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## Injection Risk Networks in Rural Puerto Rico

This research is lead by the REACH Lab  
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# Hepatitis C Serosorting Among People Who Inject Drugs in Rural Puerto Rico

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# Background on Hep C

- 2.7 million Americans are chronically HCV  
† (Denniston et. al., 2014)
- Worldwide, 2-3% of the population is estimated to be infected with the Hepatitis C Virus, with 500,000 deaths annually (Lozano et. al., 2012)
- In recent years, HCV deaths have outpaced HIV deaths in the U.S. (Ly et. al., 2012)

# Hepatitis C and Injection Drug Use

- PWID at elevated Hepatitis C risk
  - Bloodborne pathogen
- CDC reports roughly 1/3<sup>rd</sup> of PWID under age 30 have HCV, up to 90% of older/former PWID
- HCV virus much more robust than the HIV virus (Paintsil et. al., 2010)
- HCV is seen as less-threatening than HIV, even to people who are HCV+ (Al-Tayyib et. al., 2015)
- March 2014 CDC report states that 80% of PWID living with HIV also have HCV
  - Decreased ability to fight HCV infection



# Hepatitis C Treatment

- Currently, prophylactic medication that is effective in 43-80% of patients, depending on genotype (Manns et. al. 2001)
- Sofosbuvir now on the market as well, but is very expensive (Berden et. al., 2014)
- Preventing new HCV infections in imperative to combating the disease

# Preventing New Infection

- Testing as Treatment
- PWID are tested for HCV, encouraged to only inject with users who have the same status
- Serosorting – sorting on serostatus

## Previous Serosorting Work

- Most research done on sexual partner selection, not injection partner (Cox, Beauchemin, & Allard, 2004; Fendrich, Mackesy-Amiti, Johnson, & Pollack, 2010; Zablotska et al., 2009)
- Burt, Thiede, and Hagan found about 40% of their sample serosorted on HCV (2009)
- Mizuno et. al. found similar results on HIV (2011)



# Serosorting, Place, and Cultural Norms

- Prior research suggests that local norms are key in serosorting and needle behavior (Golub et. al., 2007)
- Cultural norms play a role as well
  - Puerto Rican PWID living in the U.S. are more likely to share needles (Deren et. al., 2001) and take part in indirect equipment sharing (Andia et. al. 2008) than their peers in the same area
  - New immigrants have more risky injection behavior than less recent immigrants (Deren et. al., 2003)
- New York - PWID who had lived on island had 4 times the mortality rate of locals who identified as ethnically Puerto Rican (Colon et. al., 2006)

# The Current Study

- A 2013 study by Smith and colleagues found that PWID who knew their own HCV status were more likely to have asked their last injection partner about their status
  - Adjusted Odds ratios: 4.1 for HCV+, 2.5 for HCV-, vs. unknown status
- This study was conducted at the national level using the CDC's National HIV Behavioral Surveillance IDU2 dataset
- We collected data on PWID in rural Puerto Rico, using a design that closely matched the NHBS design
- We replicate the Smith study to draw comparison between PWID in rural Puerto Rico and the U.S. at large

# Our Data

- V.A.S. Project – Vida, Accion, Salud
- Interviews with 315 PWID in rural area near San Juan, Conducted between April 19<sup>th</sup>, 2015 and June 15, 2015
- Participants where 18 or older, alert, and reported injecting within past 30 days
- Used Respondent Driven Sampling
  - Compensated \$25 for interview, \$5 for completing HIV and HCV tests, and \$10 for each referral who came in (up to three)
- Survey modeled after CDC's NHBS IDU Round 2 Question, Version 13

# The Model We Replicate

- Model 2 from Smith et. al.'s study is replicated
- Multivariate logistic regression and adjusted odds ratios
- Dependent variable:
  - If asked last injection partner about their HCV status before co-injection
  - Aka, attempted serosorting
- Independent variable:
  - Self-Reported HCV status
- Controls:
  - gender, race, age, education, homelessness, employment status, income, and age at first injection

# How Our Models Differ

- Four Key Differences
  1. We have no measure of race, as it is impractical for a Puerto Rican sample
  2. Smith et. al. asked about **homeless over lifetime**, we asked only about **over the past 12 months**
  3. Smith et. al. used **\$15,000**/annually for the threshold between low and high income. We use **\$5,000**, as this is more reasonable for Puerto Rico
  4. Ours includes one respondent over 65 years of age who is binned into the next lowest category

# Descriptives

Variable	N	Percentage
HCV Status		
- Positive	86	55.8%
- Negative	37	24.0%
- Unknown	31	20.1
Female	18	11.7%
Age		
-18 – 34	40	26.0
- 35 – 44	45	29.2
- 45 – 54	52	33.8
- 55+	17	11.0
High School Grad	83	53.9%
Homeless	55	35.7
Employment Status		
- Employed	12	7.8
- Disabled	9	5.8
- Other	9	5.8
High Income	39	3.9
Age at First Injection		
- Under 18	57	37.0
- 18 – 24	55	35.7
- 25+	42	27.3
Serosorted on Last Partner	47	30.5

# Results

- Our analytical sample is 154 out of the 315 respondents, largely due to skip patterns in the survey
- HCV Status
  - 55.8% Positive, 24% Negative, 20.1% Unknown
- 11.7% women
  - about half of Smith et. al.
- Mean age of 42.21
  - Smith – 46
- More unemployment (80.5% v. 57.3%)
- Much lower income (3.9% in high income vs. 22.6%)
- Fewer homeless in our data – 1/3<sup>rd</sup> vs. 2/3<sup>rd</sup>
- Comparable age at first injection

# Results

- Unlike Smith and colleagues, we did **not** find a relationship
- Knowledge of own HCV status **NOT** a good predictor for asking partners about their own
- Our odds ratios were substantial, and did trend in the right direction
  - 1.46 for HCV-, 1.75 for HCV+
- However, these were not statistically significant relationships, nor did they even come close
  - Upper-limit on confidence intervals a whole order of magnitude greater than lower-limit
    - 0.51, 4.40 for HCV-; 0.55, 5.62 for HCV+



# Discussion

- Some similarities were still found
  - Current age and age at first injection → poor predictors
  - Gender was a strong predictor in both, with women being much more likely to serosort than men
    - Gender finding is curious, as female PWID are 2-3 times as likely to contract HCV (Lidman et al., 2009; Maher et al., 2007)
- Only 30.5% of our sample serosorted, whereas studies on the U.S. mainline report closer to 40% serosorting prevalence (Burt et al, 2009; Smith et. al.. 2013)
- Given the localized and culturally-based norms surrounding PWID behavior, not entirely surprising findings, especially given previous research on Puerto Rican PWID

## Limitations and Future Directions

- Substantially smaller sample size is key limitation
  - However, Smith and colleagues found strong statistical significance, where as we found nothing approaching a significant relationship between knowledge of HCV status and serosorting behavior
  - Should a relationship exist in rural Puerto Rico, it is likely much weaker than on the U.S. mainland
- Future Directions
  - We have been granted access to the San Juan data from NHBS
  - We plan to replicate this model once again using this data to tease out if these differences are due to urban vs. rural phenomena, or if PWID in Puerto Rico as whole behave differently than PWID on the U.S. mainland

# Conclusion

- Serosorting behaviors on the U.S. mainland do not match those in rural Puerto Rico
- PWID in rural Puerto Rico do not attempt to serosort on HCV status, even once they know their own status
  - This promotes HCV transmission and the spread of the virus
- This adds a unique challenge to combating HCV infection in a very high-risk community

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