

# Preventive Measures to Reduce the Exposure for Carcinogens and Causes of Viral Infection

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## Commentary

### DESCRIPTION

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The realization that cancer might largely be preventable has gained more widespread acceptance in recent years. It seems probable that at least 50% of cancers could be avoided by lifestyle changes. Many substances present in the environment or in the diet have been shown to be carcinogenic in animals. The epidemiological approach has been used to investigate the link between human cancers and substances which in animals are known to be carcinogens and to identify unsuspected carcinogens by observations on human populations without reference to previous animal experiments. Some of the factors known, or strongly suspected, to be carcinogenic in humans.

It has been estimated that more than one in three of the 7 million annual cancer deaths worldwide are caused by nine potentially modifiable risk factors, many of which are listed. Others include excess body weight and obesity (particularly for carcinomas of the uterus, rectum and colon and postmenopausal breast cancer), together with physical inactivity and inadequate dietary intake of fruit and vegetables. Alcohol use is clearly associated with hepatic and oesophageal cancers, together with those of the oral cavity and oropharynx.

However, some of the demonstration, in animals, of the carcinogenic effect of 2-naphthylamine. Benzidine and 2-naphthylamine have also been implicated in the pathogenesis of bladder cancer in these workers and those in the rubber industry who are also exposed. Workers in the aluminium industry have been shown to have an increased incidence of bladder cancer. It has been estimated that about 4% of all cancers can be related to occupational factors.

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Some epidemiologists attribute a large proportion of cancers to as yet unspecified industrial poisons and claim that there is an increase in cancer incidence which is unrelated to tobacco consumption. The figures are disputed, however, since there are the confounding variables of improved diagnosis and registration among the poorer sections of society during this period. The issue is intensely political, and the prevention and control of industrial pollution potentially involve large sums of money.

### Viral Infection

Viral infection accounts for 10%-15% of human cancer. The importance of viral infection as a cause has increased greatly since the onset of the AIDS epidemic because viral-induced malignancy is a common cause of death.

Epstein-Barr Virus (EBV) and Kaposi's sarcoma herpesvirus and human papillomavirus are among the viruses most clearly associated with cancer. EBV causes Burkitt's lymphoma and nasopharyngeal carcinoma in a small proportion of infected patients. The lymphoma occurs in sub-Saharan Africa in the malaria endemic region. The virus itself is a ubiquitous gamma herpesvirus that generally establishes lifelong symptomatic infection in memory B lymphocytes by mimicking cellular signalling pathways that regulate antigen dependent B-cell differentiation. Disability appears to be due to the biological properties of a set of EBV encoded proteins, expressed in both normal and transformed cells. It looks as though these EBV proteins are able to 'hijack' critical cellular pathways to promote the proliferation and survival of infected cells, while impairing antiviral immune responses. Kaposi's sarcoma has long existed in a similar distribution in Sub-Saharan Africa and in the Mediterranean Jewish population. HHV8 is now known to be closely linked with the sarcoma in the endemic and AIDS related disease as well as in multicentric Castleman's disease and primary effusion lymphoma. The prevalence of antibodies to HHV8 (KSHV) is higher in Italy and Africa than in the UK or the USA.