

C10: Cancer Studies: Individual Study Results

1. Cohort and Ecological Studies

a. Studies which present indirectly standardised results

Study Details	Outcome	Group	Exposure	Exposure Level	Crude Rate (Males)	Crude Rate (Females)	Standardisation						
							Methods	Observed		Expected		SMR	
								M	F	M	F	M	F
Chilvers (1985)	Cancer mortality from cancer of the buccal cavity and pharynx	Group 1: Group 2: Group 3: Group 4:	Water fluoride level	>=1.0			Method used Indirect Standard population Standardised mortality ratios provided by OPCS. Where no deaths occurred in area expected deaths calculated by applying England and Wales age-sex specific death rates. Standardised for age.	41	30			102.97	120.91
	Cancer mortality from all causes	Group 1: Group 2: Group 3: Group 4:		0.5-0.99				43	21			97.57	81.00
	Cancer mortality from all stomach cancers	Group 1: Group 2: Group 3: Group 4:		<=0.2				42	15			116.69	64.92
	Cancer mortality from breast cancer	Group 1: Group 2: Group 3: Group 4:		<=0.1				33	21			77.08	79.00
	Cancer mortality from intestinal cancer	Group 1: Group 2: Group 3: Group 4:		>=1.0				2426	2039			95.06	96.36
	Cancer mortality from kidney cancer	Group 1: Group 2: Group 3: Group 4:		0.5-0.99				2525	2169			89.02	97.18
	Cancer mortality from lung cancer	Group 1: Group 2: Group 3: Group 4:		<=0.2				2255	1957			97.06	98.58
	Cancer mortality from oesophagus cancer	Group 1: Group 2: Group 3: Group 4:		<=0.1				2632	2236			95.55	97.92
	Cancer mortality from ovary cancer	Group 1: Group 2: Group 3: Group 4:		>=1.0				288	177			97.88	82.8
	Cancer mortality from pancreas cancer	Group 1: Group 2: Group 3: Group 4:		0.5-0.99				275	180			85.10	83.09
	Cancer mortality from cancer of the prostate	Group 1: Group 2: Group 3: Group 4:		<=0.2				234	175			88.07	89.39
			<=0.1	284	214	90.26	94.43						
			>=1.0		410		96.78						
			0.5-0.99		483		105.47						
			<=0.2		396		98.13						
			<=0.1		470		101.66						
			>=1.0	162	230	93.51	93.82						
			0.5-0.99	180	264	94.21	104.94						
			<=0.2	177	221	113.14	97.69						
			<=0.1	189	277	101.62	105.90						
			>=1.0	38	25	102.11	102.07						
			0.5-0.99	28	28	65.85	108.75						
			<=0.2	27	19	77.51	83.09						
			<=0.1	41	30	100.23	114.39						
			>=1.0	938	214	92.97	97.71						
			0.5-0.99	984	221	87.71	95.41						
			<=0.2	841	181	91.01	88.21						
			<=0.1	1035	207	94.80	87.47						
			>=1.0	60	44	86.86	81.19						
			0.5-0.99	58	50	75.56	90.02						
			<=0.2	53	54	84.56	108.10						
			<=0.1	78	58	104.76	100.33						
			>=1.0		136		98.73						
			0.5-0.99		150		100.39						
			<=0.2		156		118.72						
			<=0.1		130		86.43						
			>=1.0	119	106	108.02	108.70						
			0.5-0.99	110	107	90.07	107.04						
			<=0.2	82	80	82.02	89.08						
			<=0.1	106	87	89.40	83.90						

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							Methods	Observed		Expected		SMR			
								M	F	M	F	M	F		
Chilvers (1985) - continued	Cancer mortality from rectum cancer	Group 1:	Level of fluoride that >2/3 of the population were exposed to	>=1.0								89.11	93.49		
		Group 2:		0.5-0.99								133	114	93.52	101.23
		Group 3:		<=0.2								153	96	131.86	94.43
		Group 4:		<=0.1								143	117	103.26	99.64
	Cancer mortality from skin cancer	Group 1:		>=1.0								19	30	97.59	142.81
		Group 2:		0.5-0.99								21	16	93.96	69.98
		Group 3:		<=0.2								22	26	120.79	129.32
		Group 4:		<=0.1								23	25	107.15	108.10
	Cancer mortality from bladder cancer	Group 1:		>=1.0								110	41	96.48	88.67
Group 2:		0.5-0.99	99	45	79.78	95.93									
Group 3:		<=0.2	100	50	98.79	117.54									
Group 4:		<=0.1	129	47	106.63	95.53									
Hoover (1976)	Mortality from cancer of all sites	Group 1:	>=2.0	Method used Indirect Standard population The entire 1970 US population (5 year age-groups to 74, then 75-84 and 85+)								0.9	0.9		
	Mortality from cancer of the testis	Group 2:	1.3-1.9									1.0	1.0		
		Group 3:	0.7-1.2									1.0	1.0		
		Group 4:	<0.7									1.0	1.0		
	Mortality from cancer of the nose and nasal sinuses	Group 1:	>=1.3									1.6	0.7		
		Group 2:	0.7-1.2									1.1	0.9		
		Group 4:	<0.7									0.8	2.0		
	Mortality from cancer of the nose and nasal sinuses	Group 1:	>=2.0									1.1	0.7		
		Group 2:	1.3-1.9									1.1	1.2		
Group 4:		<0.7	0.8	0.6											
Mortality from cancer of the oesophagus	Group 1:	>=2.0	0.9	1.0											
	Group 2:	1.3-1.9	1.0	1.0											
	Group 3:	0.7-1.2	1.1	1.2											
Mortality from cancer of the oesophagus	Group 4:	<0.7	0.8	0.6											
	Group 1:	>=2.0	0.9	1.0											
	Group 2:	1.3-1.9	1.0	1.0											
Mortality from cancer of the ovary	Group 3:	0.7-1.2	1.1	1.2											
	Group 4:	<0.7	0.9	1.0											
	Group 1:	>=2.0	1.1	1.2											
Mortality from cancer of the ovary	Group 2:	1.3-1.9	1.1	0.9											
	Group 3:	0.7-1.2	1.0	1.0											
	Group 4:	<0.7	1.0	1.1											
Mortality from cancer of the pancreas	Group 1:	>=2.0	1.1	1.0											
	Group 2:	1.3-1.9	1.0	1.0											
	Group 3:	0.7-1.2	1.0	1.1											
Mortality from cancer of the pancreas	Group 4:	<0.7	1.1	1.0											
	Group 1:	>=2.0	1.1	1.0											
	Group 2:	1.3-1.9	1.0	1.0											
Mortality from cancer of the prostate	Group 3:	0.7-1.2	1.0	1.0											
	Group 4:	<0.7	1.0	1.0											
	Group 1:	>=2.0	0.6	0.8											
Mortality from cancer of the prostate	Group 2:	1.3-1.9	1.0	0.9											
	Group 3:	0.7-1.2	1.0	1.1											
	Group 4:	<0.7	1.1	1.0											
Mortality from cancer of the rectum	Group 1:	>=2.0	0.6	0.8											
	Group 2:	1.3-1.9	1.0	0.9											
	Group 3:	0.7-1.2	1.0	1.1											
Group 4:	<0.7	1.1	1.0												

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							Methods	Observed		Expected		SMR		
								M	F	M	F	M	F	
Hoover (1976) - continued	Mortality from other lymphoma	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7								0.9 1.0 1.1 0.8	1.1 1.1 1.0 1.0	
	Mortality from cancer of the stomach	Group 1: Group 2: Group 3: Group 4:		>=1.3 0.7-1.2 <0.7								1.1 1.1 1.0 1.0	1.0 1.0 1.0 1.0	
	Mortality from cancer of the lung	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7								0.8 1.0 1.0 1.0	1.0 1.0 1.0 0.9	
	Mortality from cancer of the thyroid	Group 1: Group 2: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7								1.1 1.2 0.8	0.7 1.3 0.6	
	Mortality from cancer of the uterus	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7									0.8 1.1 1.0 1.0	
	Mortality from Hodgkin's disease	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7									1.4 0.7 1.1 1.0	1.4 0.6 1.1 1.1
	Mortality from leukaemia	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7									1.0 1.0 1.0 1.0	0.9 0.9 1.1 1.0
	Mortality from melanoma	Group 1: Group 2: Group 3: Group 4:		>=1.3 0.7-1.2 <0.7									1.3 1.2 0.9 1.0	1.0 1.2 1.0 0.9
	Mortality from multiple myeloma	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7									0.7 1.2 0.9 1.2	1.7 1.5 0.9 0.9
	Mortality from cancer of the salivary gland	Group 1: Group 2: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7									0.9 1.2 0.9	1.5 1.0 1.1
	Mortality from cancer of the colon	Group 1: Group 2: Group 3: Group 4:		>=1.3 0.7-1.2 <0.7									0.9 1.0 1.0 1.0	1.0 1.0 1.0 1.1

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							Methods	Observed		Expected		SMR	
								M	F	M	F	M	F
Hoover (1976) - continued	Mortality from cancer of other endocrine cancers	Group 1: Group 2: Group 4:									1.4 0.9 1.0	1.6 0.9 1.0	
	Mortality from cancer of the bladder	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7							1.0 1.1 1.0 1.0	0.7 1.2 1.0 0.9	
	Mortality from cancer of the bone	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7							0.6 1.2 1.0 1.0	0.8 0.9 1.1 0.9	
	Mortality from cancer of the brain	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7							0.7 1.0 1.0 1.2	0.7 1.1 1.0 1.2	
	Mortality from cancer of the nasopharynx	Group 1: Group 2: Group 3: Group 4:		>=1.3 0.7-1.2 <0.7							0.9 0.9 1.8		
	Mortality from cancer of the cervix	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7								0.9 1.0 1.1 0.9	
	Mortality from cancer of the mouth and throat	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7							0.7 0.8 1.0 1.1	0.9 1.2 1.0 1.0	
	Mortality from cancer of the connective tissue	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7							1.8 1.5 0.9 1.0	1.9 0.9 1.1 0.9	
	Mortality from cancer of the eye	Group 1: Group 2: Group 4:		>=1.3 0.7-1.2 <0.7							1.0 0.9 1.5	1.6 0.7 1.3	
	Mortality from cancer of the kidney	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7							0.6 1.2 1.0 1.1	1.2 1.0 1.0 1.0	
	Mortality from cancer of the larynx	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7							1.3 0.6 1.1 1.1	1.1 1.1 0.7	
	Mortality from cancer of the lip	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7							2.4 0.9 0.9 1.1		

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							Methods	Observed		Expected		SMR		
								M	F	M	F	M	F	
Hoover (1976) - continued	Mortality from cancer of the liver and bile duct	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7								0.8	0.9	
	Mortality from other skin cancer	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7								0.8	0.7	
	Mortality from cancer of the breast	Group 1: Group 2: Group 3: Group 4:		>=2.0 1.3-1.9 0.7-1.2 <0.7								1.1	1.1	
												1.0	0.9	
												0.9	0.7	
												1.0	0.8	
												1.0	1.0	
												1.0	1.1	
													1.0	
													1.0	
													1.0	
Kinlen (1975)	Thyroid cancer	Group 1: Group 2: Group 3: Group 4:	Water fluoride level	1 0.5-0.99 <0.2 <0.1	9.3 6.9 11.2 9.4	Method used Indirect Standard population Not stated, standardised for age and sex							1.05	0.79
	Bone cancer	Group 1: Group 2: Group 3: Group 4:		1 0.5-0.99 <0.2 <0.1	3.7 3.9 3.7 3.5								1.27	1.02
	Breast cancer	Group 1: Group 2: Group 3: Group 4:		1 0.5-0.99 <0.2 <0.1	117.5 128.2 127.4 123.2								1.02	0.94
	Colon cancer	Group 1: Group 2: Group 3: Group 4:		1 0.5-0.99 <0.2 <0.1	80.0 78.7 75.5 80.2								0.92	1.06
	Kidney cancer	Group 1: Group 2: Group 3: Group 4:		1 0.5-0.99 <0.2 <0.1	26.7 25.4 25.7 26.0								1.08	0.97
	Oesophagus cancer	Group 1: Group 2: Group 3: Group 4:		1 0.5-0.99 <0.2 <0.1	15.1 16.8 14.3 19.7								0.96	1.03
	Stomach cancer	Group 1: Group 2: Group 3: Group 4:		1 0.5-0.99 <0.2 <0.1	77.7 94.1 64.1 90.9								0.99	1.00
	Bladder cancer	Group 1: Group 2: Group 3: Group 4:		1 0.5-0.99 <0.2 <0.1	89.1 81.1 87.1 87.7								1.01	1.00
													0.87	1.02
													1.02	0.87
													0.87	1.13
													1.05	0.88
													1.15	0.9
													0.9	1.05
													1.00	1.00
													0.96	1.06
													1.06	1.00

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							Methods	Observed		Expected		SMR									
								M	F	M	F	M	F								
Lynch (1985) - continued	Incidence of bladder cancer	Group 1: Group 2: Group 3: Group 4:	Natural water fluoride level, and minimum length of exposure to this fluoride level (Groups 1& 2: 1968-81, Group 3 & Group 4 1950-81)	<=0.5								1.083	1.161								
				>=1.0								0.924	1.142								
				<=0.5								1.101	1.179								
				>=1.0								1.034	1.355								
	Incidence of breast cancer	Group 1: Group 2: Group 3: Group 4:		<=0.5																0.960	0.978
				>=1.0																0.987	1.043
				<=0.5																1.079	
				>=1.0																1.020	
				<=0.5																1.107	
		>=1.0									1.167										
	Incidence of rectum cancer	Group 1: Group 2: Group 3: Group 4:	<=0.5									1.308	1.106								
			>=1.0								0.938	1.053									
			<=0.5								1.276	1.053									
			>=1.0								0.967	0.967									
	Incidence of cancer from all sites	Group 1: Group 2: Group 3: Group 4:	<=0.5									1.101	1.023								
			>=1.0									1.033	1.024								
			<=0.5									1.110	1.035								
			>=1.0									1.100	1.055								
	Incidence of lung cancer	Group 1: Group 2: Group 3: Group 4:	<=0.5									1.047	0.918								
			>=1.0									1.088	1.051								
			<=0.5									1.034	0.873								
			>=1.0									1.038	1.020								
	Incidence of colon cancer	Group 1: Group 2: Group 3: Group 4:	<=0.5									1.040	1.019								
			>=1.0									1.214	1.009								
			<=0.5									1.023	1.029								
			>=1.0									1.280	1.038								
	Incidence of cancer of all other sites	Group 1: Group 2: Group 3: Group 4:	<=0.5									1.134	1.057								
			>=1.0									0.995	1.042								
			<=0.5									1.155	1.073								
			>=1.0									1.076	1.062								
Richards (1979)	Deaths from Malignant neoplasms	Group 1: Group 4:	Water fluoride level	High Low	146.7 176.8							240 340	262 359	91.6 94.9							

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Study Details	Outcome	Group	Exposure	Exposure Level	Crude Rate (Males)	Crude Rate (Females)	Standardisation						
							Methods	Observed		Expected		SMR	
								M	F	M	F	M	F
Smith (1980)	Deaths from cancer	Group 1: Group 2: Group 3: Group 4:	Water fluoride level, exposed 1 & 2 used for 1950 data, exposed 3 & 4 for 1970 data	Low Low High Low	180.8 179.0 217.4 194.2		Method used Indirect Standard population Cancer death rates for the whole of US, using 1950 rates for 1950 data and 1970 rates for 1970 data. Standardised for age, sex, ethnic origin	180.8 179.0 217.4 194.2 Expected Cancer Death rate 1950 F: 1.0 Non-F: 1.0	146.9 155.5 217.4 168.9 Expected Cancer Death rate 1970 F: 0.96 Non-F: 1.0				

b. Studies which present directly standardised results

Study Details	Outcome	Group	Exposure	Crude Risk Males/ 100 000	Crude Risk Females/ 100 000	Summary Measure (CI):		
						Details	Male	Female
Glattre (1979)	Mortality from oral or pharyngeal cancer (ICD 140-149)	Group 1: Group 2: Group 4:	0.11-0.50 0.06-.010 0-0.05			Method used Direct Standard population Age standardised mortality rate (standard error of the mean)	3.4 (0.81) 4.7 (0.90) 5.3 (0.99)	0.6 (0.24) 1.1 (0.43) 1.5 (0.34)

c. Studies which present crude results only

Study Details	Outcome	Group	Exposure	Exposure Level	Crude Risk /100 000	
					Male	Female
Cohen (1992)	Osteosarcoma incidence	Group 1: Control:	% of the population exposed to fluoridated water	>85% <10%	1.35 0.40	0.35 0.35
Hrudey (1990)	Osteosarcoma incidence	Group 1: Group 4:	Water fluoride content	1 0.3		0.27 0.29
Mahoney (1991) (SMSA data for fluoridated areas used, in order to best match the data from non-fluoridated areas)	Osteosarcoma incidence	Group 1: Group 2:	Water fluoride level	High Low	0.43 0.44	0.25 0.32
		Group 3: Group 4		High Low	0.29 0.33	0.22 0.24
	Bone cancer incidence	Group 1: Group 2:	Fluoridated water	High Low	0.90 0.97	0.64 0.67
		Group 3: Group 4:		High Low	1.04 1.24	0.8 0.70

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2. Before-After Studies

Study Details	Outcome Presented	Group	Fluoride Level	Outcome 1	Outcome 2	Outcome 3	Outcome 4	
Chilvers (1983)	Mean standardised mortality ratios for 1950 and 1970, US 1960 population used as standard			Death from cancer (SE)				
		Baseline:						
		<i>Group 1:</i>	Low	120.54				
		<i>Group 4:</i>	Low	116.80				
		Final:						
		<i>Group 1:</i>	High	123.84				
<i>Group 4:</i>	Low	120.18						
Chilvers (1982)	Standardised mortality ratios presented. Indirect standardisation carried out simultaneously for age (0-1, 1-4, 5-14) , sex and ethnic group (white & non-white). Specific rates used were total US 1960			Digestive organs (SE)	Respiratory system (SE)	Breast (SE)	Genital organs (SE)	
		Baseline:						
		<i>Group 1:</i>	Low	125.31	135.71	119.90	109.27	
		<i>Group 4:</i>	Low	109.92	130.89	112.56	106.62	
		Final:						
		<i>Group 1:</i>	High	106.72	199.17	120.89	92.97	
		<i>Group 4:</i>	Low	96.05	195.53	114.67	97.25	
				Urinary organs (SE)	Leukaemia and aleukaemia (SE)	Other malignant neoplasms (SE)	All malignant neoplasms (SE)	
		Baseline:						
		<i>Group 1:</i>	Low	125.51	104.56	115.64	121.31	
		<i>Group 4:</i>	Low	114.82	108.01	115.74	113.87	
		Final:						
<i>Group 1:</i>	High	118.79	102.01	136.40	124.03			
<i>Group 4:</i>	Low	109.20	103.07	130.94	118.43			
Cook-Mozaffari (1981)	Age adjusted rate, adjusted using geometric mean of average annual rates for England and Wales for each study period, age groups 0-4 & then 10 year groups up to 85+. SMRs multiplied by age-standardised death rates for England and Wales to give rate			Age adjusted cancer deaths males, 1959-63 & 1969-73 (SE)	Age adjusted cancer deaths females, 1959-63 & 1969-73 (SE)	Age adjusted cancer deaths males, 1969-73 & 1974-78 (SE)	Age adjusted cancer deaths females, 1969-73 & 1974-78 (SE)	
		Baseline:						
		<i>Group 1:</i>	Low	201.6	121.9	211.5	128.8	
		<i>Group 4:</i>	Low	211.2	120.1	220.7	128.1	
		Final:						
		<i>Group 1:</i>	High	214.3	129.7	213.5	130.2	
<i>Group 4:</i>	Low	223.9	128.6	215.7	129.9			
Doll (1977)	Age (10 year groups), sex and ethnic group (white/non-white) standardised (standard, specific national cancer-mortality rates for US) ratio of observed to expected deaths from cancer			Deaths from cancer (SE)				
		Baseline:						
		<i>Group 1:</i>	Low	01.23				
		<i>Group 4:</i>	low	01.15				
		Final:						
		<i>Group 1:</i>	High	01.18				
<i>Group 4:</i>	Low	01.17						

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Study Details	Outcome Presented	Group	Fluoride Level	Outcome 1	Outcome 2	Outcome 3	Outcome 4	
Goodall (1980)	Crude death rates from cancer per 100 000 population			Cancer death rate males	Cancer death rate females			
		Baseline:						
		Group 1:	Low	629.5	484.7			
		Group 4:	Low	567.7	501.4			
		Final:						
Group 1:	High	691.1	463.2					
Group 4:	low	733.5	511.9					
Hoover (1991)	Age adjusted incidence rates for 1973-80 and 1981-87			Incidence of osteosarcoma (males only) (SE)	Incidence of bone and joint cancers (both sexes) (SE)			
		Baseline:						
		Group 1:	<10% pop, <0.3	0.29	0.90			
		Group 2:	>60% pop, F<1955	0.32	0.90			
		Group 4:	>60% pop, F>=1966	0.35	0.83			
Final:								
Group 1:	<10% pop, <0.3	0.30	0.85					
Group 2:	>60% pop, F<1955	0.42	0.86					
Group 4:	>60% pop, F>=1966	0.45	0.93					
Schlesinger (1956)	Crude death rate			Deaths from cancer (SE)	(SE)			
		Baseline:						
		Group 1:		219.0	221.2			
		Group 4:		169.0	264.4			
		Final:						
Group 1:	1-1.2	221.0						
Group 4:	<0.2	264.4						
Raman (1977)	Age standardised results using the 1971 Canada population as standard			Mortality from cancer (all malignant neoplasms) - males (SE)	Mortality from cancer (all malignant neoplasms) - females (SE)			
		Baseline:						
		Group 1:	F <1959	161.1	146.0			
		Group 2:	F 1959-63	193.4	167.1			
		Group 3:	F 1964-67	159.5	134.9			
Group 4:	Not fluoridated	177.0	165.2					
Final:								
Group 1:	F <1959	170.5	136.9					
Group 2:	F 1959-63	181.2	132.9					
Group 3:	F 1964-67	166.9	122.9					
Group 4:	Not fluoridated	179.5	137.2					
Yiamouyiannis (1977)	Crude death rates			Death from cancer ages 0-24 (SE)	Deaths from cancer ages 25-44 (SE)	Deaths from cancer ages 45-64 (SE)	Deaths from cancer ages 65+ (SE)	
		Baseline:						
		Group 1:	Low	9.7	49.96	338.3	1032.8	
		Group 4:	Low	9.69	47.33	323.5	974.4	
		Final:						
Group 1:	High	7.30	47.15	375.1	1069.9			
Group 4:	Low	7.20	44.67	347.2	977.6			

C10: Cancer Studies: Individual Study Results

3. Case-Control Studies

Study Details	Outcome	Number of Subjects per Group	Exposures	Level of Exposure in Cases	Level of Exposure in Group 4 1	OR for Exposure
Gelberg (1995)	Cases of osteosarcoma newly diagnosed from January 1978 to December 1988 identified from the New York Cancer Registry. Questionnaire completed by subjects.	55	Exposure 1: Lifetime exposure to water fluoride of 0 Exposure 2: Lifetime exposure to water fluoride of 1-1850mg Exposure 3: Lifetime exposure to water fluoride of 1851-3385mg	21	29	1.00 2.31(0.74, 7.20) 2.07(0.53, 8.02)
	Questionnaire completed by parents.	110		15 14	11 12	
McGuire (1991)	Patients diagnosed with osteosarcoma between 1980 and 1990. Cases identified through University of Iowa cancer registry and medical records of division of orthopaedics, St. Joseph's Hospital, Omaha, Nebraska	22	Exposure 1: More than 1/3 of life at >0.7ppm Exposure 2: Lifetime exposure greater than 0.7ppm Exposure 3: More than 1/3 of childhood at 0.7ppm	40	57	0.14 (0.02, 1.22) 0.33 (0.04, 2.50) 0.33 (0.04, 2.50)
				32 26	16 23	
Moss (1995)	Primary osteosarcoma tumours occurring in Wisconsin reported to the Wisconsin Cancer Reporting System between 1979-1989	167	Exposure 1: Water fluoride level >0.7, estimated according to area of residence Exposure 2: Water fluoride level <0.7, estimated according to area of residence Exposure 3: Odds ratio adjusted for population, age, radiation and gender	110 57	695 294	1.0(0.6-1.5)