

# An Ancient and Persistent Foe



Cancer is the term commonly used to describe what is actually not a single disease but more than 200 individual disorders, each characterized by the presence of mutant cells that proliferate through uncontrolled growth and division. This uncontrolled proliferation leads to the formation of tumors that can invade and take over surrounding healthy tissue. Eventually, cancerous cells can metastasize – that is, break away from the primary tumor and, traveling through the circulatory and lymphatic systems, establish new cancer sites in other areas of the body.

Cancer in its various forms has plagued humanity dating back almost to the beginning of recorded history. Incidents of breast cancer, for example, were reported on papyrus manuscripts by the physicians of ancient Egypt, who at around 1600 B.C. recommended that diseased tissue be cauterized. Hieroglyphic inscriptions nearly a thousand years earlier report cancers of the stomach and uterus, which were treated by compounds of barley, pig ears, and other ingredients. Last year, cancer claimed in excess of six million lives throughout the world. In the United States, about 1.3 million Americans are diagnosed with cancer each year, and about 500,000 Americans die annually from one or more forms of the disease, which is an average of about 1,500 people a day. According to the National Cancer Institute, about one in three Americans will be diagnosed with cancer during their lifetime. In the U.S., one of every four deaths is from cancer, according to the American Cancer Society.

About 80 percent of the cancer-related deaths in the United States are caused by only a dozen types of

cancer. In descending order, they are lung, colon, breast, prostate, melanoma, uterine, kidney, pancreatic, ovarian, stomach, and cervical. Some forms of cancer can strike even the very young, but cancer primarily affects adults past age 55, which is why the rate of cancer incidence, particularly that of the four major types – lung, colon, breast, and prostate – can be expected to rise as the “baby-boomer” population ages.

Major advances have been made in identifying oncogenes – genetic mutations that can promote the development of specific forms of cancer. With the deciphering of the human genome, the pathway to understanding the genetic roots of cancer development is now open. This has led to speculation about the potential for discovering “cures” through gene

therapy (the deactivation of oncogenes or the activation of genes that suppress oncogenes) or through immunotherapy (the harnessing of the human immune system to genetically engineer unique cancer-fighting antibodies). Advances along this front in the war against cancer surely await, but recent findings by cancer researchers and molecular biologists sound a cautionary note. Genetics is only one of several risk factors in the development of cancer. Diet and environmental elements can also play important roles. For example, epidemiological studies consistently show that American and Western European women are five to six times more likely to develop breast cancer than Asian or African women. And while the mutation of a gene called BRCA1 has been identified as a

source of inherited breast cancer, women with a family history of breast cancer account for no more than six percent of all new cases. Such findings point to cancer as being caused by a complex interaction of events. This indicates that the prospects for discovering a genetic “magic bullet” capable of curing any one of the major forms of cancer are unlikely anytime soon.

Nonetheless, cancer patients today have more reason than ever before to take heart, as oncologists have at their disposal an increasingly sophisticated arsenal of therapeutic weapons. Through the combined firepower of new and improved radiation and chemical therapies, and increased genetic knowledge, this ancient and persistent enemy of humankind may finally be tamed. ■

## PROJECTIONS OF CANCER CASES IN THE U.S. BETWEEN 2000 AND 2050 BY AGE

The single most important risk factor for cancer is age, according to the National Cancer Institute. Because the U.S. population is both growing and aging, even if rates of cancer remain constant, the number of people diagnosed with cancer will increase.

“If cancer rates follow current patterns, we anticipate a doubling from 1.3 million people in 2000 to 2.6 million people in 2050 diagnosed with cancer.”

– Holly L. Howe, Ph.D., executive director of the North American Association of Central Cancer Registries

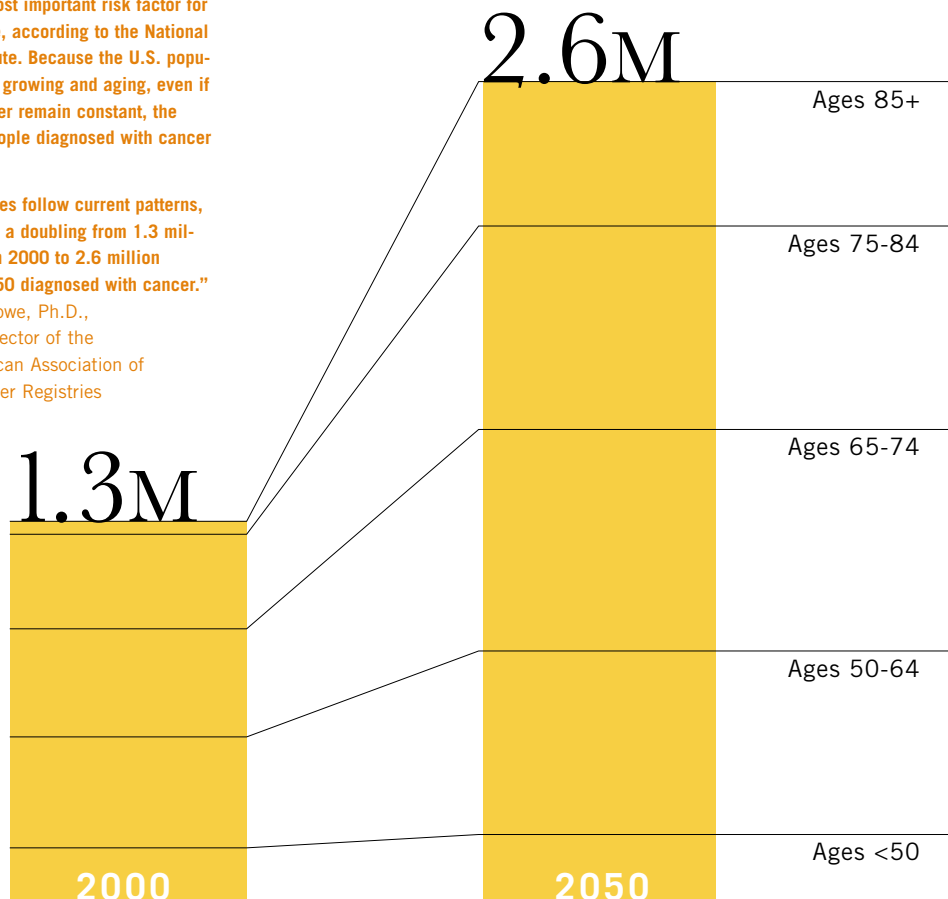


Chart data derives from NCI's SEER program (The Surveillance, Epidemiology, and End Results (<http://seer.cancer.gov>), NCI (<http://www.nci.nih.gov/>) and population projections from the U.S. Census Bureau (<http://www.census.gov>).