

Table 2.35. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract: type of tobacco and/or cigarette

Reference, Country and years of study	Cancer subsite	No. of cases	No. of controls	Smoking categories	Odds ratio (95%CI)	Comments	
Gallus <i>et al.</i> (2003a) Italy and Switzerland 1992-1999	Oral cavity, pharynx, oesophageal	60	692	Oral cavity and pharynx	1.0	Estimates from unconditional multiple logistic regression models, including terms for age, sex, study centre, education and alcohol consumption	
				Never smokers			
				<i>Current smokers</i>			
				Pipe/cigar only			6.6 (2.0-21.3)
				<i>Ex-smokers</i>			
				Piper/cigar only			4.4 (1.0-18.9)
				<i>Time since smoking cessation (years)</i>			
				<10			3.6 (2.4-5.4)
				≥10			1.3 (0.9-2.0)
				Oesophagus			
				Never smokers			1.0
				<i>Current smokers</i>			
				Pipe/cigar only			12.6 (3.6-43.6)
<i>Ex-smokers</i>							
Piper/cigar only	1.9 (0.3-13.2)						
<i>Time since smoking cessation (years)</i>							
<10	4.1 (2.5-7.0)						
≥10	1.4 (0.9-2.3)						
Znaor <i>et al.</i> (2003) India 1993-1999	Oral, pharyngeal and oesophageal ICD-9 140,141,143-5,146, 148, 149, 150	424	1799	Oral	1.0	Adjusted for age, center, education level, alcohol consumption and chewing	
				Never smokers			
				<i>Type of tobacco</i>			
				Cigarette only			0.99 (0.79-1.23)
				Bidi only			2.15 (1.75-2.63)
				Cigarette and Bidi only			1.49 (1.18-1.88)
				Chutta only			2.28 (1.50-3.45)
				Cigar/cheroot only			4.72 (2.41-9.25)
				Other combinations			1.56 (0.75-3.25)
				Pharynx			
				Never smokers			1.0
				<i>Type of tobacco</i>			
				Cigarette only			1.79 (1.29-2.50)
				Bidi only			4.68 (3.50-6.27)
				Cigarette and Bidi only			3.57 (2.55-4.98)
				Chutta only			3.22 (1.85-5.78)
				Cigar/cheroot only			4.28 (1.63-11.20)
Other combinations	2.97 (1.19-7.42)						

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Znaor <i>et al.</i> (2003) (contd)	Oral, pharyngeal and oesophageal ICD-9 140,141,143-5,146, 148, 149, 150	107	1799	Oesophagus	1.0	Adjusted for age, center, education level, alcohol consumption and chewing						
				Never smokers								
				<i>Type of tobacco</i>								
				Cigarette only			1.83 (1.34-2.50)					
				Bidi only			3.28 (2.45-4.39)					
				Cigarette and Bidi only			2.72 (1.95-3.79)					
				Chutta only			1.20 (0.55-2.61)					
Lissowska <i>et al.</i> (2003) Poland 1997-2000	Oral cavity and pharynx ICD-9 Tongue 141.0 Oral cavity 143.0-145.8 Oropharynx 146.0-46.9 Unspecified parts of pharynx 149	22	43	Never smokers	1.0	Estimates from unconditional logistic regression equations, including terms for gender, age, residence and drinking habits						
				<i>Cigarettes type</i>								
				Filtered			1.64 (0.73-3.65)					
				Mixed			4.24 (1.65-10.91)					
				Plain			6.46 (1.74-24.74)					
				Castellsagué <i>et al.</i> (2004) Spain 1996-1999			Oral cavity and oropharynx ICD-O C01-C10 Tongue, base of tongue, gum, floor of mouth, palate, salivary glands, tonsil, other parts of the mouth and oropharynx	41	67	<i>Type of tobacco</i>	2.31 (1.15-4.64)	OR adjusted for center, gender, age group, years of schooling and average daily consumption of pure ethanol
										Blond only		
Mixed	4.55 (2.12-9.77)											
Black only	7.72 (3.83-15.55)											
Blond only												
<i>Average number of cigarettes of smoker per day</i>												
Never smokers	1.0											
Ex-smokers	2.15 (0.86-5.37)											
Current of 1-20	2.92 (1.18-7.23)											
Current of 21-30	1.83 (0.47-7.18)											
Current ≥31	9.45 (1.40-63.82)											
<i>Years of tobacco smoking</i>												
Ex-smokers	2.18 (0.87-5.51)											
Current 1-30	2.66 (0.92-7.68)											
Current 31-50	2.58 (0.88-7.54)											
Current ≥51	5.77 (0.90-37.07)											

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Castellsagué <i>et al.</i> (2004) (contd)	Oral cavity and oropharynx ICD-O C01-C10 Tongue, base of tongue, gum, floor of mouth, palate, salivary glands, tonsil, other parts of the mouth and oropharynx			Mixed (blond and black)		
				<i>Average number of cigarettes of smoker per day</i>		
				Never smokers	1.0	
				Ex-smokers	4.70 (1.41-15.63)	
				Current of 1-20	5.72 (1.54-21.21)	
				Current of 21-30	6.94 (2.02-23.77)	
				Current ≥31	9.18 (2.57-32.78)	
				<i>Years of tobacco smoking</i>		
				Ex-smokers	4.70 (1.41-15.73)	
				Current 1-30	8.47 (2.13-33.70)	
				Current 31-50	5.76 (1.81-18.31)	
				Current ≥51	11.58 (2.34-57.29)	
				Black only		
				<i>Average number of cigarettes of smoker per day</i>		
				Never smokers	1.0	
Ex-smokers	4.52 (1.74-11.72)					
Current of 1-20	17.90 (6.35-50.43)					
Current of 21-30	28.19 (9.22-86.20)					
Current ≥31	16.53 (5.52-49.50)					
<i>Years of tobacco smoking</i>						
Ex-smokers	4.81 (1.85-12.51)					
Current 1-30	11.75 (3.48-39.66)					
Current 31-50	19.99 (7.26-55.08)					
Current ≥51	29.67 (9.41-93.55)					
Menvielle <i>et al.</i> (2004a) France 1989-1991	Hypopharynx and larynx			<i>Type of tobacco</i>		
				Hand-rolled cigarette ≥ commercial	1.2 (0.97-1.4)	OR adjusted for age, alcohol consumption, duration of smoking and amount of tobacco smoked
				Black tobacco ≥ blond	1.2 (0.96-1.5)	
				Use of filter ≥ no filter	1.0 (0.9-1.2)	

Table 2.35. Case-control studies on tobacco smoking and cancers of the upper aerodigestive tract: type of tobacco and/or cigarette

Reference, Country and years of study	Cancer subsite	No. of cases	No. of controls	Smoking categories	Odds ratio (95%CI)	Comments
Randi <i>et al.</i> (2007) Italy and Switzerland 1984-1999	Upper digestive tract (oral, pharynx and oesophageal) analyzed together; oral cavity and pharynx analyzed together	75	1008	All upper digestive tract		Estimates from multiple logistic regression models including terms for age, center, education, body mass index, and alcohol consumption
		18	24	<i>Exclusive pipe smoking</i>		
				Never	1.0	
				Ever	8.67 (3.99-18.85)	
		12	14	<i>Grams of tobacco per day</i>		
		6	10	≤10	7.94 (3.05-20.71)	
				>10	9.12 (2.80-29.74)	
		14	19	Current only	8.14 (3.52-18.85)	
				Oral cavity/pharynx		
				<i>Exclusive pipe smoking</i>		
	30	788	Never	1.0	Adjusted for center, age, sex, SES, alcohol consumption, tobacco snuffling and tobacco chewing	
	11	15	Ever	12.57 (4.50-35.06)		
Sapkota <i>et al.</i> (2007) India 2001-2004	ICD-O-2 Hypopharynx C12, C13 Larynx C32.0, C32.1, C32.2-C32.9	149	457	Hypopharynx		
		364	261	<i>Ever smoke</i>		
				No		1.0
				Yes		5.66 (3.99-8.02)
		149	427	<i>Smoking product</i>		
		48	104	Never		1.0
		278	113	Cigarette		3.82 (2.32-6.29)
		23	33	Bidi		6.80 (4.64-9.97)
		13	11	Cigarette and Bidi	4.74 (2.42-9.29)	
				Other	4.21 (1.69-10.47)	
				<i>Frequency of cigarette smoking</i>		
		151	427	0	1.0	
		24	79	1-10 per day	2.47 (1.34-4.54)	
		15	19	>10-20 per day	5.24 (2.19-12.53)	
9	6	>20 per day	9.75 (2.95-32.22)			
		<i>Duration of cigarette smoking</i>				
151	457	0 years	1.0			
4	44	1-15 years	1.15 (0.36-3.64)			
21	35	>15-30 years	4.77 (2.41-9.48)			
23	25	>30 years	4.26 (2.05-8.87)			

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Reference, Country and years of study	Cancer subsite	No. of cases	No. of controls	Smoking categories	Odds ratio (95%CI)	Comments			
Sapkota <i>et al.</i> (2007) (contd)	ICD-O-2 Hypopharynx C12, C13 Larynx C32.0, C32.1, C32.2-C32.9			<i>Frequency of bidi smoking</i>		Adjusted for center, age, sex, SES, alcohol consumption, tobacco snuffling and tobacco chewing			
				151	457		0	1.0	
				55	62		1-10 per day	2.83 (1.73-4.63)	
				73	25		>10-20 per day	9.45 (5.32-16.78)	
				150	26		>20 per day	17.13 (9.97-29.44)	
							<i>Duration of bidi smoking</i>		
				151	457		0 years	1.0	
				26	16		1-15 years	6.35 (3.02-13.33)	
				70	43		>15-30 years	5.51 (3.31-9.16)	
				182	54		>30 years	9.22 (5.78-14.73)	
							Glottis		
							<i>Ever smoke</i>		
				37	457		No	1.0	
				141	261		Yes	5.35 (3.40-8.42)	
							<i>Smoking product</i>		
				37	427		Never	1.0	
				37	104		Cigarette	5.74 (3.20-10.31)	
				87	113		Bidi	5.32 (3.18-8.90)	
				11	33		Cigarette and bidi	5.42 (2.37-12.39)	
				6	11		Other	3.47 (1.14-10.60)	
							<i>Frequency of cigarette smoking</i>		
				21	427		0	1.0	
				2	79		1-10 per day	1.33 (0.27-6.65)	
1	19	>10-20 per day	4.28 (0.45-40.72)						
1	6	>20 per day	6.55 (0.46-92.57)						
		<i>Duration of cigarette smoking</i>							
37	457	0 years	1.0						
9	44	1-15 years	3.35 (1.36-8.23)						
9	35	>15-30 years	3.25 (1.36-7.79)						
19	25	>30 years	5.71 (2.55-12.81)						
		<i>Frequency of bidi smoking</i>							
37	457	0	1.0						
15	62	1-10 per day	2.01 (0.96-4.20)						
18	25	> 10-20 per day	5.31 (2.42-11.63)						
54	26	>20 per day	14.59 (7.47-28.50)						

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Reference, Country and years of study	Cancer subsite	No. of cases	No. of controls	Smoking categories	Odds ratio (95%CI)	Comments
Sapkota <i>et al.</i> (2007) (contd)	ICD-O-2 Hypopharynx C12, C13 Larynx C32.0, C32.1, C32.2-C32.9	37 6 19 62 39 174 39 20 129 17 7 40 8 10 2 40 2 7 11 40 20 38 71 40 2 32 95	457 16 43 54 457 261 427 104 113 33 11 427 79 19 6 457 44 35 25 45762 25 26 457 16 43 54	<i>Duration of bidi smoking</i>		
				0 years	1.0	
				1-15 years	3.37 (1.15-9.90)	
				>15-30 years	3.96 (1.91-8.19)	
				>30 years	7.76 (4.16-14.47)	
				Larynx_ other		
				<i>Ever smoke</i>		
				No	1.0	
				Yes	8.28 (5.02-13.67)	
				<i>Smoking product</i>		
				Never	1.0	
				Cigarette	5.06 (2.50-10.26)	
				Bidi	9.61 (5.65-16.35)	
				Cigarette and bidi	9.52 (4.15-21.85)	
				Other	5.85 (1.85-18.50)	
				<i>Frequency of cigarette smoking</i>		
				0	1.0	
				1-10 per day	2.57 (1.02-6.32)	
				>10-20 per day	10.95 (3.94-30.40)	
				>20 per day	7.05 (1.12-44.46)	
				<i>Duration of cigarette smoking</i>		
				0 years	1.0	
				1-15 years	1.50 (0.32-7.06)	
>15-30 years	4.51 (1.61-12.61)					
>30 years	6.64 (2.65-16.64)					
<i>Frequency of bidi smoking</i>						
01-10 per day	1.02.82 (1.40-5.67)					
>10-20 per day	11.94 (5.74-24.84)					
>20 per day	24.71 (12.56-48.61)					
<i>Duration of bidi smoking</i>						
0 years	1.0					
1-15 years	1.54 (0.32-7.53)					
>15-30 years	7.16 (3.60-14.23)					
>30 years	12.99 (7.14-23.61)					

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Sapkota <i>et al.</i> (2007) (contd)	ICD-O-2 Hypopharynx C12, C13 Larynx C32.0, C32.1, C32.2-C32.9	21	457	Supraglottis				
				<i>Ever smoke</i>				
				99	261	No	1.0	Adjusted for center, age, sex, SES, alcohol consumption, tobacco snuffling and tobacco chewing
						Yes	6.69 (3.50-12.77)	
				21	427	<i>Smoking product</i>		
				4	104	Never	1.0	
				83	113	Cigarette	2.14 (0.63-7.30)	
				9	33	Bidi	7.53 (3.84-14.74)	
				3	11	Cigarette and bidi	15.92 (5.46-46.45)	
						Other	4.24 (0.81-22.20)	
						<i>Frequency of cigarette smoking</i>		
				21	427	0	1.0	
				2	79	1-10 per day	1.33 (0.27-6.65)	
				1	19	>10-20 per day	4.28 (0.45-40.72)	
				1	6	>20 per day	6.55 (0.46-92.57)	
						<i>Duration of cigarette smoking</i>		
				21	457	0 years	1.0	
				0	44	1-15 years	-	
				2	35	>15-30 years	3.77 (0.73-19.54)	
				2	25	>30 years	2.16 (0.39-11.85)	
						<i>Frequency of bidi smoking</i>		
		21	457	0	1.0			
		14	62	1-10 per day	3.07 (1.29-7.33)			
		16	25	>10-20 per day	7.25 (2.77-18.94)			
		53	26	>20 per day	20.31 (9.10-45.31)			
				<i>Duration of bidi smoking</i>				
		21	457	0 years	1.0			
		5	16	1-15 years	5.09 (1.43-18.16)			
		19	43	>15-30 years	6.04 (2.54-14.35)			
		59	54	30 years	11.04 (5.10-23.91)			

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De Stefani <i>et al.</i> (2007) Uruguay 1988-2000	Mouth and pharynx Excluded lip and nasopharynx			Oral cancer		Adjusted for age, residence, urban/rural status, hospital, year at diagnosis, education, family history of cancer among first-degree relatives, occupation, total vegetables and fruits consumption, mate intake and alcohol drinking
				<i>Type of tobacco</i>		
		8	374	Never smokers	1.0	
		125	570	Blond	6.1 (2.9-12.9)	
		50	191	Mixed	7.0 (3.2-15.4)	
		152	366	Black	13.3 (6.3-28.0)	
				<i>Type of cigarette</i>		
		8	374	Never smokers	1.0	
		104	461	Manufactured	6.7 (3.2-14.3)	
		44	158	Mixed	6.9 (3.1-15.4)	
		179	508	Hand-rolled	10.6 (5.0-22.3)	
				<i>Filter use</i>		
		8	374	Never smokers	1.0	
		23	128	Lifelong filter	5.3 (2.2-12.5)	
		86	357	Mixed	6.3 (2.9-13.4)	
		218	642	Plain	10.5 (5.0-21.8)	
				Pharyngeal		
				<i>Type of tobacco</i>		
		5	374	Never smokers	1.0	
		171	570	Blond	13.1 (5.2-32.6)	
55	191	Mixed	10.8 (4.1-27.9)			
210	366	Black	28.8 (11.5-72.2)			
		<i>Type of cigarette</i>				
5	374	Never smokers	1.0			
134	461	Manufactured	12.6 (5.0-31.6)			
45	158	Mixed	10.5 (4.0-27.6)			
257	508	Hand-rolled	25.0 (10.0-62.4)			
		<i>Filter use</i>				
5	374	Never smokers	1.0			
25	128	Lifelong filter	8.5 (3.1-23.6)			
104	357	Mixed	11.3 (4.5-28.6)			
307	642	Plain	23.3 (9.4-57.8)			

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Reference, Country and years of study	Cancer subsite	No. of cases	No. of controls	Smoking categories	Odds ratio (95%CI)	Comments		
Applebaum <i>et al.</i> (2007) USA 1999-2003	Head and neck ICD-9 141, 143, 144, 145, 146, 148, 149 and 161	90	182	Without HPV16 serology		Models also controlled for sex, age, race, and education		
				<i>Smoking, pack-years</i>				
				92	152		None	1.0
							>0 to <20	1.2 (0.8-1.7)
		20 to <45	1.7 (1.2-2.6)					
		126	123	≥45	3.0 (2.0-4.6)			
				With HPV16 serology				
		<i>Smoking, pack-years</i>		90	182		None	1.0
		92	152				>0 to <20	1.1 (0.7-1.7)
							20 to <45	1.8 (1.2-2.7)
							≥45	3.4 (2.2-5.3)
		126	123	Larynx				
				<i>Smoking, pack-years</i>				
				5	182		None	1.0
							>0 to <20	3.7 (1.3-10.6)
		20 to <45	6.5 (2.3-18.5)					
		22	123	≥45	19.9 (7.2-54.9)			
		51	92	Oral cavity				
				<i>Smoking, pack-years</i>				
				44	182		None	1.0
>0 to <20	0.9 (0.6-1.6)							
20 to <45	1.4 (0.8-2.4)							
52	123	≥45	1.8 (1.0-3.2)					
53	92	Pharynx						
		<i>Smoking, pack-years</i>						
		41	182	None	1.0			
				>0 to <20	0.9 (0.5-1.6)			
20 to <45	1.6 (0.9-2.8)							
52	123	≥45	3.2 (1.8-5.6)					
72	92							

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Applebaum <i>et al.</i> (2007) (contd)	Head and neck ICD-9 141, 143, 144, 145, 146, 148, 149 and 161	10	166	Pharynx		Joint effects OR, adjusted for sex, age, race, education, and alcohol consumption
				HPV16 serology		
				Negative		
				<i>Cigarettes, pack-years</i>		
		None	1.0			
		> 0 to <20	1.7 (0.7-4.0)			
		20 to <45	3.4 (1.5-7.5)			
		≥45	6.9 (3.1-15.1)			
		Positive				
		<i>Cigarettes, pack-years</i>				
None	32.5 (13.3-79.5)					
>0 to <20	15.5 (6.3-37.9)					
20 to <45	22.4 (8.4-60.1)					
≥45	27.7 (9.8-77.9)					