Lung Cancer Incidence and Risk Factors Differ by Histology among HIV +/- Veterans

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BACKGROUND

- We hypothesize that each lung cancer histologic type has an epidemiologic pattern over time and also differs between HIV+ and HIV- individuals.

People living with HIV (PWH) have a high risk for developing lung cancer and poor treatment outcomes. Predominant molecular alterations and treatment algorithms differ for each of the lung cancer histologic types, which include small cell lung cancer (SCLC), and non-small cell lung cancer (NSCLC), and the 2 common NSCLC histologic subtypes squamous cell (SC), and adenocarcinoma (AC).

METHODS

- In a retrospective cohort study, Veterans diagnosed with HIV between 10/1/99 and 12/31/2016 were identified and matched to a 2 to 1 gender, age- and year of care HIV-negative cohort.
- Both HIV+/- veterans were followed from index date until lung cancer diagnosis, death or 12/31/2016.
- Lung cancer cases and histologic types were identified using the VA Clinical Cancer Registry and Corporate Data Warehouse and medical record review of individuals with lung cancer ICD-9/10 codes.
- We calculated cumulative risk of Lung Cancer for PWH and HIV- controls.
- We used Joinpoint software for modeling trends. Cox regression analyses were used to identify risk factors for specific lung cancer histologic types and subtypes among PWH. Models were adjusted for age, race, gender, year of index HIV, smoking, baseline CD4 count, and percent undetectable HIV viral load.

Results

- We identified 46604 HIV+ and 88783 HIV- veterans who met study eligibility criteria.
- A total of 931 incident cases of lung cancer were ascertained among HIV+ and 1206 among HIV-
- The incidence of Adenocarcinoma, Squamous Cell cancer and Small Cell cancer all decreased from 2000-2016; only Squamous Cell Lung cancers demonstrated significant decrease.

The Incidence of NSCLCs but not Small Cell Cancers (SCC) are higher among HIV+ veterans compared to HIV- veterans, but not for SCLCs. The incidence of AC has remained stable for both HIV+/- veterans, but the incidence of SCC has decreased.

- Table 2 shows the Incidence of Different Lung cancer Histologies and Incidence Rate Ratio (IRR) for PWH and HIV- controls
- Table 3 shows the adjusted Hazard Ratio for HIV-associated Risk of Lung Cancer by Histology

Table 1: Demographic Distribution of PWH and HIV- controls

	PWH (N, %)	HIV - (N, %)
Overall	N=46604	N=88783
Histology		
Adenocarcinoma	380 (40.82)	436 (36.15)
Squamous	275 (29.54)	335 (27.78)
NSCLC-Undiff	193 (20.73)	248 (20.56)
SCC	83 (8.92)	187 (15.51)
Gender		
Male	45151 (96.88)	85941 (96.80)
Female	1453 (3.12)	2842 (3.20)
Race		
White	17459 (37.46)	52790 (59.46)
Black	24491 (52.55)	17254 (19.43)
Hispanic	2592 (5.56)	4736 (5.33)
Other	454 (0.97)	2503 (2.82)
Unknown	1608 (3.45)	11500 (12.95)
Age at index		
< 50	27303 (58.59)	51686 (58.22)
50 – 59	13514 (29.00)	25722 (28.97)
60 +	5787 (12.42)	11375 (12.81)
Marital Status		
Married	6764 (14.51)	33136 (37.32)
Never Married	22415 (48.10)	14275 (16.08)
Divorced, Separated, Widowed	15919 (34.16)	35054 (39.48)
Unknown/Missing	1502 (3.22)	6318 (7.12)
Means Test		
Above Means Test	9255 (19.86)	27070 (30.49)
Below means Test	27735 (59.51)	40882 (46.05)
Unknown/Missing	9613 (20.63)	20831 (23.46)
Year of index		
Before 2000	14534 (31.19)	26734 (30.11)
2000 – 2005	14682 (31.50)	28158 (31.72)
2006 – 2011	10221 (21.93)	19988 (22.51)
2012 – 2016	7167 (15.38)	13903 (15.66)
Smoking history		
Lifelong non-smoker	9163 (19.66)	19102 (21.52)
Current/former smoker	34772 (74.61)	63386 (71.39)
No smoking history	2669 (5.73)	6295 (7.09)
Stage		
I	159 (17.08)	241 (19.98)
II	60 (6.44)	102 (8.46)
III	188 (20.19)	263 (21.81)
IV	378 (40.60)	472 (39.14)
Unknown	146 (15.68)	128 (10.61)

Fig 1 Joinpoint of Adenocarcinoma Lung Cancer Age-adjusted Incidence: 2001-2016

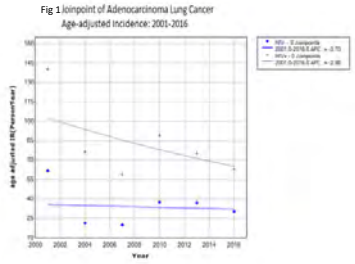


Fig 2 Joinpoint of Squamous Lung Cancer Age-adjusted Incidence:2001-2016

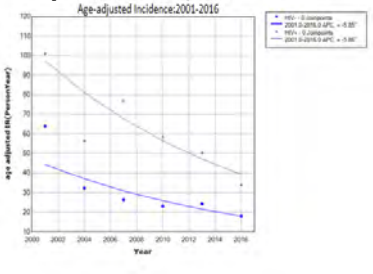


Fig 3 Joinpoint of SCC Lung Cancer Age-adjusted Incidence:2001-2016

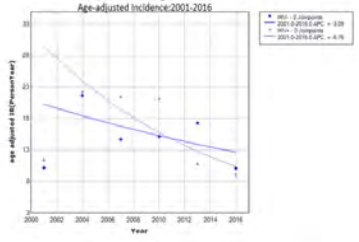


Table 2: Age-Adjusted Incidence Rates by Histology

Lung Cancer Histology	PWH Incidence/100,000	HIV – Incidence/100,000	Incidence Rate Ratio
Non-Small Cell Lung Cancer	208.69 (208.64 – 208.73)	116.43 (116.41 – 116.45)	1.79 (1.71 – 1.88)
Adenocarcinoma	93.52 (93.49 – 93.55)	49..82 (49.80 – 49.83)	1.88 (1.75 – 2.01)
Squamous Cell Cancer	67.68 (67.65 – 67.70)	38.28 (38.26 – 38.29)	1.77 (1.63 – 1.92)
Small Cell Lung Cancer	20.43 (20.41 – 20.44)	21.37 (21.36 – 21.38)	0.96 (0.84-1.09)

Table 3: Adjusted Hazard Ratio of HIV-Associated Risk by Histology

Lung CancerHistology Type	Adjusted Hazard Ratio*	P-Value
Non-Small Cell Lung Cancer	1.428 (1.288 – 1.583)	<0.001
Adenocarcinoma	1.367 (1.159 – 1.612)	<0.001
Squamous Cell Cancer	1.686 (1.390 – 2.046)	<0.001
Small Cell Lung Cancer	1.099 (0.809 – 1.492)	0.546

* Adjusted for Age, Race, Gender, Smoking, Year of Diagnosis, Means Test (Economic qualification of VA services), Marital Status and Baseline BMI

CONCLUSIONS

The Incidence of both Adenocarcinomas and Squamous Cell Cancers is higher in Veterans with HIV, compared to HIV-Controls. HIV is independently associated with an increased risk of both histologic types NSCLC but not Small Cell Lung cancer.

ADDITIONAL KEY INFORMATION

Funding Information:
This research work was supported by the National Cancer Institute (R01CA206476, PI: E. Chiao); the Houston Veterans Affairs Health Services Research and Development Center of Innovations (CIN13-413); and the Dan L. Duncan Cancer Center (P30CA022453). Drs. White and Garcia receive research support from the U.S. Department of Veterans Affairs (CX001430-White, BX002807-Garcia, respectively), Dr. Garcia receives research support from the Congressionally Directed Medical Research Program (CDMRP PC170059), Drs. Garcia and Chang from the National Institutes of Health (R01CA239208, R01AG061558 -Garcia and T32 CA174647, respectively). This funding was made possible by collaborative efforts of the Office of AIDS Research, the National Institute of Allergy and Infectious Diseases, and the International AIDS Society.