The Role of Financial Incentives in Developing Hepatitis B Immunity Following Accelerated Vaccination Among People Who Inject Drugs in Sydney, Australia: Randomised Controlled Trial

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HBV among PWID

- Injecting drug use is the leading exposure category for newly acquired HBV infection in Australia
- Despite a safe, effective vaccine, immunisation coverage remains low among people who inject drugs (PWID)
  - 28-59% HBV exposed (HBcAb positive)
  - 26-33% vaccinated (HBsAb ≥ 10IU/mL, HBcAb -ve)
  - **14-46% susceptible**

HBV among PWID

- Excess mortality in HBV/HCV co-infection
  - Concern given 50-60% prevalence of HCV Ab among PWID
- Universal vaccination since 2000 (infant schedule)
- School-based catch up reaches about half
  - Opt in program (ie parental consent required)
  - Probably misses out on those most at risk - truants, early school drop out

→Ongoing need to increase immunisation coverage

Financial incentives

- Financial incentives have been used to improved immunisation rates
- Significant effects of moderate magnitude among PWID (NICE Clinical Guidelines 51 and 52)
- Financial incentives found to increase HBV vaccination completion compared to no incentives among PWID in 2 RCTs (Weaver et al Lancet 2014, Topp et al Prev Med 2013)
- Increases completion, but **unknown if it increases serological protection**

Aim

- Determine factors associated with vaccine induced HBV immunity (HBsAb ≥10IU/ml) among a sample of PWID randomly allocated to receive a modest financial incentive or not upon receipt of an accelerated 3-dose HBV vaccination schedule (0,7,21 days)
- Hepatitis B Acceptability Vaccination Incentives Trial

Method: Study criteria

- Inclusion criteria: 16+ years, injected in last 6 months, no prior infection, ≤ one previous dose vaccine **OR** unknown infection vaccination status, English language and consent
- Exclusion criteria: serological evidence of immunity, previous exposure of 2+ vaccination doses (HBsAb≥10IU/ml)
- Randomised 1:1 control or intervention group
- 3 dose accelerated schedule (0,7,21 days)
- Pre-test discussion and dose 1 as per standard care

Study schedule

- Baseline: serological testing to confirm eligibility → consent, randomisation and baseline questionnaires
  - $20 Coles-Myers voucher reimbursement
- Visit 2 (+7 days): serologically eligible participants received dose 2, plus $30 cash for incentive group
- Visit 3 (+14 days): dose 3, plus $30 cash for incentive group
- 12 week follow up serological testing and research interview
  - $30 reimbursement for follow up

Data analyses

- The primary endpoint for analysis was HBsAb ≥ 10 IU/mL
- Compared % participants in intervention and control groups who seroconverted to HBsAb ≥10 IU/mL using *Intention to treat (ITT) analyses:*
  - Included all eligible enrolled trial participants (n=139)
  - Participants unable to be followed-up assumed to be HBsAb negative at 12 weeks

Results: baseline sample characteristics

	Total (n=139)	Incentive (n=74)	Control (n=65)
Mean age (SD)	33.1 (8.4)	34.6 (8.3)	31.4 (8.2)
Male (%)	77	80	74
Site (%) KRC	44	42	46
REPIDU	47	31	34
HITS-c	19	18	20
ATSI (%)	12	14	10
Unstable accommod'n (%)	37	38	35
Income pension (%)	86	89	82
Literacy problems (%)	12	14	11
Current psych med (%)	36	43	28
Median years inject (range)	10 (<1-41)	11.5 (<1-41)	9 (<1-31)
Daily+ inject (%)	45	43	46

Results

- 139 participants recruited
  - 121 maintained contact long enough for 12 week serological outcomes to be obtained
- The vaccination schedule completed by
  - **66%** (43/65) control participants
  - **87%** (64/74) incentive allocated participants
  - Incentive group and duration of injecting associated with increased completion
  - Aboriginal/Torres Strait Islander status associated with reduced rates of vaccine-completion

Seroconversion

- 57% (79/139) participants were HbsAb (≥10IU/ml) positive at 12 weeks
- 107 (77%) participants received all three doses
  - 88 (63%) did so within the specified timeframe

Univariate analysis of factors associated with seroconverison

Variable		n =139 (%)	% seroconverted	P value
Control group		65 (47%)	62	
Incentive group		74 (53%)	53	0.294
Vaccination series completed		107 (77%)	62	
Not completed		32 (23%)	41	0.035
Completed vaccination series within scheduled time (+/-7days)				
	Within schedule	88 (63%)	58	
	Not within schedule	51 (37%)	55	0.726
Anti-HCV (3 missing):	Positive	58 (42%)	55	
	Negative	78 (56%)	59	0.657
HCV RNA (n=73):	Detected	35 (48%)	51 (18/44)	
	Not detected	38 (52%)	68 (26/44)	0.138
Age (tirtiles):	20-28 years	45 (32%)	58	
	29-36	48 (35%)	58	0.957
	37+	46 (33%)	54	0.742
Male		107 (77%)	55	
Female (n=31)/transgender (n=1)		32 (23%)	63	0.461

Univariate analysis of factors associated with seroconverison (continued)

Variable	n =139 (%)	% seroconverted	P value
Identified as Aboriginal /TSI	16 (12%)	63	
Did not identify as Aboriginal /TSI	121 (87%)	56	0.632
Duration of injecting (years) (tirtiles)			
≤6 (reference)	44 (32%)	52	-
7-12	47 (34%)	64	0.265
13+	48 (35%)	54	0.856
Daily+ injecting in preceding month	62 (45%)	58	
< daily injecting in preceding month	77 (55%)	56	0.793
Currently in OST	45 (32%)	63	
Not currently in OST	94 (68%)	54	0.375
Drank 6+ standard drinks ≥ weekly preceding 12 months	46 (33%)	59	
Did not 6+ standard drinks ≥ weekly	93 (67%)	56	0.755
Currently prescribed psychiatric medication/s: Yes	50 (36%)	50	
No	89 (64%)	61	0.223

Multivariate analysis

Variable	*n*	*% sero-converted*	*Univariate relationship*	
			OR (95% CI)	*p-value*
Completed series	32	41		
Did not complete	107	62	**2.35 (1.05-5.27)**	**0.035**

Variable	*n*	*% sero-converted*	*Multivariate relationship*	
			AOR (95% CI)	*p-value*
Completed series	32	41		
Did not complete	107	62	**2.20 (0.97-4.95)**	**0.058**

n=139, includes 18 imputed cases

Factors associated with vaccine-induced immunity (univariate)

- **Series completion was the only factor associated with vaccine-induced immunity (p=0.035)**
- Approached significance on multivariate analysis (p=0.058)

Interactions

- **Similar proportions** of the **incentive** group seroconverted irrespective of series completion
  - Proportion seroconverted:
    - 53% completed vs 50% did NOT complete
- **More controls** who completed the series seroconverted than non-completers
  - Proportion seroconverted:
    - 74% completed vs 36% did NOT complete

Discussion

- The only factor associated with increasing vaccine-induced immunity (HBsAb ≥10IU/mL) was completion of the accelerated 3-dose HBV vaccination schedule
  - Low overall seroconverions (57%)
  - No data on the 12 month booster shot
  - Appropriate schedule?
  - **HBsAb may be inadequate measure of immune protection particularly in PWID**

Limitations and conclusion

- Study powered to detect completion not serological changes
- Data on 12 month booster unavailable
- Participants may not be representative broader population of PWID
- Social desirability bias may have veiled important covariate – reduced by use of ACASI
- **Use of incentives alone did not increase seroconversion**
- **Further work into establishing an optimal HBV vaccination schedule for PWID is necessary**

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