

CANCER AND CHEMICALS IN OUR ENVIRONMENT.

By

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A colleague recently said to me - 'Cancer has become a desperate scourge. In my own locality I know one or two people with cancer on every road. And, no wonder. We don't know what we are eating nowadays. Our food is full of chemicals'. These sentiments are common, but widely respected studies estimate that, overall, pollution accounts for only one per cent of human cancers.

Cancer is a major problem. One in three of us will contract cancer and one in five of us will die from cancer. It is mainly a disease of the aged. Elderly people are now more numerous in the population than earlier this century and, because of this fact alone, cancer is more common today. When discussing cancer trends, it is essential to speak in terms of age-adjusted rates. These rates, taking into account that absolute numbers of cancer deaths are increasing because of increased longevity, tell us how well overall we are doing against cancer.

The feeling is widespread that deaths from cancer are continually increasing, but this feeling is wrong. With the exception of deaths from respiratory cancer, largely caused by cigarettes, age-adjusted cancer death rates are slowly falling. It is true that cancer incidence rates have been increasing for some types of cancer, e.g. prostate cancer, but some/much of this increase is accounted for by improvements in detection and diagnosis.

An agent that can cause cancer is called a carcinogen. A chemical is tested for carcinogenic potential by administering it to rats at near-toxic doses and following up to see if cancer develops. About half of all chemicals tested, whether natural or synthetic, are carcinogenic at these doses. There is good reason to suspect that many chemicals are carcinogenic only at these very high doses. This is not taken into account by the testers who take a positive result to unambiguously identify a carcinogen whose potential to cause cancer is assumed to be proportional to dose, decreasing to zero risk only at zero dose. However, if it is true that many chemicals are carcinogenic only at high doses, this philosophy of risk assessment greatly exaggerates the danger at the very low doses to which the public is exposed.

Bruce Ames, the widely respected American biochemist, points out that the great bulk of the chemicals ingested by humans is natural, both by weight and number. Ames asserts that the widespread suspicion that a large fraction of all cancers is caused by synthetic industrial chemicals is mistaken. (*The Causes and Prevention of Cancer: The Role of Environment*. In: *The True State of the Planet*, R. Bailey (Ed.) The Free Press, 1995).

There is widespread concern about residual pesticides in food. According to Ames, 99.99% of the pesticides in food are natural, present in plants to repel insects and other predators. We cannot eat food without ingesting these natural pesticides, half of whom test positive as rodent carcinogens. Public and regulatory interest focuses on the 0.01% that are synthetic pesticides. However, reducing our exposure to this tiny fraction, while ignoring the 99.99% background levels, cannot be expected to reduce cancer rates.

If nobody smoked, drank alcohol or ingested a synthetic chemical, and if everybody ate a perfect diet and adopted a perfectly healthy lifestyle in all respects, would cancer disappear? Unfortunately not, but the incidence of cancer would go down by perhaps 80%. Our cells are

chemical machines. They work well but they are not perfect. Mistakes are made and damage is caused by unavoidable background agents such as natural radiation. The cell has mechanisms to repair damage and to neutralise ingested natural plant pesticides, but, over time, mistakes and damage build up. This natural ageing causes an unavoidable level of background cancer.

Causation of cancer in the developed world can be divided between the following factors - diet accounts for about one third of cancer risks, smoking accounts for about one third of the risk, and the remainder can be attributed to hormone imbalance, pollutants in air, infections, some high risk occupations, over-exposure to sun, hereditary factors, and background cancers.

Even a cursory glance at the causation factors shows that most cancer is preventable. As regards diet, the standard recommendation of eating, in moderation, a wide variety of foods distributed across the 4 food groups is very good advice. In particular one should eat lots of fruit and vegetables. The quarter of the population with the lowest intake of fruit and vegetables has twice the cancer rate of the quarter with the highest intake. Vigorous physical exercise also reduces risk of cancer. There is some evidence that animal fat and red meat increase incidence of some cancers, so it is best to watch fat intake and to eat white meat and fish as well as red meat. Excessive intake of alcohol is a risk factor for some cancers.

Smoking tobacco is responsible for up to one third of all cancer deaths. Smoking also causes about one quarter of all heart disease. Everybody knows that cigarettes are deadly. The number of people who continue to smoke, and, in particular, the numbers of young people who take up smoking is a major scandal.

Synthetic air pollutants are much feared by the public, but, the evidence is that they present only a small risk. Indoor air quality is of greatest concern as people spend 90% of their time indoors. The most important carcinogen in air is probably the natural radioactive gas radon. It seeps into houses from the underlying soil and it may cause up to 10% of lung cancers. The Radiological Protection Institute of Ireland (RPII) is surveying the country in order to identify areas with higher levels of indoor radon. Parts of Galway, Mayo, Clare, Cork, Wicklow, Carlow, Wexford and Louth have been identified as high radon areas, although individual high-radon houses can occur anywhere in the country (see later article on Radon). A test to measure radon in your house is available from the RPII. High radon levels can be remediated for £500-£1,500.

The long expensive search for a cure for cancer has been largely fruitless. Cancer prevention works and it costs little or nothing. Eat sensibly with plenty of fruit and vegetables, don't smoke, don't drink to excess, treat the sun with caution, and take plenty of exercise. And finally, be happy - it reduces risk factors for all diseases.

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