Lung cancer is the second most common cancer diagnosis in men and women and the most common cause of cancer death in Arkansas and the United States. Annually, an estimated 2,600 Arkansans are diagnosed with lung cancer; more than 2,100 will die. This far surpasses the combined deaths of prostate cancer (360), breast cancer (410) and colorectal cancer (580). Smoking rates, late presentation of disease and previous lack of effective screening all contribute to the lung cancer epidemic.

More than 85 percent of lung cancer occurs in current or former smokers. Multiple scientific reports have linked tobacco and lung cancer. However, it was the U.S. Surgeon General’s 1964 report “Smoking and Health” that marked a turning point. Smoking rates have steadily dropped since 1964. Currently, 18 percent of U.S. adults are smokers. In Arkansas, the rate exceeds 22 percent and the state ranks seventh worst in the nation.

Lung cancer develops and grows silently. Often, by the time it is detected a cure is not possible. The development of an effective screening program is essential to save lives because of the silent nature of early disease, the estimated 88-92 percent survival rate of Stage I lung cancer and the disease's typical progression to mortality. Effective screening is especially important in Arkansas because the population has significant risk.

Many non-randomized trials have demonstrated the high sensitivity of low dose helical computed tomography (LDCT) in the detection of lung cancer. However, disease detection is only part of the goal. To be truly effective, lives must be saved. The National Lung Screening Trial (NLST), published in 2011, was the first large, prospective, randomized, controlled, multi-center trial in the U.S. to evaluate LDCT versus radiograph. The NLST’s demonstrated endpoint was fewer deaths through screening. The NLST randomized 53,454 high-risk subjects to undergo annual LDCT or a single posterior-anterior chest radiograph. Both groups were followed for three years. Positive results (defined as finding a non-calcified nodule at least 4 mm.) were recorded for 24.2 percent of the LDCT examinations with 96.4 percent representing false positives—a focus of criticism. In the LDCT arm, 1,060 lung cancers were diagnosed, compared with 941 in the radiograph arm. Fifty-two percent of the cancers found in the LDCT arm were stage 1A, while only 33 percent in the radiograph arm were stage 1A. The result was a 20 percent reduction in lung cancer mortality and a 7 percent decrease in overall mortality.

In addition to a sensitive diagnostic test, a good cancer-screening program must test a population with a high prevalence of detectable disease—the better the selection criteria, the higher the pretest probability. National Comprehensive Cancer Network (NCCN) guidelines recommend screening individuals ages 55-74, with a 30-pack-year history, who currently smoke or quit smoking less than 15 years ago. The U.S. Preventive Services Task Force recommends a LDCT screening program for ages 55-80. However, Medicare currently provides coverage only for ages 55-77 with the same smoking and quit requirements as above. Additionally, Medicare requires the patient to be asymptomatic for lung cancer and well documented. Patients should have a life expectancy of at least 10 years, be free of other...
terminal malignancies, and willing and able to undergo treatment. The mortality benefit will not be gained if patients are unfit for the most effective treatment. Other known risk factors (exposure to radon, asbestos or second-hand smoke) increase patients’ risk. However, they are not supported by a level of evidence high enough to warrant insurance coverage or widespread adoption (NCCN’s category 2B recommendation).

An actuarial analysis found lung screening was cost effective — less than $19,000 per life-year saved. That is less than or comparable to mammography or Pap testing.

Few participants in a lung cancer-screening program will have lung cancer. A much more common but often overlooked diagnosis is nicotine addiction. While the NLST reported a 48 percent smoking rate in their screened population, an internal review shows that 69 percent in the University of Arkansas for Medical Sciences (UAMS) LDCT program are current smokers at intake. Lung cancer screening provides a key opportunity to reach current smokers with evidence-based resources to improve cessation rates. The NCCN’s recently developed cessation guideline supports asking about tobacco at every encounter, use of individual or combination pharmacotherapy, counseling and regular follow-up to assure abstinence, or provide further support. Multiple modalities of cessation assistance are complementary and should be used together.

Lung cancer screening is not one simple test but should be a program that integrates cessation resources at multiple points in the process. By nature, the pre-screening intake, discussion of scan results and plans for follow up provide “teachable moments” where discussion of cessation and intervention may be integrated. In the UAMS program, every patient meets face-to-face with a certified tobacco treatment specialist (CTTS) to discuss cessation and he or she is offered counseling and referral to additional resources. The UAMS program is overseen by Drs. Meek and Frost, both faculty radiologists. Scheduling of LDCT studies and tobacco cessation is provided by a CTTS supported by UAMS’ surgery department. By incorporating cessation resources as integral components of a lung cancer-screening program, many people who would not otherwise seek assistance will receive tobacco cessation help.

In Arkansas, high lung cancer incidence and mortality are primarily due to high smoking rates. Lung cancer is a disease that is preventable by tobacco prevention and cessation programs. These programs are vital for our future, but do not address current risk in smokers or those who have quit recently. The lung cancer screening programs now available will enable us to detect early stage cancer and potentially save lives. However, screening must be done in the context of well-organized, guideline-driven programs that adhere to evidence-based guidelines. Effective lung screening provides a LDCT, uses standardized language in reports, has a uniform and efficient workflow regarding treatment of positive findings, provides multidisciplinary evaluation, and tracks data for outcomes and quality assurance. Integration of evidence-based smoking cessation resources into screening programs helps prevent rather than simply detect cancer. Other cessation benefits include reducing the risk of other cancers and decreasing cardiovascular and chronic pulmonary disease.

Drs. Meek and Frost are with the University of Arkansas for Medical Sciences (UAMS) department of radiology; Ms. Franklin and Dr. Steliga are with the UAMS department of surgery.

REFERENCES


