# Immunotherapy Treatment Receipt and Outcomes among People Living with HIV and Lung Cancer

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## BACKGROUND

- People with HIV (PWH) have about 1.3–2-fold higher lung cancer risk and 1–2-fold higher overall mortality than people without HIV (PWoH)[1,2].
- Although immunotherapy has transformed lung cancer (LC) treatment, PWH are frequently excluded from clinical trials, leaving limited real-world evidence in this population[3].
- We aim to assess the role of immunotherapy (Immune checkpoint inhibitors [ICIs] ) on survival among LC patients, stratified by HIV status.

## METHODS

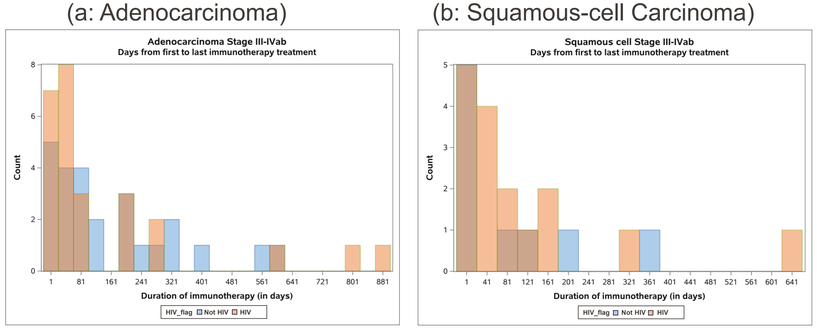
- Source: The US Department of Veterans Affairs Healthcare System
- Newly diagnosed LC cases among PWH were matched (1:1) to newly diagnosed LC cases in PWoH on age (±2 years), gender, race/ethnicity, cancer stage, and year of diagnosis (±2 years). For this analysis, we restricted the cohort to individuals with confirmed stage III–IV(a–b) LC between 2014 and 2020, with follow-up through 2021.
- ICIs included PD-1 inhibitors, PD-L1 inhibitors, or CTLA-4 inhibitors.
- Stratified by LC histology (adenocarcinoma and squamous cell carcinoma) with multivariable Cox models assessing:
  i. Time to ICIs initiation by HIV status among ICI recipients
  ii. Overall Survival from diagnosis by HIV and ICI receipt
  iii. Overall Survival after ICI initiation by HIV, among ICI recipients.
- Corresponding KM plots of overall survival and time to ICIs initiation.

## RESULTS

- The study included 119 PWH and 124 PWoH with stage III–IV LC;
  - Adenocarcinoma 159 (65%): 79vs. 80 (PWH vs. PWoH)
  - Squamous-cell carcinoma 84 (35%): 40 vs. 44 (PWH vs. PWoH).
- Among PWH and adenocarcinoma, 26 (16%) received ICIs, and 9 (11%) for PWH and squamous-cell carcinoma. No significant differences in demographic or clinical characteristics by HIV were observed among ICIs recipients.
- Among PWH, 42% of LC cases had CD4 counts ≥ 500 cells/mm$^3$.
- Median number of ICIs doses for PWH vs. PWoH;
  - 3.5 vs. 3 (p=0.54) for adenocarcinoma
  - 2 vs. 4 (p=0.7) for squamous cell carcinoma.

Figure 1. Time from first to last immunotherapy administration by HIV status in advanced (stage III-IV) lung cancer.

(a: Adenocarcinoma) (b: Squamous-cell Carcinoma)




# Are people with HIV receiving immunotherapy as quickly and benefiting as equally as those without HIV?

Table. Adjusted hazards ratios (95% confidence intervals) and Restricted Mean Survival Time (RMST) estimates comparing PWH to PWoH in advanced (stage III-IV) lung cancer, by tumor histology.

| | PWH vs. PWoH (Adenocarcinoma) | PWH vs. PWoH (Squamous-cell Carcinoma) |
|---|---|---|
| **Time to immunotherapy initiation** | 1.25 (0.70 – 2.23) | 0.67 (0.28 – 1.62) |
| **Overall survival from diagnosis** | 1.34 (0.95 - 1.90) | 1.58 (0.97 - 2.58) |
| **Overall survival after immunotherapy** | 1.09 (0.55 – 2.15) | 1.47 (0.46 – 4.64) |
| **RMST for immunotherapy initiation (days)** | 347 vs. 469 | 370 vs. 514 |
| **RMST for survival from diagnosis by ICIs (years)** | ICIs: 1.9 vs. 2.4<br>No ICIs: 1.0 vs. 1.3 | ICIs: 1.8 vs. 2.0<br>No ICIs: 1.1 vs. 1.7 |
| **RMST for survival after immunotherapy (years)** | 1.51 vs. 1.83 | 1.16 vs. 1.43 |

Note: HRs were adjusted for age, gender, race/ethnicity, year of diagnosis, Deyo-Charlson Comorbidity index, and time-dependent immunotherapy (only in the case of models of overall survival from diagnosis). ICIs: Immunotherapy recipients, No ICIs: non-Immunotherapy recipients.

Figure 2. Time to immunotherapy initiation from diagnosis by HIV status in advanced (stage III-IV) lung cancer.

(a: Adenocarcinoma) (b: Squamous-cell Carcinoma)

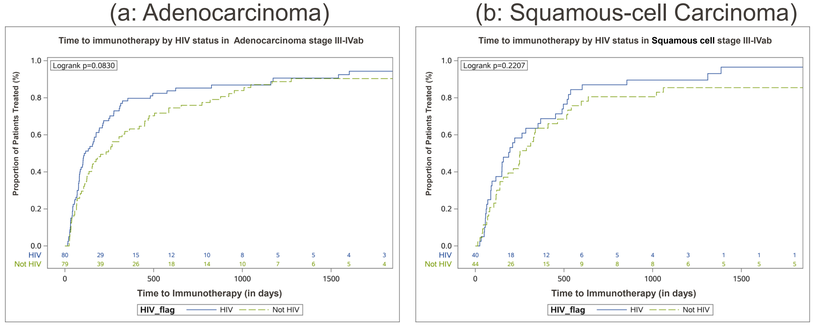



Figure 3. Kaplan–Meier overall survival from lung cancer diagnosis curves by HIV and Immunotherapy status in advanced (stage III-IV) lung cancer.

(a: Adenocarcinoma) (b: Squamous-cell Carcinoma)

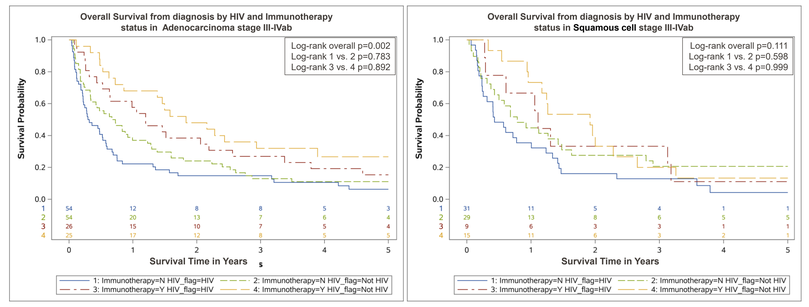
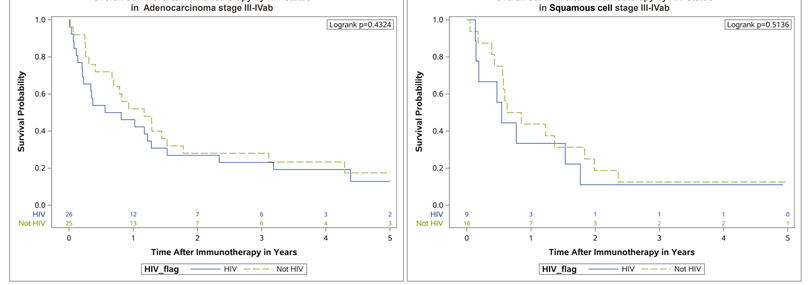



Figure 4. Kaplan–Meier overall survival curves after Immunotherapy by HIV status in advanced (stage III-IV) lung cancer.

(a: Adenocarcinoma) (b: Squamous-cell Carcinoma)




## CONCLUSION

- Future studies should further evaluate PD-L1 expression, line and intent of therapy, and immunologic and tumor-specific differences between PWH and PWoH, ideally in larger cohorts for LC.

## ADDITIONAL KEY INFORMATION

### References

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## PLAIN LANGUAGE SUMMARY

**These findings support the continued use of immunotherapy in people with HIV and advanced lung cancer, and do not support systematic exclusion from treatment based on HIV status.**