

CANCER PREVENTION: UPDATE FOR PHYSICIANS

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Potential for Cancer Prevention *

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Cancer prevention as a distinct, definable entity has come of age, some of the reasons for which have been enumerated by Cole.¹ The bottom line is that clinicians, scientists, administrators, legislators, and the public have come to the realization that cancer prevention is both the most humane and the most economical way of controlling cancer.

Cancer prevention can be defined as the identification of the causes of cancer in man, and their being rendered ineffective by whatever means. It also includes the detection and removal of early cancer before clinical disease is manifested.² Identification of the causes of cancer is usually done by laboratory investigations in animals, with subsequent extrapolation to man, or by epidemiologic investigations in humans. Rendering causes of cancer ineffective may be accomplished by a variety of methods including removal of the cause from man's environment, neutralization, inactivation, and enhancement of the host-defense mechanisms.

A brief statement about the known causes of cancer and their implications for cancer prevention is in order.

Cigarette smoking remains undoubtedly the single, leading health hazard known to society. It easily accounts for 85% to 90% of all lung cancer, 40% of all cancers in males, and 25% of all cancers in females. On the basis of current smoking habits among women, lung cancer will surpass female breast cancer as the leading cause of cancer deaths among women by the mid-1980s—a startling fact in itself. Superimposed on this is the fact that teen-age girls are taking up the smoking habit at an alarming rate, which will only add to the female lung cancer problem in the future.

Radiation is a known carcinogen. Because we receive ten times more radiation from natural background (at sea level) than we do from a single chest x-ray, constant exposure to small amounts of radiation throughout life seems inevitable. We know of no known or proposed way of avoiding, protecting against, or preventing this carcinogenic exposure. One can avoid exposure to excessive medical or diagnostic x-ray, and for the most part, the radiation community monitors such exposure constantly. They have determined acceptable levels of exposure to x-rays based on careful and conservative risk-benefit considerations.

Viruses, in all probability, contribute to the cause of Burkitt's lymphoma and liver cancer in Africa, to cervical cancer, and to nasopharyngeal cancer in southeastern Asia. Practical application of this knowledge for cancer prevention in the foreseeable future is not at hand.

Chemicals hold an interesting place in today's society. Some attribute much of cancer occurrence in man to chemicals in the environment. It is generally held that a substance found to be carcinogenic for any animal must be presumed to be carcinogenic for man and therefore should be removed from contact with man. This is certainly a prudent approach, although obviously not always a practical one. Most chemi-

cals have not been found to be carcinogenic for man, although the vast majority have not been tested in animal bioassay systems. Most chemicals are not carcinogenic in their native state. After entering the body as a procarcinogen: through inhalation, ingestion, or absorption, they must be activated to a proximate carcinogen. Following this, they may be detoxified and excreted harmlessly, or if they remain activated, they may go through a series of steps, resulting in an ultimate carcinogen producing clinical carcinoma. The more that is known about every step along this process, the more opportunity exists for blocking the process by various different methods. Research into this area of chemical carcinogenesis offers great future opportunity for the prevention of chemically induced cancers.

Lifestyle practiced by individuals is becoming more important in allowing one to minimize his or her risk for developing cancer. A prudent lifestyle for minimizing cancer risks includes cessation of all tobacco use; moderation of alcohol consumption; adequate protection in the workplace; avoidance of carcinogenic drugs, hormones, and x-rays; maintenance of ideal body weight by a suitable balance of caloric intake and exercise; and following a "prudent" diet.

Diet and nutrition as a part of lifestyle deserves special consideration. Diet refers to all those substances one ingests in the course of eating and drinking (natural contaminants, additives, preservatives, colorings, etc). Nutrition refers to those food elements that one needs to maintain body viability (proteins, fats, carbohydrates, vitamins, and minerals). The many possible ways in which diet and nutrition may act either to increase the risk of cancer, or equally important, to protect against cancer is beyond the scope of this paper; reviews of the subject are available.^{3,4} Suffice it to say that most investigators today believe that pursuit of the role of diet and nutrition in the etiology and prevention of cancer is one of the, if not the most, promising avenue for cancer prevention for the future. What may be done by individuals now to prevent cancer is based on possible benefit and no known risk.^{5,6} This essentially consists of a standard diet that is higher in fiber content and lower in total fat.

Our own estimate of preventable cancers, modified from National Cancer Institute data, is given in Table 1. If these large numbers of cancer are preventable today, then why are they not being prevented? Should this be considered a failure? If so, where does the blame lie?

Before attempting to answer these poignant questions, one should make a distinction between two important concepts—"etiology" and "prevention." *Etiology* is a noun that means "knowing the cause of a disease." It is a scientific endeavor using investigative techniques, conducted by researchers, resulting in truth, knowledge, or fact. *Prevention* comes from a verb, "to prevent," implying action. It is a public health endeavor, requiring education, motivation, legislation, and/or regulation, conducted by a variety of health and nonhealth professionals, which seeks to effect a change based on knowl-

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Table 1. Estimated Preventable Cancers*

Cancer Associated with	Site	Incidence	Preventable
Cigarette smoking	Lung & larynx	90,000	80,000
plus alcohol	Head & neck, esophagus	13,500	8,500
Industrial exposure	Bladder	9,000	5,000
Diet-related	Breast	30,000	10,000
	Colon	30,000	10,000
Sex-related	Cervix	7,500	7,500
Sunlight	Melanoma & other skin	5,000	1,500
Total		185,000	122,500

*Modified from National Cancer Institute data.

dge of etiology. Change must occur at the individual or societal level. The process from etiology to prevention is complicated and difficult, at best.

So, who is to blame for our current lack of cancer prevention? Take cigarettes as an example: (1) Scientists say we have proved that cigarette smoking causes lung cancer. Our job is done; the rest is up to someone else. (2) Health educators say it is impossible to get certain groups of men and women to quit smoking, or now even to prevent teen-age girls from beginning to smoke; therefore, the fault lies with smokers themselves. (3) Smokers say that we will die of something anyway. It is our right to choose to die from lung cancer, emphysema, or cardiovascular disease if we want to. Besides, it must not be as bad as they say because government, who tends to overregulate everything else allows tobacco to be grown and to continue to be sold on the open market. (4) Tobacco farmers say growing tobacco is the very livelihood for their families and the community, and how can it be

denied them? (5) Public health officials who have no available legal sanctions take strong personal public stands against cigarette smoking, at times to their own personal detriment; other parts of the executive branch continue to subsidize the tobacco growers. (6) Legislators (politicians) say "you scratch my back and I'll scratch yours." Some 15 states grow tobacco, with the result being 30 senators of 100 who together form an obviously very strong coalition. (7) Industry says to proceed with more marketing, more advertising, more sales, and more profits. Results of the recent trend toward a less-hazardous cigarette remain to be evaluated.

So, where does the blame lie? Individually, no one is to blame, but collectively, all are partially to blame.

In the foreseeable future, preventive action will continue to be a complex and sensitive balance of scientific knowledge that is often inadequate or imprecise, societal expectation that is often unrealistic, and political reality that is almost always pragmatic.²

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CLINICAL CASE REPORTS/UT M. D. ANDERSON HOSPITAL

Series Editor/Fred G. Conrad, MD, Vice President for Patient Care

CISCA Chemotherapy for Bladder Cancer

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Bladder cancer remains a major cause of morbidity and mortality, with 10,300 bladder cancer deaths expected in 1980.¹ Experimental and clinical studies indicate that cyclophosphamide, Adriamycin, and cis-platinum (CISCA) are active against this tumor.^{2,3} Single agents or combinations of agents have achieved response rates from 40% to 60% but have achieved no complete remissions.^{4,5} This case clearly demonstrates that, despite the metastatic stage of bladder cancer, aggressive CISCA chemotherapy combined with intravenous infusions of cis-platinum are capable of achieving a complete remission with prolonged palliation of symptoms.

CASE 1. A 39-year-old white man was initially evaluated at UT M. D. Anderson Hospital in December 1978. His history was normal, except for peptic ulcer disease. Six weeks prior to this evaluation, he experienced frequency of urination, dysuria, and lower abdominal pain. Initial studies revealed evi-

dence of a lower abdominal and pelvic mass with bilateral hydronephrosis. Subsequent cystoscopy and biopsy revealed a poorly differentiated carcinoma. The patient was referred to UT M. D. Anderson Hospital for treatment.

On examination, the patient was found to be asthenic. He had prominent abdominal distention and a mass filling the lower abdomen. Rectal examination revealed a large mass constricting the rectum and involving the rectal mucosa and the prostate. The mass was firmly fixed and nontender. Prominent large bowel distention was thought to be secondary to incomplete bowel obstruction from the invading tumor. Neurologic and cardiopulmonary examinations were unremarkable; no lymphadenopathy was evident; and the liver and spleen were not palpable.

Laboratory studies on admission were hemoglobin, 9.5 mg/100 ml; platelets, 344,000; WBC count, 9,600/cu mm, with