



**Figure 7-19** Comparison between a benign tumor of the myometrium (leiomyoma) and a malignant tumor of the same origin (leiomyosarcoma).

- Benign tumors are slow growing, while malignant tumors generally grow faster.
- Benign tumors are circumscribed and have a capsule; malignant tumors are poorly circumscribed and invade surrounding normal tissues.
- Benign tumors remain localized at the site of origin, whereas malignant tumors metastasize to distant sites.

## Epidemiology of Cancer

Study of cancer patterns in populations has contributed substantially to knowledge about its origins. Epidemiologic studies have established the causative link between smoking and lung cancer, and comparison of diet and cancer rates in the Western world and the developing world has implicated high dietary fat and low fiber in the development of colon cancer. Major insights into the causes of cancer can be obtained by epidemiologic studies that relate particular environmental, racial (possibly hereditary), and cultural influences to the occurrence of specific neoplasms. Certain diseases associated with an increased risk of developing cancer also provide clues to the pathogenesis of cancer. In the following sections, we discuss the overall incidence of cancer and then review factors relating to the patient and the environment that influence the predisposition to cancer.

### The Global Impact of Cancer

**In 2008, it was estimated that there were about 12.7 million new cancer cases worldwide, leading to 7.6**

**million deaths (21,000 deaths per day). Due to increasing population size and age, by 2030 it is projected that the number of cancer cases and cancer-related deaths worldwide will increase to 21.4 million and 13.2 million, respectively.** Cancer is ubiquitous in human populations; the only certain way to avoid cancer is to not be born, as to live is to incur risk. However, there is remarkable geographic variation in the incidence of specific cancers that is believed to stem mainly from differences in exposure to environmental carcinogens (discussed later), suggesting that many (and perhaps even most) cancers are preventable. The major organ sites affected and the estimated frequency of cancer deaths in the United States are shown in [Figure 7-20](#). The most common tumors in men arise in the prostate, lung, and colon/rectum. In women, cancers of the breast, lung, and colon/rectum are the most frequent. Cancers of the lung, female breast, prostate, and colon/rectum constitute more than 50% of cancer diagnoses and cancer deaths in the United States. In contrast, in the developing world the most common cancers involve the lung, stomach, and liver in men and the breast, cervix, and lung in women.

Most longitudinal data pertaining to cancer incidence comes from developed countries. Age-adjusted death rates (deaths per 100,000 population) for many cancers have changed significantly over the years in the United States. In the last 50 years of the twentieth century, the overall age-adjusted cancer death rate increased significantly in both men and women. However, in men the cancer incidence rate has been stable since 1995 and the cancer death rate has decreased 18.4% since 1990. Similarly, in women the cancer incidence rate also stabilized in 1995 and the cancer death rate has decreased 10.4% since 1991. Among men, nearly 80% of the decrease is accounted for by lower