

Supplementary Appendix

Tobacco smoking and solid fuels for cooking and risk of liver cancer: a prospective cohort study of 0.5 million Chinese adults

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Supplementary table 1. HRs for liver cancer associated with smoking characteristics, stratified by baseline characteristics.

	No. of cigarettes/day			P _{interact}	Age started smoking (years)			P _{interact}
	≤10	11-20	>20		>25	19-25	≤18	
Gender				0.826				0.948
Male	1.21 (1.06,1.39)	1.31 (1.15,1.49)	1.33 (1.14,1.55)		1.21 (1.04,1.40)	1.27 (1.12,1.45)	1.35 (1.18,1.56)	
Female	1.08 (0.78,1.49)	1.25 (0.74,2.08)	2.05 (0.76,5.54)		1.03 (0.68,1.54)	1.16 (0.72,1.89)	1.34 (0.86,2.09)	
Region				0.742				0.152
Rural	1.27 (1.08,1.50)	1.45 (1.23,1.71)	1.41 (1.15,1.71)		1.18 (0.98,1.43)	1.41 (1.20,1.65)	1.48 (1.24,1.76)	
Urban	1.18 (0.98,1.43)	1.19 (1.00,1.42)	1.27 (1.01,1.60)		1.23 (1.01,1.50)	1.13 (0.95,1.35)	1.30 (1.06,1.59)	
HBsAg				0.083				0.368
Negative	1.14 (0.98,1.32)	1.28 (1.10,1.47)	1.41 (1.19,1.69)		1.16 (0.99,1.37)	1.24 (1.08,1.43)	1.32 (1.12,1.55)	
Positive	1.35 (1.06,1.73)	1.40 (1.11,1.78)	1.19 (0.87,1.63)		1.19 (0.89,1.59)	1.36 (1.08,1.73)	1.47 (1.14,1.91)	
Cirrhosis				0.355				0.688
No	1.22 (1.07,1.39)	1.30 (1.14,1.48)	1.36 (1.16,1.60)		1.20 (1.04,1.39)	1.28 (1.13,1.46)	1.35 (1.17,1.55)	
Yes	0.96 (0.65,1.42)	1.44 (1.01,2.05)	1.02 (0.63,1.66)		1.07 (0.67,1.71)	1.12 (0.79,1.61)	1.34 (0.90,1.98)	
Drinker				0.086				0.046
Never	1.04 (0.83,1.31)	1.18 (0.95,1.47)	1.21 (0.89,1.65)		1.04 (0.80,1.34)	1.19 (0.96,1.47)	1.11 (0.86,1.44)	
Ever	1.31 (1.13,1.53)	1.44 (1.25,1.66)	1.50 (1.26,1.78)		1.30 (1.10,1.53)	1.38 (1.20,1.59)	1.55 (1.32,1.81)	
BMI (kg/m ²)				0.778				0.435
18.5-24.0	1.27 (1.07,1.51)	1.38 (1.17,1.63)	1.45 (1.19,1.78)		1.26 (1.04,1.52)	1.32 (1.11,1.55)	1.49 (1.25,1.78)	
≥24	1.12 (0.92,1.36)	1.19 (0.99,1.44)	1.23 (0.97,1.56)		1.14 (0.92,1.41)	1.18 (0.98,1.41)	1.20 (0.97,1.49)	
Physical activity				0.373				0.776
Low	1.28 (1.08,1.52)	1.38 (1.17,1.62)	1.28 (1.04,1.58)		1.30 (1.08,1.57)	1.30 (1.10,1.53)	1.39 (1.16,1.67)	
High	1.10 (0.92,1.32)	1.23 (1.03,1.46)	1.38 (1.11,1.71)		1.08 (0.88,1.32)	1.22 (1.02,1.45)	1.29 (1.06,1.56)	

Taking those who had never smoked regularly as common reference group.

HRs were stratified by gender, baseline age groups and study regions and adjusted for education, household income, occupation, marital status, alcohol consumption, environmental tobacco smoke, months of storing pesticides at home, long-term cooking and heating fuel exposure, stoves with chimney/extractor, physical activity, BMI, having a refrigerator at home, consumption frequency of fresh fruit, preserved vegetables, red meat, fish and grains at baseline, hepatitis B test result, family history of cancer, medical history of hepatic cirrhosis and diabetes.

Abbreviations: HBsAg, hepatitis B surface antigen; BMI, Body mass index

Supplementary table 2. HRs for liver cancer associated with long-term cooking fuel use, stratified by baseline characteristics.

	Cooking fuel type (Always solid) ^a			P _{interact}	Duration exposed (years)			P _{interact}
	Always coal	Always wood	Solid (mixed)		1-14	15-29	≥30	
Gender				<0.001				0.007
Male	1.02 (0.73,1.43)	1.12 (0.86,1.45)	1.84 (1.25,2.71)		0.95 (0.77,1.17)	0.99 (0.80,1.22)	1.25 (1.01,1.55)	
Female	1.52 (1.01,2.28)	1.63 (1.16,2.28)	1.45 (0.99,2.12)		1.33 (0.99,1.78)	1.48 (1.12,1.95)	1.32 (0.99,1.76)	
Region				0.011				0.055
Rural	1.51 (1.05,2.19)	1.57 (1.11,2.22)	1.70 (1.17,2.46)		1.32 (0.92,1.90)	1.57 (1.11,2.22)	1.60 (1.13,2.28)	
Urban	0.43 (0.19,0.97)	1.28 (0.95,1.71)	0.85 (0.35,2.07)		0.98 (0.80,1.18)	1.01 (0.84,1.23)	1.11 (0.90,1.37)	
HBsAg				0.183				0.043
Negative	1.30 (0.96,1.74)	1.44 (1.14,1.83)	1.45 (1.08,1.95)		1.12 (0.91,1.37)	1.19 (0.98,1.45)	1.26 (1.03,1.53)	
Positive	0.72 (0.40,1.31)	0.86 (0.56,1.33)	1.04 (0.55,1.94)		0.96 (0.69,1.34)	1.02 (0.73,1.42)	1.16 (0.82,1.64)	
Cirrhosis				0.776				0.974
No	1.18 (0.90,1.54)	1.25 (1.01,1.54)	1.27 (0.97,1.66)		1.06 (0.89,1.27)	1.16 (0.97,1.38)	1.20 (1.01,1.44)	
Yes	0.66 (0.24,1.78)	1.96 (0.98,3.90)	3.72 (1.43,9.66)		1.03 (0.58,1.83)	1.46 (0.86,2.51)	1.51 (0.84,2.73)	
Drinker				0.324				0.253
Never	1.21 (0.82,1.80)	1.50 (1.11,2.04)	1.43 (0.98,2.07)		1.28 (0.97,1.69)	1.40 (1.08,1.83)	1.36 (1.04,1.78)	
Ever	1.09 (0.77,1.53)	1.11 (0.84,1.47)	1.28 (0.89,1.85)		0.93 (0.75,1.15)	1.00 (0.81,1.24)	1.14 (0.91,1.42)	
BMI (kg/m ²)				0.200				0.332
18.5-24.0	1.30 (0.92,1.84)	1.53 (1.16,2.02)	1.46 (1.03,2.07)		1.27 (0.99,1.62)	1.36 (1.07,1.74)	1.46 (1.14,1.87)	
≥24	0.98 (0.64,1.49)	0.94 (0.67,1.32)	1.12 (0.74,1.72)		0.90 (0.71,1.15)	1.02 (0.81,1.29)	1.00 (0.78,1.29)	
Physical activity				0.076				0.602
Low	1.32 (0.93,1.86)	1.33 (1.00,1.78)	1.85 (1.30,2.64)		1.04 (0.83,1.31)	1.20 (0.96,1.49)	1.35 (1.07,1.69)	
High	1.01 (0.69,1.48)	1.13 (0.85,1.49)	0.94 (0.65,1.39)		1.05 (0.81,1.35)	1.10 (0.85,1.41)	1.04 (0.80,1.34)	

Taking those always used clean fuels for cooking as common reference group.

^a Analysis was restricted to individuals who always solid fuels in the last 3 residences before baseline survey (N=182,285).

HRs were stratified by gender, baseline age groups and study regions and adjusted for education, household income, occupation, marital status, alcohol consumption, smoking habits, environmental tobacco smoke, months of storing pesticides at home, long-term heating fuel exposure, stoves with chimney/extractor, physical activity, BMI, having a refrigerator at home, consumption frequency of fresh fruit, preserved vegetables, red meat, fish and grains at baseline, hepatitis B test result, family history of cancer, medical history of hepatic cirrhosis and diabetes.

Abbreviations: HBsAg, hepatitis B surface antigen; BMI, Body mass index

Supplementary table 3. Sensitivity analysis for adjusted hazard ratios for liver cancer associated with smoking characteristics and long-term cooking fuel use.

		Smoking status			Cooking fuel		
		Never	Ex-smoker	Current smoker	Always clean	Solid to clean	Always solid
Main analysis							
	No. of cases	1,374	153	1,470	365	513	1,009
	HR (95% CIs)	1.00	1.13 (0.94,1.36)	1.28 (1.15,1.42)	1.00	1.10 (0.94,1.28)	1.25 (1.03,1.52)
Excluding first 2 years of follow-up							
	No. of cases	1,189	130	1,231	309	441	848
	HR (95% CIs)	1.00	1.15 (0.94,1.40)	1.28 (1.14,1.44)	1.00	1.11 (0.94,1.31)	1.26 (1.02,1.55)
Excluding family history of cancer							
	No. of cases	1,125	120	1,174	279	401	848
	HR (95% CIs)	1.00	1.14 (0.93,1.41)	1.30 (1.15,1.46)	1.00	1.14 (0.96,1.36)	1.34 (1.08,1.66)
Adjustment for 11 groups of alcohol consumption							
	No. of cases	1,374	153	1,470	365	513	1,009
	HR (95% CIs)	1.00	1.14 (0.95,1.37)	1.28 (1.15,1.43)	1.00	1.09 (0.94,1.27)	1.25 (1.03,1.51)

HRs were stratified by gender, baseline age groups and study regions and adjusted for education, household income, occupation, marital status, alcohol consumption, environmental tobacco smoke, months of storing pesticides at home, long-term heating fuel exposure, stoves with chimney/extractor, physical activity, BMI, having a refrigerator at home, consumption frequency of fresh fruit, preserved vegetables, red meat, fish and grains at baseline, hepatitis B test result, family history of cancer, medical history of hepatic cirrhosis and diabetes, mutually adjusted for long-term cooking fuel exposure and smoking habits.