



Supporting Information

Supplementary methods and results

**This appendix was part of the submitted manuscript and has been peer reviewed.
It is posted as supplied by the authors.**

Appendix to: Grzeskowiak LE, Moore V, Hall K, et al. Concurrent use of hormonal long-acting reversible contraception by women of reproductive age dispensed teratogenic medications, Australia, 2013–2021: a retrospective cohort study. *Med J Aust* 2024; doi: 10.5694/mja2.52451.

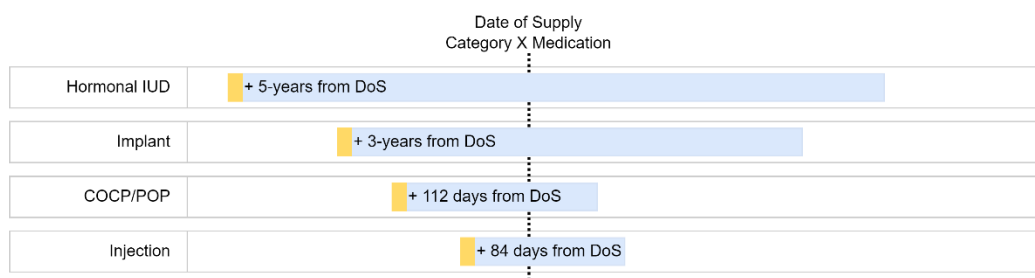
Table 1. Category X medications included in our analysis, by Anatomical Therapeutic Chemical (ATC) classification system category

ATC 1	ATC 1 name	ATC 3	ATC 3 Name	Generic name
C	Cardiovascular system	C02K	Other antihypertensives	Bosentan Ambrisentan Macitentan Riociguat
D	Dermatologicals	D05B	Antipsoriatics for systemic use	Acitretin
		D10B	Anti-acne preparations for systemic use	Isotretinoin
J	Antiinfectives for systemic use	J05A	Direct acting antivirals	Paritaprevir + ritonavir + ombitasvir & dasabuvir & ribavirin Ribavirin
L	Antineoplastic and immunomodulating agents	L01B	Antimetabolites	Azacitidine
		L01X	Other antineoplastic agents	Arsenic Sonidegib
		L04A	Immunosuppressants	Leflunomide Pomalidomide Lenalidomide Thalidomide Teriflunomide

Figure 1. Visual representation of contraceptive overlap of category X medication dispensing

Scenario A: Overlapping Contraception

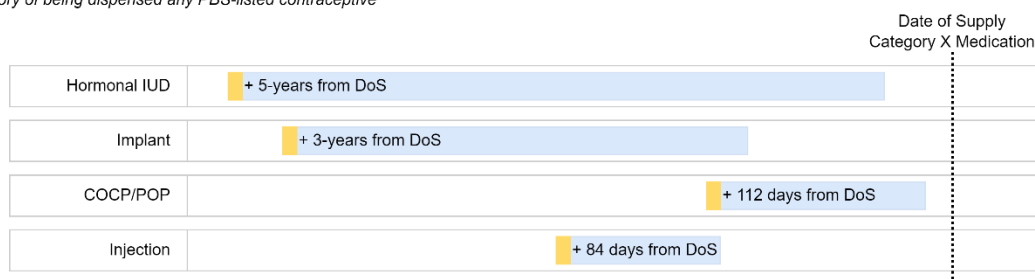
Where the previous date of supply for a PBS-listed contraceptive + estimated duration of efficacy overlaps with date of supply of Category X medication



Scenario B: No Overlapping Contraception

Where the previous date of supply for a PBS-listed contraceptive + estimated duration of efficacy does not overlap with date of supply of Category X medication
OR

There is no prior history of being dispensed any PBS-listed contraceptive



PBS, Pharmaceutical Benefits Scheme; IUD, intrauterine device; COCP, combined oral contraceptive pill; POP, progestogen only pill; DoS, Date of Supply.

Table 2. Pharmaceutical Benefits Scheme item codes for hormonal contraception

Hormonal contraception type	Pharmaceutical Benefits Scheme item codes
Intrauterine device	
Levonorgestrel	11909T; 08633J
Contraceptive implant	
Etonogestrel	08487Q
Contraceptive injection	
Medroxyprogesterone	03118D
Progestogen-only pill	
Norethisterone	01967M
Levonorgestrel	02913H
Combined oral contraceptive pill	
Levonorgestrel + ethinylestradiol	01392G; 01393H; 01394J; 01456P; 02416E
Norethisterone + ethinylestradiol	02774B; 02775C; 02776D; 12211Q
Norethisterone + Mestranol	03176E; 03179H

Table 3. Incident and prevalent dispensing of category X medications to women aged 15–49 years, Australia, 2013–2021, overall and by Anatomical Therapeutic Chemical (ATC) level 1 category

A. Incidence					
	ATC Level 1				
Year	(C) Cardiovascular system	(D) Dermatologicals	(J) Antiinfectives for systemic use	(L) Antineoplastic and immunomodulating agents	All medication
2013	0.01	2.06	0	0.24	2.31
2014	0.01	2.11	0	0.23	2.35
2015	0.01	2.51	0	0.18	2.71
2016	0.01	2.53	0.028	0.24	2.81
2017	0.01	2.54	0.014	0.21	2.76
2018	0.01	2.69	0.017	0.24	2.94
2019	0.01	2.75	0.033	0.22	2.98
2020	0.01	3.43	0	0.27	3.71
2021	0.01	3.76	0	0.25	4.02
B. Prevalence					
	ATC Level 1				
Year	(C) Cardiovascular system	(D) Dermatologicals	(J) Antiinfectives for systemic use	(L) Antineoplastic and immunomodulating agents	All medication
2013	0.04	3.94	0	0.64	4.63
2014	0.04	4.12	0	0.68	4.84
2015	0.05	4.76	0	0.64	5.45
2016	0.05	5.1	0.028	0.64	5.83
2017	0.05	5.2	0.017	0.64	5.91
2018	0.05	5.51	0.002	0.64	6.21
2019	0.06	5.86	0.005	0.64	6.57
2020	0.06	6.91	0	0.71	7.68
2021	0.06	7.94	0	0.7	8.7

Table 4. Contraceptive overlap at the time of first dispensing of category X medications, Australia, 2013–2021, by Anatomical Therapeutic Chemical (ATC) level 1 category

	ATC Level 1			
Overlap type	(C) Cardiovascular system	(D) Dermatologicals	(J) Antiinfectives for systemic use	(L) Antineoplastic and immunomodulating agents
Dispensing	55	14331	27	1214
None	40 (73%)	11282 (78.7%)	19 (70%)	845 (69.6%)
Hormonal LARC	9 (16%)	1806 (12.6%)	7 (26%)	237 (19.5%)
Non-LARC	6 (11%)	1243 (8.7%)	1 (4%)	132 (10.9%)

LARC, long-acting reversible contraception.

Table 5. Contraceptive overlap at the time of first dispensing of category X antineoplastic and immunomodulating agents to women aged 15–49 years, Australia, 2013–2021, by ATC level 1 category: sensitivity analysis (contraceptive commenced up to 60 days after first dispensing of category X medication)

Overlap type	ATC Level 1				Total
	(C) Cardiovascular system	(D) Dermatologicals	(J) Anti- infectives for systemic use	(L) Anti-neoplastic and immunomodulating agents	
Dispensing	55	14,331	27	1214	15,627
No overlap	38 (69%)	11,034 (77.0%)	18 (67%)	814 (67.1%)	11,904 (76.2%)
LARC overlap	9 (16%)	1865 (13.0%)	7 (26%)	241 (19.9%)	2122 (13.6%)
Non-LARC overlap	7 (13%)	1432 (10.0%)	NR	159 (13.1%)	1601 (10.2%)

ATC, anatomical therapeutic chemical; LARC, long-acting reversible contraception; NR, not reported (small cell size).

Table 6. Contraceptive overlap at the time of first dispensing of category X medications, Australia, 2013–2021, by Anatomical Therapeutic Chemical (ATC) level 1 category

Overlap type	ATC Level 1				Total
	(C) Cardiovascular system	(D) Dermatologicals	(J) Anti- infectives for systemic use	(L) Anti- neoplastic and immunomodulating agents	
Dispensing	53	12597	26	1001	13677
Hormonal LARC overlap					
Always	8 (15.1%)	1391 (11.0%)	7 (26.9%)	162 (16.2%)	1568 (11.5%)
Sometimes	6 (11.3%)	627 (5.0%)	0	77 (7.7%)	710 (5.2%)
Never	39 (73.6%)	10579 (84.0%)	19 (73.1%)	762 (76.1%)	11399 (83.3%)
Any overlap					
Always	8 (15.1%)	1954 (15.5%)	8 (30.8%)	228 (22.8%)	2198 (16.1%)
Sometimes	15 (28.3%)	1863 (14.8%)	1 (3.8%)	163 (16.3%)	2042 (14.9%)
Never	30 (56.6%)	8780 (69.7%)	17 (65.4%)	610 (60.9%)	9437 (69.0%)

LARC, long-acting reversible contraception.

Table 7. Contraceptive overlap at each dispensing of category X dermatological agents to women aged 15–49 years, Australia, 2013–2021: multivariable logistic regression analysis*

Characteristic	Always v sometimes/never			
	Hormonal LARC overlap		Any hormonal contraceptive overlap	
	Number	aOR (95% CI)	Number	aOR (95% CI)
Age group				
15-19 years	200/5704	0.16 (0.13-0.20)	385/5704	0.23 (0.20-0.27)
20-24 years	514/3542	0.82 (0.71-0.96)	744/3542	0.91 (0.79-1.04)
25-29 years	381/2196	1	496/2196	1
30-34 years	189/1057	1.04 (0.85-1.29)	234/1057	0.98 (0.81-1.19)
35-39 years	124/704	1.04 (0.81-1.33)	151/704	0.94 (0.75-1.18)
40-44 years	92/527	0.95 (0.72-1.26)	104/527	0.80 (0.61-1.03)
45-49 years	56/385	0.84 (0.60-1.18)	65/385	0.70 (0.51-0.97)
Concessional status				
No	1199/11391	1	1657/11391	1
Yes	356/2718	1.31 (1.13-1.50)	521/2718	1.40 (1.24-1.58)
State/Territory				
New South Wales	343/4448	1	486/4448	1
Australian Capital Territory	51/291	2.38 (1.67-3.39)	61/291	2.09 (1.51-2.89)
Northern Territory	9/41	3.32 (1.45-7.59)	10/41	2.60 (1.19-5.71)
Queensland	375/2935	1.78 (1.51-2.11)	496/2935	1.70 (1.47-1.97)
South Australia	144/891	2.33 (1.85-2.93)	203/891	2.34 (1.91-2.86)
Tasmania	57/243	4.16 (2.93-5.91)	75/243	4.02 (2.92-5.52)
Victoria	398/3741	1.31 (1.11-1.54)	600/3741	1.46 (1.28-1.68)
Western Australia	179/1524	1.53 (1.24-1.89)	248/1524	1.55 (1.30-1.86)
Year				
2013	157/1885	1	234/1885	1
2014	108/1272	1.03 (0.75-1.41)	166/1272	1.04 (0.80-1.35)
2015	141/1401	1.19 (0.89-1.60)	193/1401	1.07 (0.84-1.38)
2016	139/1404	1.17 (0.87-1.57)	198/1404	1.07 (0.83-1.37)
2017	152/1426	1.30 (0.97-1.75)	209/1426	1.15 (0.90-1.48)
2018	165/1508	1.46 (1.10-1.95)	229/1508	1.27 (1.00-1.62)
2019	192/1527	1.70 (1.28-2.24)	275/1527	1.59 (1.26-2.01)
2020	245/1921	1.45 (1.34-2.28)	325/1921	1.47 (1.18-1.85)
2021	257/1771	2.01 (1.54-2.63)	350/1771	1.78 (1.42-2.23)

aOR= adjusted odds ratio; CI = confidence interval; LARC = long-acting reversible contraception; NR = not reported (small cell size).

* Adjusted for age group, concessional status, state/territory, and calendar year.

Table 8. Contraception overlap at each dispensing of category X anti-neoplastic and immunomodulating agents to women aged 15–49 years, Australia, 2013–2021: multivariable logistic regression analysis*

Characteristic	Always v sometimes/never			
	Hormonal LARC overlap		Any hormonal contraceptive overlap	
	Number	aOR (95% CI)	Number	aOR (95% CI)
Age group				
15-19 years	NR	NR	3/16	0.31 (0.07-1.31)
20-24 years	7/44	0.56 (0.17-1.84)	11/44	0.49 (0.18-1.36)
25-29 years	13/70	1	22/70	1
30-34 years	14/83	0.80 (0.32-1.96)	27/83	0.98 (0.46-2.08)
35-39 years	29/223	0.61 (0.28-1.31)	45/223	0.49 (0.26-0.96)
40-44 years	43/337	0.51 (0.24-1.08)	56/337	0.34 (0.18-0.66)
45-49 years	75/480	0.762 (0.30-1.25)	97/480	0.42 (0.23-0.78)
Concessional status				
No	116/809	1	162/809	1
Yes	66/442	1.09 (0.75-1.58)	99/442	1.25 (0.90-1.73)
State/Territory				
New South Wales	53/397	1	76/397	1
Australian Capital Territory	9/32	2.18 (0.88-5.43)	9/32	1.47 (0.60-3.58)
Northern Territory	NR	NR	NR	NR
Queensland	35/231	1.21 (0.73-2.01)	49/231	1.22 (0.78-1.92)
South Australia	16/96	1.66 (0.85-3.88)	21/96	1.68 (0.91-3.09)
Tasmania	10/49	1.67 (0.72-3.88)	16/49	1.99 (0.93-4.25)
Victoria	28/262	0.84 (0.48-1.47)	45/262	0.98 (0.62-1.56)
Western Australia	30/184	1.48 (0.87-2.52)	44/184	1.64 (1.03-2.61)
Year				
2013	26/321	1	42/321	1
2014	9/123	0.42 (0.14-1.25)	23/123	0.88 (0.42-1.81)
2015	14/99	1.55 (0.66-3.64)	18/99	1.16 (0.56-2.43)
2016	17/123	1.50 (0.68-3.34)	25/123	1.27 (0.65-2.49)
2017	10/103	0.88 (0.35-2.20)	14/103	0.72 (0.33-1.57)
2018	23/123	2.08 (0.97-4.49)	30/123	1.71 (0.89-3.31)
2019	20/117	1.95 (0.89-4.24)	28/117	1.60 (0.82-3.11)
2020	43/139	3.93 (1.92-8.04)	55/139	3.27 (1.77-6.04)
2021	20/105	2.21 (1.01-4.84)	26/105	1.71 (0.87-3.35)

aOR= adjusted odds ratio; CI = confidence interval; LARC = long-acting reversible contraception; NR = not reported (small cell size).

* Adjusted for age group, concessional status, state/territory, and calendar year.