

Table 2.21. Case-control studies on tobacco smoking and oesophageal cancer (unspecified) or squamous cell carcinoma of the oesophagus

Reference, Country and years of study	Cancer subsite	Smoking categories	Relative risk (95% CI)	Comments
Brown <i>et al.</i> (2001) USA 1986-1989	Squamous cell carcinoma	<i>Black men</i>		Adjusted for age, study area, alcohol intake, diet and income
		Never smoker	1.0	
		Ever smoker (cigarettes, pipes or cigars for 6 months or more)	2.5 (1.1-5.6)	
		<i>White men</i>		
Sharp <i>et al.</i> (2001) UK 1993-1996	Squamous cell carcinoma	Never smoker	1.0	Adjusted for slimming diet, breakfast, salad, regular use of aspirin, and temperature of tea/coffee
		Former smoker	0.48 (0.25-0.93)	
		Current smoker	1.34 (0.66-2.70)	
		<i>Total years of smoking</i>		
		≤37.68	0.39 (0.10-1.53)	
		37.69-48.57	0.92 (0.29-2.97)	
		≥48.58	2.35 (0.91-6.03)	
		<i>Pack-years</i>		
		≤16.63	1.05 (0.32-3.43)	
		16.64-32.02	1.60 (0.56-4.60)	
≥32.03	1.35 (0.53-3.43)			
Gallus <i>et al.</i> (2001) Italy and Switzerland 1984-1999	Squamous cell carcinoma	Never smoker	1.0	Adjusted for age, study centre, education, body mass index, non-alcohol energy intake, alcohol consumption
		Former smoker	0.86 (0.35-2.09)	
		<i>Current smoker (cigarettes/day)</i>		
		<15	1.74 (0.88-3.44)	
		15-24	3.51 (1.76-7.01)	
≥5	4.54 (1.40-14.74)			
Pacella-Norman <i>et al.</i> (2002) South Africa 1995-1999	Oesophageal cancer unspecified	Males		OR adjusted for age, place of birth, education, work category, heating fuel, snuff use and alcohol consumption
		<i>Oesophageal</i>		
		Non-smokers	1.0	
		Ex-smokers	3.8 (2.3-6.3)	
		Current smokers; all	3.8 (2.3-6.1)	
		1-14 g/day	3.3 (2.0-5.5)	
		15+ g/day	6.0 (3.2-11.0)	
		Females		
		<i>Oesophageal</i>		
		Non-smokers	1.0	
Ex-smokers	2.6 (1.5-4.5)			
Current smokers; all	3.1 (1.7-5.4)			
1-14 g/day	2.8 (1.5-5.2)			
15+ g/day	6.2 (1.9-20.2)			

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Gallus <i>et al.</i> (2003a) Italy and Switzerland 1992-1999	Squamous cell carcinoma	Never smokers	1.0	Estimates from unconditional multiple logistic regression models, including terms for age, sex, study centre, education and alcohol consumption
		Current smokers	5.1 (3.3-7.7)	
		<i>Cigarettes per day</i>		
		<15	2.7 (1.6-4.7)	
		15-24	5.7 (3.5-9.1)	
		≥25	7.9 (4.5-13.8)	
		<i>Total duration of smoking (years)</i>		
		<30	3.3 (1.7-6.4)	
		≥30	5.5 (3.6-8.5)	
		Ex-smokers	2.2 (1.4-3.4)	
		<i>Cigarettes per day</i>		
		<15	1.7 (1.0-3.0)	
		≥15	2.5 (1.5-4.0)	
		<i>Total duration of smoking (years)</i>		
		<30	1.4 (0.8-2.4)	
		≥30	3.3 (2.0-5.3)	
		<i>Tar yield</i>		
		Never smokers	1.0	
		<i>Ever smokers (mg)</i>		
		<20	3.5 (2.3-5.3)	
≥20	3.5 (2.2-5.6)			
<i>Current smokers (mg)</i>				
<20	4.8 (3.1-7.6)			
≥20	5.4 (3.2-9.3)			
<i>Cigarettes smoked in the previous 6 months (mg)</i>				
<10	2.4 (1.0-5.4)			
≥10	5.4 (3.5-8.3)			
Znaor <i>et al.</i> (2003) India 1993-1999	Oesophageal	Never smokers	1.0	Adjusted for age, center, education level, alcohol consumption and chewing
		<i>Duration of smoking (yr)</i>		
		<20	1.61 (1.12-2.31)	
		20-29	2.47 (1.79-3.40)	
		30-39	2.90 (2.13-3.94)	
		≥40	2.88 (2.06-4.02)	
		<i>Average daily amount of tobacco (g)</i>		
		<9	2.12 (1.62-2.78)	
10-19	2.92 (2.17-3.92)			
≥20	2.72 (1.81-4.10)			

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Lee <i>et al.</i> (2005) Taiwan 2000-2003	Squamous cell carcinoma	Never smoker	1.0	Adjusted for age, gender, study hospital, education, consumption of vegetables and fruits, g/day-year of alcohol intake and pack-years of betel quid chewing.			
		Former smoker	3.4 (2.1-5.3)				
		Current smoker	4.2 (2.7-6.3)				
		<i>Age at starting smoking (years)</i>					
		≥26	1.9 (1.1-3.3)				
		<26	4.6 (3.1-6.8)				
		<i>Years of cigarette smoking</i>					
		1-15	2.3 (1.0-4.9)				
		16-30	3.8 (2.4-6.1)				
		>30	4.4 (2.9-6.7)				
		<i>Average amount of cigarette</i>					
		1-20	3.5 (2.2-5.6)				
		21-40	4.0 (2.7-6.1)				
>40	4.6 (1.5-13.7)						
Yang <i>et al.</i> (2005) China 2003-2004	Squamous cell carcinoma (including 6 adenocarcinoma cases analyzed together with cases of squamous cell carcinoma)	Never smoker	1.0	Adjusted for family history of esophageal cancer, occupation, alcohol intake, eating hot food, eating speed, vegetables, fruit, pickled vegetables, fresh meat, processed meat, eggs, tea and water supply			
		Ever smoker	4.06 (1.55-10.6)				
		<i>Age at starting smoking (years)</i>					
		≥20	1.0				
		<20	0.81 (0.14-4.63)				
		<i>Tobacco dose (cigarette/day)</i>					
		Never smoking	1.0				
		<10	3.29 (0.94-11.5)				
		10-20	2.65 (0.81-8.69)				
		>20	6.05 (1.99-18.4)				
		Lindblad <i>et al.</i> (2005) UK 1994-2001	Squamous cell carcinoma		Non smoker	1.0	Adjusted for sex, age, calendar year, smoking, BMI and reflux
					Ex-smoker	0.61 (0.26-1.43)	
					Current smoker	1.64 (1.05-2.56)	
Unknown status	1.62 (0.85-3.09)						

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Reference, Country and years of study	Cancer subsite	Smoking categories	Relative risk (95% CI)	Comments
Wu <i>et al.</i> (2006) Taiwan Study period not informed	Squamous cell carcinoma	Never smoker	1.0	Adjusted alcohol drinking, betel chewing, age, and year of education
		Former smoker	2.5 (0.9-7.6)	
		Current smoker	6.3 (2.8-15.4)	
		<i>Age at starting smoking (years)</i>		
		≥25	5.4 (2.4-13.0)	
		<25	4.7 (1.6-15.3)	
		<i>Years of cigarette smoking</i>		
		≥25	7.4 (2.4-24.4)	
		<25	4.8 (2.1-11.7)	
		<i>Quantity (cigarettes/day)</i>		
		≥20	4.6 (2.1-10.9)	
		<20	6.4 (2.5-17.7)	
		<i>Cumulative exposure (cigarettes/day)</i>		
<500	5.1 (2.0-13.4)			
500-1000	5.6 (2.3-14.2)			
Jiang <i>et al.</i> (2006) China 1989-1991	Oesophagus (unspecified)	Urban men:		Death rate ratios were adjusted for age (within 5 years) and locality (count or city district of residence)
		<i>Age starting smoking (years)</i>		
		<20	1.89 (1.74-2.05)	
		20-24	2.17 (2.02-2.32)	
		25+	1.80 (1.67-1.95)	
		<i>Years of cigarette smoking</i>		
		<20	1.33 (1.10-1.60)	
		20-29	1.72 (1.47-2.01)	
		30+	1.88 (1.76-2.01)	
		<i>Quantity (cigarettes/day)</i>		
		<20	1.46 (1.35-1.57)	
		20-29	2.02 (1.87-2.18)	
		30+	3.36 (2.90-3.91)	
		Rural men:		
		<i>Age starting smoking (years)</i>		
		<20	1.41 (1.32-1.52)	
		20-24	1.32 (1.22-1.43)	
		25+	1.37 (1.25-1.49)	
		<i>Years of cigarette smoking</i>		
		<20	1.17 (1.03-1.34)	
		20-29	1.32 (1.17-1.48)	
30+	1.45 (1.32-1.58)			
<i>Quantity (cigarettes/day)</i>				
<20	1.30 (1.19-1.42)			
20-29	1.37 (1.24-1.51)			
30+	1.90 (1.47-2.45)			

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Reference, Country and years of study	Cancer subsite	Smoking categories	Relative risk (95% CI)	Comments
Hashibe <i>et al.</i> (2007a) Czech Republic, Poland, Romania and Russia 2000-2002	Squamous cell carcinoma	Non smoker	1.0	Adjusted for age, sex, education, BMI, fruit intake, vegetable intake, center, alcohol drinking (years and grams ethanol/week)
		Former smoker	2.40 (1.18-4.89)	
		Current smoker	7.41 (3.98-13.79)	
		<i>Frequency (cigarettes/day)</i>		
		1-10	4.24 (2.01-8.94)	
		10-19	5.21 (2.77-9.80)	
		20-19	5.86 (2.98-11.49)	
		≥30	4.77 (1.94-11.71)	
		<i>Duration (years)</i>		
		1-9	2.57 (0.78-8.43)	
		10-19	3.86 (1.67-8.94)	
		20-29	3.75 (1.75-8.02)	
		30-39	7.36 (3.82-14.17)	
		40-49	6.15 (3.06-12.34)	
		≥0	3.65 (1.55-8.63)	
		<i>Pack-years</i>		
1-9	2.92 (1.27-6.69)			
10-19	5.32 (2.61-10.85)			
20-29	5.25 (2.64-10.43)			
30-39	7.15 (3.55-14.40)			
≥40	5.41 (2.70-10.83)			

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Reference, Country and years of study	Cancer subsite	Smoking categories	Relative risk (95% CI)	Comments
Lee <i>et al.</i> (2007) Taiwan 1996-2004	Squamous cell carcinoma	Anatomical subsite: upper-third		Adjusted for age, gender, study hospital, education, consumption of vegetables and fruits, daily alcohol intake and pack-years of betel quid chewing
		Never smoker	1.0	
		Former smoker	4.3 (1.9-9.9)	
		Current smoker	4.4 (2.0-9.8)	
		<i>Age at starting smoking (years)</i>		
		≥26	2.3 (0.8-6.6)	
		<26	5.5 (2.5-11.9)	
		<i>Years of cigarette smoking</i>		
		1-30	4.1 (1.8-9.6)	
		31-40	5.6 (2.4-13.1)	
		>40	4.7 (2.0-11.1)	
		<i>Average amount of cigarette</i>		
		1-15	4.1 (1.8-9.5)	
		16-30	5.1 (2.3-11.3)	
		>31	4.3 (1.6-11.5)	
		<i>Inhalation of smoking</i>		
		No	3.1 (1.2-7.8)	
		Yes	5.2 (2.4-11.4)	
		Anatomical subsite: middle-third		
		Never smoker	1.0	
		Former smoker	3.1 (1.6-6.2)	
		Current smoker	6.2 (3.4-11.2)	
		<i>Age at starting smoking (years)</i>		
		≥26	2.6 (1.2-5.7)	
		<26	5.9 (3.3-10.5)	
		<i>Years of cigarette smoking</i>		
		1-30	3.3 (1.7-6.3)	
		31-40	5.9 (3.0-11.4)	
		>40	7.3 (3.8-14.1)	
		<i>Average amount of cigarette</i>		
		1-15	4.5 (2.4-8.5)	
		16-30	5.9 (3.3-10.8)	
		>31	3.2 (1.4-7.1)	
<i>Inhalation of smoking</i>				
No	3.4 (1.7-6.9)			
Yes	5.7 (3.2-10.2)			
Anatomical subsite: lower-third				
Never smoker	1.0			
Former smoker	1.8 (0.9-3.6)			
Current smoker	2.7 (1.5-4.8)			

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Reference, Country and years of study	Cancer subsite	Smoking categories	Relative risk (95% CI)	Comments
Lee <i>et al.</i> (2007) Taiwan 1996-2004 (contd)	Squamous cell carcinoma	<i>Age at starting smoking (years)</i>		Adjusted for age, gender, study hospital, education, consumption of vegetables and fruits, daily alcohol intake and pack-years of betel quid chewing
		≥26	1.4 (0.6-3.1)	
		<26	2.7 (1.5-4.7)	
		<i>Years of cigarette smoking</i>		
		1-30	1.9 (1.0-3.7)	
		31-40	1.9 (0.9-3.9)	
		>40	3.3 (1.7-6.2)	
		<i>Average amount of cigarette</i>		
		1-15	2.1 (1.1-4.0)	
		16-30	2.7 (1.5-4.9)	
		>31	1.7 (0.8-3.9)	
		<i>Inhalation of smoking</i>		
		No	1.5 (0.7-3.2)	
Yes	2.7 (1.5-4.7)			
Vioque <i>et al.</i> (2008) Spain 1995-1999	Squamous cell carcinoma	Never smoker	1.0	Adjusted for sex, age, educational level, province, alcohol drinking, energy-adjusted intake of fruits and vegetables, and energy intake
		Ever smoker	1.70 (0.72-4.03)	
		Former smoker	1.08 (0.43-2.73)	
		Current smoker	2.28 (0.95-5.51)	
		<i>Average number cigarettes/day</i>		
		<15	1.35 (0.41-4.48)	
		15-29	2.05 (0.78-5.42)	
		≥30	5.82 (1.96-17.23)	
		<i>Years of cigarette smoking</i>		
		<20	0.54 (0.12-2.11)	
		20-29	1.62 (0.57-4.65)	
		>30	2.03 (0.84-4.92)	
		<i>Pack-years</i>		
		<20	0.69 (0.19-2.51)	
		20-49	2.49 (0.96-6.51)	
		≥50	3.93 (1.40-10.99)	
		<i>Age at starting</i>		
<15	1.0			
15-17	1.45 (0.65-3.23)			
≥18	1.21 (0.57-2.58)			
<i>Inhalation of smoke</i>				
Never	1.0			
Partially	1.32 (0.54-3.25)			
Totally	2.53 (1.00-6.46)			

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Nasrollahzadeh <i>et al.</i> (2008) Iran 2003-2007	Squamous cell carcinoma	Never smoker	1.0	Adjusted for education and ethnicity
		Ever smoker	1.47 (0.98-2.21)	
		Former smoker	1.34 (0.80-2.23)	
		Current smoker	1.63 (0.97-2.76)	
		<i>Average intensity</i>		
		≤median (11 cigarettes/day)	0.98 (0.55-1.75)	
		>median	1.98 (1.20-3.25)	
		<i>Duration</i>		
		≤median (21 years)	1.27 (0.76-2.11)	
		>median	1.73 (1.03-2.93)	
		<i>Cumulative use</i>		
		≤median (13.5 pack-years)	1.36 (0.81-2.27)	
		>median	1.61 (0.95-2.74)	
		<i>Age at starting</i>		
>median	1.07 (0.62-1.86)			
≤median (25 years)	1.90 (1.15-3.11)			
Bosetti <i>et al.</i> (2008) Italy 1984-2000	Oesophageal cancer unspecified	Never smokers	0.20 (0.14-0.30)	Estimated from unconditional logistic regression with adjustment for age, study center, education, and alcohol drinking
		Current smokers	1.0	

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Pandeya <i>et al.</i> (2008) Australia 2001-2005	Squamous cell carcinoma	Never smoker	1.0	Adjusted for sex, age, education, frequency of aspirin use, average alcohol intake, BMI in the past year, heartburn or acid reflux
		Former smoker	2.18 (1.51-3.17)	
		Current smoker	4.58 (2.99-7.02)	
		<i>Age at starting (years)</i>		
		<15	2.79 (1.72-4.52)	
		15-16	2.86 (1.82-4.49)	
		17-18	2.45 (1.55-3.88)	
		>18	3.20 (2.05-5.00)	
		<i>Duration (years)</i>		
		≤15	1.97 (1.20-3.25)	
		15.01-25	2.27 (1.37-3.77)	
		25.01-35	2.45 (1.54-3.90)	
		>35	4.25 (2.80-6.46)	
		<i>Intensity (cigarettes/day)</i>		
		0-9	1.44 (0.83-2.48)	
10-19	2.62 (1.67-4.13)			
20-25	3.24 (2.11-4.99)			
>25	4.71 (2.92-7.60)			
<i>Cumulative dose (pack-years)</i>				
≤10	1.60 (1.00-2.56)			
10.01-20	2.10 (1.21-3.63)			
20.01-30	4.62 (2.84-7.51)			
>30	3.93 (2.58-5.99)			