

**Supplementary table S1** Codes for identification and classification of pregnancy outcomes, congenital malformations, extra-musculoskeletal manifestations, comorbidities, and pharmacological treatments

Type of pregnancy outcome	
Delivery (including stillbirth)	<b>ICD-10-GM code:</b> O15.1 O15.2 O48 O60 O61 O62 O63 O64 O65 O66 O67 O68 O69 O70 O71 O72 O73 O74 O75 O80 O81 O82 O85 O86 O87 O88 O89 O90 P05 P07 P08 P95 Z37.0 Z37.1 Z37.2 Z37.3 Z37.4 Z37.5 Z37.6 Z37.7 Z38 Z39 <b>OPS code:</b> 1-699.2 5-72 5-730 5-731 5-732 5-733 5-738 5-739 5-740 5-741 5-742 5-745 5-749 5-756 5-758 9-26 9-280 <b>EBM code:</b> 01710 01711 01712 01784 01815 08410 08411 08412 08413 08414 08415 08416
Elective termination	<b>ICD-10-GM code:</b> O04 <b>OPS code:</b> 5-734.2 5-734.3 5-734.4 5-750 5-751 5-752 5-753.2 <b>EBM code:</b> 01904 01905 01906 01910 01911 01912 01913 01914
Ectopic pregnancy	<b>ICD-10-GM code:</b> O00 <b>OPS code:</b> 5-743 5-744
Spontaneous abortion	<b>ICD-10-GM code:</b> O01 O02 O03 O05 O06 <b>EBM code:</b> 1060
Classification of pregnancy outcome and complication (ICD-10-GM codes if not stated otherwise)	
Stillbirth	P95 Z37.1 Z37.4 Z37.7
Preterm birth (< week 37)	P07.2 P07.3
Gestational week 28-36	P07.3
Gestational week <28	P07.2
Small-for-gestational-age	P05.0 P05.1 P07.0 P07.1
Large-for-gestational-age	P08.0 P08.1
Caesarean section	O82 <b>OPS code:</b> 5-740 5-741 5-742 5-745 5-749 <b>EBM code:</b> 08415
Pre-eclampsia	O14 O15
Gestational diabetes	O24.4 O24.9
Congenital malformation (ICD-10-GM codes)	
Nervous system	Q00–Q07, excluding Q0461, Q0782
Eye	Q10–Q15, excluding Q101–Q103, Q105, Q135
Ear, face, and neck	Q16–Q18, excluding Q170–Q175, Q179, Q180–Q182, Q184–Q187, Q1880, Q189
Congenital heart defects	Q20–Q26, excluding Q211, Q250 if GA <37 weeks, Q2541, Q256 if GA<37 weeks, Q261
Respiratory system	Q300, Q32–Q34, excluding Q320, Q331
Orofacial clefts	Q35–Q37
Digestive system	Q38–Q45 Q790, excluding Q381, Q382, Q3850, Q400, Q401, Q4021, Q430, Q4320, Q4381, Q4382
Abdominal wall defects	Q792, Q793, Q795
Genital	Q50–Q52 Q54–Q56, excluding Q523, Q525, Q527, Q5520, Q5521
Urinary	Q60–Q64 Q794, excluding Q610, Q627, Q633
Limb	Q65–Q74, excluding Q653–Q656, Q658, Q659, Q661–Q669, Q670–Q678, Q680, Q6810, Q6821, Q683–Q685, Q7400
Other anomalies / syndromes	D821, P350, P351, P371, Q0435, Q206, Q240, Q3381, Q411, Q412, Q418, Q4471, Q6190, Q710, Q712, Q713, Q720, Q722, Q723, Q730, Q7402, Q7484, Q750, Q751, Q754, Q7581, Q77, Q7800, Q782–Q788, Q793, Q795, Q7980, Q7982, Q80–Q82, Q86, Q87, Q890, Q893, Q894, Q936, excluding Q825, Q8280, Q8703, Q8704, Q8708, Q8724
Chromosomal	Q90–Q92, Q93, Q96–Q99, excluding Q936
Extra-musculoskeletal manifestation (ICD-10-GM codes)	
Inflammatory bowel disease	K50 K51
Psoriasis	L40
Psoriatic arthritis	M07.0 M07.2 M07.3 L40.5
Anterior uveitis	H20
Comorbidity (ICD-10-GM codes)	
Hypertension	I10–I113 I15
Diabetes mellitus	E10.0 E10.1 E10.9 E11.0 E11.1 E11.9 E12.0 E12.1 E12.9 E13.0 E13.1 E13.9 E14.0 E14.1 E14.9 E10.2–8 E11.2–8 E12.2–8 E13.2–8 E14.2–8
Obesity	E66

Pharmacological treatments (ATC codes)	
Non-steroidal anti-inflammatory drugs	M01A
Biological disease-modifying anti-rheumatic drugs	L04AA24 L04AA33 L04AB L04AC05 L04AC07 L04AC10
Conventional synthetic disease-modifying anti-rheumatic drugs	A07EC01 A07EC02 L04AA06 L04AA13 L04AA31 L04AD01 L04AD02 L04AX01 L04AX03 L04AX04 L01BA01 M01CX01 M01CX02
Steroids	H02AB01 H02AB02 H02AB04 H02AB06 H02AB07 H02AB09 H02AB14 H02AB56 H02AB58
Non-opioid analgesics	N02B
Opioids	N02A

ATC = Anatomical Therapeutic Chemical; ICD-10-GM = International Statistical Classification of Diseases, Tenth Revision, German Modification; OPS = Operation and Procedure Classification System; EBM = Einheitlicher Bewertungsmaßstab (German Uniform Evaluation Standard).

**Supplementary table S2** Frequencies of caesarean section stratified by calendar year of delivery

Year	Caesarean section among women with axSpA			Caesarean section among matched controls		
	Total	Elective	Emergency	Total	Elective	Emergency
2006	52.6% (20/38)	27.8% (10/36)	22.2% (8/36)	31.5% (130/413)	15.5% (62/400)	13.8% (55/400)
2007	48.8% (21/43)	24.4% (10/41)	22.0% (9/41)	30.1% (149/495)	16.5% (79/478)	11.1% (53/478)
2008	37.8% (17/45)	22.2% (10/45)	15.6% (7/45)	34.7% (157/452)	16.8% (74/441)	16.3% (72/441)
2009	34.1% (15/44)	22.7% (10/44)	11.4% (5/44)	35.8% (165/461)	16.4% (74/451)	18.0% (81/451)
2010	37.2% (16/43)	19.0% (8/42)	16.7% (7/42)	33.7% (166/492)	16.1% (78/484)	16.5% (80/484)
2011	56.1% (32/57)	33.9% (19/56)	21.4% (12/56)	31.2% (160/513)	14.2% (72/508)	16.3% (83/508)
2012	38.5% (20/52)	17.6% (9/51)	19.6% (10/51)	28.2% (150/532)	10.6% (56/527)	16.9% (89/527)
2013	38.7% (24/62)	25.8% (16/62)	12.9% (8/62)	30.3% (182/600)	12.4% (74/595)	17.3% (103/595)
2014	45.8% (27/59)	25.4% (15/59)	20.3% (12/59)	32.2% (186/578)	13.8% (79/573)	17.8% (102/573)
2015	43.5% (20/46)	17.4% (8/46)	26.1% (12/46)	28.0% (139/496)	13.8% (68/493)	13.8% (68/493)
2016	38.9% (21/54)	17.0% (9/53)	20.8% (11/53)	27.9% (183/656)	12.3% (80/653)	15.3% (100/653)
2017	41.8% (38/91)	21.1% (19/90)	20.0% (18/90)	33.3% (276/828)	14.9% (123/825)	18.2% (150/825)
2018	34.4% (21/61)	19.7% (12/61)	14.8% (9/61)	31.4% (182/579)	13.8% (80/578)	17.5% (101/578)
2019	24.0% (18/75)	9.3% (7/75)	14.7% (11/75)	29.3% (174/593)	15.1% (89/591)	14.0% (83/591)

axSpA: axial spondyloarthritis.

**Supplementary table S3** Frequencies and odds ratios for pregnancy outcomes in women with axSpA versus age- and calendar year-matched controls without axSpA, excluding axSpA women with a prior diagnosis of rheumatoid arthritis

	Deliveries in women with axSpA N=673	Deliveries in matched controls N=7,688	Odds ratio (95% CI)	Adjusted odds ratio* (95% CI)
Pre-eclampsia	7.4% (50)	6.2% (479)	1.21 (0.89, 1.64)	1.07 (0.78, 1.47)
Gestational diabetes	12.0% (81)	11.1% (850)	1.07 (0.83, 1.38)	0.83 (0.63, 1.10)
Caesarean section	40.3% (271)	31.2% (2399)	<b>1.50 (1.26, 1.77)</b>	<b>1.43 (1.21, 1.70)</b>

Elective	22.0% (146)	14.3% (1088)	<b>1.65 (1.34, 2.02)</b>	<b>1.59 (1.29, 1.95)</b>
Emergency	17.5% (116)	16.1% (1220)	1.13 (0.91, 1.40)	1.09 (0.88, 1.36)
Stillbirth	0.6% (4)	0.4% (34)	1.35 (0.48, 3.81)	1.38 (0.48, 3.94)
Preterm birth (< gestational week 37)	7.2% (48)	6.2% (473)	1.17 (0.86, 1.59)	1.11 (0.81, 1.52)
gestational week <28	0.3% (2)	0.3% (25)	0.92 (0.22, 3.88)	0.84 (0.21, 3.30)
Small for gestational age	5.5% (37)	6.2% (476)	0.88 (0.62, 1.24)	0.85 (0.60, 1.21)

\* adjusted for obesity, hypertension, diabetes mellitus. axSpA: axial spondyloarthritis.

**Supplementary table S4** Frequencies and odds ratios for pregnancy outcomes in women with axSpA versus age- and calendar year-matched controls without axSpA, excluding axSpA women with extra-musculoskeletal manifestations

	Deliveries in women with axSpA N=646	Deliveries in matched controls N=7,688	Odds ratio (95% CI)	Adjusted odds ratio* (95% CI)
Pre-eclampsia	7.6% (49)	6.2% (479)	1.24 (0.91, 1.69)	1.07 (0.78, 1.48)
Gestational diabetes	11.0% (71)	11.1% (850)	0.97 (0.74, 1.26)	0.78 (0.58, 1.05)
Caesarean section	39.0% (252)	31.2% (2399)	1.41 (1.19, 1.68)	1.35 (1.13, 1.61)
Elective	20.5% (131)	14.3% (1088)	1.52 (1.23, 1.88)	1.46 (1.18, 1.81)
Emergency	17.7% (113)	16.1% (1220)	1.14 (0.91, 1.42)	1.10 (0.88, 1.37)
Stillbirth	0.3% (2)	0.4% (34)	0.71 (0.17, 2.94)	0.71 (0.17, 2.99)
Preterm birth (< gestational week 37)	7.1% (46)	6.2% (473)	1.17 (0.85, 1.59)	1.11 (0.80, 1.52)
gestational week <28	0.2% (1)	0.3% (25)	0.47 (0.06, 3.51)	0.44 (0.06, 3.08)
Small for gestational age	5.1% (33)	6.2% (476)	0.81 (0.57, 1.17)	0.78 (0.54, 1.13)

\* adjusted for obesity, hypertension, diabetes mellitus. axSpA: axial spondyloarthritis.

**Supplementary table S5** Frequencies and odds ratios for pregnancy outcomes in women with axSpA versus age- and calendar year-matched controls without axSpA including deliveries of multiple births

	Deliveries in axSpA women N=793 (N=814 infants)	Deliveries in matched controls N=7,918 (N=8,034 infants)	Odds ratio (95% CI)	Adjusted odds ratio* (95% CI)
Pre-eclampsia	7.9% (63)	6.4% (503)	1.27 (0.96, 1.68)	1.13 (0.84, 1.50)
Gestational diabetes	12.6% (100)	11.1% (878)	1.12 (0.89, 1.41)	0.85 (0.66, 1.10)
Caesarean section*	41.2% (327)	31.9% (2,525)	<b>1.51 (1.29, 1.76)</b>	<b>1.44 (1.23, 1.69)</b>

elective	21.7% (170)	14.7% (1,152)	<b>1.57 (1.29, 1.90)</b>	<b>1.51 (1.24, 1.83)</b>
emergency	18.8% (147)	16.3% (1,276)	1.21 (0.99, 1.47)	1.16 (0.96, 1.42)
Stillbirth	0.5% (4)	0.4% (34)	1.18 (0.42, 3.33)	1.20 (0.42, 3.45)
Preterm birth* *	10.8% (88)	7.8% (625)	<b>1.42 (1.10, 1.85)</b>	<b>1.36 (1.07, 1.73)</b>
gestational week**<28	0.5% (4)	0.5% (39)	1.10 (0.34, 3.58)	0.96 (0.35, 2.63)
Small for gestational age**	7.7% (63)	7.7% (616)	0.96 (0.71, 1.30)	0.97 (0.74, 1.27)

<sup>a</sup> adjusted for obesity, hypertension, diabetes mellitus. \* unspecified for N=107 \*\* based on infants; axSpA: axial spondyloarthritis.

**Supplementary table S6** Prevalences of congenital malformations\* in infants of women with axSpA stratified by pharmacological treatment during 12 months prior to delivery

	No treatment (N=416 infants)	Treatment with NSAIDs <sup>a</sup> (N=124 infants)	Treatment with csDMARDs, steroids, or analgesics <sup>b</sup> (N=90 infants)	Treatment with NSAIDs and csDMARDs, steroids, or analgesics <sup>c</sup> (N=73 infants)	Treatment with bDMARDs (N=63 infants)
Malformation	8.9% (37)	6.5% (8)	5.6% (5)	13.7% (10)	7.9% (5)
Nervous system	1.0% (4)	1.6% (2)	0.0% (0)	0.0% (0)	0.0% (0)
Eye	0.5% (2)	0.0% (0)	1.1% (1)	1.4% (1)	0.0% (0)
Ear, face, and neck	0.0% (0)	0.8% (1)	0.0% (0)	0.0% (0)	0.0% (0)
Congenital heart defects	1.9% (8)	0.8% (1)	1.1% (1)	6.8% (5)	1.6% (1)
Respiratory system	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Orofacial clefts	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)	0.0% (0)
Digestive system	0.5% (2)	0.8% (1)	0.0% (0)	0.0% (0)	0.0% (0)
Genital	1.4% (6)	0.0% (0)	1.1% (1)	0.0% (0)	0.0% (0)
Urinary	1.9% (8)	1.6% (2)	2.2% (2)	2.7% (2)	3.2% (2)
Limb	1.4% (6)	0.0% (0)	0.0% (0)	4.1% (3)	0.0% (0)
Other anomalies / syndromes	1.0% (4)	0.8% (1)	0.0% (0)	0.0% (0)	1.6% (1)
Chromosomal	0.2% (1)	0.0% (0)	0.0% (0)	0.0% (0)	1.6% (1)

\* based on the categories adopted from the European Surveillance of Congenital Anomalies; a excluding bDMARDs, csDMARDs, steroids, and analgesics; b excluding bDMARDs and NSAIDs; c excluding bDMARDs.

axSpA: axial spondyloarthritis; b/csDMARDs: biological / conventional synthetic disease-modifying anti-rheumatic drugs; NSAIDs: non-steroidal anti-inflammatory drugs.

**Supplementary table S7** Frequencies and odds ratios for pregnancy outcomes in women with axSpA stratified by pharmacological treatment during 12 months prior to delivery versus age- and calendar year-matched controls without axSpA

	Matched controls N=7,688 deliveries	No treatment N=416 deliveries			Treatment with NSAIDs <sup>a</sup> N=125 deliveries			Treatment with csDMARDs, steroids, or analgesics <sup>b</sup> N=93 deliveries			Treatment with NSAIDs and csDMARDs, steroids, or analgesics <sup>c</sup> N=73 deliveries			Treatment with bDMARDs N=63 deliveries		
		axSpA	OR (95% CI)	Adjusted* OR (95% CI)	axSpA	OR (95% CI)	Adjusted* OR (95% CI)	axSpA	OR (95% CI)	Adjusted* OR (95% CI)	axSpA	OR (95% CI)	Adjusted* OR (95% CI)	axSpA	OR (95% CI)	Adjusted* OR (95% CI)
Pre-eclampsia	6.2% (479)	8.7% (36)	<b>1.45</b> <b>(1.01, 2.08)</b>	1.25 (0.86, 1.82)	4.0% (5)	0.63 (0.26, 1.55)	0.58 (0.23, 1.49)	4.3% (4)	0.68 (0.25, 1.85)	0.58 (0.20, 1.71)	6.8% (5)	1.11 (0.44, 2.76)	0.88 (0.34, 2.27)	14.3% (9)	<b>2.51</b> <b>(1.24, 5.09)</b>	<b>2.44</b> <b>(1.12, 5.30)</b>
Gestational diabetes	11.1% (850)	12.5% (52)	1.12 (0.82, 1.52)	0.93 (0.66, 1.30)	10.4% (13)	0.97 (0.54, 1.73)	0.79 (0.43, 1.47)	11.8% (11)	1.09 (0.58, 2.06)	0.65 (0.27, 1.56)	9.6% (7)	0.87 (0.40, 1.89)	0.69 (0.30, 1.57)	17.5% (11)	1.69 (0.87, 3.25)	0.95 (0.39, 2.30)
Caesarean section	31.2% (2399)	41.8% (174)	<b>1.59</b> <b>(1.29, 1.96)</b>	<b>1.53</b> <b>(1.24, 1.89)</b>	36.0% (45)	1.23 (0.85, 1.80)	1.19 (0.81, 1.75)	34.4% (32)	1.17 (0.76, 1.80)	1.13 (0.73, 1.74)	39.7% (29)	1.41 (0.88, 2.28)	1.30 (0.79, 2.15)	47.6% (30)	<b>2.16</b> <b>(1.29, 3.62)</b>	<b>2.04</b> <b>(1.19, 3.49)</b>
Elective	14.3% (1088)	22.0% (91)	<b>1.65</b> <b>(1.28, 2.12)</b>	<b>1.60</b> <b>(1.24, 2.06)</b>	17.2% (21)	1.21 (0.74, 1.97)	1.19 (0.73, 1.94)	23.1% (21)	<b>1.81</b> <b>(1.11, 2.96)</b>	<b>1.82</b> <b>(1.11, 2.96)</b>	20.8% (15)	1.49 (0.83, 2.69)	1.38 (0.75, 2.54)	22.2% (14)	1.76 (0.97, 3.21)	1.67 (0.90, 3.12)
Emergency	16.1% (1220)	19.4% (80)	1.28 (0.99, 1.66)	1.23 (0.95, 1.60)	17.2% (21)	1.10 (0.68, 1.77)	1.07 (0.66, 1.73)	9.9% (9)	0.58 (0.29, 1.15)	0.55 (0.27, 1.10)	18.1% (13)	1.16 (0.64, 2.13)	1.10 (0.60, 2.02)	25.4% (16)	<b>1.85</b> <b>(1.04, 3.28)</b>	1.68 (0.94, 3.01)
Preterm birth (< week 37)	6.1% (469)	4.7% (20)	0.76 (0.48, 1.20)	0.71 (0.45, 1.13)	10.9% (13)	<b>1.88</b> <b>(1.05, 3.36)</b>	<b>1.84</b> <b>(1.02, 3.32)</b>	10.6% (9)	1.81 (0.90, 3.65)	1.68 (0.83, 3.41)	20.8% (15)	<b>3.96</b> <b>(2.17, 7.21)</b>	<b>3.67</b> <b>(2.04, 6.59)</b>	6.2% (4)	1.01 (0.37, 2.75)	0.95 (0.33, 2.69)
Small for gestational age	6.2% (471)	3.5% (15)	0.56 (0.33, 0.94)	0.54 (0.32, 0.91)	5.9% (7)	0.95 (0.44, 2.05)	0.92 (0.43, 2.00)	5.9% (5)	0.95 (0.38, 2.36)	0.89 (0.37, 2.17)	13.9% (10)	<b>2.38</b> <b>(1.16, 4.88)</b>	<b>2.27</b> <b>(1.17, 4.39)</b>	4.6% (3)	0.73 (0.23, 2.34)	0.71 (0.22, 2.31)

<sup>a</sup> excluding bDMARDs, csDMARDs, steroids, and analgesics; <sup>b</sup> excluding bDMARDs and NSAIDs; <sup>c</sup> excluding bDMARDs; \* adjusted for obesity, hypertension, diabetes mellitus, maternal age, calendar year of birth.

axSpA: axial spondyloarthritis; b/csDMARDs: biological / conventional synthetic disease-modifying anti-rheumatic drugs; NSAIDs: non-steroidal anti-inflammatory drugs; OR: odds ratio.

**Supplementary figure S1** Pharmacological treatment of women with axSpA (N=770) by trimester