

Table 2.62. Recent case-control studies that examined smoking and breast cancer by menopausal status

Case-control study	Exposure	Cases		RR (95%CI)		Controlled for
Schechter <i>et al.</i> (1985)		Pre	Post	Pre	Post	Age, Age at menarche, age at first live birth, parity, age at menopause, family history of breast cancer, history of benign breast disease, breast symptoms, menstrual irregularity, OC use, HRT use, marital status, ethnicity, occupation, education, height, weight, skin fold thickness, history of breast self-exam, number mammograms, center
	Never	20	40	1.0 (ref)	1.0 (ref)	
	Current	19	19	3.6 (1.7–7.7)	1.3 (0.7–2.4)	
	Former	10	12	1.0 (0.5–2.7)	1.0 (0.5–2.0)	
Brinton <i>et al.</i> (1986)		Pre	Post	Pre	Post	Age at diagnosis
	Never	213	346	1.0 (ref)	1.0 (ref)	
	Current	117	125	1.10 (0.8–1.5)	1.12 (0.8–1.5)	
	Former	116	142	1.44 (1.0–2.0)	1.05 (0.8–1.4)	
Brownson <i>et al.</i> (1988)		Pre	Post	Pre	Post	Age, age at first pregnancy, parity, age at menarche, age at menopause, marital status, family history of breast cancer, OC and HRT use
	Never	68	155	1.0 (ref)	1.0 (ref)	
	Ever	46	51	1.62 (0.91–2.87)	0.93 (0.64–1.35)	
Rohan & Baron (1989)		Pre	Post	Pre	Post	Family history of breast cancer, breast self-exam, history of benign breast disease, obesity, type of menopause, alcohol
	Never	80	158	1.0 (ref)	1.0 (ref)	
	Current	33	69	1.32 (0.63–2.79)	1.48 (0.90–2.43)	
	Former	33	53	2.44 (1.10–5.41)	0.92 (0.59–1.44)	
Chu <i>et al.</i> (1990)		Pre	Post	Pre	Post	Age, parity, age at first birth, age at menarche, family history of breast cancer, history of benign breast disease, HRT use
	Never	924	196	1.0 (ref)	1.0 (ref)	
	<10 pack-yr	483	64	1.2 (1.0–1.4)	0.8 (0.5–1.1)	
	10–19	256	57	1.2 (1.0–1.5)	1.1 (0.7–1.7)	
	20–29	152	43	1.1 (0.8–1.4)	0.9 (0.6–1.5)	
	30–39	92	87	2.2 (1.4–3.2)	1.2 (0.9–1.8)	
	≥40	65	62	1.5 (1.0–2.3)	1.0 (0.7–1.6)	
Ewertz (1990)		Pre	Post	Pre	Post	Age, place of residence
	Never	228	203	1.0 (ref)	1.0 (ref)	
	Current	104	280	0.96 (0.75–1.25)	0.96 (0.74–1.25)	
	Former	308	115	0.83 (0.59–1.16)	1.29 (0.91–1.82)	
Rautalahti <i>et al.</i> (1993)				Pre	Post	Age
	Never		Pre: 117	1.0 (ref)	1.0 (ref)	
	Ever		Post: 107	2.01 (0.79–5.11)	2.17 (0.90–5.22)	
Ranstam & Olsson (1995)				Pre	Post	
	Never			1.0 (ref)	1.0 (ref)	
	Ever			1.0 (0.6–1.5)	0.7 (0.4–1.2)	
	1–10 CPD			0.7 (0.3–1.4)	0.7 (0.4–1.3)	
	>11 CPD			1.2 (0.7–2.1)	0.8 (0.4–1.6)	

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Case–control study	Exposure	Cases		RR (95%CI)		Controlled for
Baron <i>et al.</i> (1996)		Pre	Post	Pre	Post	Age at menarche, age at first term birth, parity, lactation, family history of breast cancer, history of benign breast disease, alcohol
	Never	1304	3151	1.0 (ref)	1.0 (ref)	
	Current	722	1400	0.99 (0.83–1.18)	1.01 (0.90–1.12)	
	Former	665	1876	1.20 (1.01–1.42)	1.04 (0.94–1.14)	
Gammon <i>et al.</i> (1998)		Pre	Post	Pre	Post	Age, center, alcohol, parity, age at first birth, age at menarche, breastfeeding, abortion, miscarriage, ever married, education, income, race, BMI at age 20, BMI as adult, OC use, HRT use, caloric intake, history of breast biopsy, family history of breast cancer
	Never	821	90	1.0 (ref)	1.0 (ref)	
	Current	318	52	0.83 (0.67–1.04)	0.77 (0.42–1.41)	
	Former	334	28	1.04 (0.84–1.28)	0.61 (0.30–1.25)	
Millikan <i>et al.</i> (1998)		Pre	Post	Pre	Post	Age, race, age at menarche, age at first term pregnancy, parity, family history of breast cancer, benign breast biopsy, alcohol
	Never	123	125	1.0 (ref)	1.0 (ref)	
	Current	46	47	1.0 (0.7–1.4)	1.2 (0.7–2.0)	
	Former	72	85	1.3 (0.9–1.8)	1.5 (1.0–2.4)	
Johnson <i>et al.</i> (2000)		Pre	Post	Pre	Post	10-yr age groups, province, education, BMI, alcohol, physical activity, age at menarche, age at first 5+ month pregnancy, parity, breastfeeding, height
	Never Active	378	700	1.0 (ref)	1.0 (ref)	
	Current	173	309	0.9 (0.7–1.2)	1.3 (1.1–1.6)	
	Former	250	494	1.2 (0.9–1.5)	1.1 (0.9–1.3)	
	Never A/P	14	52	1.0 (ref)	1.0 (ref)	
	Current	116	202	1.9 (0.9–3.8)	1.6 (1.0–2.5)	
	Former	182	307	2.6 (1.3–5.3)	1.4 (0.9–2.1)	
	Passive only	208	334	2.3 (1.2–4.6)	1.2 (0.8–1.8)	
Band <i>et al.</i> (2002)		Pre	Post	Pre	Post	Ethnic origin, marital status, education, alcohol consumption, age at menarche, age at menopause, family history of breast cancer, history of biopsy for benign breast diseases, weight, BMI at 18, no BMI change, use of birth control pills, use of ERT, reproductive history (pregnancies, live births, age at first pregnancy, age at first full-term pregnancy)
	Never	128	315	1.00 (ref)	1.00 (ref)	
	Ever	189	380	1.50 (1.09–2.07)	0.96 (0.77–1.19)	
Zheng <i>et al.</i> (2002)		Pre	Post	Pre	Post	Age, BMI, age at first term pregnancy, breast feeding, family history of breast cancer
	Never	45	97	1.0 (ref)	1.0 (ref)	
	Current	16	36	0.9 (0.4–2.0)	1.1 (0.6–2.0)	
	Former	26	118	0.8 (0.4–1.4)	1.3 (0.8–1.9)	
Gammon <i>et al.</i> (2004)		Pre	Post	Pre	Post	Age, history of benign breast disease, BMI, family history of breast cancer, history of fertility problems, parity, menopausal status, weight prior to reference date
	Never A/P	48	107	1.0 (ref)	1.0 (ref)	
	Pass only	163	280	1.21 (0.78–1.90)	0.93 (0.68–1.29)	
	Active	35	92	0.98 (0.54–1.78)	1.09 (0.72–1.62)	
	Active&Pass	212	419	1.43 (0.93–2.21)	1.02 (0.74–1.38)	
Lissowska <i>et al.</i> (2006)		<45	>55	<45 yrs old	>55 yrs old	Age, site, education, age at menarche, full-term births, age at first term birth, age at menopause, BMI, family breast cancer history, benign biopsy, mammography, OC use, HRT use
	Never A/P	9	81	1.0 (ref)	1.0 (ref)	
	Passive only	86	559	1.28 (0.52–3.11)	1.04 (0.74–1.46)	
	Active&Pass	208	488	2.40 (1.00–5.72)	0.98 (0.69–1.38)	

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Case–control study	Exposure	Cases		RR (95% CI)		Controlled for
Magnusson <i>et al.</i> (2007)	Never	1526		Pre/peri	Post	Age, age at first birth, BMI, alcohol consumption
	Current	657		1.0 (ref) 1.4 (0.7–2.5)	1.0 (ref) 1.0 (0.9–1.2)	
Slattery <i>et al.</i> (2008) (NHW)		Pre/peri	Post	Pre/Peri	Post	Age, center, BMI, NSAIDs, parity, alcohol, physical activity, recent estrogen in post-menopausal women
	Never	313	516	1.00 (ref)	1.00 (ref)	
	Current	74	324	1.3 (0.9–1.9)	1.0 (0.7–1.3)	
Slattery <i>et al.</i> (2008) (H/AI)		Pre/peri	Post	Pre/Peri	Post	Age, center, BMI, NSAIDs, parity, alcohol, physical activity, recent estrogen in post-menopausal women
	Former	148	345	1.4 (<1.0–1.8)	1.1 (0.8–1.7)	
	Never	232	286	1.00 (ref)	1.00 (ref)	
Ahern <i>et al.</i> (2009)		Pre	Post	Pre	Post	Age, menopausal status, lifetime passive smoke, BMI, parity, alcohol, family history of breast cancer
	Current	30	64	0.9 (0.5–1.6)	1.0 (0.7–1.5)	
	Former	67	100	1.1 (0.8–1.7)	0.9 (0.7–1.3)	
Ahern <i>et al.</i> (2009)		Pre	Post	Pre	Post	Age, menopausal status, lifetime passive smoke, BMI, parity, alcohol, family history of breast cancer
	Never	81	151	1.0 (ref)	1.0 (ref)	
	≤23 pack–yrs	80	109	1.5 (0.9–2.4)	1.1 (0.7–1.6)	
	>23 pack–yrs	30	106	0.8 (0.4–1.6)	1.0 (0.6–1.4)	

*Case–control studies not considered in IARC 2004 review