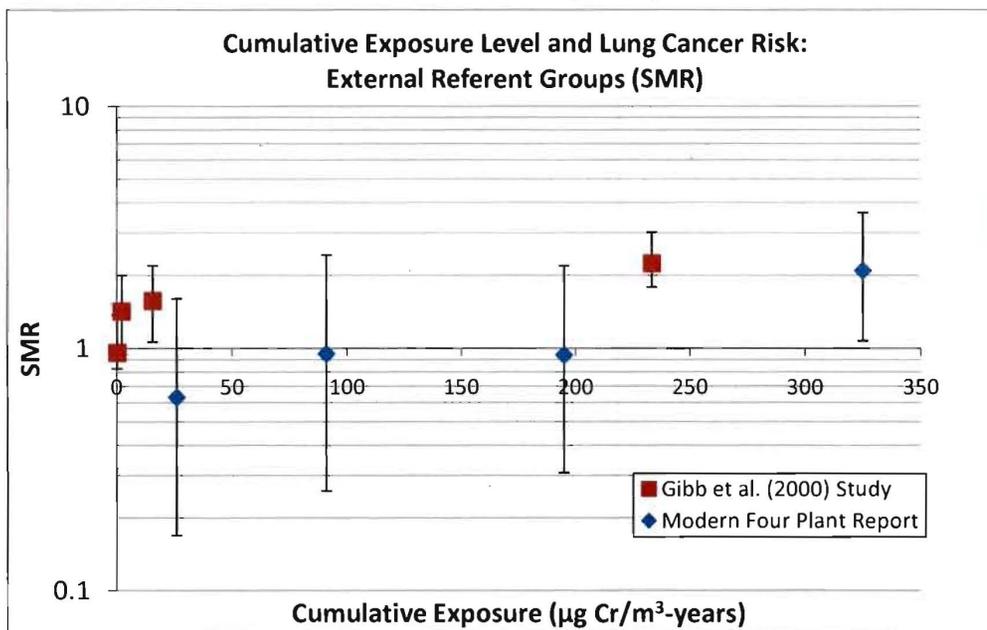


**Lung Cancer Mortality Risk in Relation to Cumulative Chromium Exposure  
Using External Referent Groups (Standardized Mortality Ratios (SMRs)):  
Gibb and Modern Four Plant Report Studies**

The analyses reported in the Gibb et al. (2000) study (CX 62) and the April, 2003 Modern Four Plant Report (RX 14) show a trend of increasing risk with increasing exposure (trend p-value < 0.05). However, the Modern Four Plant Report provides data that were not available in the Gibb et al. study. These data provide additional information about lung cancer mortality risk.

The lung cancer mortality risk (SMR = 0.63) for the low exposure group in the Modern Four Plant Report is consistent with the "healthy worker effect." An analysis using an internal referent group addresses this issue and provides additional information about the pattern of risk (CX 100).



Study	Cumulative Exposure			SMR	(95% Confidence Limits)
	Mean mg CrO <sub>3</sub> /m <sup>3</sup> -years	Mean µg/L urine-years	Mean µg Cr/m <sup>3</sup> -years		
Gibb et al. (2000) Study <sup>a</sup>	0.00045		0.23	0.96	(0.83, 1.38)
	0.0042		2.18	1.42	(0.95, 2.01)
	0.03		15.6	1.57	(1.07, 2.2)
	0.449		233.5	2.24	(1.8, 3.03)
			(trend p-value) <sup>b</sup>	(0.003)	
Modern Four Plant Report (April, 2003) <sup>d</sup>	Minimum and Maximum µg/L urine-years	Mean µg/L urine-years	Conversion to air concentration <sup>c</sup> : Mean µg Cr/m <sup>3</sup> -years		
	0 - 39.9	20	26	0.63	(0.17, 1.61) <sup>d</sup>
	40 - 99.9	70	91	0.95	(0.26, 2.44)
	100 - 199.9	150	195	0.94	(0.31, 2.2)
	≥ 200	250	325	2.09	(1.08, 3.65)
			(trend p-value) <sup>b</sup>	(< 0.03)	

<sup>a</sup> Data presented for the Gibb et al. (2000) study are based on RX 32 and 33.

<sup>b</sup> Statistical Methods in Cancer Research, Volume II: The Design and Analysis of Cohort Studies, 96-100 (N.E. Breslow & N.E. Day eds., International Agency for Research on Cancer, Scientific Publications No. 82, 1987).

<sup>c</sup> Adjusted by 0.77.

<sup>c</sup> RX 33 except as noted in footnote d.

<sup>d</sup> RX 14 at 115 (Table 14).

\*Only the data from the April, 2003 Modern Four Plant Report are shown because the October, 2002 Modern Report contains an error in the calculation of the SMR that was corrected in the April, 2003 version of the Modern Report.