

Background

- Lung cancer is the most common cancers affecting Canadians
- In 2017, 28600 new lung cancer cases are expected to be diagnosed, accounting for 14% of all cancers
- Compared to small cell lung cancer, Non-small cell lung cancer (NSCLC) patients show longer survival rates (stage I: 68% to 92%; stage IV: 1% to 10%)
- Around 47% of the NSCLC were diagnosed at stage IV

Objectives

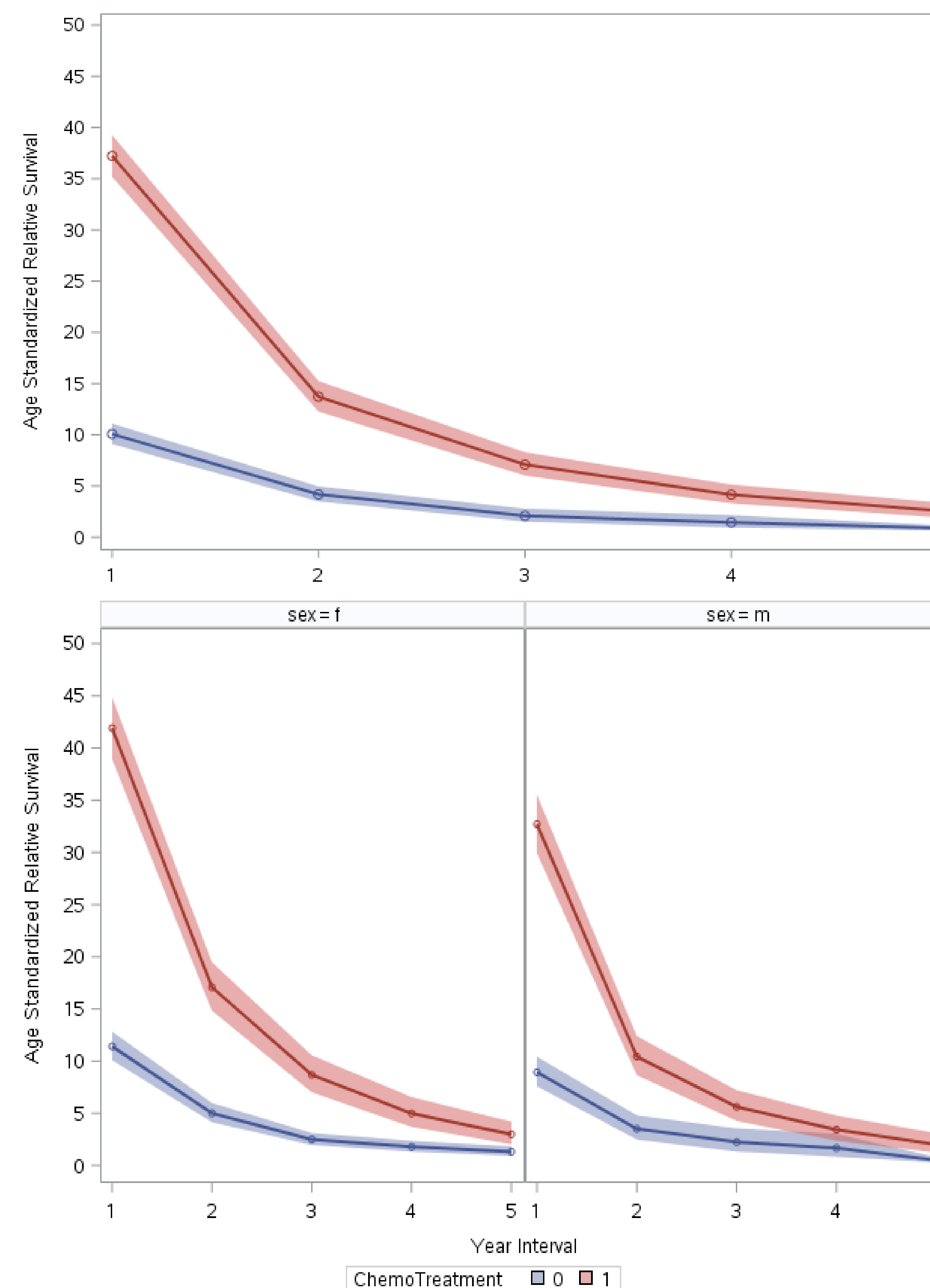
We evaluated the age-standardized relative survival rate (ASRS) of a cohort of stage IV NSCLC patients dividing by chemotherapy status. We also explored the subgroups of patient who are more prone to benefit from the chemotherapy treatment than others. Unlike the conventional subgroup analysis study evaluating the prognostic factors, we focus on the predictive factors that provide information on the outcome of interest under the effect of the treatment

Study Population

- The data were extracted from the Alberta Cancer Registry and Electronic Medical Records
- All patients were 18 years or older when they were diagnosed with stage IV NSCLC from 2009 to 2016
- Data elements such as gender, age, year of diagnosis, the side of original tumor occurrence, diagnosis method (cytology, histology or radiation alone), topography, whether chemotherapy was received, site of progressive disease (adrenals, brain, liver, lymph nodes, bone or other), Charleston comorbidity index (0, 1,2 or 3+), and vital status (alive or deceased) were included

Methods

1. Relative Survival Analysis
 - 1) The Ederer II method (Ederer and Heise, 1959)
 - 2) Hakulinen-Tenkanen additive model (1987)
2. The Heterogeneity of Treatment Effect
 - 1) The Stabilized Inverse Probability Weighting
 - Balance the covariates across treated and control groups
 - 2) FindIt Method
 - Subgroup analysis method developed from the penalized regression framework with a Lasso penalty



Results

- Our data included 9717 patients, with 71.3% of them received chemotherapy treatment
- The patients in the non-chemotherapy group were older, compared to the chemotherapy group (age ≥ 70 : 56.1% vs. 29.8%)
- Most of the patients in the chemotherapy group were female (50.4%) and had a Charlson index equal to 0 (52.6%)
- The chemotherapy group shows a higher ASRS rate, ranging from 37.2% to 2.6% for the first five years, compared to another group (ranging from 10.1% to 0.9%)
- This trend is more obvious among female patients, with five year ASRS ranging from 41.9% to 3.0% for the chemotherapy group and from 11.4% to 1.3% for non-chemotherapy group
- After adjusting for the covariates such as age, gender, diagnosis year and Charlson Index, the chemotherapy group shows a lower risk, with a hazard ratio equal to 0.68 (95% CI: 0.67, 0.69)
- Subgroup analysis: female patients between age 60 and 70, with a Charlson index smaller than or equal to 2, and an upper or lower lobe tumor

Conclusions

- NSCLC patients have a higher relative survival rate after receiving chemotherapy treatment, especially for a short-term period
- The estimation obtained from the Hakulinen-Tenkanen additive model also echoes the positive finding, that patients received chemotherapy show a lower risk
- The subgroup analysis results shed some lights on the potential patient subgroups who are more likely to benefit from chemotherapy. It could provide research hypotheses for future studies as well as developing personalized medicine