

The burden of occupational cancer in Great Britain

Technical Annex 3: Non-melanoma skin cancer

Prepared by **Imperial College London** and
the **Health and Safety Laboratory**
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The aim of this project was to produce an updated estimate of the current burden of occupational cancer specifically for Great Britain. The primary measure of the burden of cancer used was the attributable fraction (AF), ie the proportion of cases that would not have occurred in the absence of exposure. Data on the risk of the disease due to the exposures of interest, taking into account confounding factors and overlapping exposures, were combined with data on the proportion of the target population exposed over the period in which relevant exposure occurred. Estimation was carried out for carcinogenic agents or exposure circumstances that were classified by the International Agency for Research on Cancer (IARC) as Group 1 or 2A carcinogens with strong or suggestive human evidence. Estimation was carried out for 2004 for mortality and 2003 for cancer incidence for cancer of the bladder, leukaemia, cancer of the lung, mesothelioma, non-melanoma skin cancer (NMSC), and sinonasal cancer.

The proportion of cancer deaths in 2004 attributable to occupation was estimated to be 8.0% in men and 1.5% in women with an overall estimate of 4.9% for men plus women. Estimated numbers of deaths attributable to occupation were 6,259 for men and 1,058 for women giving a total of 7,317. The total number of cancer registrations in 2003 attributable to occupational causes was 13,338 for men plus women. Asbestos contributed the largest numbers of deaths and registrations (mesothelioma and lung cancer), followed by mineral oils (mainly NMSC), solar radiation (NMSC), silica (lung cancer) and diesel engine exhaust (lung and bladder cancer). Large numbers of workers were potentially exposed to several carcinogenic agents over the risk exposure periods, particularly in the construction industry, as farmers or as other agricultural workers, and as workers in manufacture of machinery and other equipment, manufacture of wood products, land transport, metal working, painting, welding and textiles. There are several sources of uncertainty in the estimates, including exclusion of other potential carcinogenic agents, potentially inaccurate or approximate data and methodological issues. On balance, the estimates are likely to be a conservative estimate of the true risk. Future work will address estimation for the remaining cancers that have yet to be examined, together with development of methodology for predicting future estimates of the occupational cancers due to more recent exposures.

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Table 12: Summary of estimates of numbers exposed, proportion exposed, relative risks and attributable fractions for solar radiation.

Occupational exposure		Solar Radiation						
'Best study' for RR estimate	Reference	Freedman et al (2002)						
	Type of study	Death certificate based case-control study, US						
	Sex	Male						
	Exposure level	Farmer	Outdoors					TOTAL
<i>Independent data:</i>	Industry Sectors	A-B	C-E	F	G-Q Armed forces	G-Q Other	Total	
	CAREX numbers exposed	139,738	141,800	319,129	108,857	200,350	770,136	909,874
	CAREX adjustment factor	1.00	1.40	1.00	0.90	0.90		
	Annual employment turnover	0.09	0.09	0.13	0.11	0.11		
	Numbers exposed in the REP	482,800	685,894	1,563,962	409,314	753,336	3,412,506	3,895,306
<i>Proportion of the population exposed</i>		0.025	0.036	0.081	0.021	0.039	0.178	0.203
<i>Relative risks</i>		1.15					1.30	
<i>Attributable fraction</i>		Levin's	0.004				0.051	0.054
	Random error 95% confidence interval	[0.000 - 0.008]					[0.024 - 0.077]	
<i>Attributable deaths</i>			1				16	17
<i>Attributable registrations</i>			127				1,709	1,824

Occupational exposure		Solar Radiation						
'Best study' for RR estimate	Reference	Freedman et al (2002)						
	Type of study	Death certificate based case-control study, US						
	Sex	Female						
	Exposure level	Farmer	Outdoors					TOTAL
<i>Independent data:</i>	Industry Sectors	A-B	C-E	F	G-Q Armed forces	G-Q Other	Total	
	CAREX numbers exposed	37,734	56,908	31,572	8,388	233,509	330,377	368,111
	CAREX adjustment factor	0.75	1.50	0.67	0.80	0.80		
	Annual employment turnover	0.10	0.14	0.16	0.15	0.15		
	Numbers exposed in the REP	116,038	478,748	134,590	40,163	1,118,133	1,771,634	1,887,673
<i>Proportion of the population exposed</i>		0.006	0.023	0.006	0.002	0.053	0.085	0.09
<i>Relative risks</i>		1.15					1.30	
<i>Attributable fraction</i>		Levin's	0.001				0.025	0.026

										117.0 Metal Working Production Fitters and Fitter/Machinists	546,544	6,933	553,477
										118.1 Motor Mechanics Auto Engineers	269,925	1,271	271,196
										118.2 Maintenance Fitters (Aircraft Engines)	3,957	-	3,957
										119.0 Office Machinery Mechanics	11,506	-	11,506
										Labourers and Other Unskilled Workers in Foundries in Engineering	15,469	567	16,036
										Labourers and Other Unskilled Workers in Engineering and Allied Trades	21,276	259	21,535
										<i>High Total</i>	<i>1,515,547</i>	<i>79,469</i>	<i>1,595,016</i>
	Low or Background exposure						1.00			111.6 Foremen of Metal Polishers	265	-	265
										111.7 Foremen of Fettlers Dressers	-	-	-
										111.8 Foremen of Shot Blasters	-	-	-
										113.2 Metal Polishers	11,112	1,425	12,537
										113.3 Fettlers Dressers	12,391	1,619	14,010
										131.8 Shot Blasters	6,049	-	6,049
	Low exposure						1.00			114.2 Foremen of Precision Instrument Makers and Repairers	969	-	969
										114.3 Foremen of Watch and Chronometer Makers and Repairers	-	-	-
										116.1 Precision Instrument Makers and Repairers	28,071	1,667	29,738
										116.2 Watch and Chronometer Makers and Repairers	6,527	225	6,752
										<i>Low Total</i>	<i>65,384</i>	<i>4,936</i>	<i>70,320</i>
										<i>TOTAL</i>	<i>1,580,931</i>	<i>84,405</i>	<i>1,665,336</i>
PAHs - Coal tars and pitches	All	Partanen and Boffetta (1994)	Meta-analysis of cohort studies in asphalt workers	Not stated	Mortality and incidence	Asphalt workers	1.74 [1.07 - 2.65]	LFS 1979	F	139.4 Foremen of Roofers Glaziers	240	-	240
										139.7 Foremen of Road Surfacers Concreters	254	-	254
										139.8 Foremen of Roadmen	6,807	-	6,807
										139.9 Foremen of Paviers Kerb Layers	246	-	246

