

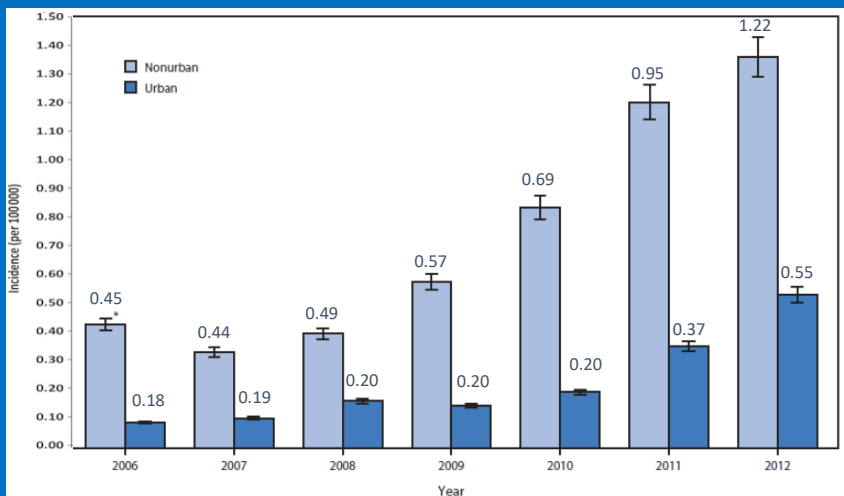
Injection partner mixing: higher risk of HCV among young adults who inject drugs with young injecting partners

Page K, Evans J, Morris, MD, Vickerman P, Hahn JA.

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Background: HCV in young adults who inject

- HCV incidence nationally is increasing, and especially among younger adults who are injecting, and in non urban areas.



Nonurban trend: $p=0.003$; urban trend $p=0.028$

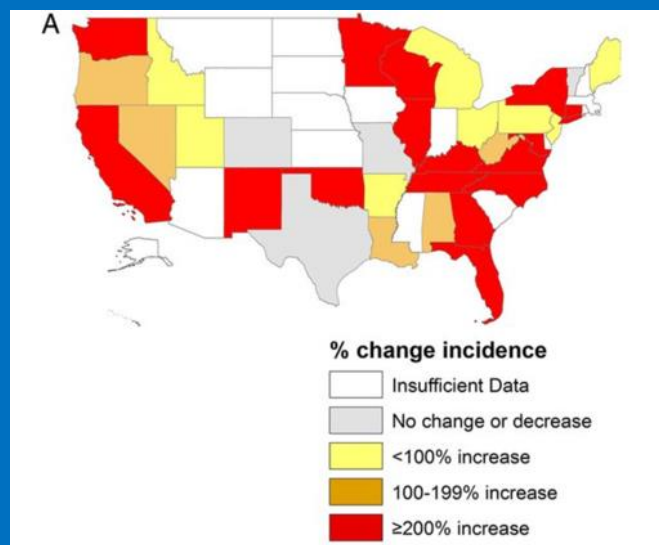
Suryaprasad AG, et al. *Clin Infect Dis.* 2014;59:1411-9.

HCV and HIV Infection in Communities where injection drug use is increasing

- HCV outbreaks in younger groups, and especially in non-urban areas, began to gain attention in 2008
 - New York¹; Massachusetts²; Wisconsin³; Kentucky, Virginia, West Virginia⁴; Indiana, Pennsylvania, Florida, Northern Plains Indians⁵
- HCV prevalence is ~50% and incidence is over 20/100 pyo in many locales among young adult (<30 yrs) PWID in both urban⁶ and rural areas⁷
- HIV diagnosis in PWID dropped 48% between 2008-2014⁸

1. CDC. *MMWR Morb Mortal Wkly Rep.* 2008;57:517-21; 2. CDC. *MMWR Morb Mortal Wkly Rep.* 2011;60:537-41;
3. CDC. *MMWR Morb Mortal Wkly Rep.* 2012;61:358; 4. Zibbell JE, et al. *MMWR Morb Mortal Wkly Rep.* 2015;2016-64(No.17);
5. Page K, et al. *Clin Infect Dis.* 2013;57:532-8; 6. Page K, et al. *J Infect Dis.* 2009;200:1216-26;
7. Havens JR, et al. *Am J Public Health.* 2013;103:e44-52; 8. Wejnert C, et al. *MMWR Morb Mortal Wkly Rep.* 2016;65:1336-42.

Incidence of acute HCV among young persons Reported to CDC



Suryaprasad AG, et al. *Clin Infect Dis.* 2014;59:1411-9.

Risk factors for HCV: individual and social factors

• Individual risk factors

- ↑ Older age, duration and frequency of injecting, using previously used syringes, and/or ancillary injecting equipment, incarceration, crack cocaine use, female sex;
- ↓ Medication Assisted Treatment (MAT) for opioid dependence; Syringe and Needle Programs (NSP; in Europe), HCV testing; Combination approaches

• Injecting relationships:

- Injecting is a highly social activity, not usually done in isolation;
- Partnerships may be formed for economic reasons (share drugs, lower price), safety, romantic
 - "Pooling money to buy drugs" is associated higher risk of HCV
 - Many of participant's injecting partners are also sex partners, associated with increased HCV infection among female injectors.
 - Overlapping injecting/sexual partnerships is associated with higher odds of receptive needle sharing and more frequent injecting,
- Younger PWID are more likely to have more partners, and have a high frequency of 'partner' turnover.

(1) Hagan et al 2008; Hahn et al, 2002; Thorpe et al 2000, Judd et al, 2005; Roy et al, 2001; Esmaeli et al, 2016; 2017;
 (2) Tsui et al, 2014, White et al, 2014, Nolan et al, 2014; Palmateer et al 2014; Hagan et al, 2011; Platt et al, in press; Kuo et al, 2015

... Partnerships -

Age of partnerships was associated with receptive needle sharing in partnerships (Hahn et al, Addiction 2010)

Partner age compared to partner	Odds Ratio for Receptive Needle Sharing (95% CI)
Partner <5 years older	5.53 (1.59, 19.24)
Partner 5-10 years older	5.15. (1.65, 16.06)
Partner >10 years older	1.0

- Other *partnership* variables associated with RNS:
 - Partnership gender; duration of acquaintance; cohabitation, traveling w/ partner, being injected by partner
- Those who reported that their partner was HCV-positive were significantly less likely to engage in RNS with that partner [OR 0.49 (95% CI 0.25–0.95)].

Objectives:

- To assess the association between partner age and risk of incident HCV in injecting partnerships.
- To assess the effect of knowledge of partner HCV serostatus and risk of incident HCV in age-discordant injecting partnerships

Methods:

- Acute UFO Study 2003-2017: prospective observational study of young adult (enrolled <30 years old) active injectors
- Survey: Baseline behavioral questionnaire: demographics, HCV risk behaviors/exposures, and injecting partnerships
- Injecting Partnerships:
 - Each participant reported on up to 3 injecting partners with whom he/she had injected the most or with whom they spent the most time in the prior month.
 - Injecting partners defined: people with whom the participant had injected drugs with in the same physical space
 - This definition did not require that drugs or injecting equipment was shared.
 - Partnership characteristics and partnership risk behaviors
- Blood: anti-HCV and HCV RNA testing
- Quarterly follow up visits

Analyses:

- Descriptive statistics were tabulated on baseline data on all HCV negative individuals followed in the cohort who reported at least 1 injection partner.
- For incidence analyses, partner age was categorized as 'all <30 years', 'all ≥30 years', and mixed age. Partner HCV serostatus knowledge was categorized as 'any HCV+ partner', 'all HCV- partners', and 'mixed HCV- and unknown (?) status partners'.
- HCV incidence overall and within partner age and HCV status categories was calculated. Multivariate Cox Proportional Hazards models compared incidence by partner age and HCV serostatus knowledge adjusting for sex and frequency of injecting.
- Receptive syringe sharing (RNS) and ancillary equipment (cooker) sharing (AES) were examined at the partnership level. Generalized estimating equations were used to assess correlates of RNS and AES.

Results:

- Baseline interview, N=870
- 472 anti-HCV and RNA negative
- 391 reported on one to three injecting partnerships
 - Reported on 909 injecting partnerships

Sample characteristics: HCV negatives, N=391 at baseline

Characteristic	N (or median)	% (or IQR)
Age in years (median; IQR)	24.1	21.8-26.5
Female	124	31.7
White	268	68.5
Years since first injected, median (IQR)	4.1	1.9-7.9
Days injected, prior 30, median (IQR)	25	11-30
Injected heroin, prior 3 months	318	81.5
Injected methamphetamine, prior 3 months	238	60.9

Partnership* characteristics , HCV negative indexes, N=391

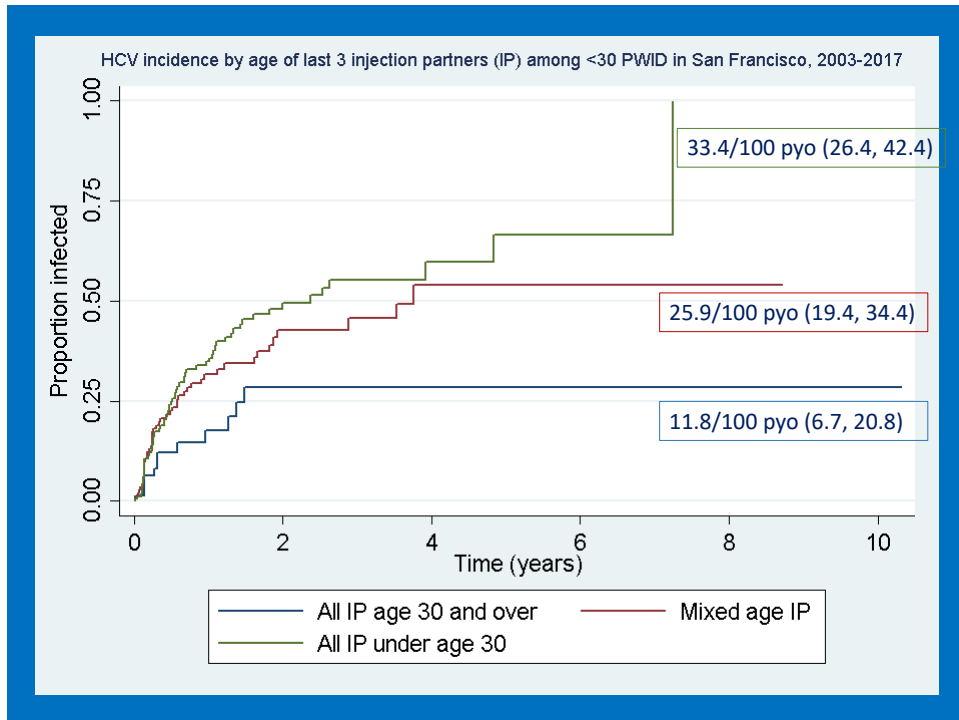
Characteristic	N	%
Injecting partner mix		
- all > 30 years	67	17.1
- mixed over & under 30 years	145	37.1
- all < 30 years	179	45.8
HCV serostatus# of partners		
- Any HCV-positive	150	38.4
- All HCV-negative	60	15.4
- Mix of HCV-negative & -unknown	181	46.3
Receptive syringe sharing with partners	106	27.1
Cooker sharing with partners	298	78.4

* The 3 injecting partners with whom he/she had injected the most, or with whom they spent the most time in the prior month, and injected in the same physical space with. # Partner serostatus was known based on partner report

Partner age and serostatus mixing and association with risk exposure

	Receptive syringe sharing*	Ancillary equipment (cooker) sharing*
	AOR (95% CI)	AOR (95%CI)
Injecting partner age		
- under 30 years	1.00	
- \geq 30 years	0.70 (0.47, 1.05)	0.73 (0.55, 0.95)
HCV status of partner		
- HCV+	1.00	1.00
- HCV-	1.60 (0.97, 2.73)	1.31 (0.91, 1.87)
- Unknown status	1.03 (0.62,1.69)	0.87 (0.63, 1.21)

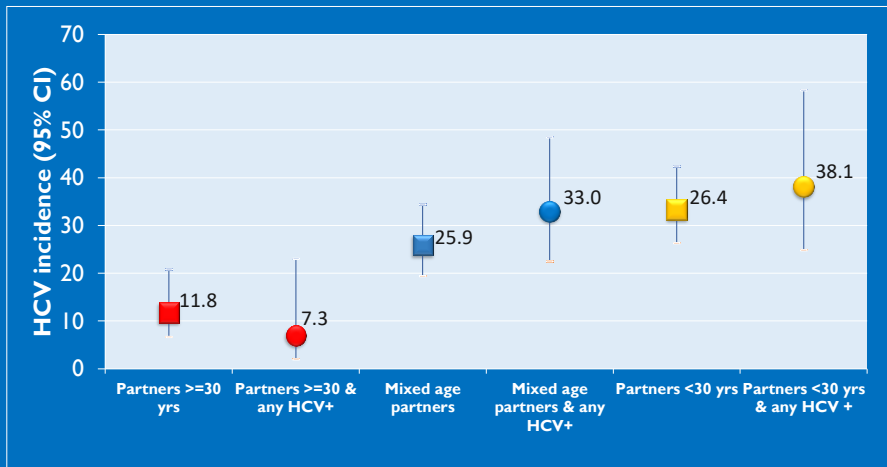
*Adjusting for sex and frequency of injecting



Partner mixing by age and HCV serostatus and HCV risk

		Hazard Ratio*	95%CI
Model 1: Overall	Injecting partner age mix	1.00	
	- Mixed ages (over & under 30 yrs.) - All ≥ 30 years	0.65	0.32, 1.31
Model 2: Any HCV+ partner			
	Injecting partner age mix	1.00	
	- Mixed ages (over & under 30 yrs.) - All ≥ 30 years	0.30	0.09, 0.99
Model 3: Mix of HCV- and unknown partners			
	Injecting partner age mix	1.00	
	- Mixed ages (over & under 30 yrs.) - all ≥ 30 years	0.68	0.33, 1.39
Interaction of Injecting partner age mix and HCV status of partners P=0.11			
*Adjusting for sex and frequency of injecting			

HCV incidence by injecting partner group



Conclusions

- We found differences in HCV incidence by injecting partner age and perceived HCV status.
- Among the groups we examined, HCV incidence was lowest in those with whose injecting partners were all over 30 years of age, and who had any partner who they knew was HCV+.
- HCV prevalence is higher in older injectors, and protective factors at work in these relationships need further exploration: who and what is at play that decreases risk?
- Disclosure of HCV serostatus within partnerships has potential to increase preventive behaviors and potentially reduce HCV incidence.
 - Those who do not know the status of their partners maybe be at higher risk due to several mechanisms: don't ask, don't know, don't care?
- Acute infection in younger injectors may contribute to increased incidence due to seronegative viremic status and high viremia during this phase of infection (i.e. not knowing they are positive).

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