

# Factors Associated with Receipt of Pulmonary Metastasectomy in Patients with Lung-Limited Metastatic Colorectal Cancer: Disparities in Care and Impact on Overall Survival

## Background:

Pulmonary metastasectomy for colorectal cancer has been shown to provide respite from systemic therapy as well as to provide some patients with prolonged disease-free intervals. However, patients with lung-limited metastatic colorectal cancer may not receive equitable access to pulmonary resection. We sought to identify factors associated with pulmonary metastasectomy as well as to characterize the differential impact on survival outcomes for those offered lung resection.

## Methods:

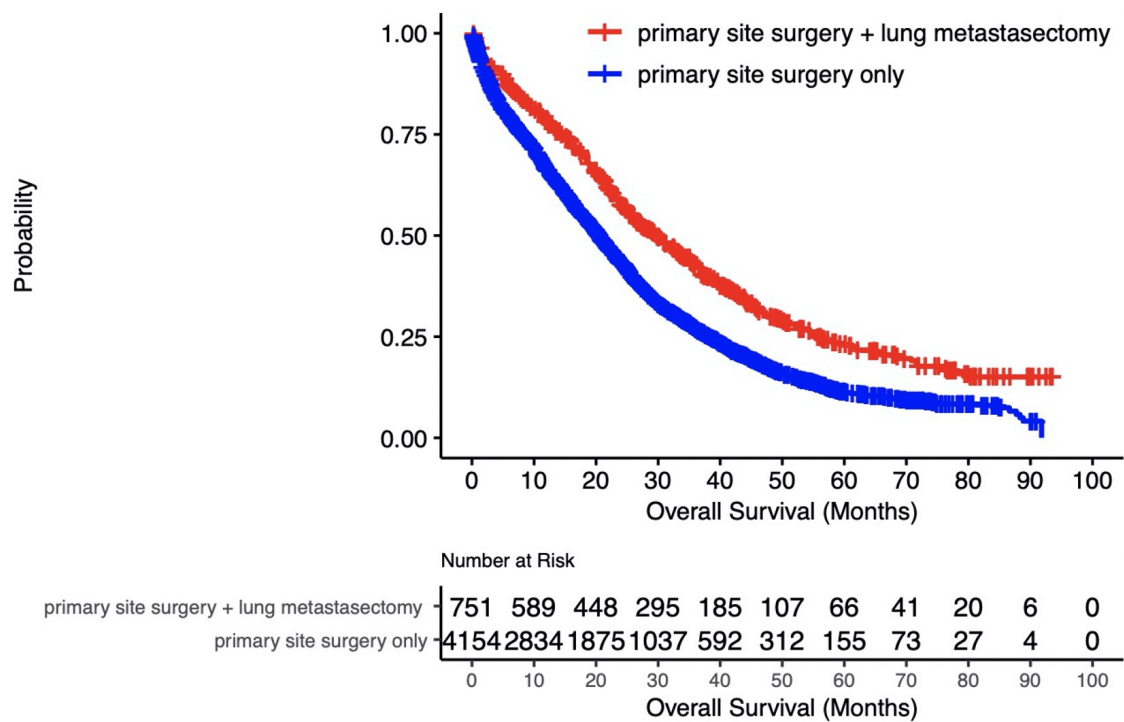
The National Cancer Database (NCDB) was queried for all patients with stage IV colorectal cancer and lung-limited metastatic disease between 2010-2016. Patients who underwent resection of the primary tumor only were compared to those who underwent both resection of the primary tumor and their pulmonary metastatic disease. Penalized regression with the least absolute selection and shrinkage operator (LASSO) was used to determine factors associated with receiving metastasectomy as well as those associated with overall survival in multivariate models.

## Results:

5731 patients met inclusion criteria, including 867 (15.1%) who underwent resection of both the primary tumor and pulmonary metastases and 4864 (84.8%) who had surgery for the primary tumor only. In unadjusted analyses, metastasectomy patients were younger (median age 60 vs 63 years,  $p < 0.001$ ), more often privately insured (49.1% vs 37.7%,  $p < 0.001$ ), more educated ( $p = 0.001$ ), and often traveled farther to receive their care ( $p < 0.001$ ) compared to those not receiving metastasectomy. In multivariable analyses, younger age, traveling  $> 25$  miles, and care at high-volume hospitals were associated with pulmonary metastasectomy ( $p < 0.01$ ). In adjusted analyses within the entire cohort, primary site surgery without metastasectomy was associated with worse overall survival (hazard ratio [HR] 1.35, confidence interval [CI] 1.23-1.49), even after adjusting for patient, tumor, and hospital-related factors, highlighting the importance of providing pulmonary metastasectomy (Figure).

## Conclusions:

Patients who were older, received care closer to home, and those treated at low-volume hospitals were less likely to receive pulmonary metastasectomy for lung-limited colorectal cancer after undergoing definitive resection of their primary tumor. Moreover, failure to receive pulmonary metastasectomy resulted in worse overall survival, emphasizing the strong need for efforts to provide uniform, equitable care to all patients.



**Figure: Kaplan-Meier Curve of Overall Survival in Patients Undergoing Primary Site Surgery with and without Pulmonary Metastasectomy**