

**Supplementary Table 1. ROC-AUC % (95% confidence limits) for cancer risk models, by smoking exposure and disease type**

<b>Disease Type</b>	<b>Pack-Years<sup>a</sup></b>	<b>Cumulative Tar</b>	<b>Cumulative Tar and Pack-Years</b>	<b>CSI<sup>b</sup></b>
Overall lung cancer	76.7 (74.2, 79.1)	75.0 (72.5, 77.5) p<0.0001	76.7 (74.3, 79.2) p=0.17	77.3 (74.9, 79.8) p=0.005
Lung small cell cancer	86.9 (82.7, 91.0)	85.1 (80.9, 89.4) p=0.017	87.1 (82.9, 91.3) p=0.11	87.6 (83.4, 91.8) p=0.091
Lung squamous cell	86.5 (82.1, 90.8)	84.0 (79.4, 88.6) p=0.014	86.4 (82.0, 90.8) p=0.47	87.1 (82.7, 91.5) p=0.10
Lung large cell cancer	81.8 (77.3, 86.2)	79.7 (75.1, 84.3) p=0.022	81.8 (77.3, 86.2) p=0.45	82.5 (78.0, 87.0) p=0.078
Lung adenocarcinoma	69.4 (65.8, 73.1)	68.2 (64.6, 71.8) p=0.001	69.7 (66.0, 73.3) p=0.11	70.1 (66.4, 73.7) p=0.025
Overall UADT cancer	66.1 (63.2, 68.9)	65.2 (62.4, 68.0) p=0.011	66.1 (63.2, 68.9) p=0.90	66.6 (63.7, 69.4) p=0.021
UADT squamous cell	66.4 (63.3, 69.4)	65.4 (62.4, 68.5) p=0.012	66.4 (63.3, 69.4) p=0.98	66.9 (63.8, 69.9) p=0.031
Esophageal adenocarcinoma	69.9 (63.2, 76.7)	69.5 (62.8, 76.2) p=0.54	70.0 (63.3, 76.8) p=0.67	69.9 (63.1, 76.6) p=0.86

<sup>a</sup>Reference variable for the p-values

<sup>b</sup>Comprehensive smoking index

**Supplementary Table 2. Interaction between cumulative tar exposure and race/ethnicity on cancer risk**

<b>Cancer Type</b>	<b>Adjusted OR (95% CL's) for Tar Tertile 3 vs Never Smokers<sup>a</sup></b>		
	<b>White</b>	<b>Non-White</b>	<b>Interaction Odds Ratio</b>
Lung	16.65 (10.22, 27.13)	5.89 (3.43, 10.10)	0.36 (0.19, 0.69) p=0.002
UADT	2.17 (1.44, 3.27)	1.95 (1.09, 3.47)	0.75 (0.40, 1.39) p=0.36

a. Models adjusted for age, sex, years of education, and drink-years

**Supplementary Table 3. Interaction between cumulative tar exposure and smoking status on cancer risk**

<b>Cancer Type</b>	<b>Adjusted OR (95% CL's) for Tar Tertile 3 vs Tertile 1<sup>a</sup></b>		
	<b>Former Smokers</b>	<b>Current Smokers</b>	<b>Interaction Odds Ratio</b>
Lung	10.80 (6.31, 18.49)	36.72 (3.97, 339.96)	5.98 (0.66, 54.22) p=0.11
UADT	2.96 (1.76, 4.99)	6.65 (1.42, 31.02)	3.31 (0.82, 13.51) p=0.09

a. Models adjusted for age, race/ethnicity, sex, years of education, and drink-years