LUNG CANCER
Lung cancer, a cancer that forms in tissues of the lung, usually in the cells lining air passages,\(^1\) has traditionally been classified into two major types: non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC).\(^1\) 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.\(^2\) 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 \textbf{1.8 million} new cases of lung cancer were expected to be diagnosed,\(^3\) accounting for approximately 13 percent of total cancer diagnoses.\(^4\) In the United States, an estimated \textbf{224,390 new cases of lung cancer are expected to be diagnosed in 2016}, accounting for approximately 14 percent of total cancer diagnoses.\(^3\)

- Lung cancer is the leading cause of cancer death worldwide\(^6\) with an estimated \textbf{1.6 million deaths each year}.\(^7\) An estimated \textbf{158,080 deaths from lung cancer} are expected to occur in the U.S. in 2016, accounting for about 25 percent of all cancer deaths.\(^3\)

- Globally, lung cancer is the most common cause of cancer-related deaths in men and the second most common in women.\(^8\) More people die of lung cancer in the U.S. than of colon, breast and prostate cancers combined.\(^3\)

- Since 1987, more women in the U.S. have died each year from lung cancer than from breast cancer.\(^3\)

### 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 \textbf{10 to 15 percent of lung cancers in the U.S. are unrelated to smoking}.\(^7\)
- 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 \textbf{difficult disease to treat}, particularly in the metastatic or advanced setting (Stage IIIB/IV). In these patients, the \textbf{five-year survival rate is only 5 percent}.\(^5\)
- Previously thought of as one disease, doctors now understand that there are \textbf{different types of lung cancer}, which can be driven by different biomarker profiles. \textbf{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\(^9\) recommend (category 1) that metastatic NSCLC that is determined by histology to be adenocarcinoma or not otherwise specified (NOS) undergo \textbf{biomarker testing for EGFR mutations and ALK gene rearrangements}.\(^10\) If both sensitizing EGFR mutation and ALK are negative or unknown, NCCN Guidelines recommend consideration of \textbf{ROS1 testing}.\(^8\)
- EGFR mutations occur in \textbf{10 to 20 percent of NSCLC tumors}\(^9\) and as high as \textbf{60 percent} in NSCLC tumors in Asian populations.\(^10\)
- Epidemiology studies suggest that approximately \textbf{3 to 5 percent of NSCLC tumors are ALK-positive}.\(^11\)
- Approximately \textbf{1 percent} of lung tumors harbor \textbf{ROS1 fusions}. Like ALK fusions, ROS1 fusions are more commonly found in \textbf{light smokers (<10 pack years)} and/or \textbf{never-smokers}. ROS1 fusions are also associated with \textbf{younger age and adenocarcinomas}.\(^12\)
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.¹
- 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.¹²,¹³,¹⁴,¹⁵,¹⁶,¹⁷,¹⁸

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

REFERENCES