen.

- Treatments and finishes for textiles, clothing and furnishings, and furniture. Formaldehyde is commonly used in these and is irritant to many tissues and is a known carcinogen.

- Perfumes. More than 5000 chemicals are used in their manufacture, most of which are petroleum derived, and many of which can cause birth defects, CNS disorders and cancers.

- Many pesticides, used in gardens and in homes as well as in agriculture. The WHO claims that there are 1000 pesticides in 100,000 formulations in use worldwide. Carcinogens and EDCs.

- Wood treatments and preservatives. Carcinogens.

- Food packaging; food can linings; medical blood bags and tubing; lab equipment. EDCs.

- Some toys containing phthalates. Now banned in some countries. EDCs.

- Food dye Red# 3 and artificial sweetener aspartame Carcinogens.

- Benzene- widely used in making plastics and other synthetics, dyes, detergents, drugs and pesticides. Found in fires volcanoes, crude oil, petrol and cigarette smoke. Linked to leukaemia.

- Poly-aromatic–hydrocarbons. (PAHs) from combustion of a range of materials. Carcinogens.


- Aromatic amines in dyes. Carcinogens.

- A range of heavy metals, including nickel, chromium, arsenic, lead and cadmium. Carcinogens and EDC

(For further information see Martin Walker Dirty Medicine.)

*In March 2002 in the UK, a four-year girl died as a result of ingesting a small amount of lindane powder being used as an ant killer, even although lindane has been banned in the North for agricultural and most other use. It still finds its way to us in the UK from other countries particularly in chocolate.*
Some dangerous situations - and their associated increased rates of cancers:

- Exposure to asbestos increases the risk of lung cancer ten-fold in non-smoker and fifty fold in smokers. (Agius, Edinburgh).
- Ultra violet light: skin cancer. This reflects a cultural change that exposes fair skinned people to strong sunlight. Recent researchers have found compounding factors, e.g., fluorescent lights, diets. It also affects farm and other outdoor workers. The increase is also a result of the increased levels of u-v light reaching the earth as a result of ozone depletion in the upper atmosphere caused by the use of CFCs. Although these have been banned, their substitutes, HCFCs and other halogenated compounds like methyl bromide, used as a soil fumigant, are also ozone depleters.
- Skin cancers: working with pitches and tars.
- Farmers and other agricultural workers and gardeners: myelomas, leukaemias and prostate cancer. Multiple myeloma and lymphoma rates have trebled in the US since the 1950s. This has been associated with pesticide use.
- Non-Hodgkin’s Lymphoma in humans and pets exposed to the herbicides 2,4,5,T and 2,4,D, and from exposure to dioxins and furans in the plastics, pesticides, wood preservatives, print and paper bleaching industries. There are 74 dioxins and 135 furans, with different levels of toxicity.
- A range of cancers in painters, welders, plastics, dye and fabric makers, fire-fighters, miners, printers, chemists and chemical engineers, dentists, dental nurses, and nurses involved in chemotherapy.
- Exposure to ionising and possibly to non-ionising radiation.
- Adult cancer in survivors of childhood leukaemias.
- Childhood leukaemias around nuclear installations: at Sellafield it was found to be ten times the national average; at Cap-le-Hague in France, fifteen times; at Dounreay, eight times.
- Childhood leukaemias and brain cancers in children of parents who work in the paint, petroleum, solvent and pesticide industries. This is thought to be as a result of damage to parental germ cells, or by direct contamination from clothing and cuddles.
- Bladder and salivary gland cancer in hairdressers and beauticians. The risk is increased threefold after five years in the job.
- Pancreatic cancer in workers in paint and plastic trinnings in the automobile industry.
- Working with vinyl-chloride and poly-vinyl-chloride (PVC), in making things like plastic cards, plastic hoses and furniture, toys, food packaging, floor coverings, plastic trims, etc., and a greatly increased risk of the rare liver tumour angiosarcoma, calculated to be 3000 times that of the average in the population. Even when it doesn’t cause cancer directly, it can cause liver damage, which predisposes to further damage from other substances, e.g. alcohol. It is also associated with increased risk of breast, brain and lung cancers.
- Twice the rate of oesophageal cancer in workers in the dry cleaning industry than the general population.
• Cancers and congenital abnormalities and low birth babies in proximity to hazardous waste sites, incinerators, industrial sites and nuclear plants. One New Jersey study showed increased rates of breast, colonic and gastric cancers, with a gradient according to the distance from the site. In another, rates of breast, lung, bladder, colon and stomach cancers were raised, those of breast by 6.5 times that of the average. Similar findings from studies on municipal waste sites in other countries, including the UK.

• Working in the pharmaceutical industry. About 85% of pharmaceuticals are based on chlorine chemistry. There are about 15 thousand organochlorides.

• There is no firm evidence as yet from the newer industries, e.g. microelectronics, fish farming - both heavy users of toxic chemicals- or from call centre type employment. Some anecdotal evidence exists and needs to be acted on in the spirit of precaution.

*Some Effects of Endocrine Disrupting Chemicals Found in Animal and/or Human Populations

On the Reproductive System

In Males:
- Undescended testicles
- Hypospadias;( the urethra opening on the underside of the penis)
- Small testes
- Testicular cancer;
- Prostate cancer
- Reduced sperm counts, and other sperm abnormalities.
In some exposed animals, testes were seven times smaller than in the unexposed. Hypospadias in the US doubled between 1973 and 1990. Both undescended testicles and hypospadias are associated with later development of testicular cancer.

In Females
- More adverse outcomes of pregnancy:
- Shorter pregnancies
- Ectopic pregnancy
- Stillbirths
- Spontaneous abortions, low birth weight babies;
- Reproductive organ abnormalities in infant
- Earlier onset of puberty and vaginal cancers in daughters
- Breast cancer in mothers and daughters.
- Endometriosis.

Altered birth sex ratio
The normal slight preponderance of male births was in some studies reversed, and in some there were no male births.
After the Seveso incident, there were no male births for the next eight years in the families exposed.

On the Central Nervous System
- Brain development and cognitive ability impaired;
- Behaviour problems, including altered reproductive behaviour;
- Difficulty in socialisation;
- Neurological impairment;
Some researchers have suggested links with Parkinson’s disease.
**On the Immune System**
- Individuals more susceptible to infections, and showing less ability to deal with them.
- Suppression of the immune system can also have a role in the development of cancer.

**On Thyroid Function**
In vitro studies have shown a powerful effect of some EDCs on the hormone thyroxin, which is involved in growth and in brain development;
There is a failure to thrive, and many early deaths in animal populations threatening the survival of the species.

**On Corticosteroid Function**
Production altered, interfering with protein and glucose metabolism, and so with growth.

**On The Road**
Not only are we at risk from vehicle exhausts as we go about on the country’s highways and byways, but also from the loads they may be carrying.

About twenty years ago I read a series of weekly briefings in my newspaper, written by scientist John Baruch. Each one told of his encounter on the highways and motorways with great tankers, thundering along with their loads of substances that most of us had never heard of, and he speculated on the possible outcomes of accidents or spills.

He explained how to find out what they were carrying. Look for the plate on the side or back of the vehicle with a number and some letters. The numbers identify the chemical or other substance. The letters indicate what should be done by the emergency services if the vehicle is involved in an accident.

He speculated on the outcome of an accidental spill. A fine mist or an invisible cloud could float downwind of the accident towards a town or village, where 20-30 years later an unusual and unexplained cluster of cancers could appear. No one would remember a motorway accident, which at the time had been successfully cleaned up with no casualties!

I remember clearly the letter E which stands for evacuate the area! Since then I have kept my distance from such vehicles. I am afraid I never get close enough to read what it says on their labels.

* The information on the previous pages 53-56 has been selected from the sources quoted throughout this report.
10. Case Studies

There have been many sustained campaigns by local communities in the UK, but I have chosen three studies from the US because they have been so prolonged and have been successful in pushing Governments into action, and have aroused national and international interest. There are lessons to be learned, both in what can be achieved, and what we should guard against.

They show what can be done when women get together and win over support from other sections of the community, especially from scientists and politicians. But they also show the pitfalls, like the lack of co-ordination causing unnecessary repetition of work, and the lack of reasonable time frames – these studies have been going on for years, and further funding for more studies could appear as stalling and a substitute for action by the authorities.

But in each one, although carried out in a different way, the primary emphasis is on environmental concerns, with personal factors also being considered.

The Long Island Breast Cancer Research Project

In the early 1990s, women on Long Island were concerned that their rates of Breast Cancer were higher than for the rest of New York State, and wanted to know why. Official studies gave the reasons as women being affluent, Jewish, postponing childbearing, and not breast-feeding.

This outraged the women! They formed the One in Nine Long Island Breast Cancer Coalition. They lobbied Senators, and in 1993 they obtained $210 million for further research. The same year Congress directed the National Cancer Institute (NCI) to study the role of environmental factors in the causation of breast cancer on Long Island.

As a result of studies carried out on pesticide use, President Clinton signed the Food Quality Protection Act in 1996. This included a clause that the Environmental Protection Agency (EPA) should find a way to screen chemicals for their oestrogenicity.

The declared purpose of the Long Island Breast Cancer Research Project was to find ways to prevent the disease. Six research groups are involved in ten projects, and will report in 2001.

They have developed a sophisticated geographic mapping system, the Geographic Information System for Health, (GIS-H). The areas studied are:

- Drinking water
- Indoor and outdoor air pollution, including aircraft emissions
- Electromagnetic fields
- Pesticide use past and present, and other toxic chemicals
- Hazardous and municipal waste sites
- Any other factors deemed important

They set up:

- Human Population Studies;
- Family Breast and other cancer registers
- Research into the mechanisms of action and of susceptibility in the development of breast cancer.
Geographic and personal factors were also considered.

The community is involved at all stages through an ad hoc advisory committee, and through the schools and libraries. The chemicals project has studied several commonly used organochloride products (there are many thousands of these, and many of the ones being studied have already been banned in most Western countries, but are persistent in the environment), e.g. the pesticides DDT and its metabolite DDE, and dieldrin, some PCBs, (of which there are 209); PAHs (poly aromatic hydrocarbons) - the products of incomplete combustion of a wide range of substances.

They measured the levels of these in blood, urine or tissue samples. They studied the proximity to waste, industrial and toxic release sites; land use, and chemicals in drinking water.

One of the researchers, Dr Michael Wigler, examined genetic damage in tumour cells. He found that “certain point mutations in genes may be linked to environmental exposures, and may be characteristic of specific environmental exposures”. (See also Sandra Steingraber and Brian Goodwin).

The researchers admit to many challenges and difficulties in their studies, often with inconclusive results. (For further details see the Long Island Breast Cancer Research Project web site).

On 17th June 2001, Hilary Clinton and members of the Senate Environment and Public Works Committee attended a Public Hearing to consider the continuing discussion of whether or not there was a relationship between Breast Cancer and environmental pollutants on Long Island. After hearing evidence from 23 expert witnesses, Clinton promised to seek further substantial funding for more research. (2).

Some Long Island residents were less than elated by this and, as already referred to, thought that it was not so much more research but action to clean up that was needed.

**Cape Cod Research Project**

When the women of Cape Cod noticed, like the Long Island women, that their breast cancer rates were higher than for the rest of the state of Massachusetts, which in turn were higher than the US average, they asked questions, and in 1994, formed the Massachusetts Breast Cancer Coalition. Later, along with a number of concerned professionals, the Silent Spring Institute was set up the study the problem. (Silent Spring after scientist Rachel Carson who wrote the seminal book of that title).

They obtained funds from the Department of Public Health. The first phase ran to 1997. It found an association with a number of sites and installations known to emit toxic substances and potential carcinogens. The second phase, set to run from 1998 to 2001, has been to conduct interviews with 2100 women. The questions asked are about their use of a range of products - pesticides, detergents, plastics and cosmetics. Many of these are known to contain oestrogen-like chemicals, some of which are also associated with prostate cancer, asthma, and a range of reproductive health problems.

They are testing air and dust in seven locations, including homes and workplaces, and air collected during an eleven hour shopping trip!

The samples are analysed for 86 suspect chemicals. They found 33 of these in dust and 24 in air samples. In most they found phthalates (used in plastics manufacture) and alkylphenols (found in a range of detergents and pesticides).

This study is also using the GIS-H mapping system, and is plotting all the places where the women have lived from 1948, not just their current places of residence.
**The Women of Love Canal**

In 1942 a chemical company began using an old abandoned never used two-mile stretch of canal for dumping chemical waste. In 1953 the Board of Education built a school on top of the by then abandoned dump, and many new houses were also built.

Attention was first drawn to the problem when there was a high rate of miscarriage among the women, and high rates of congenital abnormalities, low birth weight and illness in their babies. Lung cancer rates amongst men were 70%, and for women 100% higher than the national average.

In 1997 tests showed that 248 chemicals were leaching into homes. For 100 of these chemicals there were no data available. 30 were known to be toxic to the embryo and foetus, and 34 were known carcinogens.

A long, tenacious and bitter struggle ensued, and eventually the people were evacuated and rehoused. There are many accounts of this sustained and determined campaign that the residents waged over many years.

It seems it is nor over yet. Recently I read that new houses were to be built in this area!

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**The Women’s Environmental Network**

To its great credit, while working on a veritable shoestring compared to our American sisters, WEN has to date achieved a remarkable amount. The Breast Cancer Campaign started in 1995 with a petition to Government signed by over 80,000, asking for more attention to be given to primary prevention of breast cancer. While everyone agrees that better treatment and early detection are essential, women would rather not get the disease in the first place.

A lottery grant enabled WEN to extend the scope of the campaign. This has involved hundreds of women in ‘Putting Breast Cancer on the Map’, a project in which women compiled maps of their own communities throughout the UK, and supplied information about the known cases of breast cancer in these areas, using a similar health mapping system as used in the US.

This was an imaginative campaign and its significance lies in the way in which women participated, and put together a great deal of information about the incidence of the disease, suspected sources of pollution and harm, and about women’s experiences, concerns and perceptions.

With the results of that preliminary study, WEN has gone on to involve some important support in the body politic, and is now embarking on the next phase of the campaign. (5)

This is invaluable work and must stimulate further research and above all action to remove known and suspected sources of substances that can cause cancers or are reproductive toxins.
11. **Ways Forward**

Any overview of the present-day levels of toxic industrial pollutants, their relationship with human and animal disorder, disease and death, and the nature and extent of the damage caused, indicates that the situation is intolerable and unsustainable.

Without doubt, enough is already known to take action.

There are small beginnings.

In May 2001 in Stockholm, a UN Convention was agreed by 90 Nations to ban 12 chemicals worldwide. Many of these are already banned in the North, and there are qualifications in the case of others. It is indeed a small start, but it is recognition of a problem. (6)

Without doubt, further studies could be useful to confirm or refute suspicions already held, and to supply local information. But their greatest value would be to find benign alternatives to present harmful practices.

It is clearly impossible to test all existing chemicals, so action must be taken on what is already known or suspected, to phase out the most potentially harmful, and to find safe alternatives.

- New testing standards and legally binding safety guidelines should be introduced for all new chemicals before release.
- Responsibility for safety and liability for any adverse outcomes must be carried by the manufacturers, and the balance of proof changed from the public having to prove harm, to the producer having to guarantee safety for their products.
- We need laws, at present under consideration, to cover Corporate Responsibility, and realistic penalties for those found guilty when that responsibility is ignored.
- Registrations of deaths and incidence of illness should cover past and present employment and places of residence.
- The Pilot Schemes introduced by the Trades Unions have already indicated what is possible in recording patient’s impressions of the possible association between their occupations and their illnesses. When this is centrally collated it can give valuable insights. (7)

The Conclusions and Recommendations of the Women’s’ Environmental Network’s Report on the 1st phase of the Mapping Breast Cancer Campaign covers comprehensively what we can begin to do now, and is worth reproducing in full. (with thanks to WEN):
The Conclusions and Recommendations of the Women’s’ Environmental Network’s Report on the 1st phase of the Mapping Breast Cancer Campaign

The Project identified:

- A large number of ‘clusters’ of breast cancer throughout the UK.
- Many areas where participants reported high incidence rates for breast cancer.
- A significant number of ‘Hot Spots’ for breast cancer.

Our analysis of the questionnaires, maps and workshops showed that:

- 54% of participants were concerned about the high incidence rates of breast cancer, cancer in general, asthma and other allergic illnesses.
- 44% of participants were concerned about the effects on environment and health from agricultural and industrial chemicals and emissions. This concern was particularly emphasized in relation to crop spraying, pesticide usage and contamination of food, air and water supplies.

34% of participants were worried about the increase in health effects including asthma, hay fever and other illnesses that may possibly be linked to environmental pollution. This was expressed especially in connection with air pollution from traffic.

RECOMMENDATIONS

The World Health Organisation (WHO) recently reported that breast cancer had become the most common cancer in women throughout the world. The urgency needed in addressing this growing problem is obvious in the UK, where 635 new cases of breast cancer are diagnosed and 240 women die of the disease every week.

WEN demands that more emphasis be placed on prevention of breast cancer.

The following recommendations are based on the analysis of the project questionnaire, and information arising from participants’ maps and project workshops.

WEN calls upon the Government to:

- Make women’s and children’s health the prime indicator of the state of the environment.
- Acknowledge the right of women and their communities to participate as equal and active partners at every level of decision-making about local pollution and health-related problems, including setting of research agendas, implementation of recommendations, enforcement and evaluation of solutions.
• Establish mechanisms for improved collaboration between statutory and voluntary bodies (e.g. Department of Health; Department of Environment, Transport and the Regions; Health and Safety Executive; Local Government) in order to effectively address environmental factors linked to breast cancer and women's health. Such collaborative work needs to be done in conjunction with NGOs, government and community groups.

• Commitment of a proportion of annual health spending to a comprehensive programme for primary breast cancer prevention.

• Follow the lead of progressive policies from other European countries on the control and restriction of all endocrine-disrupting substances and implement the Precautionary Principle in connection with all substances, processes and pollutants suspected of impacting adversely on the health of the population.

**RESEARCH**

WEN calls for:

• Acknowledgement of the relevance of women's experienced based evidence on possible links between adverse health effects and environmental pollutants; and commitment to the use of this evidence to initiate official research programmes.

• The planning of a national breast cancer research agenda to be undertaken by governments in consultation with health professionals, patient-user groups, voluntary sector organisations etc.

• Analysis of Health Authority data on breast cancer incidence and prevalence by locality.

• Review of all chemically based pollutants suspected of having the potential to cause breast cancer, and publication of results in freely available and easily accessible forms for the public.

• Synergistic effects on human health of minute amounts of chemicals, pollutants and radiation to be an intrinsic part of research.
WORKPLACE

WEN calls for:

- Employers should be obliged to keep better long-term records of occupational ill health.

- Every worker should have a health file, extending over the whole period of his/her working life, in order to assess possible long-term health effects of hazardous workplaces.

- More research is needed into effects on workers' health from exposure to multiple combinations of pollutants in the workplace. This is especially important for women who can suffer "double jeopardy" from exposure both at home and at work.

WEN will continue to work toward the achievement of these recommendations.”

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One Cautionary Tale

The following is just one story of what might be possible and where Local Authorities can play a part. We didn’t achieve what we set out to do in West Lothian, but we learned a lot for later work. So beware of the pitfalls!

In the days when we had Women’s Committees, Women’s Officers and Women’s Units, our forward-looking Women’s Officer set up a Women’s Issues Consultative Group, (WICG) drawn from a wide range of women’s organisations in the community. Its purpose was to provide a forum to raise issues of concern to the women of West Lothian, and pass them on to the appropriate bodies for consideration.

One of the issues raised was the health of women in the microelectronics industry, of which West Lothian has many installations. It followed concerns of women working in the industry about their exposure to the many toxic chemicals they used, and the possible effects on their health.

A sub-committee, consisting of representatives from the WICG, the Trade Union Council and the Health Council, produced a report detailing the problems, and making proposals for what we thought might be done. One suggestion was that the Local Authority should second a person from the Environmental Health Team to research the problem, after completing the appropriate course at Edinburgh University. That person would also be responsible for monitoring the women’s health. To our delight this was agreed to.

But to our great dismay, very soon after, internal politics abolished the Women’s Committee, and all the work we had done had to be shelved.

It still remains one possible model for Local Government to work with the community to improve health.

The solutions will come from many quarters, and will take many forms. What is important is that we keep informed of what is going on and make our demands heard wherever and whenever we can.
13. Sources of Information

References Case Studies and Ways Forward

(1) Long Island Breast Cancer Study Project Department of Health and Human services; Public Health Services; National Cancer Institute and National Institute of Environmental Health Services Web site http://epi.grants.cancer.gov/LIBCSP


(3) Silent Spring Web site http://www.silentspring.org/


(5) Women’s Environmental Network PO box 30626 London E1 1TZ; Tel 020 7481 9004; web site www.wen.org.uk

(6) See Stockholm Conference note (8) Environmental Hazards.

(7) In Scotland for further information contact The Secretary Hazards Movement Lothian Trades Union and Community Resource Centre, Edinburgh.

Some sources used, and useful for further information

Books

- Dr Cathy Read, Preventing Breast Cancer. A comprehensive and readable account of the factors involved in the aetiology and management of breast cancer.

- Professor Sandra Steingraber, Living Downstream a beautifully written and highly informative book about the environmental factors associated with cancer. Also, Having Faith (2001) for a wonderful account of pregnancy and lactation and of the environmental hazards at each stage.

- Dr Rosalie Bertell, No Immediate Danger. Written at the height of the cold war and updated in 2001, gives a full account of the dangers of radioactivity.

- Dr Theo Colborn, Our Stolen Future. Called the sequel to Silent Spring, and fully deserves it for this masterly collation and interpretation of a mass of scientific evidence of the dangers of EDCs

- Dr Rachel Carson, Silent Spring. Written in the 60s, and a seminal text on the dangers arising from our profligate use of pesticides.

- Dr Mae-Wan Ho, Genetic Engineering Dream or Nightmare: one of the best critiques of the philosophy and science underlying genetic engineering, and very accessible to the general reader.
Journals, Magazines and Newsletters

- The Ecologist [http://www.theecologist.org/]
- Hazards [http://www.hazards.org/]
- Institute of Science in Society newsletter [http://www.i-sis.org/]
- What Doctors Don’t Tell You [http://www.wddty.co.uk]
- Science
- Nature
- The Lancet

Organisations: Reports and Briefings

- ATSDR (Agency for Toxic Substances and Disease Registration USA) [http://www.atsdr.cdc.gov/science/]
- BCERF (Breast Cancer Environmental Risk Files of Cornell University) [www.cle.cornell.edu/bcerf/factsheets.cfm]
- ECME (Environmental Concepts Made Easy of Tulane and Zavier Universities) [http://www.tmc.Tulane.edu/ecme/ehome]
  - Friends of the Earth and Friends of the Earth Scotland* www.foe.co.uk and foe-scotland.org.uk
- National Breast Cancer Campaign
- PANUK and PANNA (Pesticide Action Network UK and North America)* [http://www.pan-uk.org]
- Rachel’s Environment Research Foundation [http://Rachel.org]
- Scottish Breast Cancer Campaign [http://scottishbreastcancercampaign.org]
- Silent Spring Institute [http://www.silentspring.org/]
- Women’s Environmental Network * [http://www.wen.org.uk]
- WWF* [http://www.worldlife.org/]

* Indicates organisations that have a specific focus on breast cancer.
Official Bodies

- Information and Statistical Department of the NHS
  [http://www.show.scot.nhs.uk/ind/cancer/cancerhtm](http://www.show.scot.nhs.uk/ind/cancer/cancerhtm)

- Scottish Executive: Towards a Healthier Scotland, and Cancer in Scotland: Action for Change


- World Health Organisation

  *Currently running excellent campaigns on toxic chemicals and health*

For a more comprehensive bibliography consult WEN’s Breast Cancer Report.
Personal Postscript

I have been asked to say why and how I came to write this report. The reasons could be traced back as far as I would like to go, but this will have to be a thumbnail sketch of what I consider to be the most important influences that have led me here.

I was brought up in a working class, Gaelic-speaking, World War 1 veteran, highly political family in the hungry 1930s in a Highland village that was no stranger to poverty. I overheard constant discussions of the major issues of the day—wealth and poverty, land and culture and war and peace. I was left with little doubt about the effects of poverty on people’s health and lives.

World War 2 had profound effects on all of us, but for many the ill effects were tempered by increased material prosperity and better nutrition. We had to be healthy for the war effort!

By the end of the war I was deciding on a career. I chose medicine. That was at a time of great relief at the ending of the slaughter, tragedy and devastation that culminated in Hiroshima and Nagasaki. It was a time of hope, almost of euphoria, and these feelings were embedded in the UN Charter and in the Universal Declaration of Human Rights: war no more and a better world for all. This was reflected at home in the work of John Boyd Orr on health and nutrition, in the Beveridge Report and in the introduction of the NHS.

The role of women had changed during the war, so it seemed reasonable for me to get married at the beginning of my second year at University and to continue my course with the intention of both having children and a career. That was the theory. The practice was rather different. It crystallised on my first attempt to return to work when my first child was two years old. The all male members of the interview panel were kind, considerate, benign, fatherly gentlemen, or in more cynical terms, condescending and patriarchal, who were more concerned about my personal life and domestic arrangements than with my ability to do the job. They concluded that I would be welcomed back when I had completed my family!

I had a Gap of nine years before finally going back to work. In spite of a lot of support from a number of colleagues I met many logistical and attitudinal difficulties of a married woman with children re-entering the workforce at that time. It had some positive spin-off: I came to understand and empathise with the problems of the women I met in the course of my work, and I realised the great need for women to support women.

Not long after the end of the war, many became aware of the immense dangers in the continuing development of atomic weapons and of the cold war. The worldwide effects of atmospheric atomic weapons testing, and, in particular, the reports of the effects on the health of our children, dominated the 50s and 60s. It was then that the contents of the lectures at Medical School on the effects of the bombs on Hiroshima and Nagasaki really came home to me as my own children were threatened. We also had the Cuban crisis! In 1962 Rachel Carson’s Silent Spring was published, alerting the world to the dangers of the profligate use of pesticides. I owe a debt to my young family for drawing this book to my attention, and to much else at that time.

In the 70s environmental concerns rose higher up on the agendas of a growing number of people. The environmental movement and Women’s politics blossomed, but always under the shadow of the bomb.

In 1972 The Limits to Growth hit the bookshops. It has been criticised for inaccurate predictions but its impact was great. It drew attention to the dangers inherent in unfettered economic growth/development/progress, along with projections of population growth, consumption, resource depletion and pollution reaching crisis point and collapse of all systems in the near future. It certainly drew our attention very sharply to the need to seriously consider our human impact on planet Earth.

About this time I became involved in the campaign to Keep Torness Green and read a small but influential pamphlet from the Centre for Human Ecology of Edinburgh University called Here Today…..

The 80s were dominated by the threat of Cruise missiles and of Trident. My concern found expression in CND, the Edinburgh Peace Forum, West Lothian Peace Forum, The Medical Campaign against Nuclear Weapons, and at the Faslane and Greenham Common Peace Camps. But later in the 80s the nuclear threat became entwined with the ecological threat in
more and more people’s thinking. This was reinforced by the 1979 Black Report on the relationship between social class and health, and the 1987 UN Bruntland Report on the Environment. Along with the ever-present threat of nuclear war there was a hidden threat all around us from the “War without Bangs”.

During this time in my professional work, I, like all other practitioners, was rightly concerned with the immediate problems of the patients in front of me. But it is difficult not to notice that beyond the surgery and the clinic lay a host of problems relevant to people’s health that were not being dealt with. My extra mural activities were not a diversion from my professional work, but rather shaped and gave meaning to it. I was made aware of the shortcomings of our conventional approach to health in seeing it predominantly as something provided by a good Health Service staffed by dedicated professionals. It became clear that Health is a state of being that results from the totality of the conditions of living, working, relating, thinking, in a person’s life. There can be no fragmentation, no separation of the numerous facets of our lives. Each must be seen as integrating with and influencing all the others. Yet all around us we were seeing a way of life being created in our names, one that denied all this and was supremely damaging to our health. I became acutely aware that a large part of my work was treating patients to the best of my ability and then too often sending people back to the same conditions that had been responsible for the illness in the first place. This struck me most forcibly in the case of so many women suffering from a variety of mental illnesses. It seemed to me that the NHS was trying to fill the proverbial bucket with the hole in it, or that we were transfusing the patient without stopping the haemorrhage. In spite of a growing body of knowledge we were, and are, failing to prevent preventable illness. The political knowledge, and above all the political will to do so, seemed not to exist. We continue to pull the dead dying and damaged bodies from the river with ever-greater efficiency, but never ask to go upstream to find who is pushing them in.

I found a channel for some of my concerns in the Women’s Issues Consultative Group. This body of women from all areas of West Lothian met regularly under the auspices of the then Women’s Committee of the Local Authority.

Retirement at the end of the 80s set me free to engage in voluntary work within our community Women’s Forum where we campaigned on many issues including Violence Against Women and Children, Health and The Environment. Two of the most satisfying campaigns were concerned with the hazards to the health of women working in a local microelectronics factory, and of women working in the local Daks Simpson clothing factory. Some years ago I became interested in the work being done by The Women’s Environmental Network, and particularly in their Breast Cancer Campaign. I may have been criticised for hoarding books, papers and magazines, but after many years of campaigning I had accumulated a fair weight of information, which I thought should be passed on to others in some sort of accessible form. I trawled through the volumes of paper and followed up references, mostly on the Internet, where I found an additional wealth of information. As a result I had no doubts about the links between what author Di Ward called our seriously degraded environment and the Symbolic Disease of our time, Breast Cancer.

I think most of the sources I used are quoted in the report. This is a report without an end, and fresh evidence continues to roll in. I hope that many people will feed in information to keep it up to date and to keep the discussion alive.

Apart from the highly disturbing features of Breast Cancer itself which deserve massive consideration, focussing on this disease leads us to a better understanding of the role of the environment in all disease, which, pari passu, will be included when we persuade those with the power and resources to deal with this disease at source, to implement the Precautionary Principle and to Stop Breast Cancer Before it Starts.