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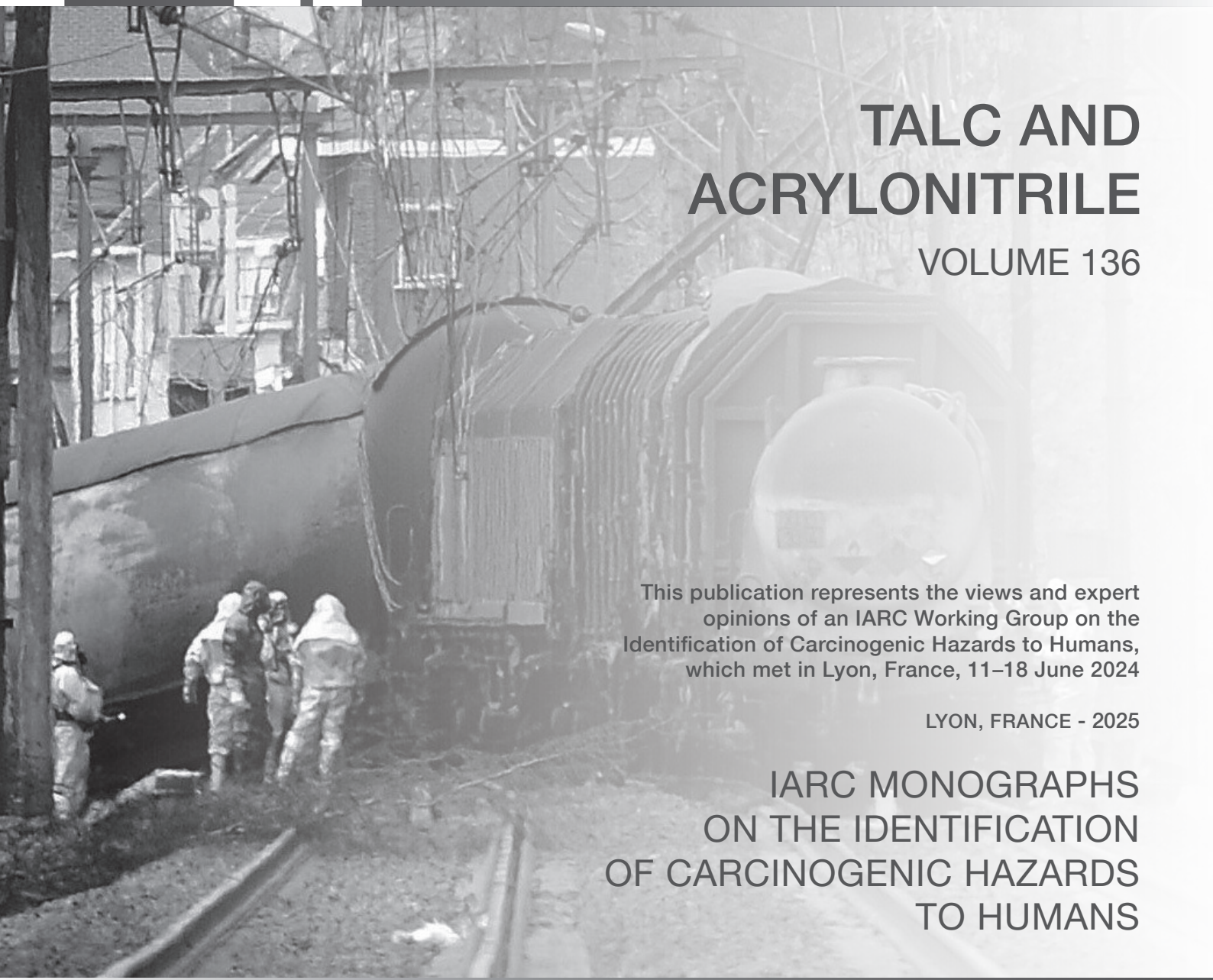

TALC AND ACRYLONITRILE

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Table S1.20 Exposure assessment review and critique for epidemiological studies on cancer in humans with non-occupational exposure to talc

Reference Study design Country Study period	Exposure scenario	Study population Incidence or mortality	Study participants Exclusions	Outcomes	Exposure time period	Type of exposure	Exposure prevalence	Minimum duration	Asbestos contamination
Chang et al. (2019) Cohort (Health insurance database) Taiwan, China 1997–2013	Medical	Taiwan, China health insurance database Incidence	1 million beneficiaries randomly sampled by demographics Exclusions: age < 20 years of age, without cancer < 1997, without gastric/duodenal ulcer, *H. pylori* < l997	Stomach cancer	1997–2013	Ingestion of talcum powder in Chinese herbal products	3.5% of entire population	No minimum	Not likely, strict control, measured 100 talc particles and found no asbestos. However, some of the exposure period covers a time before 2005, when asbestos was started to be prohibited in medicinal products. In addition, it is unclear how the asbestos regulation is monitored and enforced after 2005
Gertig et al. (2000) Cohort USA 1976–2000	General population	NHS-I Incidence	121 700 registered nurses living in 11 states in the USA, 78 630 in the analysis	Ovarian cancer	[1950–1980s]	Perineal application	40.4% ever talc/powder use	No minimum	Cannot be excluded, particularly in earlier time period
Karageorgi et al. (2010) Cohort USA 1976–2010	General population	NHS Incidence	121 700 registered nurses living in 11 states in the USA, 66 028 in the analysis	Endometrial cancer	[1950–1980s]	Perineal application	38.0% ever talc/powder use	No minimum	Cannot be excluded, particularly in earlier time period
Crawford et al. (2012) USA 1993–2005	General population	WHI Incidence	93 676 women from 24 US states and DC 48 526 in analysis	Endometrial cancer	[1950s–1990s]	Perineal application	51.9%	No minimum	Cannot be excluded, particularly in earlier time period
Houghton et al. (2014) USA 1993–2012	General population	WHI Incidence	93 676 women from 24 US states and DC 61 576 in analysis	Ovarian cancer	[1950s–1990s]	Perineal application	52.6%	No minimum	Cannot be excluded, particularly in earlier time period

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Gonzalez et al. (2016) USA 2003–2009	General population	SIS Incidence	50 884 women from the USA 41 654 in analysis	Ovarian cancer	[1950s–2009]	Perineal application	13.8%	No minimum	Cannot be excluded, particularly in earlier time period
O'Brien et al. (2019) USA 2003–2009	General population	SIS Incidence	50 884 women from the USA 33 609 in analysis	Endometrial cancer	[1950s–2009]	Perineal application	25.9%	No minimum	Cannot be excluded, particularly in earlier time period
O'Brien et al. (2024) USA 2003–2009	General population	SIS Incidence	50 884 women from the USA 41 654 in analysis	Ovarian cancer, endometrial cancer, breast cancer	[1950s–2009]	Perineal application	Different estimates ranging from 35–56%	No minimum	Cannot be excluded, particularly in earlier time period
O'Brien et al. (2020) Cohort (pooled) USA 1976–2017	General population	SIS, NHS-I, NHS-II, WHI-OS Incidence	257 044 women enrolled in 4 cohorts Exclusions: individual study criteria	Ovarian cancer	[1950s through 2000s]	Perineal powder, may include non-talc products	Between 26% (NHS II) to 53% (WHI-OS of entire population	No minimum (NHS II: at least weekly for any time period)	Cannot be excluded, particularly in earlier time period

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Reference **Study design** **Country** **Study period**	**Exposure scenario**	**Study population** **Incidence or mortality**	**Study participants** **Exclusions**	**Outcomes**	**Exposure time period**	**Type of exposure**	**Exposure prevalence**	**Minimum duration**	**Asbestos contamination**
O'Brien et al. (2021) Cohort (pooled) USA 1976–2019	General population	SIS, NHS-I, NHS-II, WHI-OS Incidence	209 185 women enrolled in 4 cohorts Exclusions: Individual study criteria	Uterine cancer	[1950s through 2000s]	Perineal powder	Ever use between 26% (NHS-II) and 52% (WHI-OS), 37% in the entire population	No minimum (NHS-II: at least weekly for any time period)	Cannot be excluded, particularly in earlier time period
Chang and Risch (1997) Case–control Canada 1989–1992	General population	SON, population based Incidence	450 ovarian cancer (borderline and invasive), 564 population controls	Ovarian cancer	[Probably starting in 1960s, based on study period and age]	Talc use in perineum, on sanitary napkins, cornstarch evaluated separately	44% cases, 36% controls	NR	Cannot be excluded
Wu et al. (2015) Case–control (pooled) USA (Los Angeles County) LACOCS 2003–2008	General population	USC, population based Incidence	1701 ovarian cancer cases identified through USC Cancer Surveillance Program (LA SEER); 2391 neighbourhood controls individually matched	Ovarian cancer	[Probably starting in 1970s, based on study period and age]	Perineal talc use	41% cases, 30% controls (NHW), 39% cases, 29% controls (Hispanics), 48% cases, 44% controls (AA)	At least 1 year	Cannot be excluded

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Reference Study design Country Study period	Exposure scenario	Study population Incidence or mortality	Study participants Exclusions	Outcomes	Exposure time period	Type of exposure	Exposure prevalence	Minimum duration	Asbestos contamination
Moorman et al. (2009) Case–control USA (North Carolina) 1999–2008	General population	NCO-population based Incidence	1114 cases enrolled; RCA cancer registry; 1086 frequency matched controls	Ovarian cancer	[Probably starting in 1970s, based on study period and age]	Talc use	40% cases, 39% controls (White), 46% cases, 44% controls (AA)		Cannot be excluded
Neill et al. (2012) Case–control Australia 2005–2007	General population	Australian National Endometrial Cancer Study Incidence	1399 cases, 740 controls sampled from national electoral roll (50% participation of those contacted)	Endometrial cancer	[Probably starting in 1970s, based on study period and age]	Talc use in perineal area and on upper body (as a control), direct use and use on sanitary pads or diaphragms, talc years	59% among cases, 59% among controls	No minimum	Cannot be excluded
Merritt et al. (2008) Case–control Australia 2002–2005	General population	AUS (Australia Ovarian Cancer Study and Australian Cancer Study) Incidence	1576 ovarian cancer cases, 1509 controls	Ovarian cancer	[Probably starting in 1960s, based on study period and age]	Talc use in perineal region and upper body, direct use and use on sanitary pads or diaphragm	46% among cases, 43% among controls	No minimum	Cannot be excluded

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Reference Study design Country Study period	Exposure scenario	Study population Incidence or mortality	Study participants Exclusions	Outcomes	Exposure time period	Type of exposure	Exposure prevalence	Minimum duration	Asbestos contamination
Kim et al. (2010) Case only USA (Cook County, Illinois) 1994–1998	General population	CCCS – population based	351 cases from Cook County, IL	Ovarian cancer	NI	NI	14% overall, 11% White 29.6% Black	NI	Cannot be excluded
Rosenblatt et al. (2011) Case–control USA (western Washington) 2002–2005	General population	Washington State-population based Incidence	812 cases, identified through cancer registry, 1313 controls identified through random-digit dialling	Ovarian cancer	Starting in 1950s	Perineal powder use directly, sanitary napkins, diaphragms, vaginal spray, type of powder	13% of invasive cases, 12% of controls	At least 1 year for application after bathing, at least 1 month for other applications	Cannot be excluded
Terry et al. (2013) Case–control (pooled) USA, Australia, Canada Variable across studies	General population	OCAC consortium (SON (B11), NEC (B13), USC (B18), AUS (B21), DOV (B23), HAW (B24), HOP (B25), NCO (B26) Incidence	8525 cases, 9859 controls	Ovarian cancer	Variable across studies, some exposure periods starting in the 1950s	Perineal and non-perineal powder use	31% of cases, 25% of controls	Variable, ever versus at least 1 year	Cannot be excluded

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Reference Study design Country Study period	Exposure scenario	Study population Incidence or mortality	Study participants Exclusions	Outcomes	Exposure time period	Type of exposure	Exposure prevalence	Minimum duration	Asbestos contamination
Schildkraut et al. (2016) Case–control USA 2010–2015	General AA population	AACES Incidence	593 cases, 750 controls (all AA)	Ovarian cancer	[Likely starting in 1970s, based on recruitment period and age range]	Perineal and non-perineal powder use	63% of cases; 53% of controls; increased after 2014	At least 6 months	Cannot be excluded
Cramer et al. (2016) Case–control USA 1992–2008 (three phases)	General population	Women ages 18–80 years residing in Eastern Massachusetts and New Hampshire diagnosed with ovarian cancer; frequency-matched controls by age and region of residence Incidence	2203 cases, 2100 controls	Ovarian cancer	[Likely starting in the 1950s based on recruitment period and age range]	Perineal powder use	32% cases, 27% controls	No minimum	Cannot be excluded
Davis et al. (2021) Case–control and cohort (meta-analysis) USA 1994–2018	General population	OCWAA Consortium (WHI (A22), AACES (B27), CCCS (B22), NCO (B26), LACOCS () Incidence	3420 cases, 7881 controls	Ovarian cancer	[Likely starting in 1960s, based on recruitment period and age range]	Perineal powder use	36%/ 30% cases (AA/White); 34%/ 31% controls (AA/White)	No minimum	Cannot be excluded

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Reference Study design Country Study period	Exposure scenario	Study population Incidence or mortality	Study participants Exclusions	Outcomes	Exposure time period	Type of exposure	Exposure prevalence	Minimum duration	Asbestos contamination
Peres et al. (2021) Case–control and cohort (meta-analysis) USA 1994–2018	General population	OCWAA Consortium (WHI (A20), AACES (B27), CCCS (B22), NCO (B26), USC (B18) Incidence	4296 cases, 12 048 controls	Ovarian cancer	[Likely starting in 1960s, based on recruitment period and age range]	Perineal powder use	39%/ 30% cases (AA/White); 34%/ 31% controls (AA/White)	No minimum	Cannot be excluded
Phung et al. (2022) Case–control (pooled) USA, Australia 1993–2010	General population	OCAC consortium (AUS (B21), CON (B30), DOV (B23), HAW (B24), HOP (B20), NEC (B13), UCI (B31), USC (B18) Incidence	8500 cases, 13 592 controls	Ovarian cancer	[Likely starting in 1960s, based on recruitment period and age range]	Perineal and nonperineal powder use	Stratified by endometriosis: 18% cases, 19% controls without endometriosis; 17% cases, 19% controls with endometriosis	No minimum	Cannot be excluded

AA, African American; AACES, African American Cancer Epidemiology Study; AUS, Australian Cancer Study; CCCS, Cook County (Chicago) Case Study; DC, District of Columbia; DOV, Diseases of the Ovary and their Evaluation Study; HAW, Hawaii Ovarian Cancer Study; HOP, Hormones and Ovarian Cancer Prediction Study; LACOCS, Los Angeles County Ovarian Cancer Study; LA, Los Angeles; NCO, North Carolina Ovarian Cancer Study; NEC, New England Case–Control Study of Ovarian Cancer; NHS-I, Nurses' Health Study; NHS-II, Nurses' Health Study II; NHW, non-Hispanic white; OCAC, Ovarian Cancer Association Consortium; OCWAA, Ovarian Cancer in Women of African Ancestry Consortium; RDD, random-digit dialling; SEER, Surveillance, Epidemiology, and End Results; SIS, Sister Study; SON, Southern Ontario Ovarian Cancer Study; US, United States; USA, United States of America; USC, University of Southern California Study of Lifestyle and Women's Health; WHI, Women's Health Initiative; WHI-OS, Women's Health Initiative Observational Study.

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