

Routine blood-borne virus testing for HIV, hepatitis B & C in the emergency department: the 'new normal'?




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BBVs: Background

- BBVs (HIV, HBV, HCV) are transmissible, treatable viruses with long periods of asymptomatic disease
- Late diagnoses and mortality occur
- UK testing policy:
 - HIV is universal if prevalence $>2/1000$
 - HBV/HCV: targeted testing (at risk groups)
- 1 in 4 attend the ED annually in England
- 13-20% have bloods taken
- EDs attended by underserved groups (IDU and homeless)

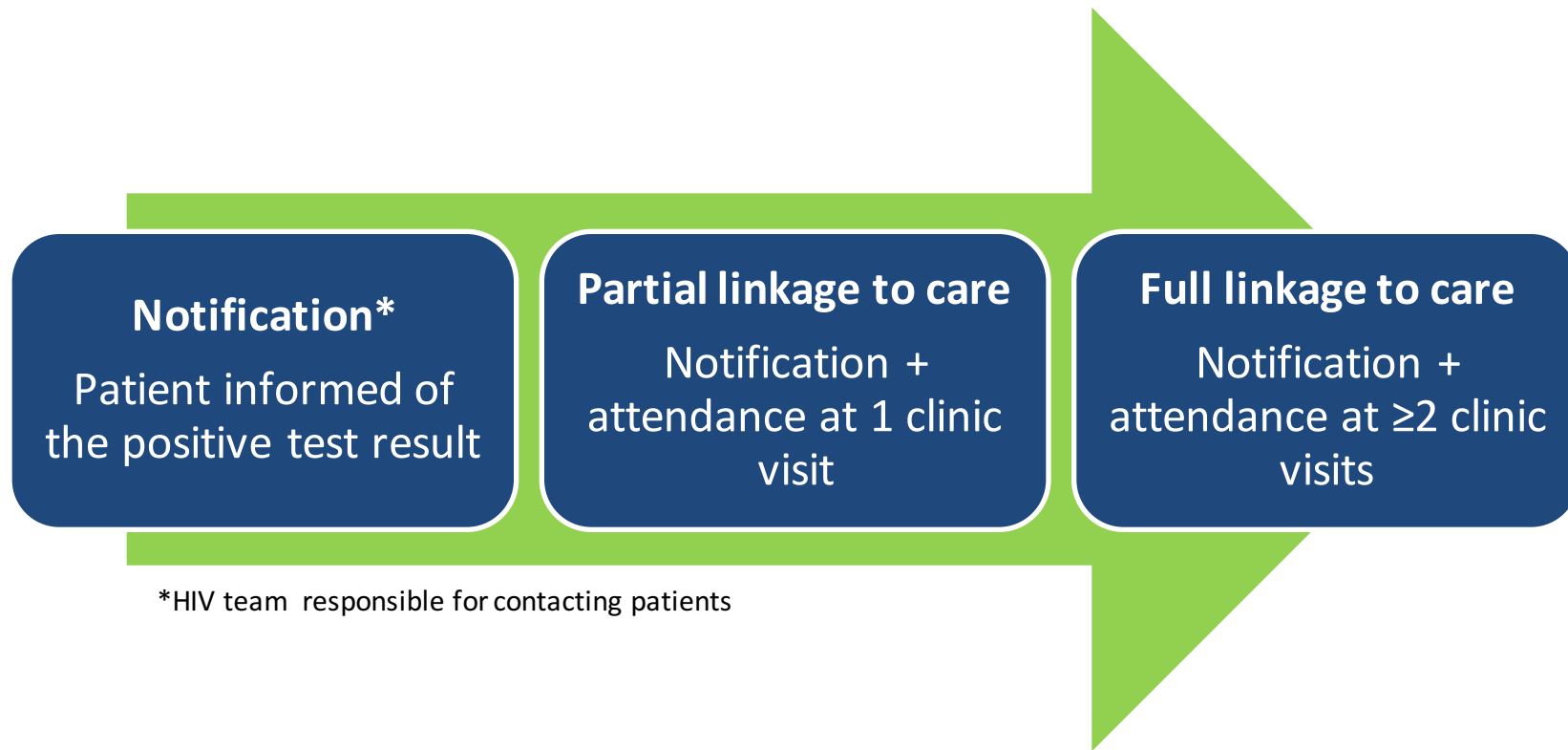
Aims

- Estimate seroprevalence of the 3 infections 
- Assess uptake of routine BBV testing in the ED
- Determine linkage to care rates for new and disengaged patients for each BBV
- Determine number of contact attempts and the time spent to link a patient for each virus

Methods:

- BBV testing for ED attendees >18 yrs having bloods for routine care (11/2015 -8/2016)
- Seroprevalence estimated as the % of cases, for BBVs overall and for each virus
 - with a reactive test result
 - with a new diagnosis
 - known needing linkage to care (disengaged)
- Markers of advanced disease were recorded
- Uptake : ED attendees tested for ≥ 2 BBV's / ED attendees having routine bloods

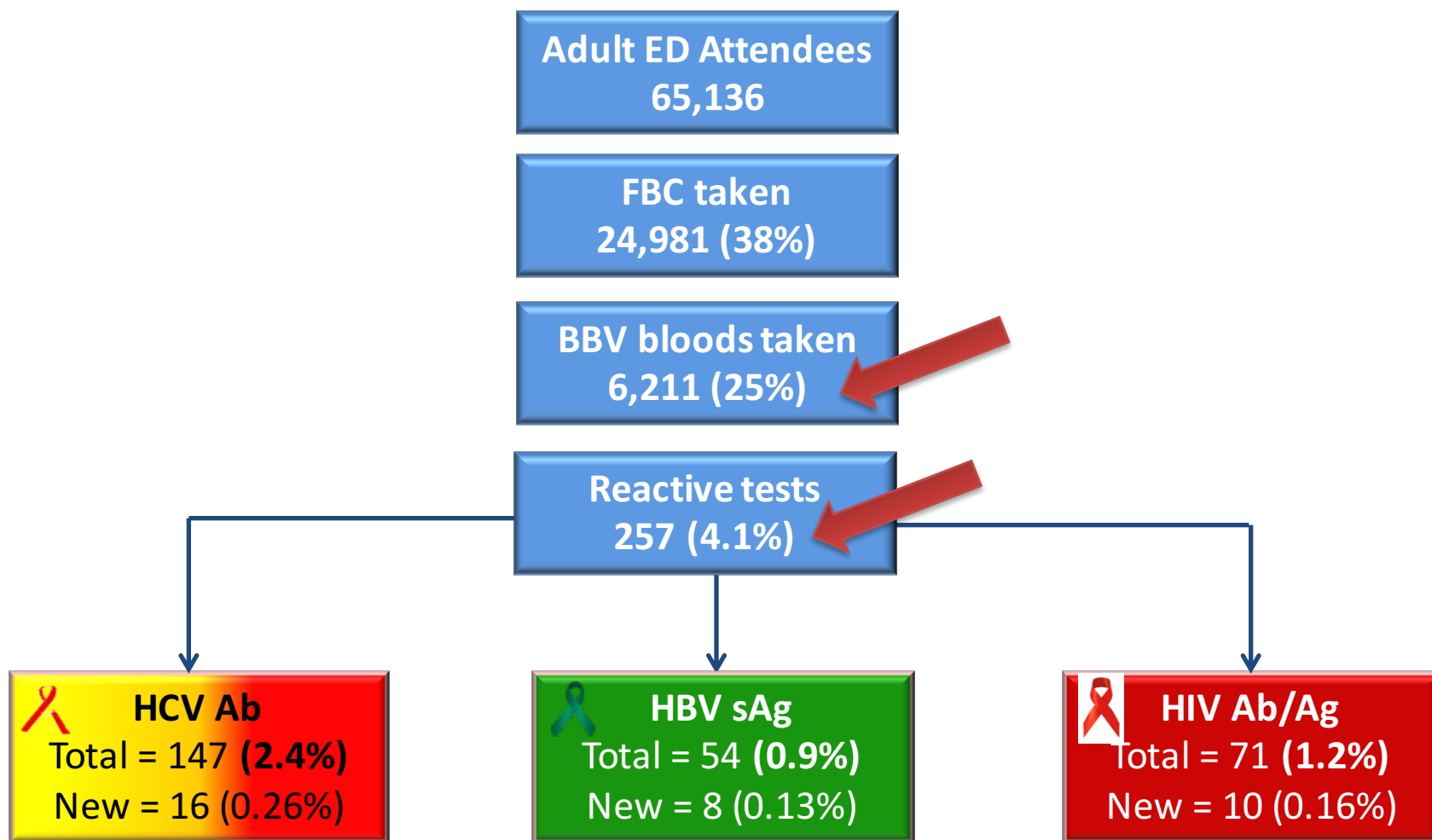
Methods:



- Number of contact attempts by phone call, text message, letter, GP, substance misuse or homeless teams were recorded
- Number of minutes spent per contact attempt (average)

Results

Uptake and Seroprevalence



Results:

Demographic distribution in BBV positives

Variable	1. Adult Emergency Department (ED) attendees		2: Study population (full blood count patients)				3. Going Viral (GV) patients							
	n	(%)	Breakdown of FBC patients n	(%)	Proportion of ED attendees having FBC	Adjusted odds of FBC among ED attendees			Breakdown of GV tested n	%	Proportion of FBC patients GV tested	Adjusted odds of GV among FBC patients		
						aOR	(95% CI)	P-value				aOR	(95% CI)	P-value
Total	65,136	(100)	24,981	(100)	38%				6,211	(100)	25%			
Gender														
Female	30,585	(47)	12,447	(50)	41%	1	ref		2,905	(47)	23%	1	ref	
Male	34,543	(53)	12,532	(50)	36%	0.80	(0.77 - 0.82)	<0.001	3,306	(53)	26%	1.2	(1.1 - 1.3)	<0.001
Age														
18-29	23,865	(37)	6,203	(25)	26%	1	ref		1,568	(25)	25%	1	ref	
30-39	15,491	(24)	4,823	(19)	31%	1.3	(1.3 - 1.4)		1,302	(21)	27%	1.07	(0.98 - 1.2)	
40-49	9,190	(14)	3,717	(15)	40%	2.0	(1.9 - 2.1)		1,050	(17)	28%	1.1	1.02 - 1.2)	
50-59	6,497	(10)	3,265	(13)	50%	2.8	(2.7 - 3.0)		827	(13)	25%	0.95	(0.86 - 1.05)	
60-69	4,069	(6)	2,406	(10)	59%	4.0	(3.7 - 4.3)		555	(9)	23%	0.85	(0.76 - 0.95)	
70-89	5,133	(8)	3,908	(16)	76%	8.5	(7.9 - 9.1)	<0.001	806	(13)	21%	0.74	(0.67 - 0.81)	<0.001
Unclassified	891	(1)	659	(3)	74%		n/a		103	(2)	16%		n/a	
Ethnicity														
White British	15,979	(25)	7,036	(28)	44%	1	ref		1,709	(28)	24%	1	ref	
White other (incl Irish)	11,092	(17)	3,078	(12)	28%	0.69	(0.65 - 0.73)		819	(13)	27%	1.07	0.97 - 1.2)	
Asian or Asian British	17,953	(28)	6,721	(27)	37%	0.94	(0.90 - 0.99)		1,749	(28)	26%	1.06	0.98 - 1.1)	
Black or Black British	5,268	(8)	2,233	(9)	42%	1.00	(0.93 - 1.07)		603	(10)	27%	1.1	1.01 - 1.3)	
Mixed or other	6,858	(11)	2,407	(10)	35%	0.89	(0.84 - 0.95)		618	(10)	26%	1.04	0.93 - 1.2)	
Ethnicity not recorded	7,986	(12)	3,506	(14)	44%	1.2	(1.09 - 1.2)	<0.001	713	(11)	20%	0.78	(0.70 - 0.87)	<0.001

Results: All positives

Demographic distribution in BBV positives

Variable	Number tested for BBV	All positives					
		Prevalence estimate			Adjusted odds of being BBV positive		
		n	(%)	(95% CI)	aOR	(95% CI)	P-value*
All observations	6,211	257	(4.1)	(3.7 - 4.7)	n/a		
Gender							
Female	2,905	70	(2.4)	(1.9 - 3.0)	1	ref	
Male	3,306	187	(5.7)	(4.9 - 6.5)	2.1	(1.5 - 3.0)	<0.001
Age							
18-29	1,568	26	(1.7)	(1.13 - 2.4)	1	ref	
30-39	1,302	59	(4.5)	(3.5 - 5.8)	2.7	(1.6 - 4.6)	
40-49	1,050	86	(8.2)	(6.7 - 10.0)	5.6	(3.3 - 9.2)	
50-59	827	49	(5.9)	(4.5 - 7.8)	3.6	(2.1 - 6.3)	
60-69	555	24	(4.3)	(2.9 - 6.4)	2.3	(1.2 - 4.6)	
70-89	806	10	(1.2)	(0.67 - 2.3)	0.49	(0.20 - 1.2)	<0.001
Unclassified	103	3	(2.9)	(0.94 - 8.6)	n/a		
Ethnicity							
White British	1,709	86	(5.0)	(4.1 - 6.2)	1	ref	
White other (incl Irish)	819	51	(6.2)	(4.8 - 8.1)	1.3	(0.85 - 1.9)	
Asian or Asian British	1,749	26	(1.5)	(1.0 - 2.2)	0.28	(0.17 - 0.46)	
Black or Black British	603	43	(7.1)	(5.3 - 9.5)	1.5	(0.97 - 2.2)	
Mixed or other	618	29	(4.7)	(3.3 - 6.7)	0.89	(0.55 - 1.4)	
Ethnicity not recorded	713	22	(3.1)	(2.0 - 4.7)	0.40	(0.23 - 0.73)	<0.001

Results:

Demographic distribution in BBV positives:



Variable	Number tested for HIV	HIV positive					HCV positive					HBV positive						
		Prevalence estimate			Adjusted odds of being HIV positive		Prevalence estimate			Adjusted odds of being HCV positive		Prevalence estimate			Adjusted odds of being HCV positive			
		n	(%)	(95% CI)	aOR	(95% CI)	P-value*	n	(%)	(95% CI)	aOR	(95% CI)	P-value*	n	(%)	(95% CI)	aOR	(95% CI)
All observations	6,092	71	(1.2)	(0.92 - 1.5)	n/a		147	(2.4)	(2.0 - 2.8)	n/a		54	(0.90)	(0.69 - 1.2)	n/a			
Sex																		
Female	2,852	14	(0.49)	(0.29 - 0.83)	1 ref		42	(1.5)	(1.1 - 2.0)	1 ref		18	(0.63)	(0.40 - 1.0)	1 ref			
Male	3,240	57	(1.8)	(1.4 - 2.3)	5.8	(3.2 - 11) <0.001	105	(3.2)	(2.7 - 3.9)	1.5	(1.02 - 2.3) 0.040	36	(1.1)	(0.82 - 1.6)	1.9	(1.01 - 3.7) 0.046		
Age (years)																		
18-29	1,546	17	(1.10)	(0.68 - 1.8)	1		7	(0.45)	(0.21 - 0.94)	1 ref		5	(0.33)	(0.14 - 0.80)	1 ref			
30-39	1,288	13	(1.0)	(0.59 - 1.7)	0.8 (0.4 - 1.7)		35	(2.7)	(2.0 - 3.7)	5.3 (2.2 - 13)		13	(1.0)	(0.60 - 1.8)	2.4 (0.72 - 8.1)			
40-49	1,028	23	(2.2)	(1.5 - 3.3)	1.9	(0.9 - 3.9)	51	(4.9)	(3.8 - 6.4)	10	(4.4 - 24)	16	(1.6)	(0.96 - 2.5)	4.8 (1.5 - 16)			
50-59	809	14	(1.7)	(1.0 - 2.9)	1.5 (0.7 - 3.4)		32	(3.9)	(2.8 - 5.5)	7.1 (2.9 - 17)		6	(0.74)	(0.33 - 1.6)	1.7 (0.43 - 6.6)			
60-69	534	4	(0.75)	(0.28 - 2.0)	0.6 (0.1 - 2.3)		15	(2.7)	(1.7 - 4.5)	4.1 (1.5 - 11)		7	(1.3)	(0.62 - 2.7)	3.7 (0.94 - 14)			
70-89	785	0	(0)		1 0.092		6	(0.75)	(0.34 - 1.7)	0.62 (0.16 - 2.3) <0.001		4	(0.50)	(0.19 - 1.3)	2.2 (0.48 - 9.6) 0.079			
Unclassified	102	0	(0)		n/a		1	(1.0)	(0.14 - 6.6)	n/a		3	(3.0)	(0.96 - 1.2)	n/a			
Ethnicity																		
White British	1,676	15	(0.89)	(0.54 - 1.5)	1 ref		73	(4.3)	(3.4 - 5.4)	1 ref		2	(0.12)	(0.03 - 0.48)	1 ref			
White other (incl Irish)	797	12	(1.5)	(0.86 - 2.6)	1.7 (0.78 - 3.7)		31	(3.8)	(2.7 - 5.4)	0.83 (0.51 - 1.4)		12	(1.5)	(0.87 - 2.7)	12 (2.6 - 55)			
Asian or Asian British	1,730	3	(0.17)	(0.06 - 0.54)	0.17 (0.05 - 0.61)		8	(0.46)	(0.23 - 0.92)	0.10 (0.05 - 0.22)		15	(0.88)	(0.53 - 1.5)	6.7 (1.5 - 29)			
Black or Black British	593	26	(4.4)	(3.0 - 6.4)	5.3	(2.8 - 10)	7	(1.2)	(0.56 - 2.5)	0.18 (0.08 - 0.42)		14	(2.4)	(1.4 - 4.0)	21 (5.0 - 90)			
Mixed or other	607	7	(1.2)	(0.55 - 2.4)	1.2 (0.49 - 3.1)		17	(2.8)	(1.7 - 4.4)	0.53 (0.29 - 0.96)		5	(0.84)	(0.35 - 2.0)	7.9 (1.5 - 40)			
Ethnicity not recorded	689	8	(1.2)	(0.58 - 2.3)	0.99 (0.39 - 2.5) <0.001		11	(1.6)	(0.86 - 2.8)	0.26 (0.12 - 0.58) <0.001		6	(0.87)	(0.39 - 1.9)	3.0 (0.48 - 18) <0.001			

Results: Relevance of postcode

	All ED attendees		ED attendees with blood taken		ED attendees with BBV testing		All positive tests		HIV positive		HCV positive		HBV positive	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Total	65,136	100	24,981	(38.4)	6,211	(24.9)	257	(4.1)	71	(1.1)	147	(2.4)	54	(0.9)
Housed	-	-	24,181	(96.8)	6,056	(97.5)	236	(3.9)	70	(1.2)	130	(2.2)	50	(0.9)
No fixed abode	-	-	800	(3.2)	155	(2.5)	21	(14.0)	1	(0.7)	17	(11.0)	4	(2.6)



Hepatitis C

Results Overall: Diagnosis status of cases



Status	HCV (n = 147)		HBV (n = 54)	HIV (n = 71)	Total (n = 272*)
	Viraemic	Cleared			
	n (%)	n (%)	n (%)	n (%)	n (%)
New diagnosis	13 (9)	3 (2)	8 [†] (15)	10 (14)	34 (13)
Known diagnosis					
Known engaged in care	55 (37)	22 [†] (15)	26 (48)	55 [†] (77)	158 (58)
Known disengaged/LTFU	18 ^{††} (12)	0 (0)	10 (19)	5 (7)	32 (12)
Known ? engaged	3 (2)	18 (12)	1 [†] (2)	0 (0)	23 (8)
Uncontactable	11 (7)	4 (3)	9 [†] (16)	1 (1)	25 (9)
Total	100 (68)	47 (32)	54 (100)	71 (100)	272 (100)
Needing linkage	43 (29)		25 (46)	16 (23)	84 (31)

* Total n=272 due to 15 co-infections. † Includes 1 patient deceased during follow-up.

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Diagnosis status of cases



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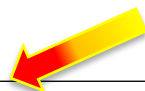


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Needing linkage	43 (29)		25 (46)	16 (23)	84 (31)















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Disease status of those requiring linkage to care















Disease status	HCV	HBV	HIV
	n (%)	n (%)	n (%)
Early Disease*	30 (70)	23 (92)	5 (31)
New diagnosis	11 (26)	7 (28)	4 (25)
Known but disengaged/LTFU	10 (23)	9 (36)	1 (6)
Known but current engagement status unknown	3 (7)	0 (0)	0 (0)
Uncontactable	6 (14)	7 (28)	0 (0)
Late Disease**	13 (30)	2 (8)	9 (56)
New diagnosis	2 (5)	0 (0)	6 (37)
Known but disengaged/LTFU	6 (14)	1 (4)	3 (19)
Known but current engagement status unknown	0	0 (0)	0 (0)
Uncontactable	5 (12)	1 (4)	0 (0)
Inadequate results to determine status	0 (0)	0 (0)	2 (13)
Total	43 (100)	25 (100)	16 (100)

* CD4 >350 or no evidence of cirrhosis (platelets <150, APRI >1, FS score ≥F3), **CD4 <350 or evidence of cirrhosis















Deaths

Gender	Ethnicity	BBV	Linkage status*	BBV Disease status	Cause of death	Related to BBV?
M	Asian		Known engaged	Advanced	B cell non-Hodgkins lymphoma	
M	Asian		Known engaged	Advanced	Decompensated liver disease and HCC	
M	Asian		New	Advanced	Metastatic HCC	
M	White British		Known ? engaged	Early	Oesophageal cancer	
F	White British		LTFU	Advanced	Decompensated liver disease and variceal bleed	
M	White British		LTFU	Advanced	Decompensated liver disease and variceal bleed	
M	White British		Known engaged	Cleared	Metastatic lung cancer	

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M	Asian		Known engaged	Advanced	Decompensated liver disease and HCC	
M	Asian		New	Advanced	Metastatic HCC	
M	White British		Known ? engaged	Early	Oesophageal cancer	
F	White British		LTFU	Advanced	Decompensated liver disease and variceal bleed	
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F	White British		LTFU	Advanced	Decompensated liver disease and variceal bleed	
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M	White British		Known engaged	Cleared	Metastatic lung cancer	

Linkage to Care

- 84/257 (33%) patients required linkage to care – 43 HCV, 25 HBV, 16 HIV
- In total, 52/84 (62%) attended once or more¹



HIV: 13/16 (81%) attended once or more



HBV: 15/25 (60%) attended once or more

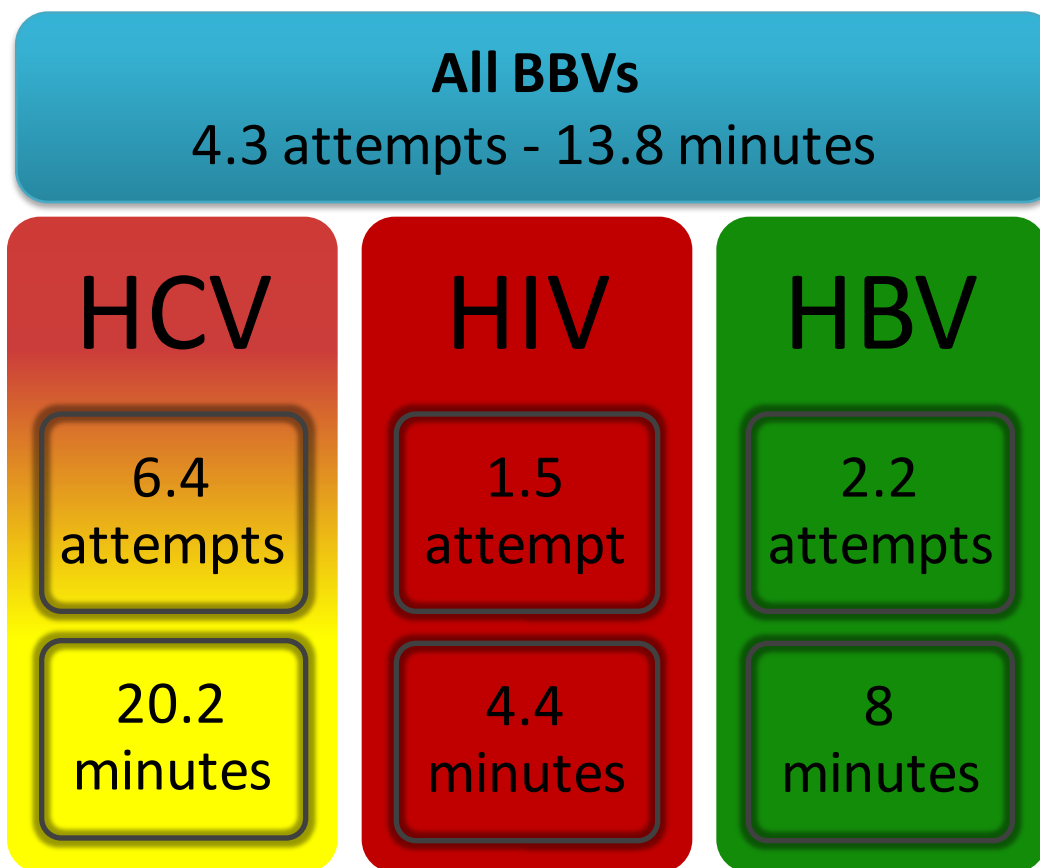


HCV: 24/43 (56%) attended once or more

Overall, newly diagnosed patients were 10x more likely to attend for clinic review than known, disengaged (LTFU) patients

1. Notified 58 (69%), Partial linkage (x1 clinic visit) 12 (14%), Full linkage (≥2 clinic visits) 40 (48%), Unlinked 32 (38%).

Contact attempts and time spent to contact each person



HCV cases = 925/1,102 (84%) contact attempts and 2,925/3,542 (82.5%) minutes spent

Conclusions

- One third of the 257 identified required linkage to care (LTFU > new)
- Late disease more common in those with HIV and HCV who required linkage to care
- 5 deaths were directly attributable to BBVs (4 were liver)
- 68% with HCV were viraemic
- Most of the HCV patients self-reporting as engaged in care were viraemic (71%) = not successfully treated
- HCV patients hardest to link – possibly related to homelessness
- Consideration should be given to resources required to link patients to care (HIV vs HCV vs HBV)

Acknowledgements

- ED staff at the Royal London Hospital



- Funders: The project has been supported by the Gilead UK and Ireland Fellowship Programme