

Implementation of dried blood spot testing for HIV and hepatitis C: the NSW DBS pilot study - a client-centred alternative to traditional health care

Joint-first authors: Carrington N^{1,4} (named), and Conway A^{2,3}

Joint-senior authors: Murray C⁴, McNulty A¹, and Cunningham P^{5,6} (named)

All authors, no order:

Lu H¹, Starr M^{5,6}, Catlett B^{2,5,6}, Prain B⁴, Holden J⁷, Stevens A⁴, McGrath C⁷, Read P⁸, Keen P², Causer L², Guy R², Power C⁴, Grebely J²

¹Sydney Sexual Health Centre, ²The Kirby Institute, UNSW Sydney, ³Centre for Social Research in Health, UNSW Sydney, ⁴Centre for Population Health, NSW Ministry of Health, ⁵NSW State Reference Laboratory for HIV, St Vincent's Hospital, ⁶ St Vincent's Centre for Applied Medical Research, St Vincent's Hospital, ⁷NSW Justice Health & Forensic Mental Health Network, ⁸Kirketon Road Centre, South Eastern Sydney Local Health District

Background: Dried blood spot (DBS) testing provides an alternative to phlebotomy and addresses barriers to accessing healthcare experienced by some key populations. Large-scale evaluations of DBS testing programs are needed to understand their feasibility. This study aims to evaluate the implementation of a state-wide DBS HIV and HCV testing pilot.

Methods: The New South Wales (NSW) DBS Pilot is an interventional cohort study of people testing for HIV Ab and/or HCV RNA in NSW, Australia. Participants at risk of HIV/HCV participated in testing via: 1) self-registration online with a DBS collection kit delivered and returned by conventional postal service; or 2) assisted DBS sample collection at 36 community health sites (including drug treatment and harm-minimisation services) and prisons. Participants received results by text (negative) or a healthcare provider (positive). The RE-AIM framework was used to evaluate reach, effectiveness, and implementation.

Results: Reach: Between November 2016 and December 2020, 7,392 individuals were tested for HIV and/or HCV (21% self-registration, 34% assisted in community, and 45% assisted in prison). Effectiveness: Of 6,922 people tested for HIV (19% MSM, 13% living outside major cities, 21% born outside Australia), 51% (3,521/6922) had no HIV test in the past two years, 0.001% (9/6,922) were newly diagnosed with HIV, and 89% (8/9) initiated HIV treatment within six months. Of 5,960 people tested for HCV (24% women, 35% Aboriginal and/or Torres Strait Islander, 55% recently injected drugs), 15% had detectable HCV RNA (878/5,960), and 45% (393/878) initiated treatment within six months. Implementation: By the end of 2020, DBS testing was available in 36 community sites and 21 prisons.

Conclusions: This study demonstrates the feasibility of DBS testing for HIV and HCV in key populations including people in rural locations, people who inject drugs, and people in prison.

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Table 1 – Reach: Characteristics of online registrations by return of sample to lab

Variables	Total online registrations		Did not return DBS sample to lab		Returned DBS sample to lab	
	N	%col	n	%row	n	%row
Total	3506		1258	36%	2248	64%
Test performed						
HIV + HCV	653	19%	270	41%	383	59%
HIV only	2839	81%	985	35%	1854	65%
HCV only	14	0%	3	21%	11	79%
Gender						
Male	3045	87%	1052	35%	1993	65%
Female	409	12%	175	43%	234	57%
Other	52	1%	31	60%	21	40%
Age						
=<25	1076	31%	374	35%	702	65%
25-34	1364	39%	499	37%	865	63%
35-44	549	16%	230	42%	319	58%
45-54	285	8%	103	36%	182	64%
>55	232	7%	52	22%	180	78%
Aboriginal and/or Torres Strait Islander						
No	3350	96%	1172	35%	2178	65%
Yes	156	4%	86	55%	70	45%
Major city postcode						
No	843	24%	292	35%	551	65%
Yes	2663	76%	966	36%	1697	64%
Men who have sex with men						
No	1068	30%	426	40%	642	60%
Yes	2438	70%	832	34%	1606	66%
Sexual partner from Asia or Africa						
No	2337	67%	848	36%	1489	64%
Yes	1169	33%	410	35%	759	65%
Born outside of Australia						
No	2035	58%	746	37%	1289	63%
Yes, Asia or Africa	991	28%	355	36%	636	64%
Yes, other	480	14%	157	33%	323	67%
Speaks English at home						
No	854	24%	305	36%	549	64%
Yes	2652	76%	953	36%	1699	64%
Recently injected drugs						
No	3202	91%	1118	35%	2084	65%
Yes	239	7%	110	46%	129	54%
Prefer not to say	59	2%	26	44%	33	56%

Table 2- Reach: Characteristics of people tested by registration type

Variables	People tested		Online self-registration		Assisted registration	
	N	%col	n	%col	n	%col
Total	7392		1559		5833	
Test performed						
HIV + HCV	5467	74%	269	17%	5198	89%
HIV only	1441	19%	1282	82%	159	3%
HCV only	484	7%	8	1%	476	8%
Gender						
Male	5752	78%	1340	86%	4412	76%
Female	1573	21%	205	13%	1368	23%
Other	67	1%	14	1%	53	1%
Age						
=<25	1194	16%	490	31%	704	12%
25-34	2308	31%	607	39%	1701	29%
35-44	1981	27%	243	16%	1738	30%
45-54	1279	17%	120	8%	1159	20%
>55	630	9%	99	6%	531	9%
Aboriginal and/or Torres Strait Islander						
No	5255	71%	1499	96%	3756	64%
Yes	2137	29%	60	4%	2077	36%
Major city postcode						
No	901	12%	354	23%	547	9%
Yes	6491	88%	1205	77%	5286	91%
Men who have sex with men						
No	6054	82%	548	35%	5506	94%
Yes	1338	18%	1011	65%	327	6%
Sexual partner from Asia or Africa						
No	6171	83%	981	63%	5190	89%
Yes	1221	17%	578	37%	643	11%
Born outside of Australia						
No	5896	80%	845	54%	5051	87%

Yes, Asia or Africa	757	10%	489	31%	268	5%
Yes, other	739	10%	225	14%	514	9%
Speaks English at home						
No	813	11%	418	27%	395	7%
Yes	6579	89%	1141	73%	5438	93%
Recently injected drugs						
No	3780	51%	1436	92%	2344	40%
Yes	3360	45%	98	6%	3262	56%
Prefer not to say	250	3%	23	1%	227	4%
Assisted registration setting						
Community					2523	43%
Justice Health					3310	57%

Table 3 – Effectiveness: Characteristics of people not recently tested for HIV by registration type

Variables	Overall		
	Total people tested for HIV in pilot N	Tested more than 2 years ago or never n %	
Total	6922	3521	51%
Test performed			
HIV + HCV	5481	2676	49%
HIV only	1441	845	59%
Gender			
Male	5365	2724	51%
Female	1491	767	51%
Other	66	30	45%
Age			
=<25	1138	662	58%
25-34	2158	1016	47%

35-44	1851	833	45%
45-54	1195	629	53%
>55	580	381	66%
Aboriginal and/or Torres Strait Islander			
No	4953	2650	54%
Yes	1969	871	44%
Major city postcode			
No	876	519	59%
Yes	6046	3002	50%
Men who have sex with men			
No	5599	2859	51%
Yes	1323	662	50%
Sexual partner from Asia or Africa			
No	5729	2810	49%
Yes	1193	711	60%
Born outside of Australia			
No	5482	2658	48%
Yes, Asia or Africa	741	468	63%
Yes, other	699	395	57%
Speaks English at home			
No	788	485	62%
Yes	6134	3036	49%
Recently injected drugs			
No	3477	2027	58%
Yes	3203	1338	42%
Prefer not to say	240	155	65%
Assisted registration setting			
Community Justice Health			

Table 4 – Effectiveness: Characteristics of people not recently tested for HCV RNA by registration type

Variables	Overall		
	Total people tested for HCV in pilot N	Tested more than 2 years ago or never n	%
Total	4112	1851	45%
Test performed			
HIV + HCV	3581	1675	47%
HCV only	531	176	33%
Gender			
Male	3150	1433	45%
Female	918	394	43%
Other	44	24	55%
Age			
=<25	495	245	49%
25-34	1192	500	42%
35-44	1212	466	38%
45-54	806	400	50%
>55	407	240	59%
Aboriginal and/or Torres Strait Islander			
No	2755	1333	48%
Yes	1357	518	38%
Major city postcode			
No	480	231	48%
Yes	3632	1620	45%
Men who have sex with men			
No	3824	1701	44%
Yes	288	150	52%
Born outside of Australia or Africa			
No	3430	1439	42%
Yes, Asia	284	185	65%
Yes, other	398	227	57%
Speaks English at home			
No	337	210	62%
Yes	3775	1641	43%
Recently injected drugs			
No	2406	1233	51%
Yes	1481	474	32%
Prefer not to say	225	144	64%
Assisted registration setting			
Community Justice Health			

Table 5- Effectiveness: Characteristics of people with a positive/borderline HCV RNA result

Variables	Total people tested for HCV RNA		Negative result		Positive/borderline result		p value
	N	%col	n	%row	n	%row	
	5960		5082	85%	878	15%	
Registration type							
Online	328	6%	313	95%	15	5%	
Assisted (community)	2357	40%	1948	83%	409	17%	
Assisted (prison)	3275	55%	2821	86%	454	14%	0.000
Test performed							
HIV + HCV	5472	92%	4661	85%	811	15%	
HCV only	488	8%	421	86%	67	14%	0.515
Gender							
Male	4517	76%	3853	85%	664	15%	
Female	1390	23%	1188	85%	202	15%	
Other	53	1%	41	77%	12	23%	0.261
Age							
=<25	749	13%	639	85%	110	15%	
25-34	1768	30%	1555	88%	213	12%	
35-44	1755	29%	1471	84%	284	16%	
45-54	1162	19%	942	81%	220	19%	
>55	526	9%	475	90%	51	10%	0.000

Aboriginal and/or Torres Strait Islander							
No	385 7	65 %	332 8	86%	529	14%	
Yes	210 3	35 %	175 4	83%	349	17%	0.003
Major city postcode							
No	593	10 %	487	82%	106	18%	
Yes	536 7	90 %	459 5	86%	772	14%	0.023
Men who have sex with men							
No	552 6	93 %	468 2	85%	844	15%	
Yes	434	7%	400	92%	34	8%	0.000
Born outside of Australia							
No	508 4	85 %	427 1	84%	813	16%	
Yes, Asia or Africa	347	6%	331	95%	16	5%	
Yes, other	529	9%	480	91%	49	9%	0.000
Speaks English at home							
No	439	7%	405	92%	34	8%	
Yes	552 1	93 %	467 7	85%	844	15%	0.000
Recently injected drugs							
No	244 3	41 %	225 5	92%	188	8%	
Yes	329 2	55 %	261 8	80%	674	20%	
Prefer not to say	225	4%	209	93%	16	7%	0.000