

DDT**Prospective (nested studies)****Blood measures**

Study (reference)	Country	Study design			Unadjusted results		Adjusted results			Typical DDT 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)	Cases	Controls	
Høyer et al. (2000) 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	Denmark	155	274	Highest compared to the lowest quartile			Age adjusted OR 1.9 (0.9-9.3)	Age	0.10	Median serum levels (all subjects regardless of case control status) 1 st examination (1976-1978) 144.2ng/g lipid 2 nd examination (1981-1983) 45.7ng/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 β-HCH, p,p'-DDT, Total DDT, four PCB congener and total PCB (number of congeners not reported)]
Ward et al. (2000) 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 0.3 (N.D.)	N.D.				Mean serum levels 119.5ng/g lipid	Mean serum levels 137.7ng/g lipid	Samples from the Janus Serum Bank. Study also reports OR for p, p' DDE, 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

N.S. = Not significant; N.D. = Not determined; OR = Odds ratio; RR = Risk Ratio

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Dorgan et al (1999) Cancer causes and control 10, 1-11 Nested case-control study	USA	105	207	Highest compared to the lowest quartile			Relative Risk p,p'-DDT 0.4 (0.2-1.0)	Matched by age, benign breast disease diagnosis during prior 2 years, month and year of blood collection	0.05	Not reported	Not reported	Study also reports RRs for β -HCH, p,p'-DDE, Dieldrin, two PCB congener and total PCBs (27 congeners)
							Total DDT 0.8 (0.4-1.6)		0.65			
Hoyer et al. (1998) The Lancet 352, 1816-1820	Denmark	237	469	Highest compared to lowest quartile	p,p'DDT 1.31 (0.84-2.02)	0.32	p,p'DDT 1.19 (0.76-1.87)	Age, number of full term pregnancies and weight	0.52	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 β -HCH, p,p'-DDE, Dieldrin and total PCBs (28 congeners)
					Total DDT 0.92 (0.54-1.56)	0.57	Total DDT 0.84 (0.49-1.45)		0.65			

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DDT**Retrospective (case-control studies)
Blood measures**

		Study design			Unadjusted results		Adjusted results			Typical DDT 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	
Pavuk <i>et al.</i> (2003) Journal of exposure analysis & Environ. Epid. 13, 267-275	USA	24	88	Highest compared to lowest tertile			1.19 (0.27-5.23)	Age, age at menarche, education, alcohol consumption, pack years of smoking	0.68	Age adjusted geometric mean 163.8ng/g lipid	Age adjusted geometric mean 107.6ng/g lipid	Difference between cases and controls significant (p=0.03) for levels of DDE, but no evidence of association with breast cancer risk. Study also reported OR's for DDE, HCB and PCBs (total PCB used analysis of 15 congeners).
Charlier <i>et al.</i> (2003) Occup environ Med 60, 348-351 Case-control study	Belgium	159	250	% threshold level for cases and controls (0.5ppb)	Odds ratio Total DDT 5.36 (1.89-15.19)		Odds ratio Total DDT 5.66 (1.83-17.51) 5.64 (1.81-17.65)	Adjusted for presence of HCB Breast feeding history	N.D. N.D.	Mean total DDT levels 3.94ppb	Mean total DDT levels 1.83ppb	Mean levels of DDT higher in cases (p<0.0001) Oestrogen receptor status was available for 102 individuals but was not correlated with total DDT concentration (r=0.09, p=0.49)

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DDT**Retrospective (case-control studies)****Blood measures**

Study (reference)	Country	Study design			Unadjusted results		Adjusted results			Typical DDT 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)	Cases	Controls	
Gammon et al. (2002) Cancer Epidemiology, Biomarkers & Prevention, 11, 686-697 Population-based case-control study	USA	643	427	Upper compared to lowest quintile using data from 614 cases and 409 controls			Age adjusted OR 0.97 (0/66-1.44)	Age	0.05	Geometric means (serum) 68.98ng/g lipid	Geometric means (serum) 69.32ng/g lipid	No increase in risk due to Breastfeeding status, weight, postmenopausal status, invasive/ <i>in situ</i> disease, hormone receptor positive tumour No significant difference between cases and controls for levels of DDT. Study also reported OR's for DDE, Dieldrin and four PCB congeners
Demers et al., (2000) Cancer Epidemiology, Biomarkers & Prevention, 9, 161-166 Hospital-based case-control study	Canada	315	219 hospital controls (HC) 307 population controls (PC)	Upper compared to lowest quintile			Relative Risk (RR) Using HC 1.37 (0.73-2.56) Using PC) 0.81 (0.48-1.37)	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 Age, region of residence	N.D. N.D.	Mean plasma levels 12.7µg/kg lipid	Mean plasma levels HC 12.5µg/kg lipid lipid PC 11.0µg/kg lipid lipid	No significant difference between control and cases for levels of DDT The study reports OR's for β-HCH, p,p-DDE, one PCB congener and two other organochlorines

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DDT**Retrospective (case-control studies)****Blood measures**

Study (reference)	Country	Study design			Unadjusted results		Adjusted results			Typical DDT 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)	Cases	Controls	
Romieu <i>et al.</i> (2000) American Journal of Epidemiology, 152 363-70 Case Control study	Mexico	120	126	Not stratified			p, p' DDT Adjusted OR 1.03 (0.74-1.43) per loge, unit of lipid adjusted DDT in serum	Age		Mean serum levels 0.15µg/g lipid	Mean serum levels 0.23µg/g lipid	Body mass index was positively associated with DDT serum levels Study also reports OR for DDE
Wolff <i>et al.</i> (2000b) Environmental Research, 84, 151-161 Hospital-based case-control study	USA	175	355	Highest compared to lowest tertile using data from 150 cases and 314 controls			p, p' DDT Adjusted Odds Ratio 1.34 (0.82-2.2)	Age, menopausal status, and race	0.241	Geometric mean serum levels 0.030µg/g lipid	Geometric mean serum levels 0.028µg/g lipid	The study also reports OR for DDE and other organochlorines DDT was higher in women with ER-positive tumours than in those with ER-negative tumours, however the differences were not significant after adjusting for age, BMI, menopausal status and race

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DDT**Retrospective (case-control studies)****Blood measures**

		Study design			Unadjusted results		Adjusted results			Typical DDT 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	
Schrecker <i>et al.</i> (1997) Arch. Environ. Contam. Toxicology, 33, 453-456 Case control study 21 cases, 21 controls	Vietnam	21	21	Highest compared to lowest tertile	p, p' DDT Odds ratio 1.21 (0.23-5.68)					Mean levels (serum) 2.37ng/ml	Mean levels (serum) 2.33ng/ml	Adjustment for risk factors had no effect on point estimates for OR, therefore only unadjusted analysis were presented Odds ratios for DDE also reported

DDT**Retrospective (case-control) studies****Adipose measures**

		Study design			Unadjusted results		Adjusted results			Typical DDT 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	
Bagga <i>et al.</i> (2000) J. Natl Canc. Inst 92, 750-753	USA	73	73	Presented for 1 unit change in DDE			1.052 (0.930-1.191)	Age	N.D.	Unadjusted mean levels (lipid basis) 261.6ng/g	Unadjusted mean levels (lipid basis) 267.3ng/g	Levels of DDT in cases and controls not significantly different (p=0.23)] OR's also reported for DDE

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DDT**Retrospective (case-control) studies****Adipose measures**

		Study design			Unadjusted results		Adjusted results			Typical DDT 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	
Aronson et al. (2000) Cancer Epidemiology, Biomarkers & Prevention, 9, 55-63 Hospital-based case-control study	Canada	217	213	Highest compared to lowest quartile			Adjusted OR 1.18 (0.61-2.29)	Age, study site, menopausal status, age last breast fed, ethnicity, BMI, fat intake, alcohol intake	N.D.	Geometric means (breast adipose tissue) 22.0µg/kg lipid	Geometric means (breast adipose tissue) 19.3µg/kg lipid	Increased risk in pre-menopausal women (adjusted OR = 1.52), but no measure of significance Study also reports odds ratios for p,p'-DDT, β-HCH, 10 PCB congeners and 6 other pesticides
Stellman et al. (2000) Cancer Epidemiology, Biomarkers & Prevention, 9, 1241-1249 Hospital-based case-control study	USA	232	323	Highest compared to lowest tertile			Odds ratios were not reported, although the authors stated that no associations were found with breast cancer risk		N.D.	Geometric mean levels (adipose tissue) 13.6ng/g	Geometric mean levels (adipose tissue) 13.4ng/g	There were no significant odds ratios or trends when the authors considered associations between breast cancer risk and body burden of p,p' DDT. The study also reports OR's for DDE, a mixture of seven OC pesticide species and total PCB's (14 congeners)
Guttes et al. (1998) Arch. Environ. Contam. Toxicol 35, 140-147	Germany	45 (breast cancer)	20 (benign breast cancer)							Age adjusted geometric mean 30µg/kg	Age adjusted geometric mean 28µg/kg	No determination of odds ratio. No significant difference between cases and controls (p=0.714)

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DDT**Retrospective (case-control) studies****Adipose measures**

		Study design			Unadjusted results		Adjusted results			Typical DDT 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	
Falck <i>et al.</i> (1992) Arch. Environ Health, 47, 143-146	USA	20	20							Mean breast adipose levels (wet weight, corrected for recovery) 179ng/g Mean breast adipose levels (lipid basis, uncorrected) 216ng/g	Mean breast adipose levels (wet weight, corrected for recovery) 14ng/g* Mean breast adipose levels (lipid basis, uncorrected) 148ng/g	Significance of differences between cases and controls were 0.05 and 0.12 for wet weight basis and lipid basis respectively *Figure given by Falck, but does not correspond with range given
Mussalo-Rauhamaa (1990) Cancer 66, 212402128	Finland	41	33							Mean level in adipose breast tissue 0.07mg/kg fat	Mean level in adipose breast tissue 148mg/kg fat	No statistical difference between cases and controls (P=0.57)
Zheng <i>et al.</i> (1999) Am. J. Epid. 150, 453-458	USA	304	186	Highest compared to lowest quartile			Adjusted odds ratio 0.8 (0.5-1.4) Multivariate adjusted odds ratio 0.8 (0.5-1.5)	Age Age, BMI, lifetime months of lactation, age at menarche, age at first full-term pregnancy, menopausal status, race income in previous 10 years	0.31 0.38	Age-adjusted geometric mean tissue level of DDE 51.8 ppb)	Age-adjusted geometric mean tissue level of DDE 55.6 ppb)	No significant difference in geometric mean tissue levels between cases and controls. The authors suggest that no significant differences were seen when stratified by menopausal status (data not shown) OR's for DDE also reported in this study

N.S. = Not significant; N.D. = Not determined; OR = Odds ratio; RR = Risk Ratio

DDT**Hormone Receptor Status
Adipose measures**

Study (reference)	Country	Study design			Unadjusted results		Adjusted results			Typical DDE 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)	Cases	Controls	
Woolcott <i>et al.</i> (2001) Cancer Causes Control, 12, 395-404 Hospital-based case-control study 217 cases (ER & PR determined), 213 controls	Canada	217	213	Highest compared to the lowest tertile			OR not shown		N.D.	Geometric means (breast adipose tissue) (ER+) 21.3µg/kg lipid <hr/> (ER-) 23.5µg/kg lipid	Geometric means (breast adipose tissue) 19.3µg/kg lipid (controls)	Study also reported odds ratio for DDE, β-HCH, 4 PCB congeners and total PCB (Measured by adding congeners 138 and 153 and multiplying by 5.2)].

N.S. = Not significant; N.D. = Not determined; OR = Odds ratio; RR = Risk Ratio

DDTOther studies
Blood measures

		Study design			Unadjusted results		Adjusted results			Typical 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)	Mean (cases)	Mean (controls)	
Høyer et al. (2002) Breast Cancer Research and Treatment, 71, 59-65 Nested case control study	Denmark	240 (162 for p53 mutation analysis),	477	Highest compared to lowest quartile			Odds ratios	Age, Parity, body weight, HRT	0.98	Serum levels of organochlorines were not reported		
							p,p' DDT 0.95 (0.30-2.98) (P53 mut, 36 cases 72 controls)					
							1.32 (0.68-2.59) (Wild type p53 123 cases 244 controls)					
							total DDT 0.88 (0.19-4.17) (P53 mut, 28 for cases 56 controls)					
							0.70 (0.32-1.55) (Wild type p53 86 cases 171 controls)		0.98			

N.S. = Not significant; N.D. = Not determined; OR = Odds ratio; RR = Risk Ratio