

2.11 Cancer of the urinary bladder

Information on alcoholic beverage consumption and cancer of the urinary bladder was derived from five cohort (Table 2.65) and 18 case-control (Table 2.66) studies, which included more than 9000 cases in total.

Of the five cohort studies, one investigation in the Netherlands (Zeegers *et al.*, 2001) found a relative risk of 1.6 in men who drank ≥ 30 g ethanol per day, but no trend in risk with dose. The corresponding value for women was 1.0. The other cohort studies, one among Danish brewery workers (Jensen, 1979) and three from selected populations in the USA (Mills *et al.*, 1991; Chyou *et al.*, 1993; Djoussé *et al.*, 2004) found no association between various measures of alcoholic beverage consumption and risk for cancer of the urinary bladder.

In a multicentre case-control study conducted in 1978–79 in 10 areas of the USA (Thomas *et al.*, 1983), which included 2982 incident cases, no association was found between urinary bladder cancer and total alcoholic beverage consumption (relative risk for ≥ 42 drinks per week, 0.99 in men and 0.66 in women) or consumption of beer (relative risk, 0.93 in both sexes combined), wine (relative risk, 0.60) or spirits (relative risk, 1.14). Of the subsequent case-control studies, nine showed some excess risk in (heavy) alcoholic beverage drinkers and eight showed no association. Moreover, the largest studies, conducted in Canada on 1125 cases (Band *et al.*, 2005) and in Italy on 727 cases (Pelucchi *et al.*, 2002a), also showed no association between various measures of alcoholic beverage consumption and risk for cancer of the urinary bladder.

An explanation for some apparently inconsistent epidemiological findings on alcoholic beverage consumption and cancer of the urinary bladder is that there are different correlates (including tobacco, coffee and diet) of alcoholic beverage drinking in various populations. Alcoholic beverage drinking, in part, may be positively correlated with cigarette smoking, a poorer diet or other recognized risk factors (i.e. social or occupational) for bladder cancer. Thus, residual confounding is possible.

A meta-analysis of 11 studies (two cohort and nine case-control) published between 1966 and 2000 (Bagnardi *et al.*, 2001), which included a total of 5997 cases, found relative risks of 1.04 (95% CI, 0.99–1.09) for 25 g, 1.08 (95% CI, 0.98–1.19) for 50 g and 1.17 (95% CI, 0.97–1.41) for 100 g ethanol per day.

Table 2.65 Cohort studies of alcoholic beverage consumption and cancer of the urinary bladder

Reference, location, name of study	Cohort description	Exposure assessment	Case definition (ICD code)	Exposure categories	No. of cases/deaths	Relative risk (95% CI)	Adjustment factors	Comments
Special population								
Jensen (1979), Denmark	14 313 Danish brewery workers employed at least 6 months in 1939–63; followed for cancer incidence and mortality in 1943–73; age not given; workers allowed 2.1 L of free beer/day (77.7 g pure alcohol)	Follow-up 1943–72	Cases and deaths ascertained through Cancer Registry (ICD-7)	All cancers Bladder cancer	1303 75	SIR (1.0–1.2) 0.9 (0.7–1.1)	Age, sex, area, time trends	Cancer morbidity and mortality compared with those in the general population

Table 2.65 (continued)

Reference, location, name of study	Cohort description	Exposure assessment	Case definition (ICD code)	Exposure categories	No. of cases/deaths	Relative risk (95% CI)	Adjustment factors	Comments
General population								
Mills <i>et al.</i> (1991), USA, California Seventh-day Adventists	34 198 white, non-Hispanic Seventh-day Adventists, aged ≥ 25 years; followed through to 1982; newly diagnosed cancer cases identified by record linkage with the Los Angeles Cancer Surveillance Program and the Resource for Cancer Epidemiology in San Francisco; follow-up 99% complete	Detailed lifestyle and 51-item food-frequency questionnaire in 1976	Bladder (ICD-0, 188); 52 histologically confirmed (36 men, 16 women); 94% transitional-cell carcinomas	<i>Beer/wine/liquor (frequency/week)</i> <1 ≥ 1	45 3	1.0 (0.6–5.9) 1.5 (0.4–4.9)	Age, sex Age, sex, smoking	

Table 2.65 (continued)

Reference, location, name of study	Cohort description	Exposure assessment	Case definition (ICD code)	Exposure categories	No. of cases/deaths	Relative risk (95% CI)	Adjustment factors	Comments
Chyou <i>et al.</i> (1993), USA, Japanese–American Cohort study (1965–68)	American men of Japanese ancestry, born 1900–19 and residing on Oahu, Hawaii; identified via the Honolulu Heart Program and through Service draft registration files; of 11 148, 8006 interviewed (72%) in 1965–68; data from 7995 men used; incident cancer cases identified via the Hawaii Cancer Registry; follow-up to May 1991	Interview on smoking history, usual frequency of consumption of 17 food items; a diet recall history (24 h) obtained	96 histologically confirmed cancers in the lower urinary tract (bladder, 83; renal pelvis, 8; ureter, 5); 91% transitional-cell carcinomas	<i>Total intake (g/day)</i>				
				0	30	1.0		
				<15	38	1.3 (0.8–2.1)		
				>15	27	1.2 (0.7–2.0)		
				<i>Beer (g/day)</i>				
				0	30	1.0		
				250	29	1.4 (0.8–2.3)		
				>250	29	1.1 (0.7–1.9)		
				<i>Wine</i>				
				None	30	1.0		
Any	18	1.2 (0.7–2.3)						
<i>Spirits (g/day)</i>								
0	30	1.0						
<2	15	0.95 (0.5–1.8)						
>2	29	1.7 (0.98–2.8)						

Table 2.65 (continued)

Reference, location, name of study	Cohort description	Exposure assessment	Case definition (ICD code)	Exposure categories	No. of cases/deaths	Relative risk (95% CI)	Adjustment factors	Comments
Zeegers <i>et al.</i> (2001), Netherlands Cohort Study (1986–92)	58 279 men and 62 573 women from 204 municipal registries, aged 55–69 years in 1986; follow-up, 6.3 years via record linkage with cancer registries and the Dutch database of pathology reports	Self-administered questionnaire; consumption of beer, red and white wine, sherry and other fortified wines, liqueur and liquor noted	Analysis based on 594 cancer cases (517 men, 77 women) of bladder, renal pelvis, ureter, urethra and 3170 sub-cohort members (1591 men, 1579 women)	<i>Total alcohol intake (g/day)</i>		Men		Age, smoking (status, amount and duration)
				0	62	1.0		
				<5	108	1.5 (1.0–2.2)		
				5–<15	136	1.5 (1.0–2.2)		
				15–<30	109	1.2 (0.8–1.7)		
				≥30	102	1.6 (1.1–2.5)		
				<i>Beer (g/day)</i>				
				0	62	1.0		
				<5	174	1.4 (0.9–2.0)		
				5–<15	89	1.4 (1.0–2.2)		
15–<30	22	1.7 (0.9–3.2)						
≥30	10	1.1 (0.5–2.6)						

Table 2.65 (continued)

Reference, location, name of study	Cohort description	Exposure assessment	Case definition (ICD code)	Exposure categories	No. of cases/deaths	Relative risk (95% CI)	Adjustment factors	Comments
Zeegers <i>et al.</i> (2001) (contd)				<i>Wine (g/day)</i>				
				0	62	1.0		
				<5	151	1.5 (1.1–2.2)		
				5–<15	67	1.2 (0.8–1.9)		
				15–<30	25	1.1 (0.7–2.0)		
				≥30	11	1.7 (0.7–4.1)		
				<i>Liquor (g/day)</i>				
				0	62	1.0		
				<5	114	1.4 (1.0–2.1)		
				5–<15	89	1.4 (0.9–2.1)		
				15–<30	70	1.3 (0.8–1.9)		
				≥30	50	1.9 (1.2–3.2)		
				<i>Total intake (g/day)</i>				
				Women				
0	25	1.0						
<5	29	0.97 (0.56–1.69)						
≥5	33	0.75 (0.41–1.37)						

Table 2.65 (continued)

Reference, location, name of study	Cohort description	Exposure assessment	Case definition (ICD code)	Exposure categories	No. of cases/deaths	Relative risk (95% CI)	Adjustment factors	Comments
Djoussé <i>et al.</i> (2004), USA, Framingham Heart Study	Population-based; nested case-control study within the cohort started in 1948 with 5209 persons; of these, 205 excluded because alcohol data missing; in 1971, the children of the original cohort and their spouses were invited to join the Offspring Study; of the 5124 subjects in this cohort, 3 were excluded (missing alcohol data); mean age of 10 125 participants, 40.3 years (range, 5–70 years); 9821 subjects included; average follow-up, 27.3 years	Biennial examinations, asking about alcoholic beverage intake, smoking	133 confirmed incident cases of bladder cancer	<i>Total intake (g/day)</i>			Age/sex, cohort, smoking status, pack-years of smoking; beverage-specific data also controlled for the other two types	
				0	14	1.0		
				0.1–6.0	43	0.9 (0.5–1.8)		
				6.1–12.0	21	0.9 (0.4–1.9)		
				12.1–24.0	14	0.6 (0.3–1.3)		
				24.1–48.0	22	0.9 (0.5–1.9)		
				>48	8	0.5 (0.2–1.2)		
				<i>Beer (drinks/week)</i>				
				0	48	1.0		
				<1	20	0.6 (0.3–1.2)		
				1–4	23	0.7 (0.4–1.3)		
				>4	31	0.5 (0.1–0.8)		
				<i>Wine (drinks/week)</i>				
				0	49	1.0		
<1	42	0.9 (0.5–1.6)						
1–4	17	0.6 (0.3–1.2)						
>4	14	0.8 (0.4–1.7)						
<i>Spirits (drinks/week)</i>								
0	21	1.0						
<1	20	1.0 (0.5–2.0)						
1–4	28	1.4 (0.4–2.9)						
>4	53	1.6 (0.9–3.1)						

CI, confidence interval; ICD, International Classification of Diseases

Table 2.66 Case-control studies of alcoholic beverage consumption and cancer of the urinary bladder

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments
Mommsen <i>et al.</i> (1983), Denmark, 1977-79/80	212 (165 men, 47 women), mean age, 66.1 years (range, 42-85 years); newly diagnosed over 2 (men) or 3 years (women)	259 (165 men, 94 women) selected from the same area; matched with cases on sex, age, degree of urbanization, geographic area	Questionnaire and interview with physician on job history, use of alcohol, tobacco, coffee, sugar substitutes	Bladder	Alcohol drinking	193	2.3 (1.3-3.9)	Matching factors	
Thomas <i>et al.</i> (1983), USA, 1978-79	2982 newly diagnosed identified over a 1-year period from cancer registries in 10 areas in the USA; 100% histologically confirmed; participation rate, 73%	Population in same areas selected by random-digit dialling (2469; aged 21-64 years) and from files of Health Care Finance Administration (3313; aged 65-84 years); stratified on age, sex, geographic distribution; response rates, 84% (21-64 years) and 82% (65-84 years)	At-home interview with standardized questionnaire on job/residential history, use of sweeteners and coffee, tobacco products; number of alcoholic servings in a typical winter week 1 year before	Bladder	Servings per week <i>All alcohol</i>		<i>Men/women</i>	Age, sex, race, smoking status, hazardous occupational exposure	[No CIs provided]
					0	835/426	1.0 (1.0)		
					<3	216/92	0.94 (0.80)		
					4-6	228/75	0.86 (0.93)		
					7-13	335/62	0.98 (0.77)		
					14-27	359/59	0.88 (0.97)		
					28-41	139/9	1.13 (0.87)		
					≥42	114/2	0.99 (0.66)		
					<i>Beer</i>		<i>Men + women</i>	Age, race, smoking status, hazardous occupational exposure	
					0	1261	1.0		
					<3	275	0.89		
					4-6	223	0.98		
					7-13	154	0.92		
					14-27	161	1.01		
					28-41	43	1.16		
					≥42	46	0.93		

Table 2.66 (continued)

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments
Thomas <i>et al.</i> (1983) (contd)					<i>Wine</i>				[No CIs provided]
					0	1261	1.0		
					<3	370	0.94		
					4–6	175	0.86		
					7–13	128	0.81		
					14–27	89	1.00		
					≥28	15	0.60		
					<i>Spirits</i>				
					0	1261	1.0		
					<3	294	0.78		
					4–6	259	0.91		
					7–13	255	0.95		
					14–27	235	0.99		
					28–41	53	1.04		
				≥42	51	1.14			

Table 2.66 (continued)

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments
Claude <i>et al.</i> (1986), Germany, 1977–82	431 patients (340 men, 91 women) in three hospitals in Lower Saxony; mean age, 68.6 (men) and 69.7 years (women); refusal rate, 2%	Patients in the same hospitals; mean age, 69.7 (men) and 70.9 (women) years; matched 1:1 to cases by age (± 5 years), sex; due to a lack of suitable patients >65 years, 21% recruited from homes for the elderly; about 70% of the men had prostate adenoma and infections	Interviews with a questionnaire on smoking, use of alcohol, coffee, drugs, medical history, radiation, urination habits, use of hair dyes, job history and exposures	Lower urinary tract (90% bladder); 89% transitional-cell carcinoma	<i>Beer (L/day)</i>	NR	<i>Men</i>	Smoking	Beer drinkers consumed ≥ 1 glass of beer (0.3 L) per day for ≥ 5 years; odds ratio for all beer drinkers, 1.6; odds ratio for nonsmokers among them, 0.8; odds ratio for beer drinkers who smoke, 1.7; also seen for spirits, not for wine; information on histology available
					0.1–0.5		1.16		
					0.6–1.0		2.14 ($p < 0.05$)		
					>1		2.77 ($p < 0.05$)		
					<i>Wine (L/day)</i>	NR	0.97		
					0.1–0.3		0.82		
>0.30									
<i>Spirits (L/week)</i>	NR	1.46							
0.1–0.5		2.71 ($p < 0.05$)							
>0.5									
<i>Ever</i>	NR	<i>Women</i>							
<i>Beer</i>		1.42							
<i>Wine</i>		1.88							
<i>Spirits</i>		1.21							

Table 2.66 (continued)

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments
Kunze <i>et al.</i> (1986), Germany, 1977–82	340 patients from three hospitals in Lower Saxony; cancers of the bladder (309), pelvis (15), ureter (4), urethra (1) or multifocal tumours (11); 100% histologically confirmed; refusal rate, 2%	Patients in the same hospitals without any tumour primarily from urological departments; matched with cases on age, sex, hospital	Interviews at the hospital, about smoking, drinking, medical history, drug use, urinary habits, use of hair dyes.	Lower urinary tract (91% bladder, 4.4% pelvis, 1.2% ureter, 3.3% multifocal)	<i>Beer (L/day)</i>	NR	1.16	Smoking	[Numerical data identical to Claude <i>et al.</i> (1986)]
					0.6–1.0		2.14 ($p<0.05$)		
					>1		2.77 ($p<0.05$)		
					<i>Wine (L/day)</i>	NR	0.97		
					<0.3		0.82		
					>0.30				
					<i>Spirits (L/week)</i>	NR	1.46		
					<0.5		2.71 ($p<0.05$)		
					>0.5		1.6 ($p<0.05$)		
					<i>Beer drinkers</i>		1.7 ($p<0.05$)		
<i>Smoker</i>		0.8							
<i>Nonsmoker</i>									
Slattery <i>et al.</i> (1988), Utah, USA, 1977–82	419 patients identified via Utah Cancer Registry (all white); aged 20–84 years; 100% histologically confirmed carcinomas; completion rate, 76.3%	889 population-based selected by random-digit dialling (aged 21–64 years) or via Health Care Finance records (aged 65–84 years); matched 2:1 to cases by 5-year age group, sex; completion rate, 81.5%	Personal interviews on smoking, drinking, use of sweeteners, medical history, job history, demographics; intake of fluid noted for a typical winter week 1 year prior to interview	Bladder (ICD-0, 188)	<i>Alcohol (oz/week)</i>			Age, sex, diabetes, bladder infections	
					0	110	<i>Never smokers</i>		
					1–30	14	1.0		
					≥31	7	1.2 (0.6–2.2)		
							2.1 (0.8–5.4)		
							<i>Ever smokers</i>		
					0	159	4.1 (2.5–6.7)		
					1–30	59	2.8 (2.1–3.9)		
					≥31	66	2.9 (2.0–4.4)		
					<i>Alcohol (oz/week)</i>		<i>Never smokers</i>		
0	110	1.0							
0.1–3.64	11	1.0 (0.5–2.0)							
≥3.65	10	2.4 (1.1–5.4)							
		<i>Ever smokers</i>							
0	159	3.8 (2.4–6.2)							
0.1–3.64	51	2.8 (2.1–3.9)							
≥3.65	74	3.0 (2.0–4.4)							

Table 2.66 (continued)

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments
Nomura <i>et al.</i> (1989), Hawaii, USA, 1979–86	261 patients of Caucasian or Japanese ancestry in 7 large hospitals on Oahu, Hawaii; 261 participated (195 men, 66 women), aged 30–93 years; 100% histologically confirmed; overall reponse rate 73%; 31 cases diagnosed in 1977–79	522 population-based identified from lists of the Health Surveillance Program; matched 2:1 for age (± 5 years), sex, race, current residency on Oahu; 89% of those eligible	Interviews on smoking history, alcohol intake 1 year before the interview, job history, use of hair dyes	Lower urinary tract (90% bladder)	Alcohol intake				Cigarette smoking (pack-years)
					<i>Drinks/week</i>				
					<i>Men</i>				
					Non-drinker	46	1.0		
					Drinker	149	1.2 (0.8–1.9)		
					1–14	78	1.1 (0.7–1.8)		
					>15	71	1.3 (0.8–2.2)		
					<i>Women</i>				
Non-drinker	33	1.0							
Drinker	33	0.9 (0.5–1.6)							
1–7	22	0.7 (0.4–1.4)							
>8	11	1.5 (0.6–3.8)							

Table 2.66 (continued)

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments
Akdaş <i>et al.</i> (1990), Turkey, 1980–87	194 patients (168 men, 26 women) admitted to 2 hospitals, aged 24–80 years (mean age, 60 years); 100% histologically confirmed	194 patients in the same hospitals with no gross haematuria or cancer history; 91% had IVU done, showing a normal bladder; 57% had cystoscopy, showing absence of tumour; matched on age, sex	Interview on past and present residence, job history, socio-economic status, drinking habits (tea, alcohol, Turkish coffee), smoking habits, medical history, use of fertilizers or insecticides	Bladder	No drinking* Ever drinking Daily drinker <i>Drinking duration</i> 11–20 years >20 years >175 mL liquor/day		<i>Case control ratio</i> 0.67 1.67 $p < 0.001$ $p < 0.01$ $p < 0.001$ $p < 0.01$ $p < 0.05$	Unadjusted Smoking	Risk for bladder cancer increased with intensity and duration of alcohol drinking * read from graph

Table 2.66 (continued)

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments
Momas <i>et al.</i> (1994), France, 1987–89	219 men living in the Hérault district for >5 years diagnosed with primary bladder carcinoma, checked with the Hérault Cancer Registry; mean age, 67.8 years; papillomas and polyps excluded; 100% histologically confirmed; participation rate, 81% (53 died)	928 men living in Hérault region for >5 years, randomly selected from electoral rolls; aged >50 years; 558 of 692 in the telephone book agreed to be interviewed (80.6%); 236 of 329 not in phone book replied by mail (71.7%).	Interviews (direct or by phone) on past and present residence, level of education, jobs of >1 year, smoking/drinking habits, intake of spiced food, sweeteners	Bladder (188)	<i>Lifelong intake of pure alcohol (kg)</i> <15 15–600 >600–1200 >1200	7 47 57 50	1.0 2.2 (0.9–5.6) 1.7 (0.7–4.3) 3.1 (1.2–8.2)		Stepwise logistic regression, using the largest possible data set in the regression model, i.e. with the set of persons having no missing values for any of the model variables
Nakata <i>et al.</i> (1995), Gunma Prefecture, China	303 men; mean age, 70.1 years	303 men from the general population from 15 areas of the Gunma prefecture; mean age, 70.2 years; age-matched (± 1 year)	Not reported	Bladder	History of drinking (yes/no)	191 190	1.0 (0.7–1.5) 0.9 (0.7–1.4)	Age Smoking	

Table 2.66 (continued)

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments
Bruemmer <i>et al.</i> (1997), USA, 1987–90	427 Caucasian patients with invasive or non-invasive (in-situ or papillary) bladder cancer living in Washington State with no prior bladder cancer history; aged 45–65 years; 262 completed the interview; response rate, 62.4%	535 identified via random-digit dialling; matched to cases by sex, county of residence; 405 interviewed (79% of those eligible and selected)	Telephone interviews on demographics, history of cancer, smoking; fluid intake over a 10-year period before reference date (2 years before diagnosis)	Bladder (188)	<i>Alcoholic drinks (per day)</i>				
						0	33	1.0	<i>Men</i>
						≤0.5	49	1.4 (0.7–2.7)	
						>0.5–2.0	57	1.2 (0.6–2.2)	
						>2	63	1.1 (0.6–2.1)	
									<i>Women</i>
						0	19	1.0	
						≤0.5	22	0.4 (0.2–0.8)	
						>0.5–2.0	10	0.6 (0.2–1.6)	
						>2	9	0.5 (0.2–1.3)	

Table 2.66 (continued)

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments				
Donato <i>et al.</i> (1997), Brescia, Italy, 1990–92	172 patients (135 men, 37 women) diagnosed in a large hospital in Brescia; all but one histologically confirmed	578 patients (398 men, 180 women) in the same and two other hospitals with prostate adenoma, urolithiasis or obstructive uropathy; men age-matched (\pm 5 years) with cases; this could not be achieved for women	Questionnaire on education, history of smoking, coffee/alcohol drinking	Bladder (188)	<i>Alcohol drinking (g/day)</i>		<i>Men</i>	Age, place of residence, education, date of interview, smoking, coffee consumption	People who drank alcohol less than daily were considered non-drinkers				
										Non-drinker	10	1.0	
										Former drinker	16	1.0 (0.4–2.7)	
										Current drinker	109	2.1 (1.0–4.8)	
										1–20	18	1.7 (0.6–4.7)	
										21–40	33	1.6 (0.6–3.8)	
										41–60	36	4.3 (1.7–11.0)	
										>61	22	4.6 (1.6–13.4)	
										<i>Women</i>	Non-drinker	12	1.0
											Current drinker	25	3.4 (1.2–9.7)
											1–20	14	3.1 (1.0–9.3)
											\geq 21	11	3.9 (1.1–13.7)
Probert <i>et al.</i> (1998), United Kingdom	116 patients with transitional-cell carcinoma recruited from haematuria clinics in two Bristol hospitals; tumours staged and graded by a clinical pathologist; 100% histologically confirmed	91 patients from the same clinics with benign haematuria or no bladder disease	Personal interview by the same person on job history, smoking history and status, coffee and alcohol use, place of residence	Bladder (188)	<i>Alcohol consumption</i>	34%	Crude	No relative risks given					
									Wine		Cases/controls [odds ratio] [1.59]		
									Quantity/week		3.9/3.5 units		
									Started drinking		54.1/39.9 years		
									Beer	66%	[1.85]		
									Quantity/week		11.9/9.6 units		
									0	62			
1–20	37												
>20	15												
<i>p</i> for trend		<0.05											

Table 2.66 (continued)

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments		
Pohlabein <i>et al.</i> (1999), Hessen, Germany, 1989–92	300 patients (239 men, 61 women) newly diagnosed in 4 hospitals in Hessen; 89.6% bladder cancer; 100% histologically confirmed; 98.7% carcinomas; response rate, 92.6%	300 patients from the same hospitals with non-neoplastic diseases of the lower urinary tract; matched 1:1 on age (± 5 year), sex, area of residence; response rate, 98%	Questionnaire and interview on job history, active smoking history, dietary habits (foods/drinks) 10–15 years previously	Lower urinary tract	Alcohol intake				Adjusted for smoking categories: none, 1– \leq 20, 20– \leq 40, >40 pack–years, cigar, pipe	1 bottle of beer = 2 glasses of wine = 20 g alcohol	
					<i>Total intake</i>			<i>Men</i>			
					Not daily	102	1.0				
					1–20 g/day	74	1.10 (0.70–1.73)				
					21–40 g/day	35	0.83 (0.46–1.47)				
					>41 g/day	28	1.71 (0.78–3.73)				
					<i>Not daily</i>		52	1.0			
					<i>Daily</i>		9	2.84 (0.69–11.68)			
					<i>Beer</i>			<i>Men</i>			
					<i>Not daily</i>		119	1.0			
					1–2 bottles/day		96	1.05 (0.70–1.59)			
					≥ 3 bottles/day		24	1.82 (0.79–4.21)			
					<i>Not daily</i>		58	1.0			
≥ 1 bottle/day		3	4.53 (0.32–65.24)								
<i>Wine</i>			<i>Men</i>								
<i>Not daily</i>		211	1.0								
1–2 glasses/day		24	1.18 (0.60–2.33)								
≥ 3 glasses/day		4	2.48 (0.41–14.89)								
<i>Not daily</i>		55	1.0								
≥ 1 glass/day		6	2.29 (0.44–11.92)								

Table 2.66 (continued)

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments	
Pelucchi <i>et al.</i> (2002a), Italy, 1985–92	727 patients with invasive transitional cell cancer (617 men, 110 women) in various hospitals in the Milan area and the Pordenone region; aged 27–79 years (median, 63 years); 100% histologically confirmed; refusal rate, 2.6%	1067 patients (769 men, 298 women) in the same hospitals, admitted for acute, non-neoplastic, non-urolological or genital tract diseases; aged 27–79 years (median, 60 years); refusal rate, 2.2%	Questionnaire on smoking habits, intake of coffee and tea, medical history, family history of urological cancer, alcohol use, relevant occupational exposures	Bladder (188)	<i>Total intake (drinks/day)</i>				Age, sex, study centre, education, smoking, tea or coffee consumption, green vegetable intake, occupation 'at risk'	
					Non-drinker	117	1.0			
					Ever drinker	607	0.8 (0.6–1.1)			
					<3	192	0.8 (0.6–1.1)			
					3–<6	193	0.8 (0.5–1.1)			
					≥6	222	0.8 (0.6–1.2)			
					<i>Wine (drinks/day)</i>					
					Non-drinker	126	1.0			
					Ever drinker	599	0.9 (0.6–1.1)			
					<3	207	0.9 (0.7–1.3)			
					3–<5	175	0.8 (0.6–1.1)			
					≥5	217	0.9 (0.6–1.2)			
					<i>Beer</i>					
					Never	608	1.0			
					Ever	118	0.7 (0.5–0.9)			
					<i>Spirits</i>					
Never	538	1.0								
Ever	189	0.9 (0.7–0.9)								
<i>Years of drinking</i>										
Never drinker	117	1.0								
1–24	65	0.7 (0.5–1.1)								
25–39	199	0.7 (0.5–1.0)								
≥40	342	1.0 (0.7–1.4)								

Table 2.66 (continued)

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments
Band <i>et al.</i> (2005), British Columbia, Canada, 1983–90	25 726 male patients aged ≥ 20 years listed in the British Columbia Cancer Registry, detailed questionnaire returned by 15 463 (60.1%); of these, 1129 bladder cancer patients responded (64.7%); 1125 cases had at least one matching control	8492 patients with cancer at all other sites, except lung (2998) and 'unknown sites' (708); matched on age, year of diagnosis	Questionnaire on lifetime job history (usual occupation/industry, ever occupation), smoking/drinking habits.	Bladder (188)	<i>Alcohol intake</i> Never Ever Unknown	119 858 148	1.0 0.9 (0.7–1.1) 1.2 (0.9–1.5)		Focus on identifying occupational cancer risks; similar alcohol use between cases and controls

Table 2.66 (continued)

Reference, study location, period	Characteristics of cases	Characteristics of controls	Exposure assessment	Organ site (ICD code)	Exposure categories	Exposed cases	Relative risk (95% CI)	Adjustment factors	Comments
Lu <i>et al.</i> (2005), Taiwan, China, 1997–98	103 (66 men, 37 women) patients in Kaohsiung; upper tract metastases or recurrent urinary neoplasm not eligible; 100% histologically confirmed; all genotyped for <i>N-acetyltransferase (NAT2)</i> ; response rate, 100%	103 (68 men, 35 women) ophthalmic patients with non-neoplastic and non-urological diseases, and normal renal and liver function; all genotyped for <i>NAT2</i> ; response rate, 100%	Interview with questionnaire on demographics, socioeconomic, dietary factors, jobs, smoking, betel quid use, alcohol use,	Bladder	<i>Alcohol drinking</i> No Yes <i>NAT2 genotype*</i> Rapid Slow <i>Interaction alcohol use NAT2 genotype</i> No/Rapid No/Slow Yes/Rapid Yes/Slow	98 5 52 24 12 15	<i>Odds ratio</i> 1.0 2.7 (1.3–5.9) 1.0 1.5 (0.8–2.8) 1.0 1.1 (0.5–2.1) 1.4 (0.6–3.5) 18.0 (2.3–142.8)	*Adjusted for blackfoot disease-endemic area, alcohol drinking	
Baena <i>et al.</i> (2006), Spain	74 men admitted to the Department of Urology of the University Hospital of Cordoba over 1 year; mean age, 67.1 years	89 male patients in the same department, with non-malignant urological disease; mean age, 58.7 years	Interview with questionnaire on smoking/drinking habits, diet and chronic diseases	Bladder	Alcohol drinking	60	[2.38] (<i>p</i> =0.036 in univariate analysis)	Crude	In multivariate analysis, alcohol was not an independent risk factor for bladder cancer, but no point estimates were given; unclear whether current or ever drinker.

CI, confidence interval; ICD, International Classification of Diseases; IVU, intravenous urography; NR, not reported

Given the likelihood of residual confounding and the absence of an association in large studies, there is no clear pattern of association between total alcoholic beverage consumption or consumption of various types of alcoholic beverage and the risk for cancer of the urinary bladder.