

# Lung Cancer in the Older Patient

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## KEYWORDS

- Lung cancer • Elderly • Lung cancer screening • Geriatric assessment
- Surgical resection • Stereotactic body radiation therapy • Targeted therapy
- Immunotherapy

## KEY POINTS

- More than two-thirds of new lung cancer cases in the United States are diagnosed in patients 65 and older.
- Chronologic age or performance scores alone are not accurate predictors of patients' capacity for tolerating aggressive cancer therapies.
- Use of a comprehensive geriatric assessment to determine treatment strategy can reduce toxicities and treatment failures.
- Fit elderly patients are often able to tolerate surgical resection, radiation, and/or chemotherapy appropriate for their tumor stage, with outcomes similar to those of younger patients, albeit with higher rates of treatment-related toxicity.

## INTRODUCTION

Cancers of the lung and bronchus are the leading cause of cancer deaths in both men and women in the United States and in men worldwide.<sup>1,2</sup> Two-thirds of new lung cancer cases are diagnosed in patients over the age of 65, and this rate is anticipated to increase over the next 2 decades.<sup>1,3</sup> Management of cancer in the elderly presents specific challenges, including safe acquisition of tissue for diagnosis and staging, determination of treatment strategy, and management of treatment-related toxicities in patients who have a high rate of comorbid conditions.<sup>4</sup> Additionally, there is a paucity of dedicated clinical trials in the elderly, leading to both undertreatment and overtreatment biases.<sup>4</sup> Moreover, even fit older adults experience age-related decline

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in physiologic reserve and may have issues of polypharmacy, geriatric syndromes, and inadequate social support, all contributing to well-documented disparities in treatment and survival.<sup>5</sup> This review discusses the complex challenges facing physicians and surgeons in balancing benefits and harms in the management of lung cancer in elderly patients.

## EPIDEMIOLOGY, RISK, AND AGE-RELATED DISPARITIES IN LUNG CANCER

In 2016 there were an estimated 224,390 new cases of lung cancer in the United States, with 152,220 (68%) of these occurring in patients 65 years of age and older.<sup>1</sup> This incidence is higher than that of the 3 other most common cancer types, with 60% of colon cancers and rectum cancers, 57% of breast cancers, and 57% of prostate cancers newly diagnosed in patients greater than or equal to 65 years old (Fig. 1A). Mortality in lung cancer far surpasses that of other cancers, and 72% of deaths occur in patients 65 years of age and older with lung cancer.<sup>1</sup> The proportion of cancer-related deaths in the elderly is highest in lung cancer compared with colon, breast, and prostate cancers (Fig. 1B). Globally, 60% of lung cancers are estimated to occur in patients 65 and older according to the International Agency for Research on Cancer GLOBOCAN 2012 project, with a projected increase to 68% worldwide by the year 2035 (Fig. 2).<sup>2,3,6</sup>

### *Lung Cancer Screening in Older Adults*

Lung cancer screening remains a widely debated topic given the need to balance benefits and harms on a patient-by-patient basis while offering a screening tool that has been shown to have a population-wide mortality benefit.<sup>7,8</sup> Only 25% of the National Lung Screening Trial (NLST) participants were greater than or equal to 65 years old.<sup>7</sup> Since the publication of the NLST in 2011, which demonstrated a 20% relative reduction in lung cancer mortality by annual screening with low-dose CT over 3 years in current and recent exsmokers, subsequent analyses have shown that the highest-risk groups derive the greatest benefit from screening.<sup>9,10</sup> Pinsky and colleagues<sup>11</sup> performed a post hoc analysis of the NLST to determine whether benefit was affected by demographic factors and found no significant difference in individuals aged less than 65 years versus those aged greater than or equal to 65 years (relative risk [RR] 0.82–0.87;  $P = .6$ ). The same group later examined additional facets of lung cancer screening in the NLST cohort by age group and found that both the absolute harms and benefits of screening were greater in the greater than or equal to 65-year-old subjects. This cohort, when compared with subjects less than 65, had higher false-positive rates with low-dose CT screening but also higher lung cancer incidence and mortality, with a higher positive predictive value of a positive screening result.<sup>12,13</sup> Therefore, performing lung cancer screening as part of an organized program in a setting committed to quality remains essential in the older population undergoing low-dose CT screening.

### *Age-related Disparities*

Racial and socioeconomic disparities in lung cancer diagnosis and treatment are well described in the literature, with higher lung cancer incidence and lower survival rates among blacks and Hispanics compared with whites.<sup>14</sup> Similar disparities have been noted in older adults with lung cancer as well. Krok-Schoen and colleagues<sup>15</sup> noted on analysis of the Surveillance, Epidemiology, and End Results (SEER) database that among those aged greater than or equal to 85 years, black men had higher lung cancer incidence rates than white men and that whites had more than 3 times

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