Title: Evaluating the Influence of Biomarker Status and Precision Treatment on De Novo Metastatic Non-Small Cell Lung Cancer Outcomes using the Glans-Look Lung Cancer Research Program Database

Authors: Dean ML[1], Fu H[1], Gibson AJW[1], Elegbede AA[1], Tudor RA[1], Box A[3], Chambers CR[4], D'Silva A[1], Cheung WY[1,2], Bebb DG[1,2]

Institutional Affiliations: 1: University of Calgary, Cumming School of Medicine. 2: Tom Baker Cancer Centre, Alberta Health Services. 3: Alberta Precision Laboratories, Alberta Health Services. 4: CCA Pharmacy, Alberta Health Services

Background/Purpose: Routine biomarker testing and access to tyrosine-kinase inhibitors (TKI) have become increasingly available to patients diagnosed with non-small cell lung cancer (NSCLC). While these new testing and systemic anti-cancer therapy (SACT) regimes were initially adopted via clinical trial participation, real world data are necessary to evaluate their performance in a wider NSCLC population as the standard of care evolved. Our objectives are to assess overall survival (OS) in de novo metastatic patients treated with TKI and compare these outcomes to those experienced by patients who received either cytotoxic chemotherapy (CTX), or those who were not treated with SACT.

Methods: The institutional Glans-Look Lung Cancer Research program database (GLR) is a resource that provides patient-level demographic, diagnostic, treatment, and outcome data on all patients with lung cancer diagnoses in Alberta. The GLR was used to identify four de novo metastatic NSCLC groups: 72 patients treated with TKI against confirmed anaplastic lymphoma kinase (ALK) rearrangement between 2014 and 2020 provincially, 446 patients treated with TKI against confirmed epithelial growth factor receptor (EGFR) mutation between 2005 and 2020 provincially, 253 patients who received first-line cytotoxic chemotherapy (CTX) as standard of care between 2010-2014 in Calgary, and 1,031 who were not treated with SACT (noSACT) between 2010-2014 in Calgary. Both CTX and noSACT groups represent patients in which biomarkers were not investigated.

Results: Preliminary univariate survival analysis shows that patients treated with TKI received the greatest benefit. The ALK group experienced the highest OS (34.7 months), followed by the EGFR group at 21.5 months. CTX patients experienced an OS of 11.8 months, while the noSACT group experienced the lowest OS as expected (2.57 months).

Conclusion: These findings highlight the importance of access to biomarker testing and associated TKI, and demonstrate that Alberta is exhibiting OS trends consistent with globally published clinical real-world data. The unique capabilities of the GLR database allow researchers to differentiate these outcomes in diverse Albertan populations.