

## Ultra-precise radiation targets many cancers

*Ongoing advances in nuclear medicine.*

Ivanhoe Broadcast News  
January 17, 2006

According to the American Cancer Society, more than 1 million people will be diagnosed with cancer each year. About one out of every two American men and one out of every three American women will have some type of cancer at some point during their lifetime. Anyone can get cancer at any age; however, about 77 percent of all cancers are diagnosed in people ages 55 and older.

Different types of cancer have different risk factors. For example, cancers of the lung, mouth, larynx, bladder, kidney, cervix, esophagus and pancreas are related to tobacco use including cigarettes, cigars, chewing tobacco, and snuff. Smoking alone causes about one-third of all cancer deaths.

Skin cancer is related to unprotected exposure to strong sunlight. Breast cancer risk factors include age, changes in hormone levels throughout life, obesity and physical activity. Age, race and diet can play a role in determining if a man will develop prostate cancer.

A new radiation delivery system delivers radiation to patients with nearly all types of cancer.

Overall, environmental factors, defined broadly to include tobacco use, diet and infectious diseases, as well as chemicals and radiation cause about 75 percent of all cancer cases in the United States. Among these factors, tobacco use, unhealthy diet, and physical inactivity are more likely to affect personal cancer risk. Research shows about one-third of all cancer deaths are related to dietary factors and a lack of physical activity in adulthood.

More than half of all cancer patients will undergo radiation at some point during the course of their treatment. Radiation therapy targets rapidly dividing cells in the body. The radiation reacts with water in the cells, and this reaction damages the DNA or genetic material in the cell that controls cell growth. Normally, cells can repair themselves and continue growing. However, since cancer cells can't repair themselves as easily, they die. Although normal cells are also affected, they repair themselves more effectively.

Researchers at Stanford Hospital and other centers around the country are using a new radiation delivery system called Trilogy. The system can be used to deliver radiation to patients with nearly all types of cancer. Trilogy combines three types of radiation systems into one. It allows doctors to see the tumors in 3-D and in real-time as they're being radiated. It also helps doctors track tumors as patients breathe and tumors shift. Finally, Trilogy lets doctors deliver higher doses to tumors in a shorter amount of time. The system gives doctors the capability to perform radiosurgery - meaning the radiation is given in one-time, high dose treatment.

"I think the most exciting benefit is just the fact that we're now able to do a treatment that in the past has had quite a bit of toxicity for patients. It will result in increased dose intensity to the tumor, and fewer overall side effects for the patient," Dr. Albert Koong of Stanford said.