

**β-HCH**

Prospective (nested studies)

Blood measures

		Study design			Unadjusted results		Adjusted results			Typical β-HCH levels		Comments
Study (reference)	Country	No of Cases	No of Controls	Comparison for OR	OR/RR (95% CI)	Trend test (p)	OR/RR (95% CI)	Adjusted for	Trend test (p)	Cases	Controls	
<b>Høyer et al. (2000)</b> Cancer Causes and Control, 11, 177-184  Nested case-control study designed to evaluate the precision of breast cancer risk measurement using repeated OC exposure measurement	Denmark	155	274	Highest compared to lowest quartile			Age adjusted OR	Age	N.D.	Median serum levels (all subjects)  1976-1978 119.0ng/g lipid  1981-1983 60ng/g lipid		[Cohort from the Copenhagen City Heart Study (CCHS). Cohort also used in other Hoyer studies (1998, 2001, 2002)  Limited details of analysis of organochlorines but study also reports ORs for p,p' DDE, p,p'-DDT, Total DDT, four PCB congener and total PCB (number of congeners not reported)
							Weight adjusted OR					
<b>Ward et al. (2000)</b> Cancer Epidemiology, Biomarkers & Prevention, 9, 1357-1367  Nested Hospital-based case-control study	Norway	150	150	Highest compared to lowest quartile using data from 144 pairs of cases and controls	Odds ratios	N.D.				Mean serum levels  60.0ng/g lipid	Mean serum levels  63.4ng/g lipid	Samples from the Janus Serum Bank.  Study also reports OR for p, p' DDT, a range of PCB's congeners (>24) as well as other pesticides  Adjustment for risk factors had no effect on point estimates for OR, therefore only unadjusted analyses were presented

**$\beta$ -HCH**

Prospective (nested studies)

Blood measures

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Study (reference)	Country	No of Cases	No of Controls	Comparison for OR	OR/RR (95% CI)	Trend test (p)	OR/RR (95% CI)	Adjusted for	Trend test (p)	Cases	Controls	
<b>Dorgan et al (1999)</b>  Cancer causes and control 10, 1-11  Nested case-control study	USA	105	207	Highest compared to the lowest quartile			Relative Risk 0.7 (0.3-1.5)	Matched by age, benign breast disease diagnosis during prior 2 years, month and year of blood collection	0.93	Not reported	Not reported	Study also reports RRs for p,p'-DDE, p,p'-DDT, total DDT, Dieldrin, two PCB congener and total PCBs (27 congeners)
<b>Hoyer et al. (1998)</b>  The Lancet 352, 1816-1820	Denmark	237	469	Highest compared to lowest quartile	1.36 (0.80-2.31)	0.21	1.36 (0.79-2.33)	Age, number of full term pregnancies and weight	0.24	Not reported		Cohort from the Copenhagen City Heart Study (CCHS). Cohort also used in other Hoyer studies (2000, 2001, 2002)  Study also reports ORs for $\beta$ -HCH, p,p'-DDT, total DDT, Dieldrin and total PCBs (28 congeners).

**$\beta$ -HCH**

Retrospective (case-control studies)

Blood measures

		Study design			Unadjusted results		Adjusted results			Typical $\beta$ -HCH levels		Comments
Study (reference)	Country	No of Cases	No of Controls	Comparison for OR	OR/RR (95% CI)	Trend test (p)	OR/RR (95% CI)	Adjusted for	Trend test (p)	Cases	Controls	
Lopez-Carillo <i>et al.</i> (2002) European J. Cancer Prevention, 11, 129-135  Hospital-based case-control study		95	95	Highest compared to lowest tertile			Age adjusted OR  1.45 (0.71-2.94)	Age	N.D.	Median levels (serum)  104.16ng/g lipid	Median levels (serum)  92.98ng/g lipid	Levels of $\beta$ -HCH did not differ significantly between cases and controls in the study population
							Multivariate adjusted OR  1.05 (0.46-2.40)	Age at menarche, number of children and age at first birth, lifetime lactation, family history of breast cancer, menopausal status, Quetelet Index	0.8			

**β-HCH**

Retrospective (case-control studies)

Blood measures

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Study (reference)	Country	No of Cases	No of Controls	Comparison for OR	OR/RR (95% CI)	Trend test (p)	OR/RR (95% CI)	Adjusted for	Trend test (p)	Cases	Controls	
Demers <i>et al.</i> , (2000) Cancer Epidemiology , Biomarkers & Prevention, 9, 161-166  Hospital-based case-control study	Canada	315	219 hospital controls (HC)	Upper compared to lowest quintile			Relative Risk (RR)  Using HC <b>0.83</b> <b>(0.43 - 1.61)</b>	Age, region of residence, BMI, breast feeding duration, age at first child, number of fertile years, family history of breast cancer, history of benign breast cancer	N.D.	Mean plasma levels  21.1 µg/kg lipid	Mean plasma levels  HC 19.4 µg/kg lipid	High concentrations of β-HCH were not related to increased breast cancer risk, although high β-HCH levels were suggested to be associated with risk of large tumours.  High β-HCH plasma levels associated with increased risk of large tumour (RR=2.25, 95% CI = 1.12-4.51)
			307 population controls (PC)				Using PC <b>0.80</b> <b>(0.47 - 1.35)</b>	Age, region of residence			N.D.	PC 17.5 µg/kg lipid

**$\beta$ -HCH****Retrospective (case-control) studies****Adipose measures**

Study (reference)	Country	Study design			Unadjusted results		Adjusted results			Typical levels		Comments
		No of Cases	No of Controls	Comparison for OR	OR/RR (95% CI)	Trend test (p)	OR/RR (95% CI)	Adjusted for	Trend test (p)	Mean (cases)	Mean (controls)	
<b>Aronson et al. (2000)</b> Cancer Epidemiology & Prevention, 9, 55-63  Hospital-based case-control study.	Canada	217	213	Highest compared to lowest quartile			Multivariate Adjusted OR  0.69 (0.34-1.40)	Age, study site, menopausal status, present use of HRT, ethnicity, family history, BMI, fat intake, alcohol intake	N.D.	Geometric means  43.1µg/kg lipid	Geometric means  41.5µg/kg lipid	Increased risk in premenopausal women (adjusted OR = 1.52), but no measure of significance  Study also reports odds ratios for p,p'-DDT, p,p' DDE, 10 PCB congeners and 6 other pesticides
<b>Stellman et al. (2000)</b> Cancer Epidemiology & Prevention, 9, 1241-1249  Hospital-based case-control study	USA	232	323	Highest compared to lowest tertile			Odds ratios not reported. Authors state that no associations were found with breast cancer risk			Median levels  19.8ng/g	Median levels  15.8ng/g	The study also reports OR's for a mixture of seven OC pesticide species and total PCB's (14 congeners)
<b>Guttes et al. (1998)</b>  Arch. Environ. Contam. Toxicol 35, 140-147	Germany	45 (breast cancer)	20 (benign breast cancer)							Age adjusted geometric mean 79µg/kg	Age adjusted geometric mean 93µg/kg	No determination of odds ratio. No significant difference between cases and controls (p=0.360)
Mussalo-Rauhamaa (1990)  Cancer 66, 212402128	Finland	41	33							Mean level in adipose breast tissue  0.13mg/kg fat	Mean level in adipose breast tissue  0.08mg/kg fat	b-HCH was found in a greater proportion of breast cancer cases than controls and at levels which were generally higher than those found in controls (P=0.026)

**β-HCH****Hormone Receptor Status  
Adipose measures**

Study (reference)	Country	Study design			Unadjusted results		Adjusted results			Typical levels		Comments
		No of Cases	No of Controls	Comparison for OR	OR/RR (95% CI)	Trend test (p)	OR/RR (95% CI)	Adjusted for	Trend test (p)	Mean (cases)	Mean (controls)	
<b>Woolcott et al. (2001)</b> Cancer Causes Control, 12, 395-404  Hospital-based case-control study	Canada	217	213	Highest compared to the lowest tertile			<b>Odds Ratios</b>  ER+ 0.7 (0.4-1.3) 147 cases, 208 controls  ER- 1.4 (0.6-3.2) 51 cases, 208 controls	Age, site, menopausal status, use of HRT, ethnicity, BMI, family history, intake of fat and alcohol		Geometric means (breast adipose tissue)  (ER+) 39.3µg/kg lipid  (ER-) 56.2µg/kg lipid	Geometric means (breast adipose tissue)  41.5µg/kg lipid (controls)	Study also reported odds ratio for DDT, p,p' DDE, 4 PCB congeners and total PCB (Measured by adding congeners 138 and 153 and multiplying by 5.2).
<b>Dewailly et al. (1994)</b>  <b>J. Natl. Cancer Inst. 86, 22-23</b>	Canada	9 ER+  9 ER-	17							Mean levels (breast adipose tissue)  (ER+) 39.7µg/kg  (ER-) 34.7µg/kg	Mean levels (breast adipose tissue)  39.7µg/kg	Statistical measurement of differences between cases and controls were 0.77 and 0.92 for ER+ and ER- respectively