**Supplemental Material 1. Distribution of number of visits with immunological data for subjects in the**

**study cohort (n=532).**

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 **Supplemental Material 2.** Frequency of incident virus-associated cancers.

|  |  |
| --- | --- |
| **Cancer** | **Count** |
| Anal cancer | 9 |
| Hodgkin lymphoma | 3 |
| Kaposi sarcoma | 2 |
| Liver cancer | 6 |
| Non-Hodgkin lymphoma | 9 |
| Head and neck squamous cell carcinoma | 3 |

 **Supplemental Material 3**. Subjects with multiple cancer diagnoses

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Subject |  Virus-associated cancer |  | Non-virus-associated cancer |  | Time interval between diagnoses |
|  | First diagnosis | Second diagnosis |  | First diagnosis | Second diagnosis |  |
| 1 |  | Hodgkin lymphoma  |  | Thyroid cancer  |  |  | 17 years |
| 2 |  | Anal cancer  |  | Prostate cancer  |  |  | 2 years |
| 3 | Non Hodgkin lymphoma  |  |  |  | Prostate cancer  |  | 9 years |
| 4 | Kaposi sarcoma  |  |  |  | Prostate cancer  |  | 14 years |

**Supplemental Material 4**. Longitudinal trends of CD4 and white blood cell counts proximal to virus-associated

cancer diagnosis from mixed-effects models.

|  |  |  |
| --- | --- | --- |
|  | **CD4 cell count (cells/μl)** | **White blood cell count (cells/μl) (log2)** |
|  | **Estimate** | **SE** | **p-value** | **Estimate** | **SE** | **p-value** |
| Virus-associated cancer | -233.667 | 71.748 | **0.001** | -0.185 | 0.086 | **0.032** |
| Heavy smokinga | 179.515 | 28.533 | **<0.001** | 0.245 | 0.035 | **<0.001** |
| Age proximal to diagnosisb | 1.590 | 1.138 | 0.163 | 0.000 | 0.000 | **0.041** |
| Black race |  -7.809 |  28.443 |  0.784 |  0.002 |  0.001 |  0.201 |
| FIB-4 > 1.45c | -122.874 | 29.688 | **<0.001** | -0.145 | 0.035 | **<0.001** |
| Time to diagnosisd | -0.084 | 0.164 | 0.608 | -0.196 | 0.037 | **<0.001** |

Heterogeneity was assumed between groups by cancer diagnosis; therefore, group by time interaction was included in

 the models despite non-significant estimates. Given discordant patterns for CD4 and WBC counts in NHL cases compared to other

virus-associated cancers (see Figure 3), NHL cases were excluded from these models.

aSmoking 0.5 packs per day or more on average during follow-up

bAge 6 years prior to endpoint.

cTime-updated.

dFrom 6 years prior to endpoint