Lung Cancer Fact Sheet

Lung cancer, a cancer that forms in tissues of the lung, usually in the cells lining air passages, has traditionally been classified into two major types: non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC). About 85 percent of all lung cancers are identified as non-small cell, and approximately 75 percent of these are metastatic, or advanced, at diagnosis. NSCLC can be further categorized into distinct subsets that are classified by a number of factors, including histology and the molecular makeup of the tumor.

Facts and Figures
- Worldwide in 2012, an estimated 1.8 million new cases of lung cancer were expected to be diagnosed, accounting for approximately 13 percent of total cancer diagnoses.
- In the United States, an estimated 221,200 new cases of lung cancer are expected to be diagnosed in 2015, accounting for approximately 13 percent of total cancer diagnoses.
- Lung cancer is the leading cause of cancer death worldwide with an estimated 1.6 million deaths each year. An estimated 158,040 deaths from lung cancer are expected to occur in the U.S. in 2015, accounting for about 27 percent of all cancer deaths.
- Globally, lung cancer is the most common cause of cancer-related deaths in men and the second most common in women. More people die of lung cancer in the U.S. than of colon, breast and prostate cancers combined.
- Since 1987, more women in the U.S. have died each year from lung cancer than from breast cancer.

Risk Factors
- Lung cancer affects a diverse group of people, including the young and non-smokers.
- Some lung cancer risk factors may include:
  - Smoking cigarettes or cigars
  - Exposure to second-hand smoke, asbestos, radon, chromium, arsenic, soot or tar
  - Treatment with radiation therapy to the breast or chest
  - Personal or family history of the disease
- Historically, smoking was seen as the major risk factor in developing lung cancer. While smoking is a significant factor, about 10 to 15 percent of lung cancers in the U.S. are unrelated to smoking.
- Most lung cancers do not cause any symptoms until the disease has already reached an advanced stage. Even when symptoms do appear, they are often mistaken for other health problems.

Non-Small Cell Lung Cancer
- NSCLC is a disease in which malignant cells form in the tissues of the lung. NSCLC is a difficult disease to treat, particularly in the metastatic or advanced setting (Stage III/IV). In these patients, the five-year survival rate is only 5 percent.
- Historically, NSCLC has been categorized by histology to include adenocarcinoma, squamous cell carcinoma and large cell carcinoma.
  - Adenocarcinoma, which accounts for about 40 percent of NSCLC cases, is usually found in the outer region of the lung.
  - Squamous cell carcinoma, which accounts for about 25 to 30 percent of all NSCLC cases, tends to be located in the middle of the lungs, and is more often linked to a history of smoking.
  - Large cell carcinoma, which accounts for about 10 to 15 percent of NSCLC cases, may appear in any part of the lung and tends to grow and spread quickly.
- Previously thought of as one disease, doctors now understand that there are different types of lung cancer, which can be driven by different biomarker profiles. Biomarker testing, which is usually determined by testing tumor samples, can help doctors diagnose patients more accurately and guide their treatment decisions.
- The National Comprehensive Cancer Network (NCCN) Guidelines recommend (category 1) that metastatic NSCLC that is determined by histology to be adenocarcinoma or not otherwise specified (NOS) undergo biomarker testing for EGFR mutations and ALK gene rearrangements.*
NCCN Guidelines also recommend consideration of EGFR and ALK testing in patients with squamous cell carcinoma, especially in patients who have never smoked, when small biopsy specimens were used to assess histology, or in mixed-histology tumors.\textsuperscript{10} EGFR mutations occur in 10 to 20 percent of NSCLC tumors\textsuperscript{11} and as high as 60 percent in NSCLC tumors in Asian populations.\textsuperscript{12} Epidemiology studies suggest that approximately 3 to 5 percent of NSCLC tumors are ALK-positive.\textsuperscript{13} Pfizer supports testing for all clinically relevant biomarkers during treatment planning, as testing is increasingly important to patients with metastatic NSCLC and will help guide treatment decisions that may lead to improved patient care.\textsuperscript{14}

- In April 2013, an evidence based guideline issued by the College of American Pathologists (CAP), International Association for the Study of Lung Cancer (IASLC) and Association for Molecular Pathology (AMP) emphasized the importance of routine molecular testing in metastatic NSCLC adenocarcinoma diagnosis and treatment.
- According to the guideline, doctors should order EGFR mutation and ALK rearrangement testing at the time of adenocarcinoma diagnosis for patients who present with metastatic NSCLC, regardless of their clinical history.\textsuperscript{15}

**NSCLC Treatment**

Current treatment options for NSCLC include surgery, radiofrequency ablation, radiation therapy, chemotherapy, biomarker-driven therapy and immunotherapy. In some cases, more than one kind of treatment is used.\textsuperscript{7}

- With the identification and increased understanding of molecular abnormalities in lung cancer, research efforts have focused on identifying biomarker targets and using this knowledge to develop biomarker-driven therapies and guide treatment decisions.\textsuperscript{5,12} At the same time, the oncology community is continuing to better understand how tumor histology plays a role in treatment outcomes and how each of these factors must be considered in order to choose the most appropriate therapy for each individual.
- Targets currently being used or investigated in the treatment of NSCLC include the human epidermal growth factor (HER) family of receptors, EGFR, ERCC1, KRAS, ALK, BRAF, PI3KA, IGF-1R, c-MET, ROS-1 and RET.\textsuperscript{16,17,18,19,20,21}

\* Category 1: Based upon high-level evidence, there is uniform NCCN consensus that the intervention is appropriate.

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\textsuperscript{8} American Cancer Society website. Detailed Guide: Lung Cancer (Non-Small Cell).


