Table 2.2.2. Case–control studies on other cancers and drinking of very hot beverages other than mate (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	Comments
Hakim et al. (2000) Arizona, USA 1993–1996 baseline study; participants were recontacted in 1998 to complete tea consumption questionnaire Case-control	Cases: 234; Cases of SCC of the skin were randomly selected from persons identified through the Southeastern Arizona Skin Cancer Registry as a first occurrence of SCC. Controls: 216; Population-based controls were selected using random-digit dialing techniques (phone numbers). Exposure assessment method: Questionnaire	Skin (squamous cell carcinoma)	Tea temperature			Age, sex, energy intake (kcal), and tanning ability after prolonged sun exposure and actinic keratosis history	Strengths: - Limitations: Relatively low participation rates
			Non drinker	76	1		
			Warm	7	1.51 (0.37–6.12)		
			Hot	52	0.76 (0.56–1.01)		
		Skin (squamous cell carcinoma)	Type of tea			Same as above	
			Non drinker	76	1		
			Iced black tea	125	1.02 (0.64–1.63)		
			Hot black tea	61	0.63 (0.36–1.1)		
Lagiou et al. (2009) ARCAGE Study: 13 centres across Europe: Czech Republic (1), Germany (1), Greece (1), Italy (3), Ireland (1), Norway (1), United Kingdom (3), Spain (1), Croatia (1). One centre from France was included in the overall study, but it provided no data on beverage temperature. 2002–2005 Case-control	Cases: 2304; Cases were patients with cancer of the oral cavity, pharynx (excluding nasopharynx), larynx and oesophagus. Controls: 2227; In the United Kingdom centres, population controls were randomly chosen from the same community medical practice list as the corresponding cases. In other remaining centres, controls were hospital-based. Exposure assessment method: Questionnaire	Upper aerodigestive tract: Oral cavity, pharynx (excluding nasopharynx), larynx and oesophagus	Tea or coffee temperature			Adjusted for centre through stratification and also controlled for age, sex, body mass index, height, education level, alcohol consumption, and smoking	Strengths: Large sample size; using the same protocol. Limitations: Results were reported for several cancer sites combined
			Warm	NR	1		
			Hot	NR	0.78 (0.65–0.92)		
			Very hot	NR	0.67 (0.52–0.86)		
			Trend-test p-value: 0.001				

Table 2.2.2. Case–control studies on other cancers and drinking of very hot beverages other than mate (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	Comments
Pourfarzi et al. (2009) Ardabil Province, Islamic Republic of Iran 2004–2005 Case-control	Cases: 217; Cases were identified via the Ardabil Cancer Registry (data from doctors and pathology services, as well as active surveillance for gastric cancer through all hospitals and clinics). 53% of cases had cardia cancers. Controls: 394; Controls were randomly selected from the community using a computer-based sampling frame that had been created for the annual household survey by the health department. Exposure assessment method: Questionnaire	Stomach/gastric cancer	Tea temperature			Age group, sex, education, family history of gastric cancer, intake of citrus fruits, garlic, onion, red meat, fish, dairy products, strength of tea, preference for salt intake and H. pylori infection	Strengths: - Limitations: -
			Not hot	109	1		
			Hot	106	2.85 (1.65–4.91)		
Mao et al. (2011) Yunnan Province, China 2010–2011 Case-control	Cases: 200; Cases of histologically confirmed gastric cancer were selected from 2 hospitals. Controls: 200; Controls were selected in another hospital and were healthy individuals visiting for routine physical examination. Controls were matched to cases for sex and age (± 5 years). Exposure assessment method: Questionnaire	Stomach/gastric cancer	Green tea temperature			Age, sex, education level, body mass index, annual income, family history of cancer, smoking and alcohol drinking status	No statistically significant interaction between tea temperature and smoking ($P = 0.24$) or alcohol drinking ($P = 0.37$) with regard to gastric cancer risk. Strengths: - Limitations: -
			Never drinker	66	1		
			Cool	18	0.85 (0.54–1.72)		
			Warm	34	0.81 (0.58–0.97)		
			Hot	38	1.82 (1.03–3.52)		
			Very hot	44	3.07 (1.78–7.36)		

Table 2.2.2. Case–control studies on other cancers and drinking of very hot beverages other than mate (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	Comments
Deandrea et al. (2010) Heilongjiang Province, China 1987–1989 Case-control	Cases: 266; Cases were newly diagnosed, histologically confirmed stomach cancer cases admitted to 6 hospitals. Controls: 533; Controls were patients admitted for non-neoplastic and non-gastric diseases to the surgical departments at the same hospitals. Controls were not individually matched to cases, but cases and controls were comparable in terms of sex and age group. Exposure assessment method: Questionnaire	Stomach/gastric cancer	Green tea temperature (in 1966)			Age, sex, education, and tobacco smoking	The article also presented results based on tea intake in 1961, but based on only 10 tea drinkers (not shown in this table). The two exposure dates were chosen because of possible differences in dietary patterns during the natural calamity period (1961) and beginning of the Cultural Revolution (1966). Strengths: - Limitations: Modest number of tea drinkers
			Non drinker	178	1		
			Lukewarm	5	0.5 (0.18–1.37)		
			Hot	15	1.18 (0.6–2.35)		
		Stomach/gastric cancer	Green tea temperature (in 1980s) by amount of tea (g/year)			Same as above	
			Non drinker	178	1		
			Lukewarm, 0–750 g/year	6	0.47 (0.19–1.18)		
			Lukewarm, ≥ 750	5	0.19 (0.07–0.49)		
			Hot, 0–750	18	1.33 (0.7–2.53)		
			Hot, ≥ 750	55	1.27 (0.85–1.9)		

Table 2.2.2. Case–control studies on other cancers and drinking of very hot beverages other than mate (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	Comments
Wang et al. (2015) Shenyang and Zhengzhou, China 2005–2010 Case-control	Cases: 160; Cases were recruited in two hospitals; all cases were confirmed histologically or cytologically. Controls: 320; Controls were selected randomly from outpatients without a diagnosis of cancer in the same hospitals as cases. Controls were matched to cases for age (± 3 years) and sex. Exposure assessment method: Questionnaire	Stomach/gastric cancer	Green tea temperature Lukewarm or cool Warm Hot Trend-test p-value: < 0.01	 63 63 34	 1 1.64 (1.16–2.41) 3.13 (1.85–5.11)	Adjusted results, but covariates are unclear	The authors repeated the analyses among men and women separately to examine potential confounding effects of smoking [which in China is generally much less common in women], and they found similar results (data were not shown). Strengths: - Limitations: Adjustments are unclear
Gridley et al. (1990) Multicenter study, USA 1984–1985 Case-control	Cases: 190; Cases were histologically confirmed incident cases in the population-based cancer registries of New Jersey, Atlanta, Los Angeles, and San Francisco/Oakland. Controls: 201; Controls were selected suing random-digit-dialing (for age < 65 years) and Health Care Financing Administration rosters (for age ≥ 65). Controls were matched to cases for sex and age. Exposure assessment method: Questionnaire	Oral/Pharyngeal combined: Tongue, pharynx, and other oral cancers excluding cancers of the lip, salivary gland, or nasopharynx	Beverage temperature There was no association between drinking hot beverages and cancer risk. Results not reported	NR	-	Not reported	Only black participants. Strengths: - Limitations: Proxy interviews for 56 cases (29%); this was for 1% of controls ($n = 3$). Actual results were not reported

Table 2.2.2. Case–control studies on other cancers and drinking of very hot beverages other than mate (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	Comments
Franco et al. (1989) Brazil 1986–1988 Case-control	Cases: 232; Cases were selected from patients referred to 3 head and neck surgery services. Controls: 464; Two controls per case from patients in the same hospital as cases or from neighbouring general hospitals. Controls were matched to cases for sex, age (5-year group), and trimester of hospital admission. Exposure assessment method: Questionnaire	Oral cavity	Coffee temperature			Not reported	Strengths: - Limitations: Actual results were not reported
			Not burning hot	NR	1		
			Burning hot. There was no association between drinking burning hot coffee and cancer risk. Results not reported	NR	-		
Chen et al. (2015) Fujian Province, China 2011–2015 Case-control	Cases: 203; All participants were nonsmokers and non-alcohol drinkers. Controls: 572; Controls (population-based) had no previous history of cancer and were not direct relatives of cases. Controls were matched to cases for age, gender, ethnicity and marital status. Exposure assessment method: Questionnaire	Oral cavity	Tea temperature			Age, sex, place of residence (rural/urban), occupation, ethnicity, marital status, education, and BMI	Strengths: Minimized confounding from smoking and alcohol drinking by including only nonsmokers and nondrinkers. Limitations: A modest number of tea drinkers
			Never tea drinkers	168	1		
			Moderate temperature tea drinkers	18	0.55 (0.31–0.98)		
			Hot tea drinkers	17	0.5 (0.28–0.88)		
Martinez (1969)	Cases:	Oesophagus	Black coffee temperature			None	Strengths: -

Table 2.2.2. Case–control studies on other cancers and drinking of very hot beverages other than mate (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	Comments
Puerto Rico 1966 Case-control	400; Cases were all histologically confirmed cases of SCC of the mouth, pharynx, and oesophagus in all hospitals and clinics in Puerto Rico in 1966. One non-cancer patient from the same hospital and two community controls were matched to each case for age and sex. Controls: 1200; None Exposure assessment method: Questionnaire	(Squamous cell carcinoma)	Warm/cold	296	1		Limitations: Results were not adjusted for some major risk factors of upper aerodigestive cancers, notably smoking. Results were reported for several cancer sites combined
			Hot	40	[2.14 (1.36–3.35)]		
			Non-drinkers	61	[0.74 (0.53–1.02)]		
		Oesophagus (Squamous cell carcinoma)	Black coffee with milk temperature			None	
			Warm/cold	325	1		
			Hot	51	[1.47 (1.01–2.12)]		
			Non-drinkers	23	[1.17 (0.68–1.95)]		
		Oesophagus (Squamous cell carcinoma)	Chocolate with milk temperature			None	
			Warm/cold	236	1		
			Hot	10	[1.13 (0.47–2.52)]		
			Non-drinkers	152	[0.71 (0.56–0.9)]		
Cook-Mozaffari et al.	Cases:	All cancers	Tea temperature (men)			Full account of	~50% of cases were

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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	Comments
(1979) Northern parts of Islamic Republic of Iran 1975–1976 Case-control	181 Others type of cancer (109 men, 72 women); Cases were identified from the Caspian Cancer Registry in northern Islamic Republic of Iran. Cancers were mainly diagnosed on the basis of clinical symptoms, radiological signs and results of the follow-up study. Controls: None; Controls were randomly selected from the same village or town as cases. Controls were individually matched for age (within 5 years), sex and place of residence and, in high-incidence areas, based on the first language of the subjects. Exposure assessment method: Questionnaire	combined: Lung, stomach, breast, large bowel, larynx and pharynx	Non hot	NR	1	matching was taken in the presented results.	stomach cancer cases. The researchers stated that the increased risk mainly reflected the association with gastric cancer, but they did not report the results for gastric cancer separately. Strengths: - Limitations: Proxy interviews for 23.8% of male and 20.8% female cancer cases. No adjustments for some major risk factors of oesophageal cancer, notably smoking. However, alcohol drinking in both sexes and smoking in women were uncommon habits in this study
			Hot	NR	3.23		
		All cancers combined: Lung, stomach, breast, large bowel, larynx and pharynx	Tea temperature (women)			Same as above	
			Non hot	NR	1		
			Hot	NR	0.86		

CI, confidence interval; NR, not reported

8

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