2015 DIET, NUTRITION, PHYSICAL ACTIVITY AND BLADDER CANCER

		DECREASES RISK	INCREASES RISK
STRONG EVIDENCE	Convincing		
	Probable		Arsenic in drinking water[1]
LIMITED EVIDENCE	Limited – suggestive	Vegetables and fruit[2] Tea	
	Limited – no conclusion	Cereals (grains) and their products, pulses (legumes), meat, poultry, fish, total fat, milk, yoghurt, cheese, dietetic foods, soft drinks, diet drinks, fruit juices, coffee, green tea, caffeine, alcohol, chlorinated surface water, total fluid intake, sweeteners, frying, carbohydrate, protein, vitamin A, vitamin C, serum 25-hydroxy vitamin D, vitamin E, calcium, folate, selenium, beta-carotene, alpha-carotene, lycopene, beta-cryptoxanthin, lutein, zeaxanthin, flavonoids, tocopherols, multivitamin supplements, physical activity, energy intake, BMI, waist circumference, height	
STRONG EVIDENCE	Substantial effect on risk unlikely		

1 The International Agency for Research on Cancer (IARC) has graded arsenic and arsenic compounds as Class 1 carcinogens [3]. The grading for this entry applies specifically to inorganic arsenic in drinking water.

2 Combined consumption of vegetables and fruit.

Summary of CUP 2014 of dose-response meta-analyses of intake of vegetable and fruit subtypes and bladder cancer risk

Exposure	Increment	RR (95% CI)	I^2	No. Studies	No. Cases
Combined vegetables & fruit	Per 1 serving/day	0.97 (0.95–0.99)	0%	8	2,508
Non-starchy vegetables	Per 1 serving/day	0.97 (0.94–1.00)	10%	10	5,119
Cruciferous vegetables	Per 1 serving/ week	0.98 (0.94–1.02)	58%	7	2,437
Green leafy vegetables	Per 1 serving/ week	0.98 (0.95–1.01)	0%	6	2,310
Fruit	Per 1 serving/day	0.98 (0.96–1.00)	0%	12	5,329
Citrus fruit	Per 1 serving/day	0.96 (0.91–1.02)	0%	6	1,968

Summary of published meta-analysis of tea intake and bladder cancer risk

Publication	No. Studies	Comparison	RR (95% CI)	I^2
Qin (2012) [22]	6	Tea consumption vs. no tea consumption	0.94 (0.78-1.09)	0%

Summary of studies on arsenic and bladder cancer risk

Publication	No. Cases	Sex	RR (95% CI)	Increment/Constrast
HIGH-EXPOSURE AREAS				
Chung (2013) South-western Taiwan cohort, 1989–1996 [28]	43	Men and women	7.74 (0.97–61.51)	Cumulative exposure ≥19.5 vs. <9.1 µg/L/ year
Hsu (2011) South-western Taiwan cohort, 1989–1996 [26]	41	Men and women	19.31 (2.46–151.24)	Cumulative exposure (well water) 20 vs. 0–9.9 mg/L/year
Huang (2008) South-western Taiwan cohort, 1989–2001 [25]	37	Men and women	7.9 (1.7–37.9)	Cumulative exposure (well water) ≥20 mg/L/year vs. none
Chen (2010) North-eastern Taiwan cohort, 1991/1994–2006 [27]	45	Men and women	12.6 (3.40–46.8)	Cumulative exposure (well water) ≥10000 vs. <400 µg/L
Chiou (2001) North-eastern Taiwan cohort, 1991/1994–1996 [29]	11	Men and women	15.10 (1.70–138.50)	Concentration in well water collected at enrolment >100 vs. 0–10 µg/L
Tsuda (1995) Japanese cohort, 1959–1992* [30]	3	Men and women	SMR 31.18 (8.62–91.75)	Drinking water ≥1 ppm
Chiou (1995) South-western Taiwan cohort [31]	29	Men and women	5.1 (1.5–17.3)	Cumulative exposure (well water) ≥20 mg/L/year vs. none
LOW-EXPOSURE AREAS				
Baastrup (2008) Danish Diet, Cancer and Health cohort [24]	214	Men and women	1.00 (0.91–1.11)	Time-weighted average exposure (drinking water) Per µg/L
Michaud (2004) ATBC study [32]	280	Men	1.13 (0.70–1.81)	Toenail arsenic level >0.161 vs. <0.05 µg/g
Lewis (1999) Cohort of Mormons, USA* [33]	–	Men	SMR 0.95	Drinking water ≥5000 ppb-year
		Women	SMR 1.10	
Kurttio (1999) Finnish cohort, 1981–1995 [34]	61	Men and women	1.00 (0.91–1.11)	Cumulative exposure (well water), 3 to 9 years before cancer diagnosis ≥2.0 vs <0.5 mg

Note: SMR = standardised mortality ratio; ppb = parts per billion; ppm = parts per million.
* Retrospective cohort study of mortality.

Summary of published meta-analyses of arsenic exposure and bladder cancer risk

Publication	No. Studies	No. Cases	Comparison	RR (95% CI)
Mink (2008)* [35]	8 (2 cohort, 6 case-control)	1105	HvL <100–200 µg/L	1.11 (0.95–1.30)
	6 (1 cohort, 5 case-control)	182	HvL: never-smokers <100–200 µg/L	0.81 (0.60–1.08)
	6 (1 cohort, 5 case-control)	182	HvL: ever-smokers <100–200 µg/L	1.24 (0.99–1.56)
Chu (2006) [36]	7 (2 cohort, 5 case-control)	–	Dose-response Per µg/L from high- and low-arsenic areas	Slope = 0.004 (-0.03–0.01)

* Low-level arsenic exposure in drinking water. Study funded by the Wood Preservative Science Council, Virginia, USA: a trade association of manufacturers of wood preservatives, some of which may contain arsenic.