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Supplementary Table 1. ICD 9 and 10 codes used to identify autoimmune rheumatic diseases (ARDs)

Autoimmune rheumatic diseases	ICD-9-CM codes	ICD-10-CM codes
RA	714.0, 714.1, 714.2	M05.x (MO5–MO5.9), MO6.0x, MO6.8x, and MO6.9
SLE	710.0	M32.1x, M32.8, M32.9
Lupus nephritis	SLE **plus** (580.00-586.00 and 791.0)	M32.14, M32.15, SLE **plus** (N17-N19, N00-N06, N08, R80.9)
Spondyloarthritis		
PsA	696.0	L40.5x (L40.50-L40.59)
AS	720.0	M45.x
Sjogren's syndrome	710.2	M35.**0**x
Other rheumatic conditions		
SSc	710.1	M34.x
Inflammatory myositis		
Dermatomyositis	710.3	M33.0x, M33.1x, M33.9x
Polymyositis	710.4	M33.2x
Vasculitides		
PAN	446.0	M30.0
GPA, EGPA, MPA	446.4	M30.1, M31.3 (M31.30, M31.31), M31.7
GCA	446.5	M31.5, M31.6
Takayasu disease	446.7	M31.4
APS	289.81	D68.312, D68.61, D68.62

** RA: rheumatoid arthritis, SLE: systemic lupus erythematosus, SpA: spondyloarthritis, SSc: Systemic sclerosis, PAN; polyarteritis nodosa, GPA: granulomatosis with polyangiitis, EGPA: eosinophilic granulomatosis with polyangiitis, MPA: microscopic polyangiitis, GCA: giant cell arteritis, APS: antiphospholipid syndrome*

Supplementary Table 2. ICD codes used to identify cardiovascular events (CVEs) and cardiovascular risk factors.

	ICD-9 codes	ICD-10 codes
Cardiovascular events (CVEs)		
Acute myocardial infarction (AMI)	410	I21, I22
Acute cerebrovascular accidents		
Hemorrhagic stroke	430, 431	I60, I61
Ischemic stroke	433.x1 (433.01, 433.11, 433.21, 33.31, 433.81, 433.91), 434.x1 (434.01, 434.11, 434.91)	I63
Heart failure (acute or unspecified, not rheumatic)	402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.0, 428.1, 428.20, 428.21, 428.23, 428.30, 428.31, 428.33, 428.40, 428.41, 428.43, 428.9	I11.0, I13.0, I13.2, I50.1, I50.20, I50.21, I50.23 I50.30, I50.31, I50.33, I50.40, I50.41, I50.43 I50.8x (except I50.812), I50.9
Peripartum cardiomyopathy (PPCM)	674.5x (674.50 - 674.54)	O90.3
Inflammatory heart diseases		
Acute pericarditis	420	I30.0, I30.8, I30.9, I32
Acute myocarditis (not septic or toxic)	422.0, 422.90, 422.91, 422.99, 429.0	I40.1, I40.8, I40.9, I41, I51.4
Cardiac dysrhythmias		
Atrial fibrillation/flutter	427.3x (427.31, 427.32)	I48 (I48.0, I48.11, I48.19, I48.20, I48.21, I48.3, I48.4, I48.91, I48.92)
Ventricular arrhythmias, cardiac arrest	427.1, 427.4x (472.41, 427.42), 427.5, 798, 798.1, 798.2, 798.9, 799.9	I46.x (I46.2, I46.8, I46.9), I47.2x (I47.20, I47.21, I47.29), I49.0x (I49.01, I 49.02), R99
Cardiac dysrhythmia, unspecified	427.9	I49.9
Venous thromboembolism (VTE)		
Pulmonary embolism (not septic)	415.11, 415.13, 415.19	I26.02, I26.09, I26.92, I26.93, I26.94, I26.99
Deep vein thrombosis (DVTs) of upper/lower extremities and other sites	Upper extremity DVT: 451.83, 451.84, 451.89, 453.82, 453.83, 453.84, 453.85, 453.87 Lower extremity DVT: 451.1x (451.11, 451.19), 451.2, 451.81, 453.4x (453.40, 453.41, 453.42), Other sites DVT: 451.9, 453.1, 453.2, 453.3, 453.89, 453.9	Upper extremity DVT: I82.6 (I82.60x, I82.61x, I82.62 x) Lower extremity DVT: I80.1 (I80.10-180.13), I80.2 (I80.20x, I80.21x, I80.22x, I80.23x, I80.24x, I80.25x, I80.29x), I80.3, I82.4 (I82.40x, I82.41x, I82.42 x, I82.43 x, I82.44 x, I82.45 x, I82.46 x, I82.49 x, I82.4Yx, I82.4Zx) Other sites DVT: I80.8, I80.9, I82.1, I82.210, I82.220, I82.290, I82.3, I82.A1x, I82.B1x, I82.890, I82.90
Deep phlebothrombosis and thromboembolism in pregnancy and puerperium	671.3x, 671.4x, 671.5x, 673.2x	O22.3x, O22.5x, O87.1, O88.2x, O871, O873
Cardiovascular Risk Factors		
Diabetes mellitus (DM)	648.0, 250	O24.0, O24.1, O24.2, O24.3, E10, E11, E12, E13, E14
Gestational DM	648.8	O24.4
Preexisting hypertension complicating pregnancy, childbirth, and puerperium (without superimposed preeclampsia); Unspecified maternal hypertension	401, 402, 403, 404, 405, 642.0, 642.1, 642.2, 642.9x	I10, I11, I12, I13, I15, I16 O10 O16x Infant code P00.0
Gestational hypertension without significant proteinuria	642.3	O13
Preeclampsia, eclampsia	642.4, 642.5, 642.6, 642.7	O11, O14.0, O14.1, O14.9, O15
Hyperlipidemia	272.0, 272.1, 272.2, 272.3, 272.4	E78.0, E78.1, E78.2, E78.3, E78.4, E78.5
Smoking during pregnancy	649.0, 305.1	Z72.0, F17.2
Alcohol use during pregnancy	303, 305.0	F10
Drug use during pregnancy	648.3, 304, 305.2, 305.3, 305.4, 305.5, 305.6, 305.7, 305.8, 305.9	F11, F12, F13, F14, F15, F16, F18, F19
Depression	311, 296.2, 296.3	F32, F33, F34, F38, F39

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Supplementary Table 3. Adjusted relative risks (aRRs) of composite and individual adverse pregnancy outcomes (PTB and SGA) among pregnant individuals with ARDs, by ARD category, 2005 - 2020

	No CVEs, n (%)	CVEs, n (%)	aRR (95% CI) with CVEs (reference: No CVEs)
Rheumatoid arthritis, n	**6,417**	**61**	
Any APO	1,463 (22.8)	24 (39.3)	1.4 (1.0, 2.2)
PTB	817 (12.7)	18 (29.5)	**1.7 (1.1, 2.8)**
Early PTB	78 (1.2)	*	n/c
Moderate PTB	100 (1.6)	*	n/c
Late PTB	617 (9.6)	13 (21.3)	**2.1 (1.2, 3.6)**
Spontaneous PTB	589 (9.2)	16 (24.6)	**2.2 (1.3, 3.6)**
Provider-initiated PTB	198 (3.1)	*	n/c
SGA	772 (12.0)	*	1.3 (0.7, 2.4)
Systemic lupus erythematosus, n	**8,246**	**176**	
Any APO	2,786 (33.8)	106 (60.2)	**1.3 (1.1, 1.6)**
PTB	1,717 (20.8)	83 (47.2)	**1.5 (1.2, 1.8)**
Early PTB	314 (3.8)	26 (14.8)	**2.2 (1.4, 3.3)**
Moderate PTB	207 (2.5)	12 (6.8)	**2.2 (1.2, 4.0)**
Late PTB	1,149 (13.9)	42 (23.9)	**1.6 (1.1, 2.1)**
Spontaneous PTB	1,149 (13.9)	61 (34.7)	**1.7 (1.3, 2.2)**
Provider-initiated PTB	500 (6.1)	18 (10.2)	1.5 (0.9, 2.4)
SGA	1,431 (17.4)	40 (22.7)	**1.4 (1.0, 2.0)**
Spondyloarthritis, n	**3,392**	**23**	
Any APO	590 (17.4)	11 (47.8)	**2.6 (1.4, 4.8)**
PTB	323 (9.5)	*	**3.2 (1.5, 6.9)**
Early PTB	42 (1.2)	*	n/c
Moderate PTB	28 (0.8)	*	n/c
Late PTB	251 (7.4)	*	**3.3 (1.3, 8.1)**
Spontaneous PTB	226 (6.7)	*	**4.7 (1.9, 11.7)**
Provider-initiated PTB	82 (2.4)	*	n/c
SGA	311 (9.2)	*	**2.7 (1.1, 6.8)**
Sjogren syndrome	**1,457**	**15**	
Any APO	372 (25.5)	7 (46.7)	1.4 (0.7, 3.0)
PTB	195 (13.4)	*	2.0 (0.8, 4.5)
Early PTB	27 (1.9)	*	n/c
Moderate PTB	18 (1.2)	*	n/c
Late PTB	145 (10.0)	*	n/c
Spontaneous PTB	122 (8.4)	*	**2.8 (1.1, 7.2)**
Provider-initiated PTB	66 (4.5)	*	n/c
SGA	225 (15.4)	*	n/c
Other rheumatic diseases	**688**	**17**	
Any APO	239 (34.7)	*	0.9 (0.4, 1.9)
PTB	158 (23.0)	*	1.0 (0.5, 2.2)
Early PTB	30 (4.4)	*	n/c
Moderate PTB	24 (3.5)	*	n/c
Late PTB	97 (14.1)	*	n/c
Spontaneous PTB	104 (15.2)	*	n/c
Provider-initiated PTB	53 (7.7)	*	1.7 (0.6, 4.9)
SGA	118 (17.2)	*	n/c

APO: adverse pregnancy outcome; ARD: autoimmune rheumatic disease, CVE: cardiovascular event, PTB: preterm birth, SGA: small-for-gestational-age

[*] Any APO: defined as the composite measure of PTB and SGA

Supplementary Table 4. Adjusted relative risks (aRRs) of composite adverse pregnancy outcomes and its individual components (PTB and SGA) among pregnant individuals with ARDs, primary APS, and those without either condition who experienced CVEs during pregnancy, by CVE type, 2005 – 2020

	No CVEs (Reference group)	Any CVE	Non-VTE only CVEs	aRR (95% CI) (Non-VTE CVEs vs No CVEs)	VTE only CVEs	aRR (95% CI) (VTE-CVEs vs No CVEs)	Both non-VTE and VTE CVEs	aRR (95% CI) (VTE and non-VTE CVEs vs No CVEs)
No ARD or APS, n	**6,987,204**	**17,130**	**12,512**		**4,419**		**199**	
*Any APO	1,063,139 (15.2)	4,822 (28.2)	3,576 (28.6)	**1.4 (1.3, 1.4)**	1,161 (26.3)	**1.5 (1.5, 1.6)**	85 (42.7)	**1.6 (1.3, 2.0)**
PTB (< 37 WOG)	496,415 (7.1)	3,318 (19.4)	2,457 (19.6)	**1.7 (1.6, 1.7)**	795 (18.0)	**2.0 (1.8, 2.1)**	66 (33.2)	**1.9 (1.5, 2.5)**
Early PTB	50,204 (0.7)	655 (3.8)	477 (3.8)	**3.0 (2.7, 3.3)**	170 (3.9)	**4.2 (3.6, 4.9)**	8 (4.0)	**3.0 (1.5, 6.0)**
Moderate PTB	49,055 (0.7)	502 (2.9)	387 (3.1)	**2.6 (2.3, 2.9)**	103 (2.3)	**2.7 (2.2, 3.3)**	12 (6.0)	**4.1 (2.3, 7.2)**
Late PTB	387,199 (5.5)	2,035 (11.9)	1,509 (12.1)	**1.6 (1.5, 1.7)**	490 (11.1)	**1.8 (1.6, 1.9)**	36 (18.1)	**1.9 (1.3, 2.6)**
Spontaneous PTB	337,890 (4.8)	2,146 (12.5)	1,560 (12.5)	**1.8 (1.7, 1.9)**	554 (12.5)	**2.2 (2.0, 2.3)**	32 (16.1)	**2.1 (1.5, 3.0)**
Provider-initiated PTB	116,561 (1.7)	1,047 (6.1)	801 (6.4)	**2.2 (2.0, 2.3)**	214 (4.8)	**2.3 (2.0, 2.6)**	32 (16.1)	**2.9 (2.0, 4.1)**
SGA	622,522 (8.9)	1,948 (11.4)	1,456 (11.6)	**1.2 (1.1, 1.3)**	459 (10.4)	**1.3 (1.2, 1.4)**	33 (16.6)	**1.6 (1.1, 2.3)**
ARDs, n	**19,075**	**265**	**162**		**95**		**8**	
*Any APO	5,065 (26.6)	141 (53.2)	90 (55.6)	**1.5 (1.2, 1.8)**	47 (49.5)	**1.4 (1.0, 1.9)**	*	n/c
PTB (< 37 WOG)	2,978 (15.6)	109 (41.1)	70 (43.2)	**1.7 (1.4, 2.2)**	35 (36.8)	**1.5 (1.0, 2.1)**	*	n/c
Early PTB	449 (2.4)	29 (10.9)	19 (11.7)	**5.2 (3.3, 8.3)**	8 (8.4)	**2.3 (1.1, 4.7)**	*	n/c
Moderate PTB	347 (1.8)	14 (5.3)	11 (6.8)	**3.0 (1.6, 5.6)**	*	n/c	*	n/c
Late PTB	2,113 (11.1)	62 (23.4)	39 (24.1)	**2.0 (1.5, 2.7)**	22 (23.2)	**1.6 (1.0, 2.4)**	*	n/c
Spontaneous PTB	2,042 (10.7)	79 (29.8)	48 (29.6)	**2.0 (1.5, 2.7)**	27 (28.4)	**1.9 (1.3, 2.8)**	*	n/c
Provider-initiated PTB	824 (4.3)	27 (10.2)	20 (12.4)	**2.2 (1.4, 3.4)**	7 (7.4)	1.2 (0.6, 2.6)	*	n/c
SGA	2,658 (13.9)	51 (19.3)	30 (18.5)	1.4 (1.0, 2.0)	20 (21.1)	**1.6 (1.0, 2.5)**	*	n/c
Primary APS, n	**7,330**	**428**	**121**		**301**		**6**	
*Any APO	1,517 (20.7)	131 (30.6)	41 (33.9)	1.2 (0.9, 1.6)	85 (28.2)	1.2 (1.0, 1.5)	5 (83.3)	n/c
PTB (< 37 WOG)	946 (12.9)	84 (19.6)	27 (22.3)	1.1 (0.7, 1.6)	52 (17.3)	1.1 (0.9, 1.5)	5 (83.3)	n/c
Early PTB	150 (2.1)	14 (3.3)	6 (5.0)	1.2 (0.5, 3.0)	8 (2.7)	1.0 (0.5, 2.1)	*	n/c
Moderate PTB	121 (1.7)	11 (2.6)	5 (4.1)	1.3 (0.5, 3.3)	*	n/c	*	n/c
Late PTB	58 (13.6)	58 (9.0)	15 (12.4)	1.1 (0.6, 1.8)	40 (13.3)	1.3 (0.9, 1.8)	*	n/c
Spontaneous PTB	653 (8.9)	60 (14.0)	22 (18.2)	1.2 (0.8, 1.9)	33 (11.0)	1.1 (0.8, 1.6)	5 (83.3)	n/c
Provider-initiated PTB	268 (3.7)	22 (5.1)	5 (4.1)	0.9 (0.4, 2.2)	17 (5.7)	1.3 (0.8, 2.1)	*	n/c
SGA	726 (9.9)	61 (14.3)	17 (14.1)	1.3 (0.8, 2.1)	41 (13.6)	1.3 (1.0, 1.8)	*	n/c

APO: adverse pregnancy outcome; APS: antiphospholipid syndrome, ARD: autoimmune rheumatic disease, CVE: cardiovascular event; PTB: preterm birth, SGA: small-for-gestational-age; VTE: venous thromboembolism

**Any APO: defined as the composite measure of PTB and SGA*