

Table 2.12. Cohort studies of the associations between natural sunlight and other cancer

Reference, location, name of study	Cohort description	Exposure assessment	Organ site (ICD code)	Exposure categories	No. of cases/deaths	Relative risk (95% CI)*	Adjustment for potential confounders	Comments
Adami <i>et al.</i> (1999) Sweden 1960 and/or 1970	Cohort of 4 171 175 Swedish residents who were recorded as gainfully employed in the 1960 and/or 1970 census; 60% men and 40% women; mean age at entry into cohort was 46.8 yrs; 24% were less than 30 years at entry; 56% were 30–59 year and 20% > 60yrs; mean follow up time was 16.8 yrs. 10 381 cases of NHL were identified and 4 018 of chronic lymphocytic leukaemia (CCL)	Swedish Cancer-Environment Registry (CER) III	Non-Hodgkin lymphoma (200 and 202), chronic lymphocytic leukaemia (204.1)	NHL – Men			Age, latitude, residence in a large city or not, type of occupation 1960 and 1970, socioeconomic status, number of work-hours per week and exposure to pesticides/solvents	
				<i>Latitude of residence</i>				
				Upper north	480	1.0		
				Lower north	2025	1.10 (1.00–1.22)		
				Upper south	1739	1.09 (0.98–1.21)		
				Lower south	762	1.21 (1.08–1.35)		
				<i>Occupation</i>				
				Indoor	4136	1.0		
				Mixed	1020	1.02 (0.95–1.09)		
				Outdoor	1739	0.93 (0.88–0.98)		
				NHL – Women				
				<i>Latitude of residence</i>				
				Upper north	236	1.0		
				Lower north	1393	1.22 (1.06–1.40)		
				Upper south	973	1.17 (1.01–1.35)		
				Lower south	482	1.26 (1.08–1.40)		
				<i>Occupation</i>				
				Indoor	1912	1.0		
				Mixed	49	1.12 (0.84–1.49)		
				Outdoor	73	0.83 (0.66–1.05)		
CLL – Men								
<i>Latitude of residence</i>								
Upper north	351	1.0						
Lower north	1207	0.98 (0.87–1.10)						
Upper south	1081	0.99 (0.88–1.12)						
Lower south	4 17	0.98 (0.84–1.13)						
<i>Occupation</i>								
Indoor	1759	1.0						
Mixed	4 65	1.08 (0.98–1.20)						
Outdoor	877	1.03 (0.95–1.12)						

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Adami <i>et al.</i> (1999) (contd)				CLL – Women				
				<i>Latitude of residence</i>				
				Upper north	78	1.0		
				Lower north	370	0.93 (0.73–1.19)		
				Upper south	280	0.98 (0.76–1.26)		
				Lower south	107	0.81 (0.60–1.08)		
				<i>Occupation</i>				
				Indoor	584	1.0		
				Mixed	13	0.96 (0.55–1.66)		
				Outdoor	25	0.86 (0.58–1.28)		

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Laden <i>et al.</i> (1997) USA Nurses' Health Study	Cohort of 121, 700 female nurses aged 30–55 years living in 11 US states (representing all four regions of the continental United States) enrolled in 1976; no restrictions were made on the basis of ethnicity or race, however the participants were primarily Caucasian (approximately 97%), reflecting the ethnic background of women trained as registered nurses; the follow-up rate was similar between regions and averaged 95% of potential person-time; 3 603 incident cases of invasive breast cancer through to 1992 were identified	Every 2 years, participants completed follow-up questionnaires to update information on risk factors for breast cancer and to report the occurrence of breast cancer and other illnesses.	Breast cancer	<i>Region of residence</i>			Age, age at menarche, age at first birth, parity, use of oral contraceptives, menopausal status, postmenopausal hormone use and duration of use, family history of breast cancer, history of benign breast disease and body mass index.	
				South	395	1.0		
				California	535	1.13 (0.99–1.29)		
				North-eastern	2034	1.05 (0.94–1.17)		
				Midwest	639	1.03 (0.91–1.17)		
				<i>Regions of lifetime residence</i>				
				South	113	1.0		
				California	92	1.35 (1.02–1.78)		
North-eastern	1123	1.14 (0.94–1.39)						
Midwest	335	1.13 (0.91–1.40)						

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John <i>et al.</i> (1999) USA 1971–1975 to 1992	190 women with incident breast from a cohort of 5 009 white women who completed the dermatological examination and 24-hour dietary recall during the National Health and Nutrition Examination Survey Epidemiologic Follow-up Study; 25 – 74 years; incidence follow up 1971–1975 to 1992; follow-up 93%, completion rate follow-up interviews 91–96% in the four follow-up surveys; cohort includes a representative sample of the United States population	In-person interviews, medical examinations (including dermatological examination), and laboratory tests	Breast cancer	<i>Region of residence</i>			Age, education, age at menarche, age at menopause, body mass index, alcohol consumption and physical activity	
				North-eastern	51	1.0		
				Midwest	48	0.83 (0.56–1.23)		
				West	51	0.78 (0.53–1.16)		
				South	40	0.71 (0.47–1.09)		
				<i>Solar radiation at longest residence</i>				
				Low	83	1.0		
				Medium	67	1.17 (0.85–1.62)		
				High	38	0.73 (0.50–1.08)		
				<i>Solar radiation at place of birth</i>				
				Low	79	1.0		
				Medium	64	0.99 (0.72–1.39)		
				High	35	0.73 (0.49–1.09)		
				<i>Sun exposure determined by physician</i>				
				Unimpressive	94	1.0		
				Moderate	75	0.85 (0.63–1.15)		
				Considerable	20	0.70 (0.43–1.14)		
				<i>Actinic skin damage</i>				
				None (b)	62	1.0		
				None (c)	53	0.92 (0.64–1.34)		
Minimal	51	0.88 (0.60–1.29)						
Moderate/severe	24	0.80 (0.48–1.29)						
<i>Recreational sun exposure</i>								
Rare or never	40	1.0						
Occasional	55	0.65 (0.43–0.98)						
Frequent	60	0.66 (0.44–0.99)						
<i>Occupational sun exposure</i>								
Rare or never	81	1.0						
Occasional	44	1.06 (0.73–1.53)						
Frequent	29	0.64 (0.41–0.98)						

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John <i>et al.</i> (1999) (contd)				<i>Combined recreational and occupational sun exposure</i>				
				Low	32	1.0		
				Medium	99	0.81 (0.56–1.17)		
				High	23	0.67 (0.42–1.06)		
John <i>et al.</i> (2004) USA 1971–1975 to 1992	Cohort included 3 414 white men without a prior history of prostate cancer who completed the baseline interview, 24-hour dietary recall, and dermatological examination during the National Health and Nutrition Examination Survey Epidemiologic Follow-up Study; aged 25–74; incidence follow up 1971–1975 to 1992; 153 prostate cancer cases were identified; loss to follow up 5.3%	In-person interviews, medical examinations (including dermatological examination), and laboratory tests	Prostate cancer	<i>Region of residence</i>			Age, family history of prostate cancer in first-degree relatives, and dietary intake of fat and calcium	
				North-eastern	37	1.0		
				Midwest	42	1.05 (0.66–1.67)		
				West	46	0.94 (0.60–1.48)		
				South	28	0.68 (0.41–1.13)		
				<i>Solar radiation at longest residence</i>				
				Low	80	1.0		
				Medium	41	0.81 (0.55–1.21)		
				High	30	0.62 (0.40–0.95)		
				<i>Solar radiation at place of birth</i>				
				Low	79	1.0		
				Medium	46	0.75 (0.51–1.09)		
				High	23	0.49 (0.30–0.79)		

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John <i>et al.</i> (2007) USA 1971–975 to 1992	Cohort included 5 811 men were recontacted for follow-up interviews conducted in 1982 to 1984, 1986 to 1987, and 1992 as part of the National Health and Nutrition Examination Survey Epidemiologic Follow-up Study; aged 25–74; incidence follow up 1971–1975 to 1992; 161 non-Hispanic white cases of prostate cancer were identified; loss to follow up 5.3%	Self-report, physician report, and dermatologic examination	Prostate cancer	<i>Solar radiation in state of birth</i>			Age	Analyses were also done for nonfatal and fatal prostate cancer cases separately
				Low	78	1.0		
				Medium	47	0.75 (0.52–1.07)		
				High	25	0.52 (0.33–0.81)		
				<i>Solar radiation in state of longest residence</i>				
				Low	86	1.0		
Medium	41	0.72 (0.50–1.05)						
			High	33	0.59 (0.39–0.88)			

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John <i>et al.</i> (2007) (contd)				<i>Solar radiation in state of birth vs solar radiation in state of longest residence</i>				
				Low vs low	82	1.0		
				Low vs high	8	0.87 (0.42–1.79)		
				High vs low	5	0.54 (0.22–1.33)		
				High vs high	55	0.66 (0.47–0.93)		
				<i>Physician-assessed sun exposure</i>				
				Unimpressive	44	1.0		
				Moderate	63	0.85 (0.58–1.25)		
				Considerable	53	0.78 (0.52–1.17)		
				<i>Physician-assessed skin damage induced by sun exposure</i>				
				None	35	1.0		
				Minimal	48	1.18 (0.76–1.84)		
				Moderate to severe	78	1.13 (0.75–1.71)		
				<i>Self-reported recreational sun exposure</i>				
				Never or rare	18	1.0		
				Occasional	32	0.79 (0.44–1.40)		
				Frequent	102	0.92 (0.55–1.52)		
				<i>Self-reported occupational sun exposure</i>				
				Never or rare	42	1.0		
				Occasional	25	0.93 (0.57–1.53)		
				Frequent	86	1.05 (0.73–1.52)		

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John <i>et al.</i> (2007) (contd)				<i>Self-reported occupational or recreational sun exposure</i>				
				Both never, rare or occasional	35	1.0		
				One frequent	47	0.80 (0.52–1.24)		
				Both frequent	70	1.05 (0.70–1.58)		