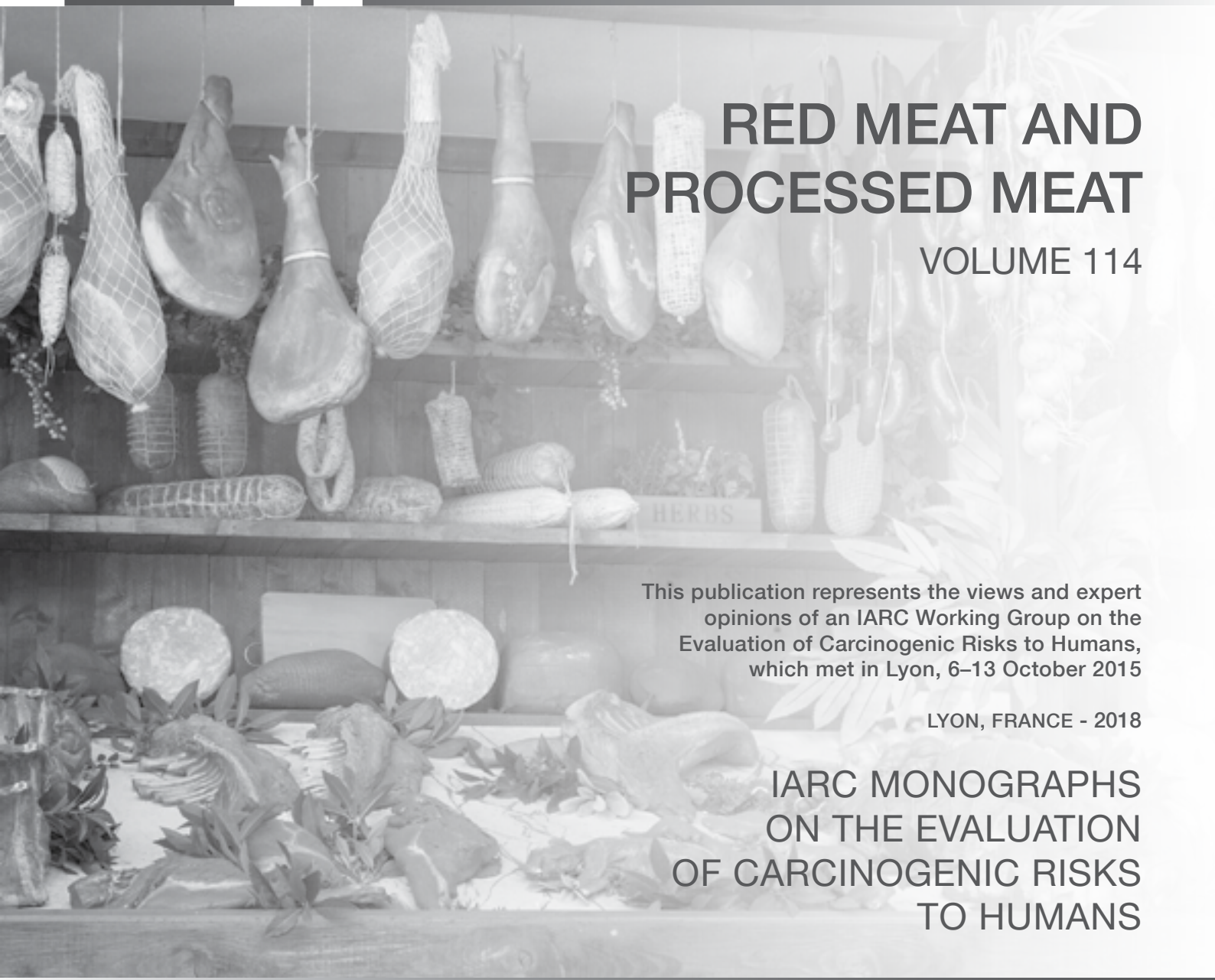
IARC MONOGRAPHS



RED MEAT AND PROCESSED MEAT

VOLUME 114

This publication represents the views and expert opinions of an IARC Working Group on the Evaluation of Carcinogenic Risks to Humans, which met in Lyon, 6–13 October 2015

LYON, FRANCE - 2018

IARC MONOGRAPHS ON THE EVALUATION OF CARCINOGENIC RISKS TO HUMANS

International Agency for Research on Cancer

World Health Organization

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Yu et al. (1988) USA – Los Angeles County 1st January 1975–31st August 1981	**Cases:** 275; Incident cases of oesophageal cancer aged 20–64, diagnosed between January 1975 and March 1981, histologically confirmed and identified through the Los Angeles County Cancer Surveillance Program (population-based registry recording all cases of cancer that are microscopically verified or mentioned on a death certificate) **Controls:** 275; Population controls selected from the neighbourhood of the cases' residence at the time of diagnosis (using a systematic canvassing of the residential units around the case's residence), matched on sex, year of birth, "race" (this last matching criterion was not strictly adhered to if no potential control was identified within 80 housing units) **Exposure assessment method:** Questionnaire; Dietary habits were assessed through a series of questions related to the usual frequency of consumption of a few broad food groups; among these food groups, "Beef" can be used to estimate "red meat" consumption.	Oesophagus: all	Beef intake (servings/week)			Sex, year of birth, "race"
			Group 1 (≤ 1)	20	1.3 (0.6–2.7)	
			Group 2 (2–4)	169	1.5 (1–2.3)	
			Group 3 (≥) = Reference group	78	1.0	
		Oesophagus: directly interviewed	Beef:			Same as above
			Group 1 (≤)	8	1 (0.3–2.9)	
			Group 2 (2–4)	79	1.5 (0.8–2.6)	
			Group 3 (≥) = Reference group	42	1.0	

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Rogers et al. (1993) USA – Western Washington state (King, Pierce, and Snohomish counties) 1st September 1983–28th February 1987	**Cases:** 127; Incident cases of oesophageal cancer of epithelial origin identified through the local Surveillance, Epidemiology and End Results cancer registry. Diagnosis was based on a positive histological finding or, in a few cases, a positive cytology with follow-up to the attending physician to confirm the diagnosis. **Controls:** 466; Population controls identified using random digit dialing, frequency-matched by sex and 5-year age intervals to the oral cancer cases (larynx, oesophagus, and oral cavity). **Exposure assessment method:** Questionnaire; Dietary habits were assessed by a food frequency questionnaire consisting of 125 food items which was a modification of a questionnaire in which reliability and validity had been assessed (Willett et al., 1985);past consumption was recorded according to 9 frequency categories ranging from "never or less than once a year" to "6+ per day"; the exposures related to red meat consumption in this study were "Beef as main dish" (as opposed to "Beef as a sandwich," the results of which can be found in the table concerning processed meat and oesophageal cancer), and "Pork excluding bacon and ham."	Oesophagus: (ICD-O 150.0–150.9)	Beef as a main dish, frequency/week			Age, sex, pack-years of cigarettes, drink-years of alcohol, energy intake, [β]-carotene intake, ascorbic acid intake
			< 1	NR	1	
			≥ 1	NR	0.8 (0.4–1.4)	
		Oesophagus: (ICD-O 150.0–150.9)	Pork excluding bacon and ham, frequency/week			Same as above
			< 1	NR	1	
			≥ 1	NR	1.2 (0.8–2.5)	
		Oesophagus: (ICD-O 150.0–150.9)	Iron level in nail tissue, ppm			Same as above
			< 48	120	1	
			48–116	167	1.7 (0.7–3.9)	
			> 116	86	2.9 (1.1–7.5)	
		Oesophagus: (ICD-O 150.0–150.9)	Iron in diet, mg/d			Same as above
			< 14.26	120	1	
			14.26–31.02	275	0.5 (0.2–0.9)	
			> 31.02	134	0.5 (0.2–1.2)	

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Castelletto et al. (1994) Argentina – Greater La Plata May 1986–June 1989	**Cases:** 131; Incident cases of squamous cell carcinoma of the oesophagus histologically confirmed and diagnosed within the previous 4 months in individuals admitted to any of the ten main hospitals of greater La Plata **Controls:** 262; Hospital-based controls (two for each case) matched by sex, age (+/– 5 years) and hospital, who did not have a diagnosis of tobacco- and/or alcohol-related disease. **Exposure assessment method:** Questionnaire; Dietary habits were assessed through a food frequency questionnaire for two time periods (the period just before the onset of symptoms and ten years before admission to the hospital).Among the considered food items, “beef” and “barbecue” may be used to assess the consumption of “red meat.”	Oesophagus: (ICD-O 15)	All – Beef – Group 1 (< daily) Group 2 (daily) All – Barbecue – Group 1 (< 1/week) Group 2 (≥ 1/week)	NR NR NR NR	1 0.6 (0.3–0.9) 1 2.4 (1.2–4.8)	Age group, sex, hospital group, education, cigarettes/day, ethanol (ml/day), barbecue, beef
Brown et al. (1995) The United States 1986–1989	**Cases:** 162; Residents of three population-based cancer registries, white men of 30–79 years **Controls:** 685; Random sampling from computerized listings of Medicare recipients aged 30–64 years **Exposure assessment method:** Questionnaire; A 60-item FFQ. recalled usual adult frequency excluding the past 5 years	Oesophagus: adenocarcinomas of the oesophagus and the oesophagogastric junction	Red meat: Quartiles 1 (low) Quartiles 2 Quartiles 3 Quartiles 4 (high) Trend-test p-value: 0.21	 1 1.3 0.9 0.8	 - - - -	Age, area, smoking, liquor use, income, calories from food, BMI

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Rolón et al. (1995) Paraguay – Asuncion January 1988–March 1991	**Cases:** 131; Incident cases of oesophageal cancer diagnosed by cytology, histology, or radiology, and identified in four hospitals and all private clinics, pathology laboratories, and radiology clinics in Asuncion. **Controls:** 381; Hospital-based controls matched (3 controls for one case) by hospital, sex and age (+/– 5 years) who had not diseases thought to be associated with smoking or alcohol. **Exposure assessment method:** Questionnaire; Double food frequency questionnaire including 50 dietary items for current and past (10 years before) consumption; monthly average amounts of consumption were computed and ranked into quartiles; a food group "red meat" was created but we do not know exactly how it was defined; results for consumption of "beef" alone are also reported.	Oesophagus: (ICD-O 15)	risk per quaratile/tertile All – Red meats: Lowest quartile Low quartile High quartile Highest quartile All – Beef only: Lowest tertile Low tertile High tertile Trend-test p-value: 0.02	 14 33 52 43 14 20 97	 1 3.1 (1.2–7.8) 3 (1.2–7.5) 3.8 (1.3–11) 1 1.8 (0.6–5) 4.7 (2–11.5)	Age group, sex, hospital group, lifetime consumption of alcohol, cigarette smoking, fats, fish, milk
Ward et al. (1997) 66 counties of eastern Nebraska, USA 1988–1993	**Cases:** 124 for oesophagus, 154 for stomach; Cases were white men and women aged 21 years or older, who had been newly diagnosed with adenocarcinoma of the stomach (*n* = 176) oesophagus (ICD-O codes 150, 151) (*n* = 143). Oesophageal cancer located in the upper and cervical oesophagus (ICD-O codes 150.0, 150.3) was excluded. Cases were limited to whites. Cases were residents of 66 counties in eastern Nebraska at the time of the	Oesophagus: (ICD-O 150, 151) excluding 150.0 and 150.3	Beef (steaks/roasts, hamburgers): times/week, < 3 times/week, 3–4 times/week, 5 times/week, 6+ Trend-test p-value: 0.37	26 58 14 26	1 1.4 (0.8–2.6) 1 (0.4–2.3) 1.1 (0.6–2.1)	Adjusted for sex and year of birth.

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
	interview. Cases from 1988 through 1990 were identified from the Nebraska Cancer Registry. Cases from 1991 through 1993 were identified by review of discharge diagnoses and pathology records at the 14 hospitals in Omaha, Lincoln and Grand Island. **Controls:** 502; Controls were selected from controls of population-based case-control study of haematopoietic cancer and re-interviewed. Controls were identified from 66 eastern counties of Nebraska and were frequency-matched to the haematopoietic cancer cases by their sex, age (in 5 year groups) and vital status in a 3:1 ratio. Controls under the age of 65 years were selected from the general population (in 1985–1986) by random digit dialing. Subjects aged 65 years and over were identified from Health Care Financing Administration Medicare files. Controls for deceased cases were selected from Nebraska mortality records with the additional matching factor of year of death (1983–1985). A total of 502 eligible controls were re-interviewed. Deceased cases and controls were not matched on year of death. **Exposure assessment method:** Questionnaire; Modified version of the Health Habits and History Questionnaire(HHHQ)	Oesophagus: (ICD-O 150, 151) excluding 150.0 and 150.3	Beef cooking method: baked/roasted/boiled	10	1	Adjusted for sex and year of birth.
			fried/broiled	101	1 (0.4–2.1)	
			grilled/barbecued	9	1.5 (0.5–4.8)	
			Trend-test p-value: 0.37			
		Oesophagus: (ICD-O 150, 151) excluding 150.0 and 150.3	Doneness preference for beef: rare/medium rare	14	1	Adjusted for sex, year of birth and weekly red meat intake.
			medium	16	1 (0.4–2.3)	
			medium well	30	1.8 (0.9–3.9)	
			well	53	1.5 (0.7–2.9)	
			Trend-test p-value: 0.35			

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Brown et al. (1998) USA – Atlanta, Detroit, New Jersey 1st August 1986–30th April 1989	**Cases:** 293; Incident cases of oesophageal cancer histologically confirmed in "white" and "black" male patients (that are treated as two separate study populations: 114 "white" and 219 "black" cases) **Controls:** 1112; Population-based controls selected to be similar to the expected age, sex and area distribution of the cases. There are two separate populations of controls (681 "whites" and 557 "black" controls). Controls aged 30–64 years were selected using a random-digit dialing technique, whereas controls aged 65–79 years were randomly chosen from computerized listings of Medicare registrants. **Exposure assessment method:** Questionnaire; Assessment of dietary intake was based on a questionnaire about 60 specific food items about which individuals were asked to recall their usual frequency of consumption (excluding the five past years);"red meat" was defined as consumption of "bacon or sausage, beef, liver, liverwurst or chopped liver, lunch meats, mixed dish with meat (e.g., chili, pork and beans, spaghetti and meat balls), other pork or ham, stew"; results are also given for "liver" consumption only, which can be considered in the "red meat" category. The detail of the FFQ is in previous article (Swanson et al., 1993).	Oesophagus: (ICD-O 15)	Red Meat: "White" male individuals Q1	NR	1	Age, area, smoking, alcohol, food calories
			Q2	NR	1.5	
			Q3	NR	1.3	
			Q4	NR	1.5	
			"Black" male individuals Q1	NR	1	
			Q2	NR	2.4	
			Q3	NR	2.4	
			Q4	NR	2.7	
			Liver: "White" male individuals Q1	NR	1	
			Q2	NR	0.6	
			Q3	NR	0.6	
			Q4	NR	0.8	
			"Black" male individuals Q1	NR	1	
			Q2	NR	0.8	
			Q3	NR	0.9	
			Q4	NR	1.5	

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
		Oesophagus: (ICD-O 15)	Risk per quintile			Same as above
			Iron "White" male individuals Q1	NR	1	
			Q2	NR	0.6	
			Q3	NR	0.9	
			Q4	NR	0.7	
			"Black" male individuals Q1	NR	1	
			Q2	NR	1.2	
			Q3	NR	1.6	
			Q4	NR	2.2	

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Bosetti et al. (2000) Northern Italy (provinces of Milan, Pordenone and Padova) 1992–1997	**Cases:** 304; Incident cases of histologically confirmed squamous cell carcinoma of the oesophagus admitted to the major teaching and general hospitals in the areas under study. **Controls:** 743; Hospital-based controls admitted to the same hospitals as the cases with non-neoplastic diseases, and conditions not related to smoking or alcohol consumption and long-term modification of diet. Controls were frequency-matched with cases based on age (5-year age groups), sex, year of interview and area of residence. **Exposure assessment method:** Questionnaire; Dietary information was obtained a FFQ including 78 specific foods and beverages as well as a range of the most common meal recipes in the Italian diet. Dietary intake was assessed in terms of the average weekly frequency of consumption during the two years before cancer diagnosis or hospital admission. Cumulative weekly intake of each food group was obtained by summing the frequency of consumption of individual food items in the same group and then forming approximate marginal quintiles. There is no detail in the text about the definition of "red meat" (we have found in Franceschi et al., 1999 that red meat was assessed from eight questions of the FFQ and at least included beef, veal and pork). In that paper, it is mentioned that FFQ was validated.	Oesophagus Squamous cell carcinoma: (ICD-O 15)	All – Red meat Q1 (< 2.9 servings/week) Q2 (2.9–3.9 servings/week) Q3 (3.9–5.2 servings/week) Q4 (5.2–6.7 servings/week) Q5 (> 6.7 servings/week) Trend-test p-value: 0.094	NR NR NR NR NR	1 1.98 (1.15–3.41) 1.78 (1.04–3.04) 1.76 (1–3.08) 1.93 (1.09–3.41)	Age, sex, area of residence, education, tobacco smoking, alcohol drinking, non-alcohol energy

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Levi et al. (2000) Switzerland – Canton of Vaud 1992–1999	**Cases:** 101; Histologically confirmed oesophageal cancer admitted to the University Hospital of Lausanne, diagnosed no longer than one year before the interview and with no previous history of cancer of other sites; age range: 34–74 years (median age 61). **Controls:** 660; Hospital-based controls admitted to the same hospital for a wide spectrum of acute, non-neoplastic conditions unrelated to smoking or alcohol consumption and long-term modification of diet **Exposure assessment method:** Questionnaire; Dietary intake quantification was based on a food frequency questionnaire including 79 items and corresponded to the average weekly frequency of consumption during the two years before cancer diagnosis or hospital admission (It was validated as mentioned in previous paper; Levi et al., 1998);no clear definition of “red meat” but apparently it does not include “pork” which is combined in their analysis with “processed meat.”	Oesophagus: (ICD-O 9th edition 150.0–0.9)	All – Red meat T1 (< 2.83 servings per week)	NR	1	Age, sex, education, tobacco smoking, alcohol drinking, non-alcohol total energy intake
			T2 (2.83–4.70 servings per week)	NR	1.8 (0.8–4.4)	
			T3 (> 4.70 servings per week)	NR	3.53 (1.46–8.53)	
			Red meat – Continuous (for an increment of 7 servings per week): All	NR	1.69 (1.3–2.2)	
			Age < 60	NR	1.51 (0.9–2.5)	
			Age ≥ 60	NR	1.61 (1.1–2.4)	
			Alcohol 0–5 drinks per day	NR	1.37 (0.9–2)	
			Alcohol > 5 drinks per day	NR	1.93 (1.1–3.5)	
			Trend-test p-value: 0.004			

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Takezaki et al. (2001) People's Republic of China – Pizhou City (Jiangsu Province) 1996 (1995 for controls) – 2000	**Cases:** 199 for oesophageal and 187 for stomach cancer; Incident cases of histopathologically confirmed cases of primary oesophageal cancer (ICD-O C15) and stomach cancer who visited Pizhou City Municipal Hospital. **Controls:** 333; Healthy residents of Pizhou, matched on sex, ethnicity and age within 2 years of each case. Controls came from three different sources: a population-based ecological study conducted in 1995–1996; individuals collected between 1995 and 1998 in the general population; individuals collected between 1998 and 2000. **Exposure assessment method:** Questionnaire; Validated (pre-tested) 152-item FFQ	Oesophagus	Risk by frequency			Adjusted for age, sex, smoking, and drinking habits.
			Broiled meat: < 1 time/month	NR	1	
			1–3 times/month	NR	2.73 (1.32–5.63)	
			1–2 times/week	NR	5.57 (2.1–14.8)	
			Meat: < 1 time/month	NR	1.0	
			Meat, 1–3 times/month	NR	0.78 (0.51–1.2)	
			Meat, 1–2 times/week	NR	1.33 (0.79–2.22)	
			Meat, ≥ 3 times/week	NR	1.31 (0.6–2.85)	
			Trend-test p-value: 0.258			

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Chen et al. (2002) USA – Eastern Nebraska 1 July 1988–31 June 1993	**Cases:** 124 (oesophagus) +124 (distal stomach); Incident histologically confirmed cases of oesophageal adenocarcinoma and stomach adenocarcinoma identified from the Nebraska Cancer Registry or 14 participating hospitals covering > 90% of the study population. **Controls:** 449; Population-based controls selected from the control group of a previous case-control study conducted in 1986–1987 in the same base population, frequency-matched to the whole distribution of cases (oesophagus + stomach + glioma) by age, sex and vital status. **Exposure assessment method:** Questionnaire; Dietary assessment was based on a modified version of the short Health Habits and History Questionnaire with the addition of several food items (e.g. for processed meat). Subjects were asked to recall their frequency of consumption of 54 dietary items before 1985. "Red meat" = beef, such as steak or roasts; beef stew or pot pie; hamburgers, cheeseburgers, or meatloaf; fresh ham, ham roast, pork chops, or pork roast; liver, including chicken liver.	Oesophagus Adenocarcinoma	All – Red meat (quartiles) Q1 Q2 Q3 Q4 p for trend: 0.05	NR NR NR NR	1.0 0.93 (0.49–2.1) 1.00 (0.46–2.2) 1.4 (0.61–3.2)	Age, sex, energy intake, respondent type, BMI, alcohol use, tobacco use, education, family history, vitamin supplement use

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Xibib et al. (2003) People's Republic of China – Linzhou City (Henan Province) August 1999–June 2000	**Cases:** 211; Incident cases of oesophageal cancer (C15) identified by the population-based Linzhou Cancer Registry, diagnosed between the 1st January 1998 and the 30th April 1999, and confirmed by histopathology. **Controls:** 633; Neighbourhood controls (three for each case) matched on age (within 5 years), sex and village of residence. **Exposure assessment method:** Questionnaire; No details on the questionnaire; exposure assessed is pork consumption.	Oesophagus (ICD-O 15)	All – Pork Group 1 (Lowest consumption per week 10 years ago) Group 2 (consumption per week 10 years ago) Group 3 (consumption per week 10 years ago) Group 4 (Highest consumption per week 10 years ago) Trend-test p-value: 0.28	22 38 23 17	1.0 1.04 1.35 1.66	Age, income, resident space, educational level, rice, wheat flour, maize, other food grain, bean and bean products, vegetables, pickled or salted vegetables, eggs, milk, animal oils, vegetable oils, deep-fry food, hot flavour food, vinegar, spring onion or garlic, person's taste for salt
Wang et al. (2007) China 2004–2006	**Cases:** 355; Histologically confirmed oesophageal squamous cell carcinoma cases **Controls:** 408; Selected from the name list of village residents with healthy and cancer free **Exposure assessment method:** Questionnaire; face-to-face interviews using a structured questionnaire. Information on validity was not reported. The detail of 'sauce-stewed pork' was unknown.	Oesophagus Squamous cell carcinoma	frequency Sauce-stewed pork Men None/seldom Often	95 128	1.0 2.059 (1.417–2.993)	Age, marital status, education years
		Oesophagus Squamous cell carcinoma	Women None/seldom Often	75 57	1.0 1.914 (1.159–3.162)	Same as above

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Wu et al. (2007) Los Angeles, USA 1992–1997	**Cases:** 206EAC, 257GCA, 366GNCA; All incident cancers were identified by the Los Angeles County Cancer Surveillance Program (CSP), a population-based tumour registry. **Controls:** 1308; Control subjects were individually matched to interviewed case patients on sex, race and date of birth (± 5 years) in the neighbourhood. **Exposure assessment method:** Questionnaire; 124 food items FFQ. Derived from the MEC Study.	Oesophagus Adenocarcinoma: (C15.0-C15.9)	Quartile intake (in gram per day)			Age, sex, race, birthplace, education, smoking, BMI (kg/m2), reflux, use of vitamins, and total calories
			Red meat: Q1	NR	1.0	
			Q2	NR	1.08 (0.7–1.8)	
			Q3	NR	0.82 (0.5–1.4)	
			Q4	NR	1.29 (0.8–2.2)	
			Trend-test p-value: 0.43			
		Oesophagus Adenocarcinoma: (C15.0-C15.9)	Quartile intake (in gram per day)			Same as above
			Red meat Further adjusted for *H.pylori* among subjects infected with *H. pylori*: Q1	NR	1.0	
			Q2	NR	0.89 (0.4–2.2)	
			Q3	NR	1.33 (0.5–3.5)	
			Q4	NR	1.96 (0.7–5.1)	
			Trend-test p-value: 0.097			
Navarro Silvera et al. (2008) USA – Connecticut, New Jersey and western Washington state 1993–early 1995	**Cases:** 206, 282, 255, 352; Incident cases of oesophageal cancer (206 cases of squamous cell cancer and 282 cases of adenocarcinoma) and stomach adenocarcinoma (255 cases of cardia and 352 cases of non-cardia). In fact, this population is part of a larger population of cases containing also cases of cardia and non-cardia gastric adenocarcinoma. Oesophageal adenocarcinomas and gastric cardia adenocarcinoma were considered as the "target cases" whereas oesophageal	Oesophagus Squamous cell carcinoma	Red meats – For an increasing intake of one serving/day	NR	2.1 (0.99–4.45)	Sex, site, age, "race," proxy status, income, education, usual body mass index, cigarette/day, consumption of beer, wine and liquor each, energy intake
		Adenocarcinoma	Red meats – For an increasing intake of one serving/day	NR	2.49 (1.39–4.46)	

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
	squamous cell carcinoma and non-cardia gastric adenocarcinoma cases were considered as a "comparison case group" frequency-matched to the "target group." **Controls:** 687; Population-based controls frequency-matched to the expected distribution of the "target cases" (i.e. cases of oesophageal adenocarcinoma and gastric cardia adenocarcinoma) by five-year age group, sex (in New Jersey and Washington state), "race" (in New Jersey), and study site. Controls aged 30–64 were identified by the random digit dialing method and controls aged 65–79 were identified by Health Care Financing Administration rosters. **Exposure assessment method:** Questionnaire; An expanded version of a food frequency questionnaire developed and validated by investigators at the Fred Hutchinson Cancer Research Center, was used to assess usual food consumption in the period 3–5 years before diagnosis (cases) or interview (controls). Processed meat was defined as " High-nitrite meats" = Smoked turkey lunchmeat; cured, smoked ham lunchmeat; bologna; salami; hot dogs; sausage, not including breakfast sausage; bacon; breakfast sausage.					
Sapkota et al. (2008) the Russian Federation (Moscow); Romania (Bucarest); Poland (Lodz); Hungary (Budapest); Slovakia (Banska Bystrica); Czech	**Cases:** 187; Incident cases of histologically confirmed oesophageal cancer (squamous cell carcinoma). In fact, the original study population consisted of patients newly diagnosed with UADT cancers (oral/pharyngeal, laryngeal and oesophageal cancers).	Oesophagus Squamous cell carcinoma: (ICD-C15)	All – Total red meat Tertile 1 (NR) Tertile 2 (NR) Tertile 3 (NR) Trend-test p-value: 0.93	74 60 53	1 1.35 (0.89–2.06) 1 (0.65–1.54)	Age, country, sex, tobacco (pack-years), education, BMI, frequency of alcohol consumption, tertiles of total vegetable consumption, tertiles of total fruit consumption

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Republic (Prague, Olomouc) August 1999–January 2003	**Controls:** 1110; Hospital-based controls who were admitted to the same hospital as cases for conditions unrelated to smoking or alcohol (but 24% were hospitalised for diseases of the digestive system). In the Russian Federation, controls were frequency-matched to the cases by age, sex, and referral or residence area. **Exposure assessment method:** Questionnaire; Intake frequency information was gathered for 23 different food items (chosen by consensus during the planning stage by the investigators and further validated during the pilot stage by asking participants to name food items not already specified). The questionnaire was repeated for two time periods (to capture possible shifts in dietary patterns before and after political changes): dietary intake for the period before political changes in 1989 (1991 in the Russian Federation) and dietary intake for the year before the interview date. Lifetime food frequencies were calculated by a weighted average of intake for the two time periods. Frequencies of intake of related foods were combined across food groups and categorized based on tertile cut-off points defined by consumption among controls. "Total red meat" = beef, pork, lamb, meat, liver, ham, salami, sausages; "Non-processed red meat" = beef, pork, lamb.	Oesophagus Squamous cell carcinoma: (ICD-C15)	All – Non-processed red meat – Low (< 1/month)	5	1.0	Same as above
			Middle (< 1/week)	14	0.58 (0.15–2.25)	
			High (1 ≤ /week)	168	0.62 (0.19–2.09)	
			Trend-test p-value: 0.7			

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Gao et al. (2011) Shanxi Province, China NR	**Cases:** 600 ESCC, 599 GCA, 316 GNCA; (1) Males or females over 20 years old; (2) Residents from Taiyuan, Linfen, Jinzhong, Changzhi, and Xinzhou; (3) Recently diagnosed for cancer of the oesophagus or stomach without previous treatment; (4) Had surgical treatment for tumour at the Shanxi Cancer Hospital; (5) Diagnoses were histologically confirmed by pathologists at the Shanxi Cancer Hospital and the National Cancer Institute in the United States. **Controls:** 1514; One control was recruited for each case matched on age (5 years), sex, and neighbourhood of residence. Interviews for controls were completed within six months of matched cases. **Exposure assessment method:** Questionnaire; 39-item (summed up from the text) FFQ. Not validated. To capture the impact of the Chinese economic reformation in the late 1970s on food and drink consumption, we asked about frequency of alcohol and dietary intake before and after 1984.	Oesophagus Squamous cell carcinoma:	Frequency (i.e. daily, weekly, monthly, seldom, not at all) of dietary intake before illness (pork, beef, lamb)			Age (continuous), geographic region (5 classes)
			Red meat: (monthly, seldom, never) after 1984	231	1.0	
			weekly after 1984	203	1.14 (0.89–1.46)	
			> weekly after 1984	166	1.37 (1.03–1.82)	
			Trend-test p-value: 0.04			

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
O'Doherty et al. (2011) FINBAR study (Northern Ireland and the Republic of Ireland) March 2002–July 2005	**Cases:** 224; Histologically confirmed adenocarcinoma; with verification that the tumour was located in the oesophagus. in situ cancers were not included **Controls:** 256; Without a history of oesophageal or other gastrointestinal cancer, or a known diagnosis of BE, selected at random from general practitioner lists in Northern Ireland and the Dublin and Cork areas **Exposure assessment method:** Questionnaire; FFQ of EPIC, 101 items relating to a period 5-year before interview (pre-morbid diet) was collected	Oesophagus Adenocarcinoma	risk per intake level			Age at interview, sex, smoking satus, body mass index 5 years before interview date, job type, education, energy intake, fruit, vegetable, alcohol, *Helicobacter pylori* infection, nonsteroidal antiinflammatory drug use 5 years before interview date, gastroesophageal reflux symptoms, location, intake of other types of meat
			Fresh red meat (median for controls) 20.6 g/day	44	1.0	
			53.5 g/day	45	1.78 (0.76–4.19)	
			59.8 g/day	49	1.9 (0.8–4.5)	
			72.8 g/day	83	3.15 (1.38–7.2)	
			Trend-test p-value: 0.01			
		Oesophagus Adenocarcinoma:	Total red meat (median for controls) 54.7 g/day	44	1.0	Same as above
			87.6 g/day	44	0.41 (0.17–1)	
			113.4 g/day	60	1.34 (0.62–2.88)	
			161.1 g/day	73	1.18 (0.55–2.54)	
			Trend-test p-value: 0.21			

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Wu et al. (2011) China – Jiangsu Province (Dafeng and Ganyu counties in Northern Jiangsu) 2003–2007	**Cases:** 1520; Incident cases of oesophageal cancer in local inhabitants. "Because of the low proportion of pathological examination in rural areas (39% on average), patients who were diagnosed by endoscopic examination (40%) or radiology (11%) were also included." **Controls:** 3879; Population-based controls randomly selected from the general population in the same counties, frequency-matched with cases by sex and age (+/– 5 years). **Exposure assessment method:** Questionnaire; Dietary information was obtained via a pretested FFQ but no details concerning this FFQ are given in the text. We found in Wu M et al. World J Gastroenterol 2006 that the FFQ included 90 food items and that for each food item, the amount and frequency over the past year was recorded: the procedure used in the present article might have been similar.	Oesophagus Squamous cell carcinoma (ICD-O 15)	All – Red meat Q1 (lowest) Q2 Q3 Q4 (highest) Trend-test p-value: 0.116	369 356 406 364	1.0 1.01 (0.84–1.2) 1.18 (0.99–1.4) 1.13 (0.94–1.36)	Age, sex, education level, previous income, BMI, pack-years of smoking, weekly ethanol intake, study area
Ward et al. (2012) Nebraska, USA 1988–1994	**Cases:** 124 for oesophagus and 154 for stomach; White men and women age 21 years or older identified from the Nebraska Cancer Registry **Controls:** 449; Randomly selected from a previous population based case-control study in the same geographic region **Exposure assessment method:** Questionnaire; They used the short Health Habits and History Questionnaire with	Oesophagus Adenocarcinoma	Total red meat (g/d): ≤ 73.8 73.9–111.3 111.4–157.2 > 157.2 OR per 10 g/day Trend-test p-value: 0.034	 19 22 36 47 NR	 1.0 1.1 (0.5–2.44) 1.44 (0.63–3.28) 2.85 (1–8.16) 1.03 (0.95–1.12)	Adjusted for year of birth, sex, cigarettes/day, (none, < 30/day, 30+/day), quartiles of body mass index, continuous intake of retinoic acid, folate, riboflavin, zinc, carbohydrate, protein, total calories.

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
	addition of foods high in nitrate/nitrite, meat cooking methods and doneness preferences. The full questionnaire contains foods that represented at least 90% of each of the 18 nutrients in the Second National Health and Nutrition Examination Survey (NHANES II) database.	Oesophagus Adenocarcinoma	Non-processed red meat (g/day)			Same as above
			≤ 50.4	19	1.0	
			50.5–75.1	25	0.86 (0.4–1.85)	
			75.2–111.2	33	1.82 (0.84–3.93)	
			> 111.2	47	1.92 (0.73–5.06)	
			OR per 10 g/day	NR	1.01 (0.92–1.1)	
			Trend-test p-value: 0.1			
		Oesophagus Adenocarcinoma	Heme Iron µg/day			Same as above
			98– < 660	19	1.0	
			660– < 1038	26	1.2 (0.56–2.55)	
			1038– < 1440	35	1.89 (0.88–4.08)	
			1440+	44	3.04 (1.2–7.72)	
			OR per mg/day	NR	1.25 (0.7–2.23)	
			Trend-test p-value: 0.01			

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
		Oesophagus Adenocarcinoma	Meat iron (µg/day)			Same as above
			589– < 2489	19	1.0	
			2489– < 3802	29	1.38 (0.66–2.9)	
			3802– < 5309	32	1.64 (0.74–3.61)	
			5309+	44	2.67 (0.99–7.16)	
			OR per mg/day	NR	1.07 (0.86–1.34)	
			Trend-test p-value: 0.05			
		Oesophagus Adenocarcinoma	Total iron (mg/day)			Same as above
			< 10.6	26	1.0	
			10.6– < 13.4	24	0.73 (0.35–1.53)	
			13.4– < 17.3	39	1.4 (0.62–3.2)	
			17.3+	35	1.67 (0.51–5.44)	
			OR per mg/day	NR	1.03 (0.91–1.19)	
			Trend-test p-value: 0.31			

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
Di Maso et al. (2013) In different areas of northern (the greater Milan area; the provinces of Pordenone, Padua, Udine, and Forlì; the urban area of Genoa), central (the provinces of Rome and Latina) and southern (the urban area of Naples and Catania) Italy, and in the Swiss Canton of Vaud 1991–2009	**Cases:** 505; Incident cancer cases, identified in the major teaching and general hospitals of the study areas **Controls:** 1259; Controls were subjects admitted to the same network of hospitals as cases for a wide spectrum of acute, nonneoplastic conditions unrelated to tobacco and alcohol consumption, to known risk factors for the corresponding cancer site or to conditions associated with long-term diet modification. **Exposure assessment method:** Questionnaire; Validated FFQ was used.	Oesophaguss	risk by 3 category intake level			Adjusted for study centre, age (quinquennia), sex (when appropriate), education (< 7, 7–11, ≥ 12 years), body mass index (< 25, 25– < 30, ≥ 30 kg m–2), tobacco smoking (never, former, current: < 15, ≥ 15 cigarettes/day), alcohol drinking (never, former, current: < 3, 3–4, 5–7, ≥ 8 drinks/day), vegetable consumption (< 1.5, 1.5– < 3, ≥ 3 servings/day) and fruit consumption (< 3, 3– < 4, ≥ 4 servings/day).
			Red meat: < 60 g/d	93	1.0	
			60–89	144	1.25 (0.87–1.79)	
			≥ 90	268	2.01 (1.43–2.84)	
		Oesophagus	risk by 50 g increase			Same as above
			OR by 50 g	505	1.46 (1.23–1.72)	
			Roasting/Grilling	505	1.28 (0.96–1.7)	
			Boiling/Stewing	505	1.84 (1.35–2.52)	
			Frying/Pan frying	505	4.52 (2.5–8.18)	

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
			P < 0.01			
De Stefani et al. (2014) Uruguay 1996–2005	**Cases:** 234; Incident cases of oesophageal (*n* = 234) cancer (ESCC) diagnosed in the four major hospitals in Montevideo and microscopally confirmed (C15). **Controls:** 1537; Hospital-based controls (from the same hospitals) with conditions not related to tobacco smoking and alcohol drinking; 936 patients were selected from the 1492 eligible controls, frequency matched on age, sex, residence. **Exposure assessment method:** Questionnaire; Dietary intake measured by a food frequency questionnaire including 64 food items (quantities recorded as servings per week) and was tested for reproducibility with good results. No definition of red meat. Intakes were energy-adjusted by the residual method.	Oesophagus	risk by tertiles			Age, residence, body mass index, smoking status, smoking cessation, number of cigarettes smoked per day among current smokers, alcohol drinking, mate consumption, total energy intake, total vegetables and fruits intake, total white meat intake, red meat intake
			Red meat: T1	NR	1.0	
			T2	NR	1.04 (0.68–1.6)	
			T3	NR	1.44 (0.96–2.14)	
			P-value trend 0.07			
			Beef: T1	NR	1.0	
			T2	NR	0.89 (0.58–1.36)	
			T3	NR	1.16 (0.79–1.71)	
			P-value trend 0.41			
			Lamb: T1	NR	1.0	
			T2	NR	0.74 (0.48–1.14)	
			T3	NR	1.64 (1.07–2.51)	
			P-value trend 0.09			
			Fried red meat: T1	NR	1.0	
			T2	NR	0.68 (0.46–1.00)	
			T3	NR	0.5 (0.34–0.76)	
			P-value trend 0.001			

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
			Barbecued red meat: T1	NR	1.0	
			T2	NR	0.98 (0.65–1.46)	
			T3	NR	0.91 (0.61–1.36)	
			P-value trend 0.64			
			Boiled red meat: T1	NR	1.0	
			T2	NR	1.36 (0.85–2.16)	
			T3	NR	2.59 (1.69–3.97)	
			P-value 0.001			
			Liver: T1	NR	1.0	
			T2	NR	0.53 (0.33–0.87)	
			T3	NR	0.65 (0.42–1)	
			P-value trend 0.09			
Matejcic et al. (2015) South Africa 2000–2012	**Cases:** 732; All patients selected for the study were histologically diagnosed with squamous cell carcinoma of the oesophagus, recruited between 2000 and 2012 from Groote Schuur and Tygerberg Hospitals in Cape Town. **Controls:** 768; The control group included healthy volunteers with no history of any cancer and no familial history of oesophageal cancer. They were	Oesophagus Squamous cell carcinoma	risk by frequency			Age, sex, smoking and alcohol
			NAT2 slow/intermediate acetylators **Black:** red meat (3 times/week or less)	198	1.0	
			Daily or almost daily	31	1.67 (0.61–4.58)	
			Trend-test p-value: 0.316			

Table 2.8.3 Case-control studies: Red meat and cancer of the oesophagus (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
	frequency matched to cases for geographical location, ethnicity, sex, and age. **Exposure assessment method:** Questionnaire; The information for validity of questionnaire was not reported.	Oesophagus Squamous cell carcinoma	**NAT2** slow/intermediate acetylators	75	1.0	Same as above
			Mixed Ancestry: Red meat (3 times/week or less)			
			Daily or almost daily	43	3.55 (1.29–9.82)	
			Trend-test p-value: 0.019			
		Oesophagus Squamous cell carcinoma	risk by frequency			Same as above
			NAT1 slow/intermediate acetylator	168	1.0	
			Black: Red meat (3 times/week or less)			
			Daily or almost daily	23	0.93 (0.43–2)	
			Trend-test p-value: 0.851			
		Oesophagus Squamous cell carcinoma	**NAT1** slow/intermediate acetylator	81	1.0	Same as above
			Mixed Ancestry: Red meat (3 times/week or less)			
			Daily or almost daily	42	1.32 (0.49–3.55)	
			Trend-test p-value: 0.586			

References

Bosetti C, La Vecchia C, Talamini R, Simonato L, Zambon P, Negri E, et al. (2000). Food groups and risk of squamous cell esophageal cancer in northern Italy. Int J Cancer. 87(2):289–94. PMID:10861489 http://dx.doi.org/10.1002/1097-0215(20000715)87:2<289::AID-IJC22>3.0.CO;2-9

Brown LM, Swanson CA, Gridley G, Swanson GM, Schoenberg JB, Greenberg RS, et al. (1995). Adenocarcinoma of the esophagus: role of obesity and diet. J Natl Cancer Inst. 87(2):104–9. PMID:7707381 http://dx.doi.org/10.1093/jnci/87.2.104

Brown LM, Swanson CA, Gridley G, Swanson GM, Silverman DT, Greenberg RS, et al. (1998). Dietary factors and the risk of squamous cell esophageal cancer among black and white men in the United States. Cancer Causes Control. 9(5):467–74. PMID:9934713 http://dx.doi.org/10.1023/A:1008861806923

Castelletto R, Castellsague X, Muñoz N, Iscovich J, Chopita N, Jmelnitsky A (1994). Alcohol, tobacco, diet, mate drinking, and esophageal cancer in Argentina. Cancer Epidemiol Biomarkers Prev. 3(7):557–64. PMID:7827585

Chen H, Ward MH, Graubard BI, Heineman EF, Markin RM, Potischman NA, et al. (2002). Dietary patterns and adenocarcinoma of the esophagus and distal stomach. Am J Clin Nutr. 75(1):137–44. PMID:11756071 http://dx.doi.org/10.1093/ajcn/75.1.137

De Stefani E, Deneo-Pellegrini H, Ronco AL, Boffetta P, Correa P, Mendilaharsu M, et al. (2014). Diet patterns and risk of squamous cell oesophageal carcinoma: a case-control study in Uruguay. Asian Pac J Cancer Prev. 15(6):2765–9. https://doi.org/10.7314/APJCP.2014.15.6.2765 PMID:24761898

Di Maso M, Talamini R, Bosetti C, Montella M, Zucchetto A, Libra M, et al. (2013). Red meat and cancer risk in a network of case-control studies focusing on cooking practices. Ann Oncol. 24(12):3107–12. PMID:24121119 http://dx.doi.org/10.1093/annonc/mdt392

Franceschi S, Favero A, Conti E, Talamini R, Volpe R, Negri E, et al. (1999). Food groups, oils and butter, and cancer of the oral cavity and pharynx. Br J Cancer. 80(3-4):614–20. https://doi.org/10.1038/sj.bjc.6690400 PMID:10408875

Gao Y, Hu N, Han XY, Ding T, Giffen C, Goldstein AM, et al. (2011). Risk factors for esophageal and gastric cancers in Shanxi Province, China: a case-control study. Cancer Epidemiol. 35(6):e91–9. PMID:21846596 http://dx.doi.org/10.1016/j.canep.2011.06.006

Levi F, Pasche C, La Vecchia C, Lucchini F, Franceschi S, Monnier P (1998). Food groups and risk of oral and pharyngeal cancer. Int J Cancer. 77(5):705–9. https://doi.org/10.1002/(SICI)1097-0215(19980831)77:5<705::AID-IJC8>3.0.CO;2-Z PMID:9688303

Levi F, Pasche C, Lucchini F, Bosetti C, Franceschi S, Monnier P, et al. (2000). Food groups and oesophageal cancer risk in Vaud, Switzerland. Eur J Cancer Prev. 9(4):257–63. PMID:10958328 http://dx.doi.org/10.1097/00008469-200008000-00005

Matejcic M, Vogelsang M, Wang Y, Iqbal Parker M (2015). NAT1 and NAT2 genetic polymorphisms and environmental exposure as risk factors for oesophageal squamous cell carcinoma: a case-control study. BMC Cancer. 15(1):150. PMID:25886288 http://dx.doi.org/10.1186/s12885-015-1105-4

Navarro Silvera SA, Mayne ST, Risch H, Gammon MD, Vaughan TL, Chow WH, et al. (2008). Food group intake and risk of subtypes of esophageal and gastric cancer. Int J Cancer. 123(4):852–60. PMID:18537156 http://dx.doi.org/10.1002/ijc.23544

O'Doherty MG, Cantwell MM, Murray LJ, Anderson LA, Abnet CC; FINBAR Study Group (2011). Dietary fat and meat intakes and risk of reflux esophagitis, Barrett's esophagus and esophageal adenocarcinoma. Int J Cancer. 129(6):1493–502. PMID:21455992 http://dx.doi.org/10.1002/ijc.26108

Rogers MA, Thomas DB, Davis S, Vaughan TL, Nevissi AE (1993). A case-control study of element levels and cancer of the upper aerodigestive tract. Cancer Epidemiol Biomarkers Prev. 2(4):305–12. PMID:8348053

Rolón PA, Castellsagué X, Benz M, Muñoz N (1995). Hot and cold mate drinking and esophageal cancer in Paraguay. Cancer Epidemiol Biomarkers Prev. 4(6):595–605. PMID:8547825

Sapkota A, Hsu CC, Zaridze D, Shangina O, Szeszenia-Dabrowska N, Mates D, et al. (2008). Dietary risk factors for squamous cell carcinoma of the upper aerodigestive tract in central and eastern Europe. Cancer Causes Control. 19(10):1161–70. PMID:18512121 http://dx.doi.org/10.1007/s10552-008-9183-0

Swanson CA, Gridley G, Greenberg RS, Schoenberg JB, Swanson GM, Brown LM, et al. (1993). A comparison of diets of blacks and whites in three areas of the United States. Nutr Cancer. 20(2):153–65. https://doi.org/10.1080/01635589309514282 PMID:8233981

Takezaki T, Gao CM, Wu JZ, Ding JH, Liu YT, Zhang Y, et al. (2001). Dietary protective and risk factors for esophageal and stomach cancers in a low-epidemic area for stomach cancer in Jiangsu Province, China: comparison with those in a high-epidemic area. Jpn J Cancer Res. 92(11):1157–65. PMID:11714439 http://dx.doi.org/10.1111/j.1349-7006.2001.tb02135.x

Wang JM, Xu B, Rao JY, Shen HB, Xue HC, Jiang QW (2007). Diet habits, alcohol drinking, tobacco smoking, green tea drinking, and the risk of esophageal squamous cell carcinoma in the Chinese population. Eur J Gastroenterol Hepatol. 19(2):171–6. PMID:17273005 http://dx.doi.org/10.1097/MEG.0b013e32800ff77a

Ward MH, Cross AJ, Abnet CC, Sinha R, Markin RS, Weisenburger DD (2012). Heme iron from meat and risk of adenocarcinoma of the esophagus and stomach. Eur J Cancer Prev. 21(2):134–8. PMID:22044848 http://dx.doi.org/10.1097/CEJ.0b013e32834c9b6c

Ward MH, Sinha R, Heineman EF, Rothman N, Markin R, Weisenburger DD, et al. (1997). Risk of adenocarcinoma of the stomach and esophagus with meat cooking method and doneness preference. Int J Cancer. 71(1):14–9. https://doi.org/10.1002/(SICI)1097-0215(19970328)71:1<14::AID-IJC4>3.0.CO;2-6 PMID:9096659

Willett WC, Sampson L, Stampfer MJ, Rosner B, Bain C, Witschi J, et al. (1985). Reproducibility and validity of a semiquantitative food frequency questionnaire. Am J Epidemiol. 122(1):51–65. https://doi.org/10.1093/oxfordjournals.aje.a114086 PMID:4014201

Wu AH, Tseng CC, Hankin J, Bernstein L (2007). Fiber intake and risk of adenocarcinomas of the esophagus and stomach. Cancer Causes Control. 18(7):713–22. PMID:17562192 http://dx.doi.org/10.1007/s10552-007-9014-8

Wu M, Zhang ZF, Kampman E, Zhou JY, Han RQ, Yang J, et al. (2011). Does family history of cancer modify the effects of lifestyle risk factors on esophageal cancer? A population-based case-control study in China. Int J Cancer. 128(9):2147–57 PMID:20602339 http://dx.doi.org/10.1002/ijc.25532

Xibib S, Meilan H, Moller H, Evans HS, Dixin D, Wenjie D, et al. (2003). Risk factors for oesophageal cancer in Linzhou, China: a case-control study. Asian Pac J Cancer Prev. 4(2):119–24. PMID:12875624

Yu MC, Garabrant DH, Peters JM, Mack TM (1988). Tobacco, alcohol, diet, occupation, and carcinoma of the esophagus. Cancer Res. 48(13):3843–8. PMID:3378219