Supplementary to

Risk of Pre-eclampsia and Impact of Disease Activity and Anti-rheumatic Treatment in Women with Rheumatoid Arthritis, Axial Spondylarthritis, and Psoriatic Arthritis - A Collaborative Matched Cohort Study from Sweden and Denmark

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Supplementary Table S1

Description of relevant registers with patient level information according to the personal identification number

SWEDEN
SRQ: The Swedish Rheumatology Quality Register
The SRQ was initially an early rheumatoid arthritis (RA) and a bDMARD register, but, eventually, opened to all inflammatory diseases regardless of treatment. The treating rheumatologist enters information on diagnosis and disease activity at regular follow-up visits as well as start and stop dates of anti-rheumatic treatments. Estimations indicate that more than 80 % of all Swedish RA patients, and >90% of all patients with RA treated with bDMARD are included in SRQ. [1,2]
The Swedish Medical Birth Register
The Swedish Medical Birth Register includes information from more than 95% of all births in Sweden (≥ gestational week 28 before July 2008 or ≥ gestational week 22 since July 2008) since 1973. Information is collected prospectively from first visit at prenatal care and throughout pregnancy, delivery, and the neonatal period. The Medical Birth Register holds information on last menstrual period gestational age, preterm birth, mode of delivery, stillbirth, birth weight, congenital malformation, Apgar scores, and neonatal morbidity and mortality. The register also provides information on maternal characteristics such as age, smoking, body mass index (BMI), country of birth, and parity.[3]
The Swedish National Patient Register
The Swedish National Patient Register is a nationwide register holding information of all hospital discharges since 1987. Since 2001 the register also includes visits and diagnoses in specialist outpatient care. Diagnoses are coded according to ICD-10 (International Classification of Diseases, 10th revision) since 1997. [4]
The Swedish Prescribed Drug Register
The Swedish Prescribed Drug Register is a nationwide register established July 2005. It contains information on all dispensed prescriptions at Swedish pharmacies, including date and the ATC-code (Anatomical Therapeutic Chemical Classification System) of the drug. The register does not include data on drugs used in hospital and only partially drugs administered in hospital day-care units. Biologic Disease-Modifying Anti-Rheumatic Drug (bDMARD) given as infusions in hospital/day-care units are not registered in the Prescribed Drug Register. [5]
The Swedish population and death register, education register
Statistics Sweden maintains individual-based statistics on residency in Sweden since the early 1960s. The National Board of Health and Welfare maintains a register of dates and causes of deaths since the early 1960s. It also includes the education of Swedish citizens. [6]
DENMARK
DANBIO: The Danish Rheumatology Register
The DANBIO registry is a Danish rheumatological quality register with nationwide coverage established in 2000. Since 2006 it has been mandatory to register rheumatologic patients treated with bDMARDs. Since 2005, all newly diagnosed patients with chronic inflammatory arthritis have been included. [7] The register holds information on treatment (type, dose, start and stop dates), disease activity at start of treatment and at follow-up visits collected by the treating rheumatologist. 95% of all RA patients in Denmark are registered in DANBIO. [8]
The Danish Medical Birth Register
The Danish Medical Birth Register is a nationwide register including information on live and still births in Denmark since 1973. Since 1973, all births have been registered in the Medical Birth Register. In Denmark, the Medical Birth Register holds information on maternal characteristics, paternal information, and pregnancy outcomes related to mother and child, collected prospectively from first antenatal visit until post-partum. Still births have been included in the Medical Birth Register from gestational week 22+0 since April 2004. [9]
The Danish National Patient Register
The Danish National Patient Register is a nationwide register established in 1977 and includes, for administrative purposes, dates of hospital admission and discharge, procedures, and up to 20 diagnoses coded by physicians at discharge according to ICD-8 until the end of 1993 and ICD-10 thereafter. Diagnoses from hospital outpatient visits have been included in the registry since 1995. [10,11]
The Danish National Prescription Register
The Prescribed Drug Register is a nationwide register holding information on all prescriptions filled at Danish pharmacies 2004, and data include, among others, date, dose, and ATC-code. In Denmark, all bDMARDs are provided free of charge to the patient through the hospital department responsible for the treatment. Information on bDMARDs are not included in the Prescribed Drug Register [12,13]
The Civil Registration System
The Danish civil registration system holds information on the total Danish population and contains recently updated information including personal civil registration number (CPR number, i.e. personal identification number assigned to all citizens living in Denmark), name, address including postal code, vital status, and emigration. The CPR also contains information about the CPR number of close relatives (legally registered father, mother and children). [14]
Register of highest educational level from Statistics Denmark
Statistics Denmark is an institution under the Danish Government responsible for conducting statistical analyses on the Danish society in a broad range of subjects including social and economic subjects. For this study we included information on highest educational level as a proxy for socioeconomic status. Statistics Denmark also provide servers for secure storage, access, and processing of sensitive data. For this study hosting of all data was at Statistics Denmark. [15]

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Supplementary Table S2

Data sources and definitions

Variable	Description
Registry: SRQ/DANBIO	
Rheumatoid arthritis (RA)	A rheumatology-based diagnosis of maternal RA (ICD-10: M05, M06) according to SRQ or DANBIO with a pregnancy occurring after the diagnosis of RA,
Axial Spondyloarthritis (AxSpA)	A rheumatology-based diagnosis of maternal AxSpA (ICD-10: M45, M46.8, M46.9) according to SRQ or DANBIO with a pregnancy occurring after the diagnosis of AxSpA.
Psoriatic arthritis (PsA)	A rheumatology-based diagnosis of maternal PsA (ICD-10: L40.5, M07.0, M07.1, M07.3) according to SRQ or DANBIO with a pregnancy occurring after the diagnosis of PsA.
28-joint Disease Activity Score CRP adjusted (DAS28-CRP)	0-10. Defined as DAS28-CRP minus patent's global VAS. Low <3.2, High ≥3.2, Missing. Maximal value during pregnancy was extracted. If CRP was missing in relation to a visit in DANBIO we obtained CRP value from the Danish Register of Laboratory Results for Research if available within a window of visit date±30 days.
Health Assessment Questionnaire (HAQ)	0-3. 20 questions in eight categories of functioning that represent a comprehensive set of functional activities. For this study we defined low functional status as HAQ <1, high as HAQ ≥1, and Missing. HAQ can be elevated up to 0.5 by pregnancy alone. [16] Maximal value during pregnancy was extracted.
C-Reactive protein (CRP)	Mg/L. Low <10, High ≥10, Missing. In Denmark. As registered in SRQ/DANBIO. Maximal value during pregnancy was extracted.
Disease load	High: HAQ≥1, CRP≥10 mg/L, and/or DAS28-CRP≥3.2 Low: a) Disease load ≠ high, b) HAQ<1, CRP<10 mg/L, and/or DAS28-CRP<3.2 Missing: Missing data on HAQ, CRP, and DAS28-CRP
Registry: Medical Birth Register	
Time of conception	Time of conception was calculated as gestational age zero days based on the gestational age at birth. Gestational age at birth in the Medical Birth Register is estimated based on ultrasonography or, if ultrasonography was unavailable, by the recorded date of the first day of the last menstrual period.
Maternal age	Maternal age (years) at delivery
Parity	At time of conception. Nulliparous, Primi/Multiparous, Missing
Calendar period of delivery	2006-2009, 2010-2012, 2013-2015, 2016-2018
Body Mass Index (BMI)	Kg/m2. Calculated from measured weight and self-reported height at the first antenatal visit. Underweight < 18.5 ≤ Normal weight < 25 ≤ Overweight < 30 ≤ Obese, Missing.
Smoking in early pregnancy	Reported at the first antenatal visit. Smoker, Non-smoker, Missing.
Registry: Educational	
Educational level	Mothers highest education level at time of delivery. >12 years, ≤12 years, Missing.
REGISTRY: National Patient Register	
Pre-eclampsia	One or more diagnosis of pre-eclampsia or eclampsia. ICD-10 O14.0-O15.9. Pre-eclampsia superimposed on chronic hypertension was not included (ICD-10 O11). The Danish National Patient Register has a sensitivity of 69% and specificity of 99% for pre-eclampsia. [17] Pre-eclampsia was further classified based on severity [18] and timing of delivery. [19–21] Moderate pre-eclampsia: ICD-10 O14.0 or O14.9 Severe pre-eclampsia: ICD-10 O14.1, O14.2, or O15.0-15.9 Early pre-eclampsia: pre-eclampsia and delivery <34 gestational weeks Late pre-eclampsia: pre-eclampsia and delivery ≥34 weeks
Chronic inflammatory arthritis (Exclusion criteria for controls)	ICD-10 codes RA: M05, M06.0, M06.2, M06.3, M06.8, M06.9, M12.3 PsA: L40.5, M07.0, M07.1, M07.3 AxSpA: M45, M46.0, M46.1, M46.8, M46.9 Juvenile Idiopathic Arthritis: M08, M09 Polyarthritis: M13.0

Abbreviations: DANBIO, the Danish Rheumatology Register; ICD-10, International Classification of Diseases, 10th revision; SRQ, Swedish Rheumatology Quality register; VAS, Visual Analogue Scale.

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Supplementary Table S3

Description of linkage procedure

SWEDEN
For Sweden, we identified all women diagnosed with RA, AxSpA, and PsA (**Supplementary Table S2**) from an existing linkage comprising all individuals with chronic inflammatory arthritis identified in SRQ and with randomly sampled comparators from the general population free from chronic inflammatory arthritis (**Supplementary Table S2**) at the time of sampling that is at the date of diagnosis in National Patient Register of the index patient and the same data for the comparators. The comparators in this linkage were originally matched 1:5 on age, residential area, and sex. [22] In the Swedish Medical Birth Register, we then sampled all pregnancies in RA, AxSpA, and PsA exposed women within the study period (January 1st, 2007, up until December 31st, 2017 in) to identify the Swedish RA, AxSpA, and PsA pregnancy cohorts, respectively. Afterwards, we generated the three Swedish control pregnancy cohorts by identifying 10 pregnancies of women from the existing linkage to each RA, PsA, and AxSpA exposed pregnancy matched on maternal age, parity, and birth year. Thereafter we pooled the Swedish and Danish pregnancy cohorts at Statistics Denmark's secure servers (**Figure 1, main**). [23]
DENMARK
For Denmark, we identified all women diagnosed with RA, AxSpA, and PsA (**Supplementary Table S2**) in DANBIO. Statistics Demark performed a linkage of these women to the Medical Birth Register and sampled all pregnancies in these women within the study period (January 1st, 2006, up until December 31st, 2018). Afterwards Statistics Denmark identified 35 control pregnancies from the Medical Birth Register to each disease exposed pregnancy matched on maternal age, parity, and year of delivery. Among the healthy controls we excluded pregnancies of women who were diagnosed with chronic inflammatory arthritis (**Supplementary Table S2**) in the National Patient Register before conception, and we generated the three Danish control pregnancy cohorts by identifying 10 pregnancies to each disease exposed pregnancy matched on maternal age, parity and birth. All pregnancies were linked to the registries of relevance using the Danish civil registration number. Afterwards, the Swedish and Danish pregnancy cohorts were pooled at Statistics Denmark's secure servers (**Figure 1, main**). [23]

Abbreviations: AxSpA, Axial Spondyloarthritis; PsA, Psoriatic Arthritis; RA, Rheumatoid Arthritis.

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Supplementary Table S4

Data sources and definitions of anti-rheumatic drugs

Anti-rheumatic therapy	SWEDEN	DENMARK
	The Prescribed Drug Register holds dispensed prescriptions with a typical filling for chronic conditions lasting three months' use. In SRQ start and stop dates are registered by the treating rheumatologist. We combined both data sources and considered the Prescribed Drug Register the more valid source. Validation through SRQ regarding treatment start and stop before and during pregnancy were done. In Sweden, drugs administered intravenously are given at specialist day care units at the hospitals and are therefore not registered in the Prescribed Drug Register, thus this information was solely collected from SRQ.	The Prescribed Drug Register holds dispensed prescriptions typically lasting three months' use. In DANBIO start and stop dates are registered by the treating rheumatologist. We combined both data sources and considered the Prescribed Drug Register the more valid source. DANBIO was used to provide data on exact dates for treatment stops before and during pregnancy. DMARDs administered subcutaneously, intramuscularly, or intravenously are only registered in the National Patient Register and DANBIO. For bDMARDs, the National Patient Register constituted the main source. A notification of bDMARDs in the National Patient Register assumes supply of eight weeks' treatment. Validation through DANBIO regarding treatment stops before and during pregnancy.
Oral corticosteroids (CS)	**Registry:** Prescribed Drug Register and SRQ **ATC-code:** H02	**Registry:** Prescribed Drug Register and DANBIO **ATC-code:** H02
Conventional synthetic Disease-Modifying Anti-Rheumatic Drug (csDMARD)	**Registry:** Prescribed Drug Register and SRQ **ATC-codes:** Sulfasalazine: A07EC01-A07EC04 Leflunomide: L04AA13 Ciclosporin: L04AD01 Azathioprine: L04AX01, L01BB01 Methotrexate: L01BA01, L04AX03 Antimalarial drugs: P01BA01, P01BA02 Mycophenolate: L04AA06	**Registry:** Prescribed Drug Register, National Patient Register, and DANBIO **ATC-codes:** Sulfasalazine: A07EC01-A07EC04 Leflunomide: L04AA13 Ciclosporin: Only from DANBIO Azathioprine: L04AX01, L01BB01 Methotrexate: L01BA01, L04AX03 Antimalarial drugs: P01BA01, P01BA02 Mycophenolate: L04AA06
Biologic Disease-Modifying Anti-Rheumatic Drug (bDMARD)	**Registry:** Prescribed Drug Register and SRQ **ATC-codes:** Etanercept: L04AB01 Infliximab: from SRQ (*L04AB02*) Adalimumab: L04AB04 Certolizumab-pegol: L04AB05 Golimumab: L04AB06 Tocilizumab: from SRQ (*L04AC07)* Abatacept: L04AA24 Rituximab: from SRQ *(L01XC02)*	**Registry:** National Patient Register and DANBIO **Treatment codes:** Etanercept: BOHJ18A2 Infliximab: BOHJ18A1 Adalimumab: BOHJ18A3 Certolizumab-pegol: BOHJ18A5 Golimumab: BOHJ18A4 Tocilizumab: BOHJ18B2 Abatacept: BOHJ18C1 Rituximab: BOHJ11

Abbreviations: ATC, Anatomical Therapeutic Chemical Classification System; DANBIO, the Danish Rheumatology Register; SRQ, Swedish Rheumatology Quality register.

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Supplementary Table S5

Maternal characteristics in RA, AxSpA, PsA, and control *s*ingleton pregnancies in **Sweden**, n (%)

Sweden		**RA**	**Controls[1]**	**AxSpA**	**Controls[1]**	**PsA**	**Controls[1]**
N		1104	11040	431	4310	233	2330
Maternal age (years)							
≤24		23 (2.1)	230 (2.1)	21 (4.9)	210 (4.9)	18 (7.7)	180 (7.7)
25-29		226 (20.5)	2260 (20.5)	117 (27.1)	1170 (27.1)	55 (26.6)	550 (26.6)
30-34		444 (40.2)	4440 (40.2)	176 (40.8)	1760 (40.8)	74 (31.8)	740 (31.8)
>34		411 (37.2)	4110 (37.2)	117 (27.1)	1170 (27.1)	86 (36.9)	860 (36.9)
Calendar year of delivery							
2006-2009		188 (17.0)	1880 (17.0)	37 (8.6)	370 (8.6)	22 (9.4)	220 (9.4)
2010-2012		299 (27.1)	2990 (27.1)	72 (16.7)	720 (16.7)	46 (19.7)	460 (19.7)
2013-2015		330 (29.9)	3300 (29.9)	169 (39.2)	1690 (39.2)	79 (33.9)	790 (33.9)
2016-2018		287 (26.0)	2870 (26.0)	153 (35.5)	1530 (35.5)	86 (36.9)	860 (36.9)
Parity							
Nulliparous		488 (44.2)	4880 (44.2)	200 (46.4)	2000 (46.4)	93 (39.9)	930 (39.9)
Primi/Multiparous		616 (55.8)	6160 (55.8)	231 (53.6)	2310 (53.6)	140 (60.1)	1400 (60.1)
Missing		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
BMI (kg/m2)							
<18.5		93 (8.4)	845 (7.7)	41 (9.5)	369 (8.6)	19 (8.2)	152 (6.5)
18.5-24.9		543 (49.2)	5244 (47.5)	197 (45.7)	2047 (47.5)	91 (39.1)	1113 (47.8)
25.0-29.9		264 (23.9)	2632 (23.8)	115 (26.7)	1023 (23.7)	70 (30.0)	570 (24.9)
≥30.0		116 (10.5)	1379(12.5)	45 (10.4)	526 (12.2)	35 (15.0)	305 (13.1)
Missing		88 (8.0)	940 (8.5)	33 (7.7)	345 (8.0)	18 (7.7)	190 (8.2)
Smoking							
Non-smoker		1015 (91.9)	10002 (90.6)	388 (90.0)	3872 (89.8)	195 (83.7)	2093 (89.8)
Smoker		32 (2.9)	459 (4.2)	21 (4.9)	186 (4.3)	19 (8.2)	99 (4.2)
Missing		57 (5.2)	579 (5.2)	22 (5.1)	252 (5.8)	19 (8.2)	138 (5.9)
Highest educational level							
>12 years		420 (38.0)	4190 (38.0)	168 (39.0)	1732 (40.2)	106 (45.5)	1026 (44.0)
≤12 years		681 (61.7)	6808 (61.7)	263 (61.0)	2556 (59.3)	127 (54.5)	1297 (55.7)
Missing		3 (0.3)	42 (0.4)	0 (0.0)	22 (0.5)	0 (0.0)	7 (0.3)
Disease duration							
Years, median (IQR)		6.9 (4.3, 10.6)	NA	9.1 (5.3, 13.9)	NA	8.8 (5.3, 13.2)	NA
Pre-pregnancy treatment							
Untreated	No	230 (20.8)	NA	172 (39.9)	NA	63 (27.0)	NA
Monotherapy	CS	111 (10.1)	NA	22 (5.1)	NA	16 (6.9)	NA
	csDMARD	138 (12.5)	NA	30 (7.0)	NA	30 (12.9)	NA
	bDMARD	141 (12.8)	NA	118 (27.4)	NA	55 (23.6)	NA
Combination therapy	CS+csDMARD	154 (13.9)	NA	14 (3.2)	NA	11 (4.7)	NA
	CS+bDMARD	145 (13.1)	NA	34 (7.9)	NA	24 (10.3)	NA
	csDMARD+ bDMARD	75 (6.8)	NA	25 (5.8)	NA	22 (9.4)	NA
	CS+csDMARD+ bDMARD	110 (10.0)	NA	16 (3.7)	NA	12 (5.2)	NA

[1]Matched 1:10 on maternal age, parity, and year of delivery.

Abbreviations: AxSpA, Axial Spondyloarthritis; bDMARD, Biologic Disease-Modifying Anti-Rheumatic Drug; BMI, Body Mass Index; CS, oral corticosteroids; csDMARD, Conventional synthetic Disease-Modifying Anti-Rheumatic Drug; IQR, interquartile range; NA, Not Applicable; PsA, Psoriatic Arthritis; RA, Rheumatoid Arthritis.

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Supplementary Table S6

Maternal characteristics in RA, AxSpA, PsA, and control singleton pregnancies in **Denmark**, n (%)

Denmark		**RA**	**Controls[1]**	**AxSpA**	**Controls[1]**	**PsA**	**Controls[1]**
N		635	6350	388	3880	256	2560
Maternal age (years)							
≤24		24 (3.8)	240 (3.8)	18 (4.6)	180 (4.6)	26 (10.2)	260 (10.2)
25-29		145 (22.8)	1450 (22.8)	113 (29.1)	1130 (29.1)	83 (32.4)	830 (32.4)
30-34		234 (36.9)	2340 (36.9)	172 (44.3)	1720 (44.3)	95 (31.2)	950 (31.2)
>34		232 (36.5)	2320 (36.5)	85 (21.9)	850 (21.9)	52 (20.3)	520 (20.3)
Calendar year of delivery							
2006-2009		54 (8.5)	540 (8.5)	16 (4.1)	160 (4.1)	6 (2.3)	60 (2.3)
2010-2012		119 (18.7)	1190 (18.7)	56 (14.4)	560 (14.4)	33 (12.9)	330 (12.9)
2013-2015		215 (33.9)	2150 (33.9)	125 (32.2)	1250 (32.2)	72 (28.1)	720 (28.1)
2016-2018		247 (38.9)	2470 (38.9)	191 (49.2)	1910 (49.2)	145 (56.6)	1450 (56.6)
Parity							
Nulliparous		278 (43.8)	2780 (43.8)	169 (43.6)	1690 (43.6)	119 (46.5)	1190 (46.5)
Primi/Multiparous		352 (55.4)	3520 (55.4)	219 (56.4)	2190 (56.4)	134 (52.3)	1340 (52.3)
Missing		5 (0.8)	50 (0.8)	0 (0.0)	0 (0.0)	3 (1.2)	30 (1.2)
BMI (kg/m2)							
<18.5		24 (3.8)	230 (3.6)	17 (4.4)	163 (4.2)	4 (1.6)	104 (4.1)
18.5-24.9		279 (43.9)	3189 (50.2)	181 (46.6)	1920 (49.5)	108 (42.2)	1270 (49.6)
25.0-29.9		148 (23.3)	1296 (20.4)	85 (21.9)	831 (21.4)	65 (25.4)	515 (20.1)
≥30.0		95 (15.0)	751 (11.8)	59 (15.2)	474 (12.2)	46 (18.0)	332 (13.0)
Missing		89 (14.0)	884 (13.9)	46 (11.9)	492 (12.7)	33 (12.9)	339 (13.2)
Smoking							
Non-smoker		561 (88.3)	5599 (88.2)	336 (86.6)	3448 (88.9)	207 (80.9)	2226 (87.0)
Smoker		55 (8.7)	512 (8.1)	42 (10.8)	325 (8.4)	36 (14.1)	233(9.1)
Missing		19 (3.0)	239 (3.8)	10 (2.6)	107 (2.8)	13 (5.1)	101 (3.9)
Highest educational level							
>12 years		338 (53.2)	3381 (53.2)	196 (50.5)	1973 (50.9)	104 (40.6)	1207 (47.1)
≤12 years		291 (45.8)	2628 (41.4)	NA	1722 (44.4)	NA	1211 (47.3)
Missing		6 (0.9)	341 (5.4)	≤3	185 (4.8)	≤3	142 (5.5)
Disease duration							
Years, median (IQR)		5.6 (3.1, 9.2)	NA	6.8 (3.7, 10.6)	NA	4.9 (2.7, 8.6)	NA
Pre-pregnancy treatment							
Untreated	No	180 (28.3)	NA	230 (59.3)	NA	126 (49.2)	NA
Monotherapy	CS	34 (5.4)	NA	11 (2.8)	NA	7 (2.7)	NA
	csDMARD	193 (30.4)	NA	17 (4.4)	NA	65 (25.4)	NA
	bDMARD	44 (6.9)	NA	91 (23.5)	NA	21 (8.2)	NA
Combination therapy	CS+csDMARD	74 (11.7)	NA	NA	NA	8 (3.1)	NA
	CS+bDMARD	18 (2.8)	NA	13 (3.4)	NA	6 (2.3)	NA
	csDMARD+ bDMARD	59 (9.3)	NA	17 (4.4)	NA	15 (5.9)	NA
	CS+csDMARD+ bDMARD	33 (5.2)	NA	NA	NA	8 (3.1)	NA

[1]Matched 1:10 on maternal age, parity, and year of delivery.

Abbreviations: AxSpA, Axial Spondyloarthritis; bDMARD, Biologic Disease-Modifying Anti-Rheumatic Drug; BMI, Body Mass Index; CS, oral corticosteroids; csDMARD, Conventional synthetic Disease-Modifying Anti-Rheumatic Drug; IQR, interquartile range; NA, Not Applicable; PsA, Psoriatic Arthritis; RA, Rheumatoid Arthritis.

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Supplementary Table S7

Risk of moderate and severe pre-eclampsia in in RA, AxSpA, and PsA singleton pregnancies versus control singleton pregnancies

	Pregnancies, n	Pre-eclampsia events, n (%)	Crude OR (95% CI)	Adjusted OR (95% CI)
Severe pre-eclampsia				
RA	1739	22 (1.3)	1.33 (0.85, 2.09)	1.35 (0.84, 2.16)
Controls	17390	167 (1.0)	REF	
AxSpA	819	12 (1.5)	1.44 (0.78, 2.65)	1.19 (0.59, 2.39)
Controls	8190	84 (1.0)	REF	
PsA	489	10 (2.1)	**2.01 (1.02, 3.99)**	**2.15 (1.03, 4.47)**
Controls	4890	51 (1.1)	REF	
Moderate pre-eclampsia				
RA	1739	45 (2.6)	1.24 (0.91, 1.69)	1.23 (0.88, 1.72)
Controls	17390	363 (2.1)	REF	
AxSpA	819	22 (2.7)	1.20 (0.73-1.95)	1.16 (0.70, 1.92)
Controls	8190	183 (2.2)	REF	
PsA	489	16 (3.3)	**2.10 (1.19, 3.70)**	1.79 (0.92, 3.48)
Controls	4890	78 (1.6)	REF	

Singleton pregnancies. One woman may contribute with one or more pregnancies. ORs were estimated using logistic regression and generalized estimation-equation method.
[1]Matched 1:10 on maternal age, parity, and year [2]Adjusted for country, maternal age, parity, year, BMI, smoking and education

Abbreviations: AxSpA, Axial Spondyloarthritis; BMI, Body Mass Index; CI, Confidence Interval; OR, Odds Ratio; PsA, Psoriatic Arthritis; RA, Rheumatoid Arthritis.

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Supplementary Table S8

Risk of pre-eclampsia in RA, AxSpA, and PsA *s*ingleton pregnancies versus control *s*ingleton pregnancies (**Sweden)**

Sweden	Pregnancies, n	Pre-eclampsia events, n (%)	Crude OR (95% CI)	Adjusted OR 1[2] (95% CI)
RA	1104	42 (3.8)	1.31 (0.95, 1.82)	**1.42 (1.01, 2.00)**
Controls[1]	11040	326 (3.0)	REF	REF
AxSpA	431	18 (4.2)	1.35 (0.78, 2.31)	1.25 (0.69, 2.28)
Controls[1]	4310	134 (3.1)	REF	REF
PsA	233	10 (4.3)	1.49 (0.72, 3.07)	1.54 (0.68, 3.47)
Controls[1]	2330	68 (2.9)	REF	REF

Singleton pregnancies. One woman may contribute with one or more pregnancies. ORs were estimated using logistic regression and generalized estimation-equation method.
[1]Matched 1:10 on maternal age, parity, and year [2]Adjusted for country, maternal age, parity, year, BMI, smoking and education

Abbreviations: AxSpA, Axial Spondyloarthritis; BMI, Body Mass Index; CI, Confidence Interval; OR, Odds Ratio; PsA, Psoriatic Arthritis; RA, Rheumatoid Arthritis.

Supplementary Table S9

Risk of pre-eclampsia in RA, AxSpA, and PsA *s*ingleton pregnancies versus control *s*ingleton pregnancies (**Denmark)**

Denmark	Pregnancies, n	Pre-eclampsia events, n	Crude OR (95% CI)	Adjusted OR 1[2] (95% CI)
RA	635	25 (3.9)	1.20 (0.79, 1.83)	1.06 (0.66, 1.69)
Controls[1]	6350	209 (3.3)	REF	REF
AxSpA	388	16 (4.1)	1.24 (0.70, 2.20)	1.04 (0.57, 1.91)
Controls[1]	3880	133 (3.4)	REF	REF
PsA	256	16 (6.3)	**2.71 (1.52, 4.85)**	**2.26 (1.12, 4.54)**
Controls[1]	2560	61 (2.4)	REF	REF

Singleton pregnancies. One woman may contribute with one or more pregnancies. ORs were estimated using logistic regression and generalized estimation-equation method.
[1]Matched 1:10 on maternal age, parity, and year [2]Adjusted for country, maternal age, parity, year, BMI, smoking and education

Abbreviations: AxSpA, Axial Spondyloarthritis; BMI, Body Mass Index; CI, Confidence Interval; OR, Odds Ratio; PsA, Psoriatic Arthritis; RA, Rheumatoid Arthritis.

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Supplementary Table S10

Risk of pre-eclampsia in RA, AxSpA, and PsA *s*ingleton pregnancies in relation to functional status and disease activity **within 180 days from time of conception (*1st and 2nd trimester*)** versus control *s*ingleton pregnancies

			External comparison		**Internal comparison**	
	Pregnancies, n	Pre-eclampsia events, n (%)	Crude OR (95% CI)	Adjusted OR 1[1] (95% CI)	Crude OR (95% CI)	Adjusted OR 1[1] (95% CI)
RA						
CRP (mg/L)						
<10	391	21 (5.4)	1.80 (1.16, 2.80)	1.79 (1.11, 2.88)	REF	REF
≥10	203	9 (4.4)	1.46 (0.75, 2.83)	1.49 (0.76, 2.89)	NA[2]	NA[2]
Missing	1145	37 (3.2)	1.06 (0.76, 1.48)	1.05 (0.73, 1.51)	NA[2]	NA[2]
HAQ						
<1	433	18 (4.2)	1.37 (0.85, 2.20)	1.36 (0.82, 2.28)	REF	REF
≥1	157	13 (8.3)	**2.85 (1.60, 5.09)**	**2.30 (1.23, 4.28)**	2.08 (0.99, 4.38)	1.69 (0.76, 3.72)
Missing	1149	36 (3.1)	1.02 (0.73, 1.44)	1.06 (0.74, 1.53)	0.75 (0.42, 1.33)	0.78 (0.42, 1.45)
DAS28-CRP[3]						
<3.2	375	17 (4.5)	1.50 (0.92, 2.45)	1.45 (0.86, 2.46)	REF	REF
≥3.2	201	11 (5.5)	1.83 (0.99, 3.38)	**1.92 (1.03, 3.58)**	1.22 (0.56, 2.66)	1.32 (0.59, 2.97)
Missing	1136	39 (3.4)	1.10 (0.79, 1.53)	1.09 (0.77, 1.56)	0.73 (0.41, 1.31)	0.75 (0.40, 1.40)
Disease load: any HAQ≥1, CRP≥10 mg/L, or DAS28-CRP[3]≥3.2						
Low (no)	368	12 (3.3)	1.07 (0.60, 1.90)	1.05 (0.56, 2.00)	REF	REF
High (yes)	388	24 (6.2)	**2.08 (1.37, 3.17)**	**1.98 (1.27, 3.08)**	1.95 (0.96, 3.96)	1.88 (0.87, 4.04)
Missing[4]	983	31 (3.2)	1.03 (0.71, 1.49)	1.04 (0.70, 1.54)	0.97 (0.49, 1.90)	0.99 (0.47, 2.07)
Controls[5]	17390	535 (3.1)	REF	REF	-	-
AxSpA						
Disease load: any HAQ≥1 or CRP≥10 mg/L						
Low (no)	169	8 (4.7)	1.57 (0.81, 3.04)	1.23 (0.56, 2.68)	REF	REF
High (yes)	118	3 (2.5)	0.74 (0.25, 2.21)	0.56 (0.18, 1.71)	NA[2]	NA[2]
Missing[6]	532	23 (4.3)	1.33 (0.84, 2.11)	1.32 (0.80, 2.18)	NA[2]	NA[2]
Controls[5]	8190	267 (3.3)	REF	REF	-	-
PsA						
Disease load: any HAQ≥1, CRP≥10 mg/L, or DAS28-CRP[2]≥3.2						
Low (no)	94	4 (4.3)	1.72 (0.62, 4.78)	2.08 (0.72, 5.97)	REF	REF
High (yes)	85	5 (5.9)	2.37 (0.95, 5.91)	1.81 (0.54, 6.04)	NA[2]	NA[2]
Missing[4]	310	17 (5.5)	**2.09 (1.20, 3.63)**	1.79 (0.93, 3.47)	NA[2]	NA[2]
Controls[5]	4890	129 (2.6)	REF	REF	-	-

Singleton pregnancies. One woman may contribute with one or more pregnancies. ORs were estimated using logistic regression and generalized estimation-equation method.
[1]Adjusted for country, maternal age, parity, year of delivery, BMI, smoking and education, [2]Not presented due to low numbers, [3]DAS28-CRP was calculated including CRP and without Global Health-Visual Analog Scale, [4]No registration of neither DAS28-CRP, HAQ, nor CRP, [5]Matched 1:10 on maternal age, parity, and year of delivery, [6]No registration of neither HAQ nor CRP.

Abbreviations: AxSpA, Axial Spondyloarthritis; BMI, Body Mass Index; CI, Confidence Interval; CRP, C-Reactive Protein; DAS28-CRP, 28-joint Disease Activity Score CRP adjusted; HAQ, Health Assessment Questionnaire; NA, Not Applicable; OR, Odds Ratio; PsA, Psoriatic Arthritis; RA, Rheumatoid Arthritis.

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Supplementary Table S11

Treatment during pregnancy in RA, AxSpA, and PsA singleton pregnancies

		RA	Controls[1]	AxSpA	Controls[1]	PsA	Controls[1]
	N	1739	17390	819	8190	489	4890
Treatment during pregnancy							
Untreated	No	607 (34.9)	NA	488 (59.6)	NA	282 (57.7)	NA
Monotherapy	CS	269 (15.5)	NA	58 (7.1)	NA	36 (7.4)	NA
	csDMARD	216 (12.4)	NA	49 (6.0)	NA	50 (10.2)	NA
	bDMARD	135 (7.8)	NA	124 (15.1)	NA	57 (11.7)	NA
Combination therapy	CS+csDMARD	204 (11.7)	NA	17 (2.1)	NA	19 (3.9)	NA
	CS+bDMARD	183 (10.5)	NA	62 (7.6)	NA	25 (5.1)	NA
	csDMARD+ bDMARD	45 (2.6)	NA	7 (0.9)	NA	11 (2.2)	NA
	CS+csDMARD+ bDMARD	80 (4.6)	NA	14 (1.7)	NA	9 (1.8)	NA

Treatment defined as any registration of one or more type of drug during pregnancy (simultaneously or not simultaneously). Singleton pregnancies. One woman may contribute with one or more pregnancies. [1]Matched 1:10 on maternal age, parity, and year of delivery. **Abbreviations**: AxSpA, Axial Spondyloarthritis; bDMARD, biologic Disease-Modifying Anti-Rheumatic Drug; BMI, Body Mass Index; CS, oral corticosteroids; csDMARD, conventional synthetic Disease-Modifying Anti-Rheumatic Drug; IQR, interquartile range; NA, Not Applicable; PsA, Psoriatic Arthritis; RA, Rheumatoid Arthritis.

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