

Improving Hepatitis B Virus Immunization among Young Injectors in San Francisco

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BACKGROUND

- Hepatitis B virus (HBV) infection is highly prevalent (44-80%) in injection-drug using populations.
- 60% of injection drug users (IDU) under age 30 in San Francisco are at risk of infection.
- Immunization rates for both IDU and high-risk non-IDU are low (11-38%).
- Only 13% of young IDU in San Francisco have serological evidence of prior immunization against HBV.

OBJECTIVE

- Do cash incentives plus street-based outreach improve completion of the HBV immunization series by young injectors?

METHODS

- Convenience sampling of IDU < age 30 in four SF neighborhoods.
- Risk assessment & serologic testing for HIV, HBV, and hepatitis C virus (HCV).
- Results disclosure & post-test counseling.
- Flexible 0, 1-2, and 4-6 month immunization schedule offered to persons testing negative for antibody to hepatitis B surface antigen (anti-HBs).
- Vaccine reminders from street outreach workers.
- \$10 cash incentive upon receipt of 2nd and 3rd vaccine doses.



Figure 1. Sample flyer from street-based peer outreach component of intervention to improve HBV immunization rates among young injectors in San Francisco, the UFO Study.

OUTCOMES

- Completion of 3-dose HBV immunization schedule
- Bivariate and multivariable factors associated with vaccine completion
- Post-vaccination antibody response (anti-HBs \geq 10 mIU/ml) in completers

RESULTS

- 404 persons screened
- 265 (66%) vaccine eligible
- 211 (80%) of vaccine-eligible persons returned for test results
- 170/211 (81%) enrolled and received first vaccine dose on day of results

Vaccine completion

- 128/170 (75%) received second dose
 - Median 5 weeks (IQR 4-8 weeks) between first two doses
- 80/170 (47%) received third dose
 - Median 21 weeks (IQR 17-26 weeks) between first and third doses

TABLE 1: Bivariate associations of selected demographic factors and baseline serology with hepatitis B vaccine completion among young injectors in San Francisco (n=170).

Characteristic	# Completers/N (%)	Odds Ratio (95% CI)	p-value
All participants	80/170 (47.1)		
Age (median, 21; IQR, 19-24)			
15-19	26/54 (48.2)	1.00	0.40
20-24	31/74 (41.9)	0.78 (0.36,1.67)	
25-29	23/42 (54.8)	1.30 (0.54,3.17)	
Sex			
Male	57/120 (47.5)	1.00	0.86
Female	23/50 (46.0)	0.94 (0.46,1.92)	
Race (n=169)			
White	64/142 (45.1)	1.00	0.32
Non-white	15/27 (55.6)	1.52 (0.62,3.77)	
Education (n=169)			
< HS	40/85 (47.1)	1.00	0.94
HS grad	26/53 (49.1)	1.08 (0.51,2.28)	
14/31 (45.2)	0.93 (0.37,2.29)		
Months lived in San Francisco			
<3	31/86 (36.1)	1.00	<0.01
\geq 3	49/84 (58.3)	2.48 (1.28, 4.84)	
Ever tested for HIV			
No	7/30 (23.3)	1.00	<0.01
Yes	73/140 (52.1)	3.58 (1.35,9.87)	
HIV antibody (n=169)			
Negative	79/168 (47.0)	--	0.29
Positive	1/1 (100.0)		
Hepatitis B core antibody			
Negative	75/163 (46.0)	1.00	0.19
Positive	5/7 (71.4)	2.93 (0.46,31.45)	
Hepatitis C antibody (n=169)			
Negative	46/112 (41.1)	1.00	0.04
Positive	33/57 (57.9)	1.97 (1.03,3.77)	

TABLE 2: Bivariate associations of injecting behavior with hepatitis B vaccine completion among young injectors in San Francisco (n=170).

Characteristic	# Completers/N (%)	Odds Ratio (95% CI)	p-value
Injecting Behavior			
Years injecting (median, 4; IQR, 1-7)			
0-1	18/49 (36.7)	1.00	0.07
15/29 (51.7)	1.85 (0.66,5.21)		
2-3	13/32 (40.6)	1.18 (0.43,3.24)	
4-5	16/26 (61.5)	2.76 (0.93,8.29)	
6-7	6/16 (37.5)	1.03 (0.28,3.82)	
8-9	12/18 (66.7)	3.44 (0.97,12.63)	
\geq 10			
Frequency of injection			
Less than daily	48/116 (41.4)	1.00	0.03
Daily	32/54 (59.3)	2.06 (1.02, 4.19)	
Ever borrowed a used syringe			
No	25/57 (43.9)	1.00	0.55
Yes	55/113 (48.7)	1.21 (0.61,2.42)	
Exchanged syringes, last 30 days			
No	21/63 (33.0)	1.00	<0.01
Yes	59/107 (44.9)	2.46 (1.23,4.96)	
Exchanged at established SEP ^a , last 30 days			
No	40/102 (39.20)	1.00	0.01
Yes	40/68 (58.8)	2.21 (1.13,4.35)	
Exchanged at underground SEP, last 30 days			
No	41/100 (41.0)	1.00	0.06
Yes	39/70 (55.7)	1.81 (0.93,3.52)	
Exchanged with outreach worker/friend, last 30 days			
No	50/101 (49.5)	1.00	0.44
Yes	30/69 (43.5)	0.78 (0.40,1.52)	
Received new syringes from friends, last 30 days (n=169)			
No	58/107 (54.2)	1.00	0.02
Yes	22/62 (35.5)	0.46 (0.23,0.93)	
Purchased new syringes on street, last 30 days			
No	53/117 (45.3)	1.00	0.50
Yes	27/53 (50.9)	1.25 (0.62,2.53)	

^a SEP = syringe exchange program

TABLE 3: Bivariate associations of sexual behavior with hepatitis B vaccine completion among young injectors in San Francisco (n=170).

Characteristic	# Completers/N (%)	Odds Ratio (95% CI)	p-value
Sexual orientation (n=168)			
Heterosexual	51/117 (43.6)	1.00	0.26
Gay or Bisexual	27/51 (47.1)	1.46 (0.71, 2.97)	
Years sexually active (n=161)			
\leq 5	24/59 (40.7)	1.00	0.17
> 5	53/102 (52.0)	1.58 (0.78, 3.18)	
Ever diagnosed with a sexually transmitted disease (n=165)			
No	58/126 (46.0)	1.00	0.77
Yes	19/39 (48.7)	1.11 (0.51,2.43)	
Traded sex for money or drugs, last 6 months			
No	70/156 (44.9)	1.00	0.06
Yes	10/14 (71.4)	3.07 (0.84,13.91)	
Sex with another IDU, last 6 months			
No	15/44 (34.1)	1.00	0.05
Yes	65/126 (51.6)	2.06 (1.01,4.21)	
Number of sexual partners, last 6 months			
0	11/21 (52.4)	1.00	0.81
1	33/71 (46.5)	0.79 (0.27,2.32)	
>1	36/78 (46.2)	0.78 (0.27,2.26)	
Less than 100% condom use for vaginal or anal sex, last 6 months			
No	14/31 (45.2)	1.00	0.85
Yes	56/119 (47.1)	1.08 (0.46,2.57)	

TABLE 4: Bivariate associations of psychosocial factors with hepatitis B vaccine completion among young injectors in San Francisco (n=160).

Characteristic	# Completers/N (%)	OR (95% CI)	p-value
Social Support^a			
Can rely on family			
No	37/65 (56.9)	1.00	0.04
Yes	38/95 (40.4)	0.51 (0.26, 1.02)	
Can rely on main sex partner or spouse (n=159)			
No	33/70 (47.1)	1.00	1.00
Yes	42/89 (47.2)	1.00 (0.51, 1.97)	
Can rely on friends (n=159)			
No	10/24 (41.7)	1.00	0.56
Yes	65/135 (48.2)	1.30 (0.50, 3.42)	
Can rely on outreach worker (n=159)			
No	22/63 (34.9)	1.00	0.01
Yes	53/96 (55.2)	2.30 (1.13, 4.67)	
Can rely on NEP staff (n=159)			
No	27/69 (39.1)	1.00	0.07
Yes	48/90 (53.3)	1.78 (0.90, 3.54)	
Depression			
CES-D score ^b (n=156)			
< 16	19/38 (50.0)	1.00	0.65
\geq 16	54/118 (45.8)	0.84 (0.38, 1.87)	

^a Note: No response = not much, none, or not applicable; Yes response = some, very much, totally
^b CES-D = Center for Epidemiologic Studies Depression Scale

Multivariable predictors of vaccine completion

- San Francisco residence for 3 months or longer (AOR, 2.41; 95% CI, 1.20-4.82)
- Prior HIV test (AOR, 2.79; 95% CI, 1.05-7.41)
- Not obtaining syringes from friends (AOR, 0.43; 95% CI, 0.21-0.87)
- Ability to rely on an outreach worker for social support (AOR, 2.49; 95% CI, 1.23-5.05)

Post-vaccination anti-HBs response (n=49)

- Anti-HBs \geq 10 mIU/ml in 38/49 (78%) of vaccine completers.
 - 12/17 (71%) anti-HCV positive
 - 26/32 (81%) anti-HCV negative
 - OR, 0.55; 95% CI 0.12, 2.82

CONCLUSIONS

- Completion of the HBV immunization series is more likely in young established IDU, who are geographically stable and engage in other prevention activities.
- Street-based outreach and cash incentives may improve vaccine completion rates.
- Young IDU demonstrate a poor immune response to the standard recommended HBV immunization series.
- Repeated or higher dose immunization schedules may be important for young injectors.