Supplementary Material

Utilisation of pre-exposure prophylaxis (PrEP) for HIV prevention in the Australian general practice setting: a longitudinal observational study
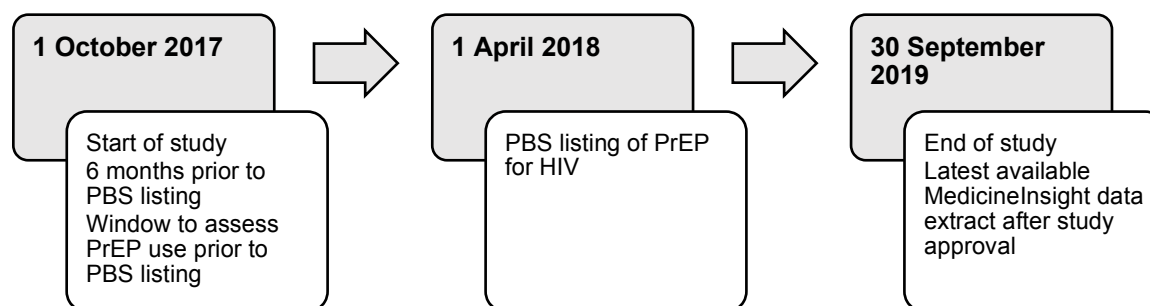
Kendal Chidwick[A,], Allan Pollack[A], Doreen Busingye[A], Sarah Norman[A], Andrew Grulich[B], Benjamin Bavinton[B], Rebecca Guy[B], and Nick Medland[B]*

[A]NPS MedicineWise, Level 7/418A Elizabeth Street, Surry Hills, NSW 2010, Australia.

[B]The Kirby Institute, UNSW Sydney, Level 6, Wallace Wurth Building, High Street, Kensington, NSW 2052, Australia.

[*]Correspondence to: Kendal Chidwick NPS MedicineWise, Level 7/418A Elizabeth Street, Surry Hills, NSW 2010, Australia Email: kchidwick@nps.org.au

Figure S1. Study time period

1 October 2017

Start of study
6 months prior to
PBS listing
Window to assess
PrEP use prior to
PBS listing

1 April 2018

PBS listing of PrEP
for HIV

**30 September
2019**

End of study
Latest available
MedicineInsight data
extract after study
approval

Table S1: PrEP medication list

Medicine active ingredients and strengths	Brand name
tenofovir disoproxil fumarate 300 mg + emtricitabine 200 mg tablet	Truvada
tenofovir disoproxil fumarate 300 mg + emtricitabine 200 mg tablet	Tenofovir/Emtricitabine APOTEX
tenofovir disoproxil maleate 300 mg + emtricitabine 200 mg tablet	Tenofovir Disoproxil Emtricitabine Mylan
tenofovir disoproxil phosphate 291 mg + emtricitabine 200 mg tablet	Tenofovir EMT GH

Table S2. Definitions for patterns of PrEP use

Type of PrEP regimen / user	Definition	How this is measured
Daily regimen	A 'daily' regimen for PrEP was identified using the free text dosage instructions recorded in the script item and prescription table (eg, one tablet daily, 1 daily)	Mentioned in dosage instructions
On demand regimen	An 'on demand' regimen for PrEP was identified using the free text dosage instructions recorded in the script item and prescription table (eg, when required, prn, 2-1-1, two tablets 24 hours before sex, one tablet 24 hours after the first dose, and another tablet 24 hours later)	Mentioned in dosage instructions
Continuous user	No gaps of > 21 days* (or > 63 days for a printed prescription with 2 repeats) between the expected end of one prescription** and the date of the next prescription for PrEP.	Prescribed regularly with no significant gaps
Non-continuous user	On-demand regimen identified; and/or one or more gaps of > 21 days (or > 63 days for a printed prescription with 2 repeats) between the expected end of one prescription and the date of the next prescription for PrEP	Mentioned in dosage instructions, or prescribed less often than every 3 months with significant gaps

* The 21-day gap was chosen as a conservative estimate of the number of days a patient could maintain a protective dose of four pills per week with a 30-day prescription (30 days plus 21)

**The expected end of one prescription (no repeats) is 30 days after the date of the prescription. The expected end of a prescription with 2 repeats is 90 days after the date of the prescription (3-month supply)

Table S3: Definitions of clinical condition

Condition	Definition
Anxiety*	Patients were defined as having anxiety, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields 'ever' (ie, recorded at any time from the patient's earliest record up to the download date). Relevant terms included: anxiety, generalized anxiety disorder, mixed anxiety/depression, obsessive compulsive disorder (OCD), post-traumatic stress disorder (PTSD)
Depression*	Patients were defined as having depression, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields 'ever' (ie, recorded at any time from the patient's earliest record up to the download date). Relevant terms included: depression, post-natal depression, adjustment disorder with depression, mixed anxiety/depression
Bipolar disorder	Patients were defined as having bipolar disorder, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields 'ever' (ie, recorded at any time from the patient's earliest record up to the download date). Relevant terms included: bipolar affective disorder, bipolar 1 disorder, bipolar 2 disorder, bipolar spectrum disorder, manic depressive illness, manic depressive psychosis
Schizophrenia or schizoaffective disorder	Patients were defined as having schizophrenia or schizoaffective disorder, if they met either of the below criteria: - if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields 'ever' (ie, recorded at any time from the patient's earliest record up to the download date). Relevant terms included: schizophrenia [catatonic, chronic, disorganised, hebephrenic, paranoid, undifferentiated], schizoaffective disorder, schizophreniform disorder, psychosis senile, senile dementia with psychosis - if they had two or more relevant entries in one of the three diagnosis fields 'ever' separated by at least 6 months to indicate chronicity. Relevant terms included: borderline schizophrenia, brief reactive schizophrenia, para schizophrenia.
HIV infection	Patients were defined as having HIV infection, if they met either of the below criteria: - if they ever have a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields. Relevant terms included: HIV, HIV carrier, AIDS, but exclude HIV embryopathy - if they had a relevant medication recorded in the scripts issued table or prescription history/current medication table.
Opioid use disorder	Patients were defined as having an opioid use disorder if they met either of the below criteria: - if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields 'ever' (ie, recorded at any time from the patient's earliest record up to the download date). Relevant terms include: (abuse or

	dependence or addiction) of an opiate, drug addict, IDU, injecting drug user, intravenous drug use, IV drug use, long term opiate use - if they had a relevant medication recorded in the scripts issued table or prescription history/current medication table. Relevant medications included: naltrexone, buprenorphine or methadone products when solely indicated for opiate substitution therapy.
Alcohol use disorder	Patients were defined as having an alcohol use disorder, if they met either of the below criteria: - if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields 'ever' (ie, recorded at any time from the patient's earliest record up to the download date). Relevant terms included: (abuse or dependence or addiction) of alcohol, alcohol addiction, alcohol dependence, alcohol related brain injury, alcohol use disorder, alcoholic, alcohol withdrawal, alcoholism, antabuse type reaction, delirium tremens, Korsakoff's dementia - if they have a relevant medication recorded in the scripts issued table or prescription history/current medication table. Relevant medications included: acamprosate (Campral) disulfiram (Antabuse), naltrexone.

* Previous research validated the algorithms used to derive the conditions flags for anxiety and depression in MedicineInsight against gold-standard patient electronic health records from participating general practices.[1]

---

[1] Havard A, Manski-Nankervis JA, Thistlethwaite J, et al. Validity of algorithms for identifying five chronic conditions in MedicineInsight, an Australian national general practice database. BMC Health Serv Res. 2021;21(1):551.

Table S4. Sociodemographic characteristics of the general study population

Characteristic	Male general study population (N = 1,999,247)	
	Number	% (95% CI)
Age mean (SE)	44.3 (0.3)	
Age group (years)		
18-24	253,295	12.7 (12.0–13.4)
25-29	199,499	10.0 (9.4–10.5)
30-39	398,006	19.9 (19.2–20.6)
40-49	367,490	18.4 (18.1–18.7)
50-74	780,957	39.1 (37.4–40.7)
Sex		
Male	875,917	43.8 (43.1–44.5)
Female	1,123,161	56.2 (55.5–56.9)
Indeterminate	169	0.0 (0.0–0.0)
State/territory		
ACT	38,335	1.9 (0.5–3.3)
NSW	669,587	33.5 (28.1–38.9)
NT	21,971	1.1 (0.1–2.1)
QLD	399,022	20.0 (15.2–24.7)
SA	54,081	2.7 (1.3–4.2)
TAS	120,047	6.0 (3.2–8.8)
VIC	440,402	22.0 (15.0–29.1)
WA	255,802	12.8 (8.4–17.2)
Remoteness		
Major city	1,221,883	61.1 (54.8–67.4)
Inner regional	523,860	26.2 (20.9–31.5)
Outer regional	226,493	11.3 (8.4–14.3)
Remote/very remote	27,011	1.4 (0.7–2.0)
Socioeconomic status		
1 (least advantaged)	292,478	14.6 (11.9–17.3)
2	346,420	17.3 (14.3–20.4)
3	500,541	25.0 (21.9–28.2)
4	441,683	22.1 (19.5–24.7)
5 (most advantaged)	417,279	20.9 (17.4–24.4)
Missing	846	

Concession status

No concession	1,471,698	73.6 (72.2–75.0)
DVA/Concession	527,549	26.4 (25.0–27.8)

Table S5. Sociodemographic characteristics of PrEP users at high vs low caseload practices

Characteristic	High caseload practices (N = 991)		Low caseload practices (N = 561)	
	Number	**% (95% CI)**	**Number**	**% (95% CI)**
Age mean (SE)	38.7 (1.1)		36.6 (0.6)	
Age group (years)				
18–24	82	8.3 (3.6–12.9)	113	20.1 (16.7–23.5)
25–30	163	16.4 (11.6–21.3)	106	18.9 (15.5–22.3)
31–40	315	31.8 (29.7–33.9)	142	25.3 (21.5–29.2)
41–50	247	24.9 (20.3–29.6)	96	17.1 (14.1–20.1)
51–74	184	18.6 (15.1–22.1)	104	18.5 (15.1–21.9)
Sex				
Male	979	98.8 (97.7–99.9)	546	97.3 (95.9–98.8)
Female	11	1.1 (0.0–2.3)	14	2.5 (1.1–3.9)
Indeterminate	<5	n.a.	<5	n.a.
State/territory				
ACT	< 5	n.a.	9	1.6 (0.3–2.9)
NSW	850	85.8 (64.5–100.0)	225	40.1 (31.3–48.9)
NT	0		0	
QLD	18	1.8 (0.0–6.0)	102	18.2 (11.9–24.5)
SA	< 5	n.a.	< 5	n.a.
TAS	< 5	n.a.	30	5.3 (2.0–8.7)
VIC	95	9.6 (0.0–25.4)	146	26.0 (17.9–34.1)
WA	21	2.1 (0.0–6.8)	45	8.0 (3.9–12.1)
Remoteness				
Major city	970	97.9 (95.4–100.0)	376	67.0 (59.5–74.5)
Inner regional	17	1.7 (0.0–3.5)	132	23.5 (16.8–30.2)
Outer regional	< 5	n.a.	51	9.1 (5.2–13.0)
Remote/very remote	0		< 5	n.a.
Socioeconomic status				
1 (least advantaged)	20	2.0 (0.8–3.3)	72	12.8 (8.6–17.1)
2	23	2.3 (0.0–5.5)	73	13.0 (9.2–16.8)
3	132	13.3 (11.7–15.0)	146	26.0 (20.8–31.3)
4	163	16.4 (10.1–22.8)	118	21.0 (16.1–26.0)
5 (most advantaged)	653	65.9 (56.4–75.4)	152	27.1 (20.7–33.5)

Missing				
Concession status				
No concession	915	91.5 (86.6–96.4)	455	78.9 (75.1–82.7)
DVA/Concession	85	8.5 (3.6–13.4)	122	21.1 (17.3–24.9)

Table S6. Average number of scripts for the PrEP initiator sub-population (initiations between 1 April 2018 and 30 September 2019)

Characteristic	PrEP initiator sub-population	
	Number	95% CI
Number of patients	762	
Person-years		
Total	517.4	
Mean per patient	0.7	0.6–0.7
Range (min-max)	0.0–1.5	
Mean/median number of total prescriptions		
Mean	6.6	5.9–7.3
Median (Q1, Q3)	5.2	2.5–8.7
Number of prescriptions per person-year	9.7 per person-year	
Duration (person-days) of PrEP exposure		
Mean	226.0	201.4–250.5
Median (Q1, Q3)	179.3	117.8–269.4
Mean time to first discontinuation		
Person-days to discontinuation (mean)*	182.2	151.9–212.4

* The analysis of mean time to first discontinuation of PrEP was restricted to those 94 patients where a true treatment gap could be demonstrated.

Table S7. Characteristics of discontinued use, LTFU and non-continuous/episodic use among PrEP initiator population

Characteristics	Active (N = 496)		Discontinued (N = 146)		LTFU (N = 120)		Continuous (N = 320)		Non-continuous (N = 94)	
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
Sex										
Female	7	1.4 (0.0–3.0)	7	4.8 (0.7–8.9)	<5	n.a.	<5	n.a.	<5	n.a.
Male	488	98.4 (97.0–99.8)	139	95.2 (91.1–99.3)	119	99.2 (97.5–100.0)	319	99.7 (99.0–100.0)	91	96.8 (93.7–99.9)
Indeterminate	<5	n.a.	0		0		0		<5	n.a.
Age group										
18–24	68	13.7 (5.6–21.9)	13	8.9 (3.9–13.9)	22	18.3 (7.6–29.1)	38	11.9 (3.7–20.0)	10	10.6 (4.1–17.1)
25–29	75	15.1 (9.9–20.3)	21	14.4 (8.0–20.8)	23	19.2 (13.2–25.1)	49	15.3 (11.2–19.4)	10	10.6 (2.4–18.9)
30–39	123	24.8 (21.4–28.2)	41	28.1 (19.3–36.9)	36	30.0 (21.4–38.6)	80	25.0 (19.5–30.5)	25	26.6 (17.8–35.3)
40–49	120	24.2 (17.8–30.6)	33	22.6 (16.6–28.6)	19	15.8 (8.1–23.6)	79	24.7 (17.0–32.4)	23	24.5 (18.2–30.7)
50–74	110	22.2 (16.4–28.0)	38	26.0 (19.3–32.8)	20	16.7 (8.5–24.9)	74	23.1 (19.3–27.0)	26	27.7 (12.0–43.4)
Rurality										
Major city	409	82.5 (69.1–95.9)	113	77.4 (65.1–89.7)	95	79.2 (64.3–94.1)	263	82.2 (67.8–96.6)	83	88.3 (76.4–100.0)
Inner regional	61	12.3 (3.1–21.5)	23	15.8 (6.1–25.4)	21	17.5 (4.2–30.8)	43	13.4 (2.3–24.5)	6	6.4 (0.0–13.1)
Outer regional	26	5.2 (0.4–10.1)	9	6.2 (1.1–11.2)	4	3.3 (0.0–7.1)	14	4.4 (0.1–8.6)	5	5.3 (0.0–12.8)
Remote/very remote	0	. (.–.)	<5	n.a.	0	. (.–.)	0			
SES										
1 (most disadvantaged)	34	6.9 (1.5–12.2)	17	11.6 (4.3–18.9)	8	6.7 (0.6–12.8)	25	7.8 (0.8–14.9)	5	5.3 (0.2–10.5)
2	37	7.5 (1.4–13.5)	9	6.2 (1.4–11.0)	12	10.0 (2.2–17.8)	20	6.3 (0.7–11.8)	6	6.4 (0.0–13.1)
3	87	17.5 (12.5–22.6)	43	29.5 (19.9–39.0)	19	15.8 (8.0–23.6)	58	18.1 (12.9–23.3)	17	18.1 (8.1–28.1)
4	83	16.7 (9.1–24.4)	25	17.1 (11.2–23.0)	24	20.0 (13.7–26.3)	46	14.4 (9.5–19.3)	18	19.1 (11.2–27.1)
5 (most advantaged)	255	51.4 (31.0–71.8)	52	35.6 (21.7–49.5)	57	47.5 (32.4–62.6)	171	53.4 (35.5–71.4)	48	51.1 (30.6–71.6)
Concession status										

Characteristics	Active (N = 496)		Discontinued (N = 146)		LTFU (N = 120)		Continuous (N = 320)		Non-continuous (N = 94)	
No concession	429	86.5 (78.8–94.2)	112	76.7 (68.3–85.1)	97	80.8 (70.5–91.2)	271	84.7 (76.3–93.1)	85	90.4 (85.9–95.0)
DVA/Concession	67	13.5 (5.8–21.2)	34	23.3 (14.9–31.7)	23	19.2 (8.8–29.5)	49	15.3 (6.9–23.7)	9	9.6 (5.0–14.1)
Clinical condition										
Depression	156	31.5 (25.0–37.9)	62	42.5 (31.8–53.1)	34	28.3 (19.4–37.3)	100	31.3 (23.6–38.9)	35	37.2 (29.0–45.5)
Anxiety	166	33.5 (29.7–37.2)	54	37.0 (29.5–44.5)	37	30.8 (22.8–38.8)	106	33.1 (28.6–37.7)	38	40.4 (25.5–55.4)
Bipolar disorder	15	3.0 (1.3–4.7)	10	6.8 (2.7–11.0)	<5	n.a.	7	2.2 (0.7–3.6)	5	5.3 (1.7–9.0)
Schizophrenia	<5	n.a.	<5	n.a.	<5	n.a.	<5	n.a.	<5	n.a.
Drug or alcohol use disorder	15	3.0 (1.7–4.3)	5	3.4 (0.1–6.7)	<5	n.a.	11	3.4 (1.4–5.5)	<5	n.a.
Practice type										
Low PrEP caseload	221	44.6 (8.9–80.2)	90	61.6 (34.4–88.9)	68	56.7 (23.4–90.0)	147	45.9 (9.4–82.5)	37	39.4 (0.0–79.3)
High PrEP caseload	275	55.4 (19.8–91.1)	56	38.4 (11.1–65.6)	52	43.3 (10.0–76.6)	173	54.1 (17.5–90.6)	57	60.6 (20.7–100.0)