

Supplementary File 3. Summary of studies reporting on the association between breast implants and risk of autoimmune myositis

Study (Year)	% in silicone	Implant group, n/N*	Comparator group, n/N*	Measure of effect (95% CI)	Follow-up, y	Adjustments	Notes	NOS	\$
Cohort studies comparing with other cosmetic surgeries and breast reduction surgeries									
Fryzek et al. (2007)	>84%	2/2761	3/8807	HR 2.8 (0.4-20.4) (DM/PM)	13.4	Age, calendar year, clinic, time since operation	Danish national hospital registry + private clinics	9	NR
Cohort studies comparing with other cosmetic surgeries									
Englert et al. (2001)	100%	0/458	0/687	RR not calculable (DM/PM)	15	N/A	16 plastic surgery practices	9	Yes
Cohort studies comparing with breast reduction surgeries									
Nyren et al. (1998)	56%	1/7442	0/3353	RR not calculable (DM)	8.0	N/A	Swedish national inpatient registry	8	Yes
Cohort studies comparing with women from the community without breast implants									
Gabriel et al. (1994)	85%	0/749	0/1498	RR not calculable (DM/PM)	7.8	N/A	Tertiary care and affiliated centers	8	No
Cohort studies comparing with female health professionals without breast implants									
Sanchez-Guerrero et al. (1995)	74%	0/1183	12/86318	RR 0 (DM/PM)	9.9	N/A	Nurses' Health Study	7	Yes
Hennekens et al. (1996)	NR	20/10830	727/384713	HR 1.52 (0.97-2.37) (DM/PM) (self-reported)	<4-≥10	Age, calendar year, cancer, implant duration	Women's Health Study	6	Yes
Lee et al. (2011)	70%	7/3950	9/19897	HR 2.24 (0.69-7.27) (DM/PM) (self-reported)	3.6	Age, body mass index, smoking, hormone, cancer	Women's Health Study	5	Yes
Cohort study comparing with post-mastectomy reconstructive surgery without implants									
Greenland et al. (2000)	NR	17/31820 person-y	NR	RR 1.52 (1.18-1.96) (myalgia/myositis)	Limited	Age, sex, time since surgery	Medicare (age ≥ 65); prevalent not excluded	4	Yes
Cohort studies comparing with national rates									
Fryzek et al. (2007)	>84%	2/2761 (0 confirmed)	NR	SIR 4.4 (0.5-15.8) (DM/PM)	13.4	Age, sex, calendar period	Danish national hospital registry + private clinics	9	NR
Coroneos et al. (2019)	100%	17/41975	0.8/10,000 person-y	SIR 1.88 (1.09-3.00) (myositis) (self-reported)	7	Age, sex, race	United States LPAS 21% 3-y follow-up	7	No
Singh et al. (2017)	100%	1/40396	0.96/100,000 person-y	SIR 0.6 (95% CI NR) (DM/PM)	5-8	Age, sex, race	United States LPAS 61% 5-y follow-up	7	Yes
Nyren et al. (1998)	56%	1/7442	NR	SHR 3.4 (0.1-19.1) (DM)	8.0	Age, sex, calendar year	Swedish national inpatient registry	7	Yes
		1/7442 (misclassified)		SHR 1.7 (0.0-9.4) (PM)					
Case-control study									
Goldman et al. (1995)	85%	0/36	138/3508	OR 0.00 (0.00-3.71)	8.3 (cases)	Age, income, period	Rheumatology practice controls, no CTD or RA	6	Yes

*For case-control studies: Case group (n breast implants/N); Control group (n breast implants/N). CI: confidence interval; CTD: connective tissue disease; DM: dermatomyositis; HR: hazard ratio; N/A: not applicable; NOS: Newcastle-Ottawa scale; NR: not reported; OR: odds ratio; PM: polymyositis; RA: rheumatoid arthritis; RR: relative risk; SES: socioeconomic status; SHR: standardized hospitalization ratio; SIR: standardized incidence ratio; y: years; \$: potential financial or other conflict of interest

Supplementary File 4. Summary of studies reporting on the association between breast implants and risk of mixed, undifferentiated or combinations of connective tissue diseases

Study (Year)	% in silicone	Implant group, n/N*	Comparator group, n/N*	Measure of effect (95% CI)	Follow-up, y	Adjustments	Notes	NOS	\$
Cohort studies comparing with other cosmetic surgeries and breast reduction surgeries									
Fryzek et al. (2007)	>84%	21/2761	69/8807	HR 1.3 (0.9-1.9) (SSc,Sjö,SLE,RA,DM/PM)	13.4	Age, calendar year, clinic, time since operation	Danish national hospital registry + private clinics	9	NR
Cohort studies comparing with other cosmetic surgeries									
Brinton et al. (2004)	50%	24/7234	4/2138	RR 2.0 (0.7-5.4) (SSc,Sjö,RA) (confirmed)	12.1	Age, race, calendar period	18 plastic surgery practices	9	NR
		310/7234	54/2138	RR 2.2 (1.6-3.0) (self-reported)				8	
Englert et al. (2001)	100%	53/458	72/687	RR 1.10 (0.79-1.54) **	15	Age, clinic, calendar year	16 plastic surgery practices	9	Yes
Cohort studies comparing with breast reduction surgeries									
Nyren et al. (1998)	56%	16/7442	11/3353	RR 0.8 (0.5-1.4) (SSc,Sjö,SLE,RA,DM)	8.0	Age, follow-up	Swedish national inpatient registry	8	Yes
Breiting et al. (2004)	100%	9/190	11/186	OR 0.8 (0.3-1.9) (SSc,Sjö,SLE,RA,DM,PM) (self-reported)	19	Age	2 hospital/private plastic surgery practices	5	Yes
Cohort studies comparing with women from the community without breast implants									
Watad et al. (2018)	100%	6510/24651	22634/98604	OR 1.22 (1.18-1.26) (prevalence)**	9.7	Age, SES, smoking, breast cancer	Israeli healthcare database	8	No
		193/1797	569/7109	HR 1.45 (1.21-1.73) (incidence)**				9	
Gabriel et al. (1994)	85%	5/749	10/1498	RR 1.10 (0.37-3.23)**	7.8	Age, calendar	Tertiary care and affiliated centers	8	No
Barbosa et al. (2021)	NR	14/452 (0% C)	21/452	OR 0.66 (0.33-1.31) (RA, SLE)	NR	Age, social, health care use, follow-up, comorbidities, medication use	Military healthcare system; prevalent not excluded?	7	No
		10/452 (0% C)	13/452	OR 0.76 (0.33-1.76) (RA, SLE)	≥ 5 visits			8	
Breiting et al. (2004)	100%	9/190	5/149	OR 1.4 (0.5-4.3) (self-reported SSc,Sjö,SLE,RA,DM,PM)	19	Age	2 plastic surgery practices	5	Yes
Cohort studies comparing with female health professionals without breast implants									
Sanchez-Guerrero et al. (1995)	74%	3/1183	513/86318	RR 0.6 (0.2-2.0) (SSc,Sjö,SLE, RA,DM,PM,MCTD)	9.9	Age	Nurses' Health Study	7	Yes
		0/1183	0/86318	RR not calculable (MCTD)					
Hennekens et al. (1996)	NR	231/10830	11574/384713	HR 1.24 (1.08-1.41) (self-reported SSc,Sjö,SLE,RA,DM, PM,other CTD)	<4≥10	Age, calendar year, cancer, implant duration	Women's Health Study	6	Yes
		83/10830	3271/384713	HR 1.30 (1.05-1.62) (self-reported other CTD, MCTD)					
Lee et al. (2011)	70%	21/3950	74/19897	HR 1.21 (0.68-2.15) (SSc,Sjö, SLE, RA,DM,PM,MCTD,other)	3.6	Age, body mass index, smoking, hormone, cancer	Women's Health Study	5	Yes
		7/3950	30/19897	HR 1.46 (0.62-3.45) (MCTD, other)					
Cohort study comparing with post-mastectomy reconstructive surgery without implants									
Greenland et al. (2000)	NR	19/31820 person-y	NR	RR 4.11 (2.44-6.91) (UCTD)	Limited	Age, sex, time since surgery	Medicare (age ≥ 65); prevalent?	4	Yes
Cohort studies comparing with national rates									
Fryzek et al. (2007)	>84%	26/2761 (4 not confirmed)	NR	SIR 1.4 (0.9-2.0) (SSc,Sjö,SLE,RA,DM/PM)	13.4	Age, sex, calendar period	Danish national hospital registry + private clinics	9	NR
		5/2761		SIR 1.8 (0.6-4.1) (CTD not otherwise specified)					
Nyren et al. (1998)	56%	29/7442 (12 prevalent, 2 misclassified)	NR	SHR 1.1 (0.8-1.6) (SSc,Sjö,SLE,RA,DM) (includes prevalent and misclassified)	8.0	Age, sex, calendar year	Swedish national inpatient registry	7	Yes
Case-control studies									
Laing et al. (2001)	100%	3/205	26/2,095	OR 2.22 (0.65-7.57) (UCTD)	NR	Age, birth year	Community controls	8	Yes
Goldman et al. (1995)	85%	3/334 (2 prevalent)	138/3508	OR 0.25 (0.09-0.79) (SSc,Sjö,SLE,DM/PM,MCTD)	8.3 (cases)	Age, income, period	Rheumatology practice controls, no CTD or RA	6	Yes
Williams et al. (1999)	100%	2/323	8.08/1,000 women	Prevalence OR: 1.15 (0.23-3.41) (early CTD)	NR	Age, sex, race, geography	National rates (United States)	5	No

*For case-control studies: Case group (n breast implants/N); Control group (n breast implants/N); **Englert et al. (2001): Any CTD or CTD-related outcome measure, including positive ANA, abnormal nailfold capillaroscopy, self-reported digital vasospasm, sicca and/or validated RA, SLE or SSc with onset after index surgery. Watad et al. (2018): any autoimmune/rheumatic disorder, including ankylosing spondylitis, fibromyalgia/chronic fatigue syndrome, hypothyroidism, hyperthyroidism, multiple sclerosis, psoriasis, psoriatic arthritis, RA, sarcoidosis, Sjö, SLE, SSc and vasculitis. Gabriel et al. (1994): any rheumatic disease, including SSc, Sjö, SLE, RA, DM/PM, systemic vasculitis, polymyalgia rheumatica, polychondritis, ankylosing spondylitis and inflammatory bowel disease-related arthritis. CI: confidence interval; CTD: connective tissue disease; DM: dermatomyositis; HR: hazard ratio; MCTD: mixed connective tissue disease; N/A: not applicable; NOS: Newcastle-Ottawa scale; NR: not reported; OR: odds ratio; PM: polymyositis; RA: rheumatoid arthritis; RR: relative risk; SES: socioeconomic status; SHR: standardized hospitalization ratio; SIR: standardized incidence ratio; Sjö: Sjögren's syndrome; SLE: systemic lupus erythematosus; SSc: systemic sclerosis; UCTD: undifferentiated CTD; y: years; \$: potential financial or other conflict of interest.

Supplementary File 5. Summary of studies reporting on the association between breast implants and risk of other autoimmune and/or inflammatory rheumatic diseases

Study (Year)	% in silicone	Implant group, n/N*	Comparator group, n/N*	Measure of effect (95% CI)	Follow-up, y	Adjustments	Notes	NOS	\$
Cohort studies comparing with other cosmetic surgeries									
Brinton et al. (2004)	50%	21/7234	4/2138	Vasculitis: RR 1.4 (0.5-4.6) (self-reported)	12.1	Age, race, calendar period	18 plastic surgery practices	8	NR
Englert et al. (2001)	100%	2/458	1/687	PsA: RR 2.30 (0.21-25.48) (includes prevalent)	15	Age, clinic, calendar year	16 plastic surgery practices	8	Yes
Cohort studies comparing with breast reduction surgeries									
Breiting et al. (2004)	100%	13/190	19/186	PMR, GCA, PAN, AS, PsA: OR 0.6 (0.3-1.3) (self-reported)	19	Age	2 hospital/private plastic surgery practices	5	Yes
Cohort studies comparing with women from the community without breast implants									
Watad et al. (2018)	100%	A) 32/24651 B) 1/1797	A) 115/98604 B) 0/7109	Vasculitis: OR 1.22 (0.80-1.87) HR NR	9.7	Age, SES, smoking, breast cancer	Israeli healthcare database A) Prevalence B) Incidence	8-9	No
		A) 41/24651 B) 0/1797	A) 155/98604 B) 4/7109	AS: OR 1.23 (0.85-1.79) HR NR					
		A) 54/24651 B) 1/1797	A) 201/98604 B) 4/7109	PsA: OR 1.17 (0.85-1.61) HR 1.42 (0.16-12.76)					
		A) 93/24651 B) 1/1797	A) 187/98604 B) 4/7109	Sarcoidosis: OR 1.98 (1.50-2.60); HR 1.06 (0.12-9.76)					
Gabriel et al. (1994)	85%	/749: 2 vasculitis 2 PMR 1 RP 0 AS 0 PsA 1 IBD-A 0 sarcoidosis	/1498: 2 vasculitis 1 OMR 0 RP 3 AS 1 PsA 0 IBD-A 2 sarcoidosis	RR: Vasculitis: 0 PMR: NR RP: NR AS: 0 PsA: 0 IBD-A: NR Sarcoidosis: 0 (0-4.23)	7.8	No	Tertiary care and affiliated centers	8	No
Breiting et al. (2004)	100%	13/190	11/149	PMR, GCA, PAN, AS, PsA: OR 0.9 (0.4-2.1) (self-reported)	19	Age	2 hospital/private plastic surgery practices	5	Yes
Cohort study comparing with post-mastectomy reconstructive surgery without implants									
Greenland et al. (2000)	NR	/31820 py: 13 vasculitis 5 AS	NR	RR: Vasculitis: 1.33 (0.78-2.26) AS: 2.60 (1.10-6.16)	Limited	Age, sex, time since surgery	Medicare (age ≥ 65); prevalent not excluded	4	Yes
Cohort studies comparing with national rates									
Fryzek et al. (2007)	>84%	/2761: 0 GCA/PMR 0 PAN 0 GPA 1 sarcoid. 1 AS 1 PsA	NR	SIR: GCA/PMR: 1.5 (0.3-4.4) PAN: 0.0 (0.0-15.2) GPA: 0.0 (0.0-13.6) Sarcoid: 0.3 (0.0-1.6) AS: 0.9 (0.0-4.8) PsA: 0.4 (0.0-2.0)	13.4	Age, sex, calendar period	Danish national hospital registry + private clinics	9	NR
Singh et al. (2017)	100%	/40396: 0 PAN 0 GPA 0 RP	/100,000 py: 2.35 PAN 1.00 GPA 0.07 RP	SIR: PAN: 0.0 GPA: 0.0 RP: 0.0	5-8	Age, sex, race	United States LPAS 61% 5-y follow-up	7	Yes
Nyren et al. (1998)	56%	/7442: GCA: 1 PMR: 6* PAN: 1* GPA: 0 Sarcoid: 2 AS: 3* PsA: 0	NR	SHR: GCA: 3.1 (0.1-17.3) PMR: 1.4 (0.5-3.1)* PAN: 3.1 (0.1-17.3)* GPA: NR Sarcoid: 0.6 (0.1-2.1) AS: 1.4 (0.3-4.2)* PsA: 0 (0-3.2)	8.0	Age, sex, calendar year	Swedish national inpatient registry	7	Yes

*In Nyren et al., 6 PMR cases included 1 misclassified, 1 PAN case was misclassified, 3 AS cases included 2 prevalent and 1 misclassified. AS: ankylosing spondylitis; CTD: connective tissue disease; CI: confidence interval; GCA: giant cell arteritis; GPA: granulomatous polyangiitis; IBD-A: inflammatory bowel disease-associated arthritis; HR: hazard ratio; N/A: not applicable; NOS: Newcastle-Ottawa scale; NR: not reported; OR: odds ratio; PAN: polyarteritis nodosa; PMR: polymyalgia rheumatica; PsA: psoriatic arthritis; py: person-years; RP: relapsing polychondritis; RR: relative risk; SES: socioeconomic status; SHR: standardized hospitalization ratio; SIR: standardized incidence ratio; y: years; \$: potential financial or other conflict of interest