

Table 2.1. Cohort studies of cadmium and lung cancer

Reference/ country	Cohort Description	Cadmium level		Organ site	Exposure category	No. of cases	Relative risk (95% CI ¹)	Adjustment for potential confounders	Comments
		Years	Estimated levels (mg/m ³)						
<i>Copper-cadmium alloy plants</i> United-Kingdom									
Holden (1980)	Urban alloy ≥ 1 year	< 1953	1	Lung cancer	Overall	8	1.78 [0.77-3.50]		Mortality, number of workers not stated
	Rural alloy ≥ 1 year	1953-57	< 0.15		Overall	2	0.26 [0.03-0.92]		Expected deaths based on national rates
	624 vicinity ≥ 1 year	> 1957	< 0.05		Overall	36	1.38 [0.97-1.91]		Vicinity workers also exposed to arsenic
Sorahan <i>et al.</i> (1995)	347 alloy	1922-78		Lung cancer	Overall	18	1.01 [0.60-1.59]		No association with cumulated exposure
	624 vicinity (> 1 year) Mortality 1946-92 at the same plant	1922-78		Lung cancer	Overall	55	1.60 [1.21-2.09]		
These populations all overlap to some extent									
<i>Cadmium processing plants</i> United-Kingdom									
Kazantzis <i>et al.</i> (1992) and Kazantzis & Blanks (1992)	6 910 men > 1 year Mortality 1943-89 ; 17 plants			Lung cancer	Overall	339	1.12 (1.00-1.24)		3% of workers had ever high exposure
					Always low	270	1.08 (0.96-1.22)		
					Ever medium	55	1.21 (0.91-1.57)		
					Ever high	14	1.62 (0.89-2.73)		
<i>Nickel-cadmium battery production</i> United Kingdom									

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Potts (1965)	74 men (≥ 10 years) Mortality through 1965			Lung cancer	Overall	1	Cannot be calculated		No referent group
Kipling & Waterhouse (1967)	248 men (≥ 1 year) Incident through 1966 at same plant as Potts (1965)	1949	0.6-2.8	Lung cancer	Overall	5	1.14 [0.37-2.65]		
Sorahan (1987)	3 025 men and women (≥ 1 month) Mortality 1946-84	1950-67	< 0.5	Lung cancer	Overall	110	1.30 [1.07-1.57]		Dose-response based on years employed in high-exposure jobs. Trend not significant
		1968-75	< 0.2		None ^b	64	1.0		
		> 1975	< 0.05		< 2 years	19	1.4 [0.73-1.83]		
					2 years	6	1.3 [0.41-2.22]		
					5 years	6	1.3 [0.44-2.4]		
					≥ 15 years	6	1.5 [0.42-2.26]		
Sorahan & Esmen (2004)	926 men (> 1 year) at the same plant Mortality 1947-2000	1947-75		Lung cancer	Overall	45	1.11 [0.81-1.48]		No association with cumulated exposure
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Sweden									
Kjellström <i>et al.</i> (1979)	228 men (≥ 5 years) Incidence 1959-75	< 1947	1	Lung cancer	Overall	2	1.48 (0.17-5.35)		
Elinder <i>et al.</i> (1985)	522 men (> 1 year) Mortality 1940-80 at same plant	1947-62	0.3	Lung cancer	Overall	8	1.33 [0.57-2.62]		
		1962-74	0.05		> 5 years	7	1.75 [0.70-3.61]		
		> 1975	0.02		and ≥20 years latency				

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Järup <i>et al.</i> (1998)	717 men (> 1 year) Mortality 1951-92 at same plant	1931-82		Lung cancer	Overall	16	1.76 [1.01-2.87]		No association with cumulated exposure
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Cadmium recovery plants USA									
Lemen <i>et al.</i> (1976)	292 men (≥ 2 years) Mortality 1940-73		Personal	Lung cancer		12	2.35 [1.21 – 4.10]		
Stayner <i>et al.</i> (1992)	579 men (≥ 6 months) Mortality 1940-84 Excludes workers hired before 1 January 1926			Lung cancer	Overall	24	1.49 (0.95-2.21)		Test for trend significant
					< 584c	2	0.34 [0.03-1]		
					585-1460	7	1.63 [0.65-3.07]		
					1461-2920	6	2.17 [0.79-4.28]		
				> 2920	9	2.72 [1.24-4.8]			

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Stayner <i>et al.</i> (1993)	Sub-group of cohort of Stayner <i>et al.</i> (1992) hired after 1940						SMR					
											Non-Mexican-American	
							≤ 584 ^c	1			0.32	Cannot be calculated
							585-1460	6			2.81	
							1461-2920	5			4.70	
							> 2920	0				
											Mexican – American	
							≤ 584 ^c	1			0.42	Cannot be calculated
							585-1460	0.				
							1461-2920	1			0.82	
> 2920	2	2.46										
Sorahan & Lancashire (1997)	571 men (≥ 6 months during 1940-69) at the same plants	1926-69	Departments with minimal or no exposure to arsenic	Lung cancer			<200	13	1.0			
							200-499	4	1.68 (0.48-5.90)			
							500-999	2	1.30 (0.26-6.59)			
							≥1000	2	2.68 (0.54-13.36)			
These populations all overlap to some extent												

^a Approximate 95% confidence intervals calculated by the Working Group are given in square brackets

^b Referent group includes jobs with no or “minimal” exposure to cadmium

^c Units are mg/m³ -days