

Table 2.7.1 Cohort studies: Red meat and cancer of the lung (web-only)

Reference, location enrolment/follow-up period, study design	Population size, description, exposure assessment method	Organ site	Exposure category or level	Exposed cases/deaths	Risk estimate (95% CI)	Covariates controlled	
Breslow et al. (2000) US Initial interview in 1987 and matched to mortality data through to 31 December 1995	20 195 individuals; Households eligible for the National Health Interview Survey in 1987 Exposure assessment method: Questionnaire	Lung	Red meat (servings/week)			Age, gender, smoking duration (years), packs per day smoked	
			0–2.3	39	1		
			2.3–4.2	29	0.7 (0.4–1.2)		
			4.2–6.6	44	1.5 (0.9–2.4)		
			> 6.6	46	1.6 (1–2.6)		
			Trend-test p-value: 0.014				
Tasevska et al. (2009) US 1995–2003	278 380 men and 189 596 women; NIH-AARP Diet and Health Study: men and women aged 50–71 y from 8 US states Exposure assessment method: Questionnaire; Self-administered semiquantitative 124-item FFQ. Meat-cooking module in a second FFQ 6 months after baseline	Lung	Red meat (g/1000 kcal)			BMI, smoking, race, education, physical activity, intake of alcohol, energy-adjusted vegetable and fruit servings, saturated fat	
			Men:				
			Q1: ≤ 19.2	NR	1		
			Q2: > 19.2 ≤ 30.0	NR	1.1 (0.98–1.23)		
			Q3: > 30.0 ≤ 40.6	NR	1.18 (1.05–1.31)		
		Q4: > 40.6 ≤ 54.7	NR	1.13 (1–1.26)			
		Q5: > 54.7	NR	1.22 (1.09–1.38)			
					Trend-test p-value: 0.005		
		Lung	Red meat (g/1000 kcal)			Same as above	
			Women:				
Q1: ≤ 13.3	NR		1				
Q2: 13.3 ≤ 22.1	NR		1.05 (0.91–1.21)				
Q3: > 22.1 ≤ 31.2	NR		0.93 (0.8–1.08)				
Q4: > 31.2 ≤ 43.8	NR	1.05 (0.91–1.22)					
Q5: > 43.8	NR	1.13 (0.97–1.32)					
			Trend-test p-value: 0.05				

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		Lung	Red meat (g/1000 kcal) Men: Never smokers: 90th percentile compared to 10th percentile Trend-test p-value: 0.52	137	1.19 (0.69–2.06)	Same as above
		Lung	Red meat (g/1000 kcal) Women: Never smokers: 90th percentile compared to 10th percentile Trend-test p-value: 0.44	166	1.21 (0.76–1.94)	Same as above
		Lung	Well/very-well done (g/1000 kcal) Men: T1: ≤ 2.7 T2: > 2.7 ≤ 9.7 T3: > 9.7 Trend-test p-value: 0.002	NR NR NR	1 1.07 (0.96–1.19) 1.2 (1.07–1.35)	Same as above
		Lung	Well/very-well done (g/1000 kcal) Women: T1: ≤ 2.5 T2: > 2.5 ≤ 9.4 T3: > 9.4 Trend-test p-value: 0.43	NR NR NR	1 0.92 (0.8–1.05) 0.93 (0.8–1.08)	Same as above

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		Lung	MelQx (ng/1000 kcal) Men: Q1: ≤ 1.7 Q3: > 4.2 ≤ 8.3 Q5: > 16.5 Trend-test p-value: 0.04	NR NR NR	1 1.15 (1–1.32) 1.2 (1.04–1.38)	Same as above
		Lung	MelQx (ng/1000 kcal) Women: Q1: ≤ 1.1 Q3: > 3.0 ≤ 6.2 Q5: > 12.7 Trend-test p-value: 0.66	NR NR NR	1 0.97 (0.81–1.15) 0.95 (0.8–1.13)	Same as above
		Lung	Heme iron (µg/1000 kcal) Men: Q1: ≤ 90.2 Q3: > 143.8 ≤ 201.0 Q5: > 285.2 Trend-test p-value: 0.02	NR NR NR	1 1.22 (1.06–1.41) 1.25 (1.07–1.45)	Same as above
		Lung	Heme iron (µg/1000 kcal) Women: Q1: ≤ 63.2 Q3: > 104.0 ≤ 149.4 Q5: > 217.2 Trend-test p-value: 0.002	NR NR NR	1 0.9 (0.74–1.08) 1.18 (0.99–1.42)	Same as above

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Linseisen et al. (2011) Europe enrollment early 1900s	142 602 men and 335 825 women; EPIC: men and women age 25–70 in 10 European countries Exposure assessment method: Questionnaire; Self-administered FFQ, 300–350 items. 24-hour recalls or 7-day diaries in subcohorts	Lung: ICD-O C34	Continuous model per 50 g: red meat	NR	1.06 (0.89–1.27)	Age, sex, centre, smoking, body weight, height, energy intake, alcohol, fruits and vegetables, physical activity, education
Tasevska et al. (2011) USA enrollment 1993– 2001; follow-up until 2006 (5.5 years median)	48 229 men and 51 350 women; PLCO Cancer Screening Trial – healthy volunteers aged 55–74 years Exposure assessment method: Questionnaire; self-administered semiquantitative food frequency questionnaire (FFQ) with 124 food items	Lung: 34.0–34.9	Red meat, g/1000 kcal	NR	1.02 (0.75–1.41)	Age, detailed smoking history, race, education, total energy intake, fruits and vegetables, fats, alcohol
			Men: Q (quintiles) 2 vs Q1	NR	1 (0.72–1.38)	
			Q3 vs Q1	NR	1.06 (0.76–1.47)	
			Q4 vs Q1	NR	1.11 (0.79–1.56)	
			Q5 vs Q1	NR	1.33 (0.91–1.94)	
			Women: Q2 vs Q1	NR	1.6 (1.1–2.33)	
			Q3 vs Q1	NR	1.24 (0.84–1.85)	
Q4 vs Q1	NR	1.3 (0.87–1.95)				
Q5 vs Q1	NR					

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Butler et al. (2013) Singapore Enrollment 1993–98	27 293 men and 34 028 women; Singapore Chinese Health Study; men & women aged 45–74 Exposure assessment method: Questionnaire; 165-item quantitative food frequency questionnaire	Lung: all cancers	Total fried meat (times/year)			Age, ethnicity, sex, education, BMI, energy intake, smoking, cryptoxanthin, interview year
			T1, < 115	357	1	
			T2, 115–189	399	1.13 (0.98–1.31)	
			T3, ≥ 190	374	1.09 (0.94–1.27)	
			Trend-test p-value: 0.2			
		Lung: adenocarcinomas	Total fried meat (times/year)			Same as above
			T1, < 115	115	1	
T2, 115–189	150		1.31 (1.03–1.68)			
T3, ≥ 190	154		1.36 (1.06–1.74)			
	Trend-test p-value: 0.02					
Gnagnarella et al. (2013) Italy Enrollment 2004– 2005	5203; Volunteer smokers or quit smoking for < 10 years and had smoked at least 20 pack-years Exposure assessment method: Questionnaire; FFQ from Italian component of EPIC	Lung	All red meats. tertile of average monthly intake			Baseline risk probability, total energy (using the nutrient-density method), fruits and vegetables, fish, red meat, olive oil, tea and wine intake
			Q1	35	1	
			Q2	39	0.95 (0.6–1.5)	
			Q3	49	0.91 (0.57–1.44)	
			Q4	55	1.73 (1.15–2.61)	
				Trend-test p-value: 0.003		

References

- Breslow RA, Graubard BI, Sinha R, Subar AF (2000). Diet and lung cancer mortality: a 1987 National Health Interview Survey cohort study. *Cancer Causes Control*. 11(5):419–31. PMID:10877335 <http://dx.doi.org/10.1023/A:1008996208313>
- Butler LM, Montague JA, Koh WP, Wang R, Yu MC, Yuan JM (2013). Fried meat intake is a risk factor for lung adenocarcinoma in a prospective cohort of Chinese men and women in Singapore. *Carcinogenesis*. 34(8):1794–9. PMID:23568952 <http://dx.doi.org/10.1093/carcin/bgt113>
- Gnagnarella P, Maisonneuve P, Bellomi M, Rampinelli C, Bertolotti R, Spaggiari L, et al. (2013). Red meat, Mediterranean diet and lung cancer risk among heavy smokers in the COSMOS screening study. *Ann Oncol*. 24(10):2606–11. PMID:23956193 <http://dx.doi.org/10.1093/annonc/mdt302>
- Linseisen J, Rohrmann S, Bueno-de-Mesquita B, Büchner FL, Boshuizen HC, Agudo A, et al. (2011). Consumption of meat and fish and risk of lung cancer: results from the European Prospective Investigation into Cancer and Nutrition. *Cancer Causes Control*. 22(6):909–18. PMID:21479828 <http://dx.doi.org/10.1007/s10552-011-9764-1>
- Tasevska N, Cross AJ, Dodd KW, Ziegler RG, Caporaso NE, Sinha R (2011). No effect of meat, meat cooking preferences, meat mutagens or heme iron on lung cancer risk in the prostate, lung, colorectal and ovarian cancer screening trial. *Int J Cancer*. 128(2):402–11. PMID:20232386 <http://dx.doi.org/10.1002/ijc.25327>
- Tasevska N, Sinha R, Kipnis V, Subar AF, Leitzmann MF, Hollenbeck AR, et al. (2009). A prospective study of meat, cooking methods, meat mutagens, heme iron, and lung cancer risks. *Am J Clin Nutr*. 89(6):1884–94. PMID:19369370 <http://dx.doi.org/10.3945/ajcn.2008.27272>