Table 2.1. Average nickel exposure levels and lung cancer risks in workers with 15 or more years since first exposure[a]

	Plant	Department	Estimated airborne concentration (mg/m^3 Ni)					Duration in department			
			Metallic nickel	Oxidic nickel	Sulfidic nickel	Soluble nickel	Total nickel	Ever		≥ 5 years	
								Lung cancer		Lung cancer	
								Obs	SMR (95% CI)	Obs	SMR (95% CI)
INCO Ontario[a] (Canada) nickel refinery facilities	Coniston	Sinter	Negl.[b]	0.1-0.5	1-5	Negl.	1-5	8	2.92 (1.26-5.76)	6	4.92 (1.81-10.73)
	Copper Cliff	Sinter									
	1948-54		Negl.	25-60	15-35	<4	40-100	63	3.07 (2.38-3.96)	33	7.89 (5.43-11.09)
	1955-63		Negl.	5-25	3-15	<2	8-40	63			
	Port Colborne	Leaching, calcining, sintering									
	1926-35		Negl.	20-40	10-20	<3	30-80	72	2.39 (1.87-3.02)	38	3.66 (2.59-5.02)
	1936-45		Negl.	3-15	2-10	<3	5-25				
	1946-58		Negl.	5-25	3-15	<3	8-40				
		Electrolysis	<0.5	<0.2	<0.5	<0.3	<1	19	0.88[d] (0.53-1.37)	10[d,e]	0.89

Table 2.1. Average nickel exposure levels and lung cancer risks in workers with 15 or more years since first exposure[a]

Plant	Department	Estimated airborne concentration (mg/m^3 Ni)					Duration in department			
		Metallic nickel	Oxidic nickel	Sulfidic nickel	Soluble nickel	Total nickel	Ever		≥ 5 years	
							Lung cancer		Lung cancer	
							Obs	SMR (95% CI)	Obs	SMR (95% CI)
MOND/INCO[j] (Clydach, South Wales, UK) nickel refinery in 'high-risk' departments	Furnaces, 1905-63	5.6[f]	6.4[f]	2.6[f]	0.4[f]		9	4.09	1	3.70
	Linear calciners, 1902-30; milling and grinding, 1902-36	5.3[f]	18.8[f]	6.8[f]	0.8[f]		16	7.25	12	12.44
	Copper plant, before 1937	-	13.1[f]	0.4[f]	1.1[f]		17	3.17 (1.85-5.07)	8	5.41 (2.33-10.66)
	1938-60	-	0.4[f]	0.01[f]	0.01[f]		-		-	
	Hydrometallurgy 1902-79	0.5[f]	0.9[f]	0.05[f]	1.3[f]		7	1.96 (0.79-4.04)	5	3.33 (1.08-7.76)
Falconbridge[a] (Kristiansand, Norway) nickel refinery	Calcining, roasting, smelting; never in electrolysis	0.3-1.3	5.0-10.0	0.3	Negl.[b]		14	2.25 (1.22-3.77)	8	2.54 (1.09-5.00)
	Electrolysis; never in calcining, roasting, smelting	0.3-1.3	0.3-1.3	Negl.[b]-1.3	1.3-5.0		30	3.85 (2.59-5.49)	19	4.76 (2.87-7.44)

[a]From ICNCM (1990), estimated average airborne concentrations of nickel species and mortality from lung cancer and nasal cancer by department; standardized mortality ratio (SMR) and 95% confidence interval (CI)
[b]Negl., negligible exposure
[c]Two nasal cancer deaths occurred in men with > 20 years in electrolysis and only short exposure (three months and seven months) in leaching, calcining and sintering
[d]Never worked in leaching, calcining and sintering
[e]Workers with ≥ 10 years in electrolysis
[f]The Working Group expressed reservations about the accuracy of these estimates, as discussed on p. 391
[j]From ICNCM (1990); estimated average airborne concentrations of nickel species and mortality from lung cancer and nasal cancer by department. In each row, observations are restricted to men with < 1 year employment in other high-risk departments. Standardized mortality ratio (SMR) and 95% confidence interval (CI)