

Cancer is a generic term that is used to describe over 100 different diseases. When the DNA of a cell becomes changed or damaged, mutations occur that affect normal cell growth resulting in uncontrollable cell division. Abnormal cell division oftentimes results in a mass of tissue called a tumor. When the tissue cells of the tumor remain in the same place where the cells originated and cell division simply enlarges the tumor, the condition is considered to be benign (not cancerous). Cancer occurs when the abnormally dividing cells migrate and invade other body cells. The condition is considered malignant because the migrating cells “take over” and the invaded cells die. Although tumors can be a classic symptom of cancer, not all tumors are cancerous and not all cancers form tumors. (National Cancer Institute (NCI), 2009). Cancers are generally categorized according to type:

- **Carcinoma** - cancer that begins in the skin or in tissues that line or cover internal organs.
- **Sarcoma** - cancer that begins in bone, cartilage, fat, muscle, blood vessels, or other connective or supportive tissue.
- **Leukemia** - cancer that starts in blood-forming tissue such as the bone marrow and causes large numbers of abnormal blood cells to be produced and enter the blood.
- **Lymphoma and myeloma** - cancers that begin in the cells of the immune system.
- **Central nervous system cancers** - cancers that begin in the tissues of the brain and spinal cord.  
(NCI, 2009)

**Leading Cancers in the U.S.**

Among the various cancers research has concluded that lung and bronchus, colon and rectum, breast (female) and prostate, account for more than half of cancer diagnoses and deaths (American Cancer Society [ACS], 2008).

Of the four most common cancers diagnosed, lung cancer continues to have the highest mortality rate in the nation. As shown in the table below, the same remains true for Texas. Statewide, lung and bronchus cancer has a mortality rate of 52.9. It is very common to find higher lung cancer rates among males than females with men having a 72.6 lung cancer rate and women coming in at a rate of 38.5 (Texas Department of State Health Services (TDSHS), 2008).

Average Annual Mortality Rates per 100,000 2002 – 2006					
	Texas	Bexar	Bandera	Comal	Kendall
<b>Total Cancer</b>	181.3	174.0	188.3	170.9	180.2
<i>Male</i>	226.9	220.7	216.5	216.2	224.4
<i>Female</i>	150.0	142.6	163.3	137.1	153.6
<b>Colorectal</b>	17.4	16.5	20.0	15.0	24.4
<i>Male</i>	21.5	20.5	19.2	16.4	34.5
<i>Female</i>	14.3	13.4	20.3	14.0	17.7
<b>Lung &amp; Bronchus</b>	52.0	42..	41.9	42.3	53.3
<i>Male</i>	70.7	60.4	49.8	57.8	65.8
<i>Female</i>	38.2	29.8	34.8	29.6	45.9
<b>Breast</b>					
<i>Female</i>	23.4	23.5	29.4	19.9	22.9
<b>Prostate</b>					
<i>Male</i>	24.2	23.4	27.2	27.3	20.2

(Texas Department of State Health Services, 2009)

### Risk Factors

There is oftentimes no identifiable cause for cancer. Factors such as age, tobacco use, sunlight (UV rays), environment, ionizing radiation, hormones, family history and poor diet can all play a role. However, the existence of one or more of these factors does not guarantee a cancer diagnosis, but does heighten the risk of eventually developing cancer in the future (NCI, 2006a).

### Prevention

Researchers estimate that up to two-thirds of all cancers can be prevented. With healthy behaviors linked to knowledge, values, attitudes, and skills learned early in life, cancer rates can continue to decline (ACS, 2007). The Mayo Clinic advocates some simple steps that everyone can take to prevent cancer:

- Eliminate tobacco use
- Eat healthy
- Stay active
- Protect yourself from the sun
- Get cancer screenings

(Mayo Clinic, 2009a)

Quality school-based health education, to include information on nutrition, physical activity, and smoking, is therefore considered to be an integral part of the solution to reducing the economic and social impacts of cancer.

### Treatment

In the event of a cancer diagnosis the patient will be overwhelmed with treatment options. The basic treatments include:

- **Chemotherapy**- drug used to kill cancer cells, stop the cancer cell growth or to slow the growth of cancer cells.
- **Radiation therapy**- injures or destroys cells in the area being treated by damaging their genetic material, making it difficult for these cells to continue to grow and divide.
- **Surgery**- In most cases, the surgeon removes the tumor and some tissue around it. Removing nearby tissue may help prevent the tumor from growing back. The surgeon may also remove some nearby lymph nodes. (NCI, 2006b)

Treatment generally depends upon the spread of the cancer at the time of diagnosis. Localized cancers respond well to surgery and radiation, which are focused treatments aimed at removing and destroying cancer cells, respectively.

Treatments are often used in conjunction with each other; for example, surgery performed prior to radiation in an effort to improve the effectiveness of radiation treatment or radiation used before surgery to shrink the size of a tumor and thereby reduce physical disfigurement.

Chemotherapy is given as a combination of drugs that work together to destroy cancer cells. The primary advantage of chemotherapy is that it treats the entire body, not a localized area. Since cancer cells can spread from the primary site through blood or lymph vessels to secondary sites, localized treatments may not be thorough enough to cure the cancer that is diagnosed (Mayo Clinic, 2009b).

Although chemo, radiation and surgery have been very traditional courses of treatment, researchers have developed new treatments like gene and biological therapies that can be used to work with the chemo and radiation, or used as a primary source of treatment. While they are still in the clinical phase, these new treatments have shown great promise, and studies have suggested that the new techniques could ease side effects associated with chemo and radiation (NCI, 2006b).

### Cost for Cancer Treatment

One of the biggest expenses associated with cancer is the treatment itself. In 2009, the NIH estimated that the overall cost for cancer in the U.S. for 2008 was \$228.1 billion. In a breakdown of the figures the NIH reported that 93.2 billion was associated with direct medical costs and \$18.8 billion in loss of productivity due to illness. They also found that 24 percent of adults aged 18-64, and 13 percent of children have been uninsured for the last part of 2008. Even if an individual has health insurance, it is expected that 1 in 5 people will be forced to go through their savings to help with other costs associated with cancer (ACS, 2009). Other factors that make health care expensive are the new cancer treatments. The new treatments typically drive up the cost of prescription drugs and health care

becomes less accessible. It is believed that with the disparity in the health care system, those who can not afford to pay for their care end up with higher medical costs, poorer outcomes, and could possibly face premature death.

There were approximately 585,910 cancer cases in Texas in 2007. The estimated cost of care was \$7.7 billion. In Health Service Region 8 (includes Bandera, Bexar, Comal, and Kendall counties) the 2007 cost for cancer care was \$842,100,000. That cost can be further broken down to reflect various stages of care which include:

- Initial phase (12 months after diagnosis) \$232.9 million
- Continuing phase (all months between initial phase and last year of life) \$429.9 million
- Final phase (last 12 months of life) \$179.3 million

(Tan, Freeman, Freeman, Zhang, et al., 2009)

### **Social and Emotional Impacts of Cancer**

Other costly effects of cancer can be a person's emotional health. It is estimated that 70% of cancer survivors experience depression at some point in their treatment. Depression can be difficult to diagnose because it mirrors many symptoms of cancer treatment, including weight loss, fatigue, insomnia and inability to concentrate. In a 10-year follow-up study it was determined that symptoms of depression were associated with a shorter survival time, so it's crucial for cancer patients and survivors to seek treatment for depression as soon as possible (University of Texas MD Anderson Cancer Center, 2009).

In many cases the social aspect can be as daunting as the emotional. It is not uncommon for cancer survivors to experience amputations, disfigurement and loss of organs like the colon or bladder. How other people react to someone's illness is perhaps the biggest challenge faced by cancer survivors. Friends, coworkers and family members may feel awkward about discussing the disease. Some may remain silent, avoidant or pretend nothing has happened. Because cancer can be a long-term illness, overcoming communication barriers early is essential to maintaining good relationships (University of Texas MD Anderson Cancer Center, 2009).

Re-entering social and professional life can often be difficult. Many times worries of infection, not having enough energy to get through a workday; and anxiety about not being able to think clearly because of "chemobrain" or memory loss can make the transition from patient to ordinary person stressful (University of Texas MD Anderson Cancer Center, 2009).

### **Future**

The future for research and prevention continues to broaden both on a national and state level. On September 1, 2009, the National Institute of Health and Human Services (NIH) awarded more than 12,000 grants, totaling \$5 billion to research institutions throughout the United States. This investment, through the government's recovery act, will give efforts such as The Cancer Genome Atlas (TCGA) aid in mapping the genomes of at least 20 cancers over the next five years. This type of data will enable researchers to catalog genetic changes related to oral cancers, tests plant extracts known to possess anti-cancer properties, and use microRNA to predict which patients have tumors that are more likely to spread throughout the body (The Whitehouse, 2009).

In 2007, Texas took a key role in cancer prevention and research. With bipartisan assistance and a grassroots effort launched on behalf of Lance Armstrong and the Lance Armstrong Foundation, the Texas legislature approved Proposition 15 (Lance Armstrong Foundation, 2007). The bill was passed by Texas voters on November 6, 2007 with overwhelming support. The bill allowed for the establishment of the Cancer Prevention and Research Institute of Texas. The institute will be responsible for issuing \$3 billion in general obligation bonds over ten years to fund grants for cancer research and prevention (Cancer and Prevention Research Institute of Texas, 2009).

Despite the decline of cancer incidences and mortality in recent years, it still remains a prevalent threat today. Researchers feel that with enough funding there is the possibility of a cure in the coming years. Until then, prevention awareness, early detection and effective treatment will be the only means of preventing or treating someone with cancer.

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