

Supplementary Materials for
**Unexpected vaginal bleeding and COVID-19 vaccination in
nonmenstruating women**

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Table S1. Hormone/contraception use and gynecological conditions, by cohort and menopausal status

	Senior Cohort		MoBa Cohort	
	Postmenopausal Women n = 2015	Postmenopausal women n = 5710	Perimenopausal women n = 7148	Premenopausal, non-menstruating n = 7052
Age, mean (min, max)	72.2 (66,81)	54.6 (39,64)	51.4 (35,63)	46.1 (32,64)
Hormone/contraception use (any), n (%)				
Yes	355 (17.6)	1689 (29.6)	4089 (57.2)	6030 (85.5)
No	1660 (82.4)	4021 (70.4)	3059 (42.8)	1022 (14.5)
Hormone/contraception use (specified), n (%)				
Combination pill	N/A	2 (<0.1)	77 (1.1)	187 (2.7)
Progestin-only pill	N/A	8 (0.1)	147 (2.1)	330 (4.7)
Hormonal IUD ¹	N/A	692 (12.1) ²	3274 (45.8) ³	5199 (73.7)
Copper IUD ¹	N/A	38 (0.7)	92 (1.3)	80 (1.1)
Contraceptive implant	N/A	3 (<0.1)	28 (0.4)	79 (1.1)
Other contraception	N/A	5 (0.1)	28 (0.4)	88 (1.2)
Hormone replacement therapy (HRT)	149 (7.4)	785 (13.7)	538 (7.5)	56 (0.8)
Other hormone treatment	209 (10.4)	422 (7.4)	225 (3.1)	74 (1.0)
Missing specification	2 (0.1)	2 (<0.1)	0 (0)	2 (<0.1)
Gynecological condition (any), n (%)				
Yes ⁴	198 (9.8)	1049 (18.4)	1379 (19.3)	1020 (14.5)
No ⁵	1772 (87.9)	4421 (77.4)	5441 (76.1)	5843 (82.9)
Don't know	45 (2.2)	240 (4.2)	328 (4.6)	189 (2.7)
Gynecological condition (specified), n (%)				
Myomas or adenomyosis	N/A	420 (7.4)	570 (8.0)	300 (4.3)
Endometriosis	N/A	236 (4.1)	279 (3.9)	216 (3.1)
Polycystic ovarian syndrome	N/A	94 (1.6)	154 (2.2)	196 (2.8)
Cervical cancer	37 (1.8)	N/A	N/A	N/A
Endometrial cancer	0	N/A	N/A	N/A
Other condition in the cervix/uterus	162 (8.0)	427 (7.5)	531 (7.4)	436 (6.2)

N/A, was not addressed in the questionnaire

¹Intrauterine device

²178 report hormonal IUD in combination with HRT

³209 report hormonal IUD in combination with HRT

⁴ Women who reported to have been diagnosed with myomas/adenomyosis, endometriosis, polycystic ovary syndrome, cervical cancer, endometrial cancer or "other gynecological condition"

⁵ Women answered "No" to all abovementioned items

Table S2. Incidence rates (IR) of unexpected vaginal bleeding per 100 person-years (PY) and hazard ratios (HR) with 95 % confidence intervals (CI) by vaccination status, in all, post-, peri- and premenopausal women (in sample without missing in any covariate)

	Events	PY	IR per 100 PY (95 % CI)	cHR ¹ (95 % CI)	aHR ² (95 % CI)	aHR ³ (95 % CI)
Postmenopausal (n=6132)						
Pre-vaccination	86	2173	4.0 (3.2-4.9)	Ref	Ref	Ref
1 st dose, ≤ 28 days	53	461	11.5 (8.8 -15.0)	2.2 (1.4-3.4)	2.9 (1.9-4.5)	2.7 (1.7-4.2)
1 st dose, > 28 days	8	333	2.4 (1.2-4.8)	0.4 (0.2-0.9)	0.5 (0.2-1.2)	0.5 (0.2-1.2)
2 nd dose, ≤ 28 days	36	386	9.3 (6.7-12.9)	1.3 (0.8-2.2)	2.2 (1.3-3.7)	2.0 (1.2-3.4)
2 nd dose, > 28 days +	18	790	2.3 (1.4-3.6)	0.3 (0.2-0.6)	0.8 (0.4-1.5)	0.7 (0.4-1.3)
Total	201	4144	4.9 (4.2-5.6)			
Perimenopausal (n=5710)						
Pre-vaccination	298	2258	13.2 (11.8-14.8)	Ref	Ref	Ref
1 st dose, ≤ 28 days	247	403	61.3 (54.1-69.4)	4.3 (3.4-5.4)	4.3 (3.4-5.4)	4.3 (3.4-5.4)
1 st dose, > 28 days	25	318	7.9 (5.3-11.6)	0.6 (0.4-1.0)	0.6 (0.4-1.0)	0.6 (0.4-1.0)
2 nd dose, ≤ 28 days	161	288	56.0 (48.0-65.3)	3.7 (2.9-4.9)	3.7 (2.9-4.9)	3.7 (2.8-4.9)
2 nd dose, > 28 days	58	339	17.1 (13.2-22.1)	1.2 (0.9-1.7)	1.2 (0.9-1.7)	1.2 (0.9-1.7)
Total	789	3606	21.8 (20.4-23.5)			
Premenopausal, non- menstruating (n=5633)						
Pre-vaccination	254	2245	11.3 (10.0-12.8)	Ref	Ref	Ref
1 st dose, ≤ 28 days	243	398	61.1 (53.9-69.3)	4.6 (3.6-5.7)	4.6 (3.7-5.7)	4.5 (3.6-5.6)
1 st dose, > 28 days	20	285	7.0 (4.5-10.9)	0.6 (0.3-0.9)	0.6 (0.4-1.0)	0.6 (0.3-0.9)
2 nd dose, ≤ 28 days	160	270	59.4 (50.8-69.3)	4.2 (3.2-5.4)	4.2 (3.2-5.5)	4.1 (3.1-5.3)
2 nd dose, > 28 days	56	379	14.8 (11.4-19.2)	1.1 (0.8-1.5)	1.1 (0.8-1.5)	1.0 (0.7-1.4)
Total	733	3577	20.5 (19.1-22.0)			

¹ Crude HR

² HR adjusted for age

³ HR adjusted for age, hormone use (any), body mass index, educational level and gynecological condition (any)

Table S3. Incidence rates (IR) of unexpected vaginal bleeding and hazard ratios (HR) with 95 % confidence intervals (CI) by vaccination in post-, peri- and premenopausal women with and without gynecological conditions¹

	Events	PY	IR per 100 PY (95 % CI)	cHR ³ (95 % CI)	aHR ⁴ (95 % CI)
Postmenopausal women					
Gynecological condition (any)²					
No (n=6193)					
Non/pre-vaccination	65	2164	3.0 (2.4-3.8)	Ref	Ref
1 st or 2 nd dose (≤ 28 days)	71	861	8.2 (6.5-10.4)	1.7 (1.1-2.7)	2.8 (1.8-4.5)
Yes (n=1247)					
Non/pre-vaccination	38	452	8.4 (6.1-11.5)	Ref	Ref
1 st or 2 nd dose (≤ 28 days)	36	166	21.7 (15.7-30.1)	2.0 (1.0-3.8)	2.3 (1.2-4.4)
Perimenopausal women					
Gynecological condition (any)²					
No (n=5441)					
Non/pre-vaccination	251	2160	11.6 (10.3-13.2)	Ref	Ref
1 st or 2 nd dose (≤ 28 days)	375	663	56.6 (51.2-65.6)	4.6 (3.6-5.8)	4.6 (3.6-5.8)
Yes (n=1379)					
Non/pre-vaccination	106	536	19.8 (16.4-23.9)	Ref	Ref
1 st or 2 nd dose (≤ 28 days)	117	160	73.1 (61.0-87.6)	3.5 (2.4-5.0)	3.5 (2.4-5.0)
Premenopausal women					
Gynecological condition (any)²					
No (n=5843)					
Non/pre-vaccination	238	2337	10.2 (9.0-11.6)	Ref	Ref
1 st or 2 nd dose (≤ 28 days)	400	696	57.5 (52.1-63.4)	4.9 (3.9-6.0)	4.9 (3.9-6.1)
Yes (n=1020)					
Non/pre-vaccination	73	398	18.3 (14.6-23.0)	Ref	Ref
1 st or 2 nd dose (≤ 28 days)	96	156	83.1 (68.0-101.5)	4.1 (2.7-6.3)	4.2 (2.7-6.4)

¹A total of 802 women were excluded due to missing or unclear information on gynecological conditions (for instance if responding “don’t know” to one or several items)

² Myomas/adenomyosis, endometriosis, polycystic ovary syndrome, cervical cancer, endometrial cancer or “other gynecological condition”

³ Crude HR

⁴ Adjusted for age