

# Prevention Best Treating Lung Cancer

by Margie Patlak

**Lung cancer is the leading cause of cancer death in this country.**

Americans are known the world over as preventive health enthusiasts. We jog for fitness, floss and take fluoride to prevent tooth decay, and eat low-fat products to reduce the risk of heart disease. Even the rarest environmental pollutant is likely to provoke public outrage and regulatory action if it is found to increase cancer risk.

Yet it's not uncommon for people who engage in such healthful activities to also engage in another activity known unmistakably to cause lung cancer: cigarette smoking.

Lung cancer is the leading cause of cancer death in this country. The lung cancer death rate recently surpassed that of breast cancer in women, according to the national Centers for Disease Control and Prevention, and continues to climb. Yet the vast majority of lung cancer cases are highly preventable.

FDA is responsible for ensuring the safety and effectiveness of the devices or drugs used to diagnose or treat lung cancer.

## **Smoke Gets in Your Lungs**

The constant assault of cigarette smoke wears away cilia, the tiny hair-like structures that line the lungs' air passages and sweep out foreign material trapped inside by mucus. Without this cleaning mechanism, the lungs are particularly vulnerable to compounds brought into air passages. Most lung cancers crop up in the cells that are directly exposed to inhaled air.

People who smoke or who live with a smoker breathe air that may harbor more than 50 cancer-fostering chemicals, including benzopyrene and formal-

dehyde, as well as a radioactive compound called polonium-210. One researcher, in the September 1993 edition of the journal *Pediatrics*, estimates that the lungs of a person who smokes a pack of cigarettes a day, are exposed to as much radiation a year as they would absorb from 250 chest x-rays.

The risk of developing lung cancer increases with the number of cigarettes smoked and the number of years of smoking. People who smoke filtered low-tar cigarettes may have a somewhat lower lung cancer risk than those who smoke regular cigarettes. However, according to the National Cancer Institute (NCI), people may smoke more cigarettes if the nicotine content is reduced (as it is in low-tar cigarettes), so these smokers still have a substantial risk of lung cancer.

Cigar and pipe smoking can also boost the risk of developing lung cancer, but because people usually inhale less smoke with this type of tobacco use, it is not as high a lung cancer risk as cigarette smoking. However, these forms of smoking, as well as chewing tobacco, cause other types of cancer. The tobacco smoke nonsmokers breathe, also called "secondhand smoke," has been classified by the Environmental Protection Agency as one of the most dangerous environmental contaminants.

## **Other Causes of Lung Cancer**

Exposure at high levels to certain compounds encountered in various mining or manufacturing jobs also can trigger lung cancer. These compounds include asbestos, nickel, chromium, coal gas, mustard gas, arsenic, vinyl chloride,

beryllium, hydrocarbons, ionizing radiation, and the radon byproducts of uranium mining.

Such compounds are more apt to cause lung cancer in smokers than nonsmokers. Asbestos workers who smoke cigarettes, for example, are 30 times more likely to develop lung cancer than asbestos workers who don't smoke. They have

cancer by eating more fruits and vegetables. More studies need to be done, however, to confirm this hypothesis.

By far the most effective way to avoid lung cancer is to steer clear of tobacco smoke, experts agree. Studies show that lung cancer risk gradually declines after stopping smoking. One study cited by CDC found that 10 years after quitting

Sometimes symptoms may be caused by hormones made by lung cancer cells. Certain lung cancer cells, for example, produce a hormone that causes a sharp drop in the level of salt in the body. This can produce many symptoms, including concentrated urine, confusion, fatigue, or coma.

Doctors diagnose the presence, type or extent of lung cancer with a series of tests. The first is a chest x-ray to detect any abnormal spots on the lungs. Doctors may also require other x-ray tests, such as a tomogram or a CT (computed

## **THE THREE MAIN WEAPONS DOCTORS CAN WIELD AGAINST LUNG CANCER ARE SURGERY, RADIATION AND CHEMOTHERAPY.**

90 times the lung cancer risk of people who neither smoke nor work with asbestos, according to NCI.

Although radon produced by the decay of uranium in soil and rocks is present in low levels in many houses, it is not certain whether such low-level radon exposure can cause lung cancer.

Some smokers may feel they are genetically protected from lung cancer because their mothers or fathers smoked and never got the disease. But this could be "a fatal mistake," points out M. Miles Braun, M.D., a senior research investigator at NCI. His recent study of twins suggests that for most people, heredity plays little or no role in the development of lung cancer.

The study found that pairs of identical twins died less often of lung disease than pairs of fraternal twins. This finding is opposite what would be expected if a susceptibility to lung cancer was inherited because fraternal twins share only some of the same genes, unlike identical twins, who inherit identical genes.

There also is no firm evidence that vitamin supplements can protect smokers from the disease. According to NCI, some human studies suggest smokers might be able to lower their risk of lung

smoking, people who had smoked for less than 20 years had almost the same risk of lung cancer as lifelong nonsmokers.

### **Difficult to Detect**

Few cases of lung cancer are detected early enough to achieve the best response to treatment. Coughing and wheezing are the earliest symptoms. But these respiratory annoyances are often dismissed as "smoker's cough"—the hacking many smokers have because smoking prompts their lungs to produce excess mucus—or chronic bronchitis, to which smokers are also prone.

Other early symptoms of lung cancer include coughing up blood, chest pain, and shortness of breath. People with lung cancer may also experience repeated bouts of pneumonia or bronchitis, fever, weakness, weight loss, hoarseness, or swelling of the neck and face.

In some cases, patients first notice symptoms stemming from the spread of the cancer to the brain, bones, or other organs. These symptoms include headaches, blurred vision, dizziness, unsteadiness or difficulty walking, and bone pain.

tomography) scan. Tomograms image thin slices of the lung that can show a small cancer not seen on standard x-rays. CT scans produce an image of a cross-sectional slice of a selected body area and are particularly useful for showing the extent of a lung tumor and whether it has spread into neighboring organs.

Sometimes doctors can detect lung cancer cells in the patient's sputum, examined under a microscope. Additional tests are usually required to determine the tumor's type and location. Doctors usually need to extract cells from the lungs to screen under a microscope for cancer cells. A procedure called a bronchoscopy allows doctors to pluck cells from the inner walls of the bronchi—the two branches of the trachea (windpipe) leading to the lungs. This procedure is generally done in a hospital. The patient is given a local anesthetic, and a flexible thin tube with lighting and magnifying devices called a bronchoscope is threaded through the nose or mouth into the lung.

To collect cells hard to reach with a bronchoscope, doctors perform a needle aspiration biopsy guided by fluoroscopy. Fluoroscopy is an x-ray procedure that

uses a television screen to view internal organs such as the heart and lungs while they are in motion. Using the picture on the screen as a guide, the doctor inserts a long, thin needle into the tumor to withdraw cells for examination.

If lymph nodes in the neck seem enlarged, doctors may remove them to see if cancer cells have spread there. Doctors may also biopsy the lymph nodes between the lungs. Tissue is removed through a small incision in the chest while the patient is under general anesthesia.

Radionuclide scans are sometimes done to find out whether lung cancer has spread to other areas of the body. Technicians inject patients with a small amount of radioactive material. These compounds emit signals a machine translates into a screen image that outlines areas of possible cancer involvement in the bones or other parts of the body.

#### **Spreads Rapidly**

Unfortunately, in about 85 percent of patients, by the time lung cancer is diagnosed the disease has spread beyond the lungs.

Lung cancers tend to spread more quickly than most other types of cancer because the lungs are richly supplied by the blood and lymph systems, which carry cells to other parts of the body. This makes lung cancers particularly difficult to treat.

The three main weapons doctors can wield against lung cancer are surgery, radiation directed at the chest, and chemotherapy with anti-cancer drugs.

Surgery involves removing part or all of the lung, depending on the extent of the tumor. Patients recovering from surgery usually need to use an artificial respirator to help them breathe for a few days. Lung cancer surgery frequently

causes disrupted heart functions, such as an abnormal heartbeat. For this reason, patients with advanced heart disease may not tolerate lung cancer surgery well. Also, patients with lung conditions that impair breathing, such as emphysema (also commonly caused by cigarette smoking), may not tolerate lung cancer surgery.

Radiation therapy is usually given five days a week for several weeks and may cause dry and reddened skin in the treated area, unusual tiredness, or a dry or sore throat that can make swallowing painful. These side effects usually disappear in a few weeks after completion of treatment.

Drugs used to treat lung cancer may be given by mouth or by injection into a muscle or vein. Some drugs require patients to stay in the hospital for a few days while doctors monitor their effects.

Other drugs may be taken on a hospital outpatient basis, at the doctor's office, or at home.

Chemotherapy affects not only cancer cells but also other rapidly growing cells, such as blood or hair cells, and cells that line the digestive tract. As a result, it can cause side effects such as anemia, an increased risk of infection or bleeding, hair loss, nausea, and vomiting. Some of these side effects may make patients feel unusually tired during treatment.

#### **Treatment Varies**

The treatment plan for lung cancer patients depends on the size, location and

type of lung cancer as well as the patient's general health.

All common types of lung cancer occur more frequently in smokers. Small cell lung cancer (SCLC) is diagnosed almost exclusively in smokers. This form of lung cancer spreads especially quickly to distant parts of the body. Consequently, treatment with surgery or radiation, both of which target localized disease, is almost never effective in controlling it.

Doctors commonly treat patients with SCLC with a combination of several anti-cancer drugs or with anti-cancer drugs plus radiation to the chest. For patients whose SCLC does not appear to have spread extensively beyond the lung, chemotherapy following surgical removal of the lung tumor may be an option.

Doctors usually treat patients with

nonsmall cell lung cancer (NSCLC) not detected in the lymph nodes or other organs with surgery that removes part or all of the cancerous lung. Doctors may also prescribe radiation therapy if patients cannot have surgery because of other medical problems.

Doctors usually treat NSCLC patients whose cancer has spread to nearby tissue or lymph nodes with radiation therapy, which is sometimes combined with surgery or chemotherapy. Radiation is also used to temporarily shrink the tumors and relieve symptoms of patients with NSCLC that has spread to distant parts of the body.

Lung cancer often spreads to the brain,

## **THE RISK OF DEVELOPING LUNG CANCER INCREASES WITH THE NUMBER OF CIGARETTES SMOKED AND THE NUMBER OF YEARS OF SMOKING.**

# Smoking Gun

Lung cancer was a rare disease at the turn of the century when Americans smoked an average of only 50 cigarettes per capita a year and tobacco was mainly used for cigars, pipes, or chewing tobacco. Twenty-five years later, the popularity of cigarette smoking mushroomed, boosting the average number of cigarettes smoked to over 1,000 per capita a year.

It often takes more than 20 years for the effects of cigarette smoke to develop into a detectable malignancy. By 1950, the country's annual lung cancer death toll had reached 18,000 (six times the amount in 1930). This set off an alarm in the public health community.

Cancer experts suspected cigarette smoke, but other factors, such as urban pollution and occupational exposures that also might have prompted the rise in lung cancer, clouded the issue. Then, in the 1960s, scientists had enough evidence to say with certainty that cigarette smoke was the "smoking gun" behind the rise in lung cancer deaths. By then,

nearly half of all Americans smoked.

In 1964, the landmark *Smoking and Health Report of the Advisory Committee to the Surgeon General* greatly increased public awareness that cigarette smoking causes lung cancer. Numerous studies done over the past two decades have shown that 9 out of 10 cases of lung cancer are caused by smoking.

Even daily exposure to secondhand cigarette smoke can boost one's chances of developing lung cancer by as much as 30 percent, according to the National Research Council.

Despite these scary statistics and the Surgeon General's plea for a "smoke-free society" by the year 2,000, 1 out of 4 Americans

still smokes. Many of these smokers have tried to quit—some more than once—but are stymied by the addictive nature of nicotine. Others either don't believe the health information about cigarette smoking or enjoy the image of being a high risk-taker. ■

—M.P.



where it can do substantial damage before it is detected. Doctors may recommend that patients whose SCLC hasn't spread extensively receive prophylactic radiation treatments directed at the brain in addition to surgery, chemotherapy, or radiation therapy for the chest region. Such radiation of the brain, however, may cause permanent side effects, according to the National Cancer Institute, including impaired memory and thinking abilities.

Nearly half of all lung cancer patients whose tumors are detected before spreading beyond the lungs live five or more years after diagnosis. But because these patients make up such a small frac-

tion of the total lung cancer cases, only 13 percent of all lung cancer patients live this long, according to the American Cancer Society.

## Experimental Treatments

Such dire statistics may prompt lung cancer patients and their doctors to consider new experimental treatments that are investigational and have not been approved by FDA. Examples of these treatments include chemotherapy and "immunotherapies" that use cancer vaccines, monoclonal antibodies, or other biologicals to boost or enhance the patient's anti-cancer immune response or to more selectively direct anti-cancer

drugs or radiation to tumors. Another new technique called photodynamic therapy selectively kills cancer cells with a compound that makes them die when exposed to laser light brought into the lung via a bronchoscope.

It is hoped that some of these experimental treatments will prove to be safe and effective enough to merit FDA approval for general use. However, despite extensive research, the discovery of safe and highly effective treatments for lung cancer remains an elusive goal. ■

*Margie Patlak is a writer in Elkins Park, Pa.*