Two Applications of Respondent Driven Sampling: Ethnic Minorities and Illicit Substance Users

Sunghee Lee, Ai Rene Ong, Michael Elliott
University of Michigan

Workshop on Improving Health Research for Small Populations
National Academy of Sciences, Engineering and Medicine
January 18, 2018

Introduction

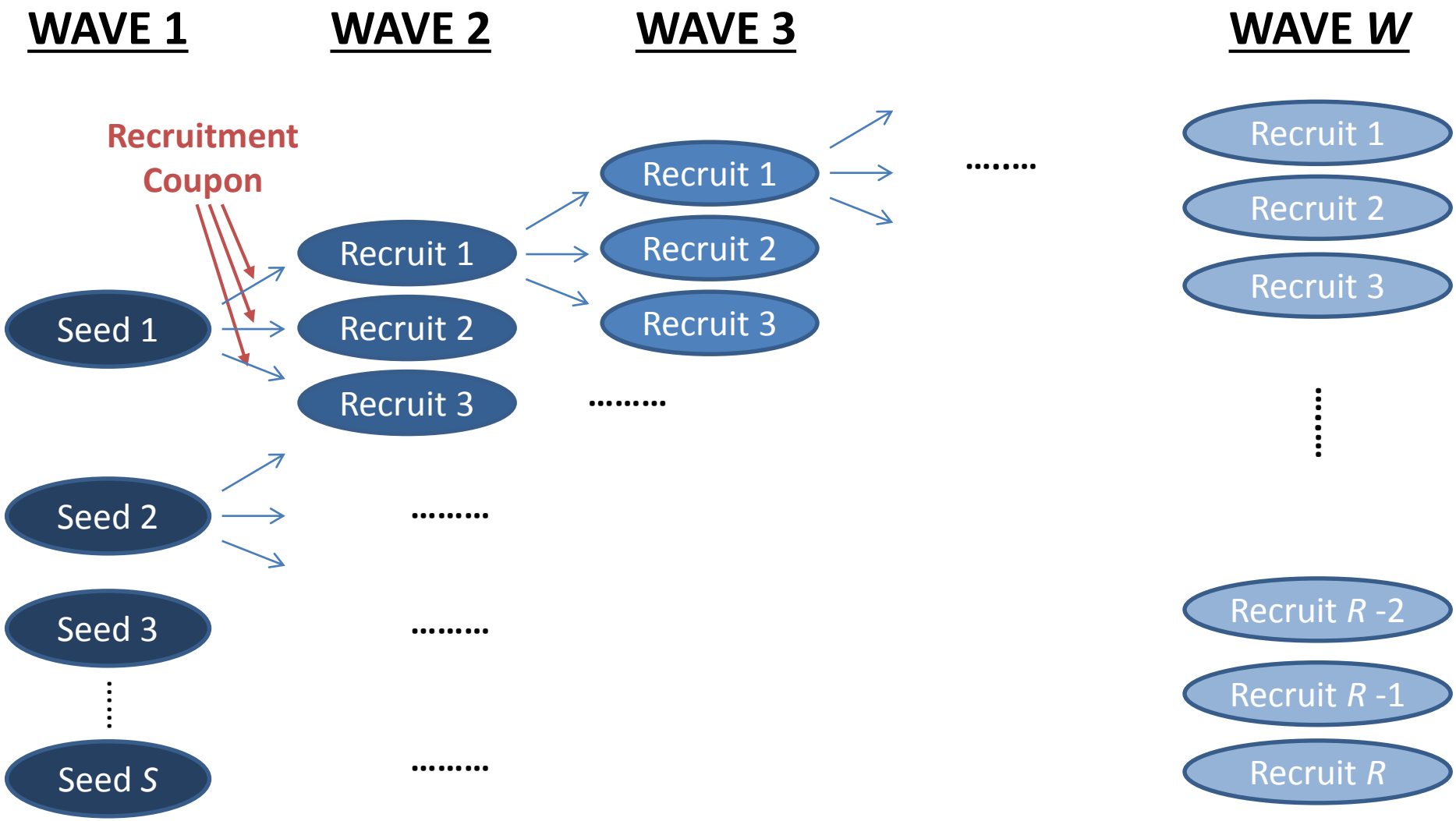
Respondent Driven Sampling – 1

- Growing interest in studying hard-to-reach, rare, elusive, hidden populations
  - HIV at-risk population: MSMs, Sex workers, IDUs
  - LGBT populations
  - Recent immigrants
- No clear and practical solution with probability sampling
  - High screening costs
  - Hesitant to be identified

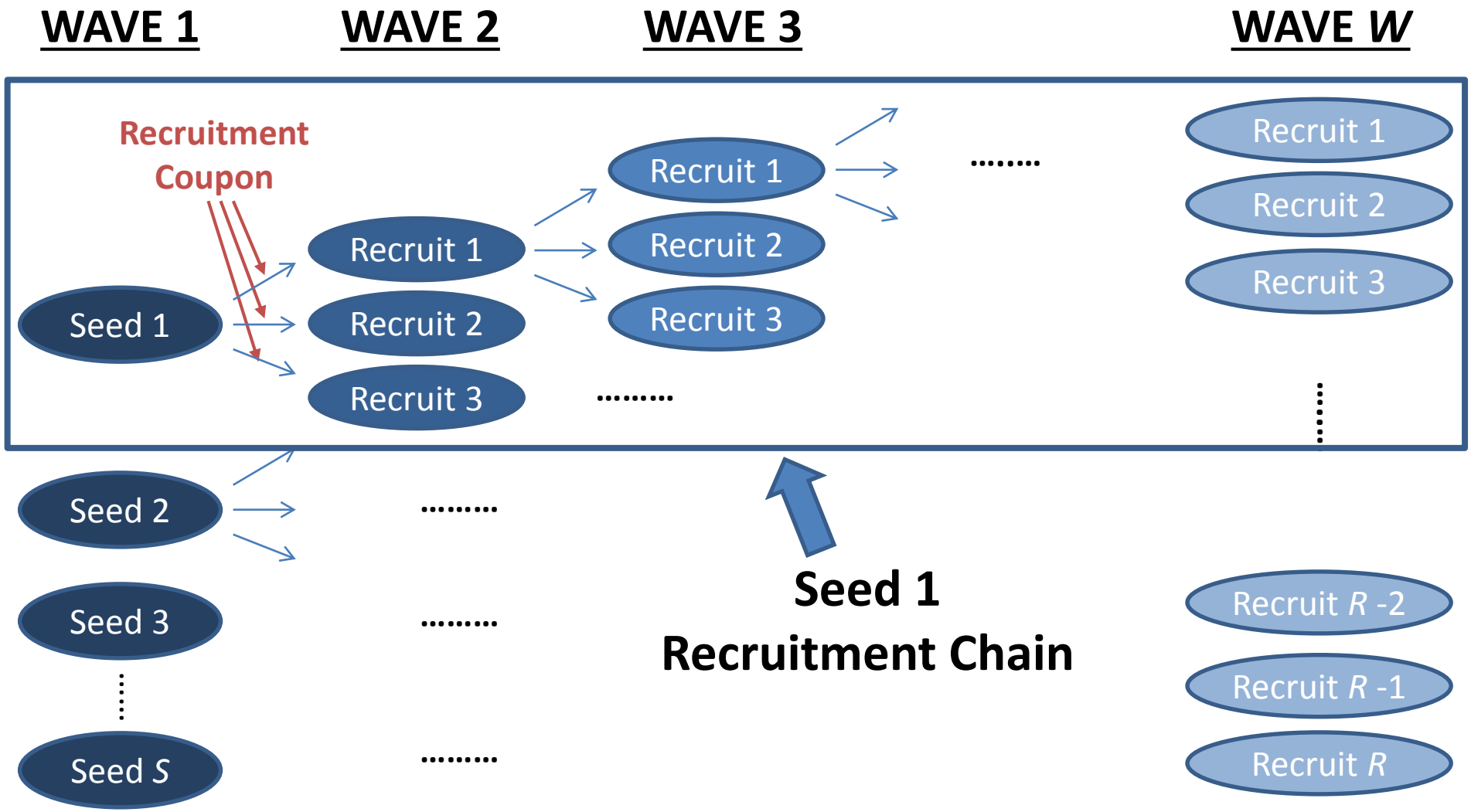
Respondent Driven Sampling – 2

- Proposed by Heckathorn (1997, 2002)
- Popular usage in public health
- Exploits social networks among rare population members for sampling purposes
  - Sampled members also play a role of a recruiter
  - Incentivized recruitment from own network through coupons and this continues in waves/chains
  - Recruitment assumed to be random within each individual's network and to follow memory-less Markov chain and reach equilibrium
    - Under these assumptions, unbiased estimators can be obtained after equilibrium using weights, an inverse of a participant's network size (e.g., a count of nodes).

Respondent Driven Sampling – 3



Respondent Driven Sampling – 4



Network Sampling vs. RDS

Similar:

- Rely on social networks

Different:

- Network specification
  - NS: biological siblings, immediate family members
  - RDS: jazz musicians
- Who selects the sample
  - NS: researchers
  - RDS: study participants

Application 1:
Project PATH (Positive Attitudes Towards Health)

Funded by the National Science Foundation (GRANT NUMBER SES-1461470)

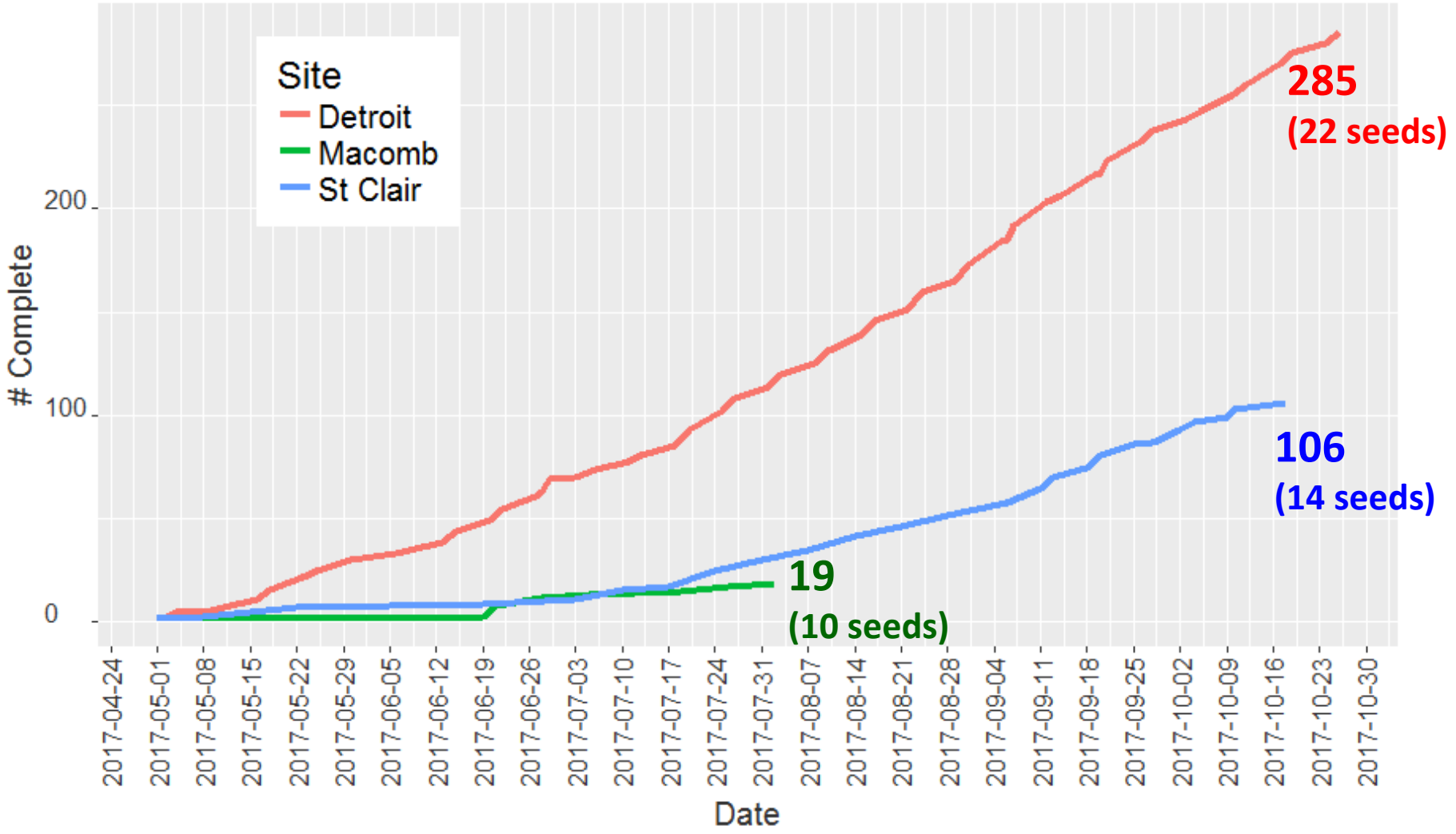
PATH Data Collection

- Injection drug users in Southeast Michigan
- Phone screener

  → In-person screener + Main interview + ~3 Coupons

  → In-person follow-up interview
- Data collection sites
  - Detroit: Urban; Tues, Thur @ Detroit Center
  - Macomb: Suburban; Weds @ County PH Depart
  - St. Clair: Rural; Mon (+Weds) @ County PH Depart
  - 4 interviewers rotating between sites
- Field Period: 5/1/2017 – 10/31/2017

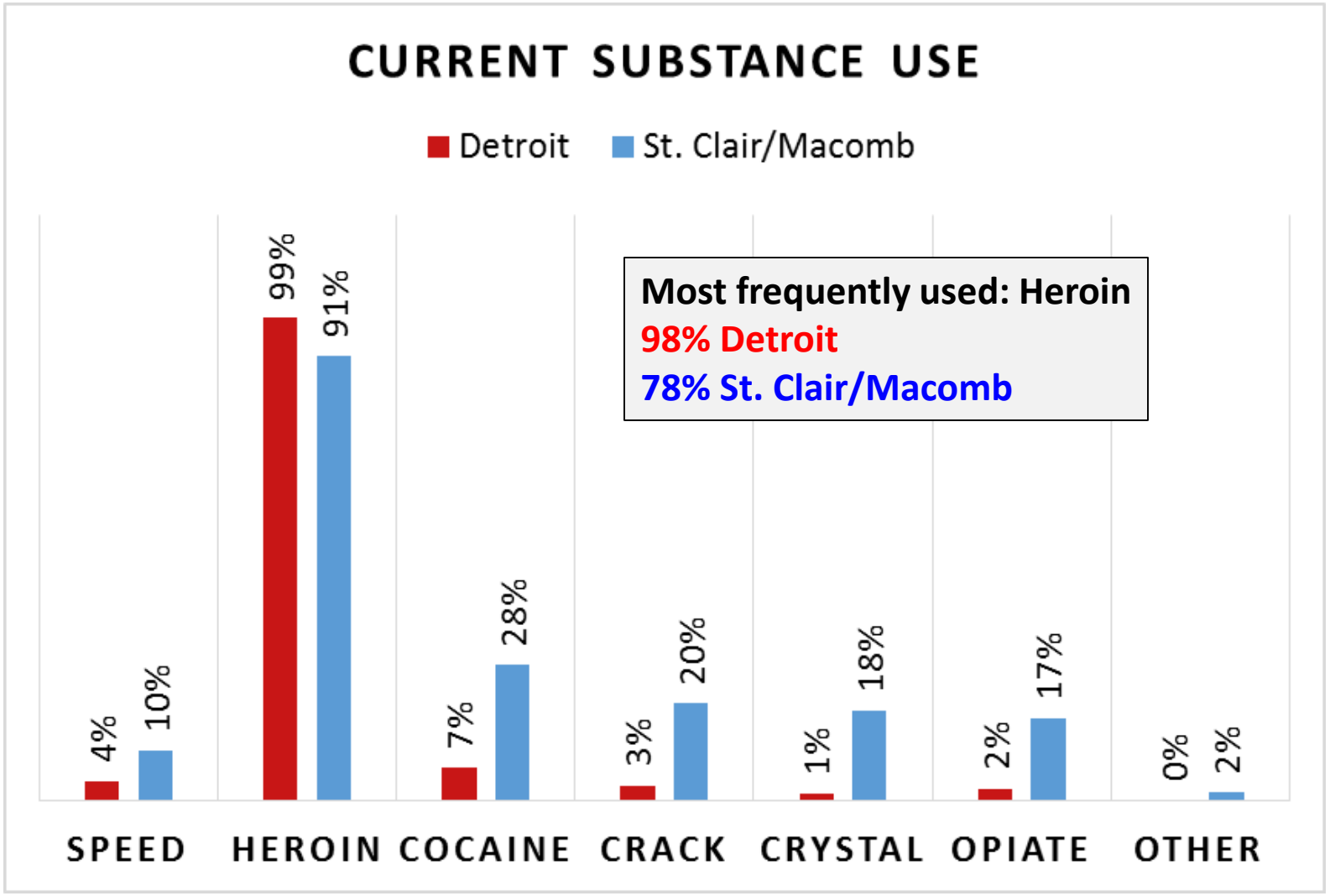
PATH Data Collection Progress



Demographics

	Detroit	St Clair/ Macomb
Age (avg)	56 yrs	40 yrs
Age: <30 years old	2%	32%
Male	68%	53%
Non-Hispanic White	11%	73%
Non-Hispanic Black	81%	16%
Education: <High School	32%	18%
Employed	8%	18%
Ever homeless past 12 mos	40%	56%

Substance Use



Application 2:
Health and Life Study of Koreans (HLSK)

Funded by the National Science Foundation (GRANT NUMBER SES-1461470)

HLSK

- Targets foreign-born Korean American adults in
  - Los Angeles County
  - State of Michigan
- Web-RDS survey

  http://sites.lsa.umich.edu/korean-healthlife-study/
  - Unique number required for participation
  - Incentive payment through checks
- Target n=800 (currently ~600)
- Benchmarks from American Community Survey

HLSK Formative Research

- 3 rounds of focus group discussions
  - ~30 participants; 2 rounds in Korean and 1 in English
  - Discussion focused on
    - Web surveys

      → URL, Web site contents, etc.
    - Concept of RDS
    - Coupons

      → Up to 2 coupons

      → “Expire” in 2 weeks
    - Level of incentives

      → $20 for main, $5 for follow-up, $0 for recruitment

한인 건강생활 연구
Health and Life
Study of Koreans

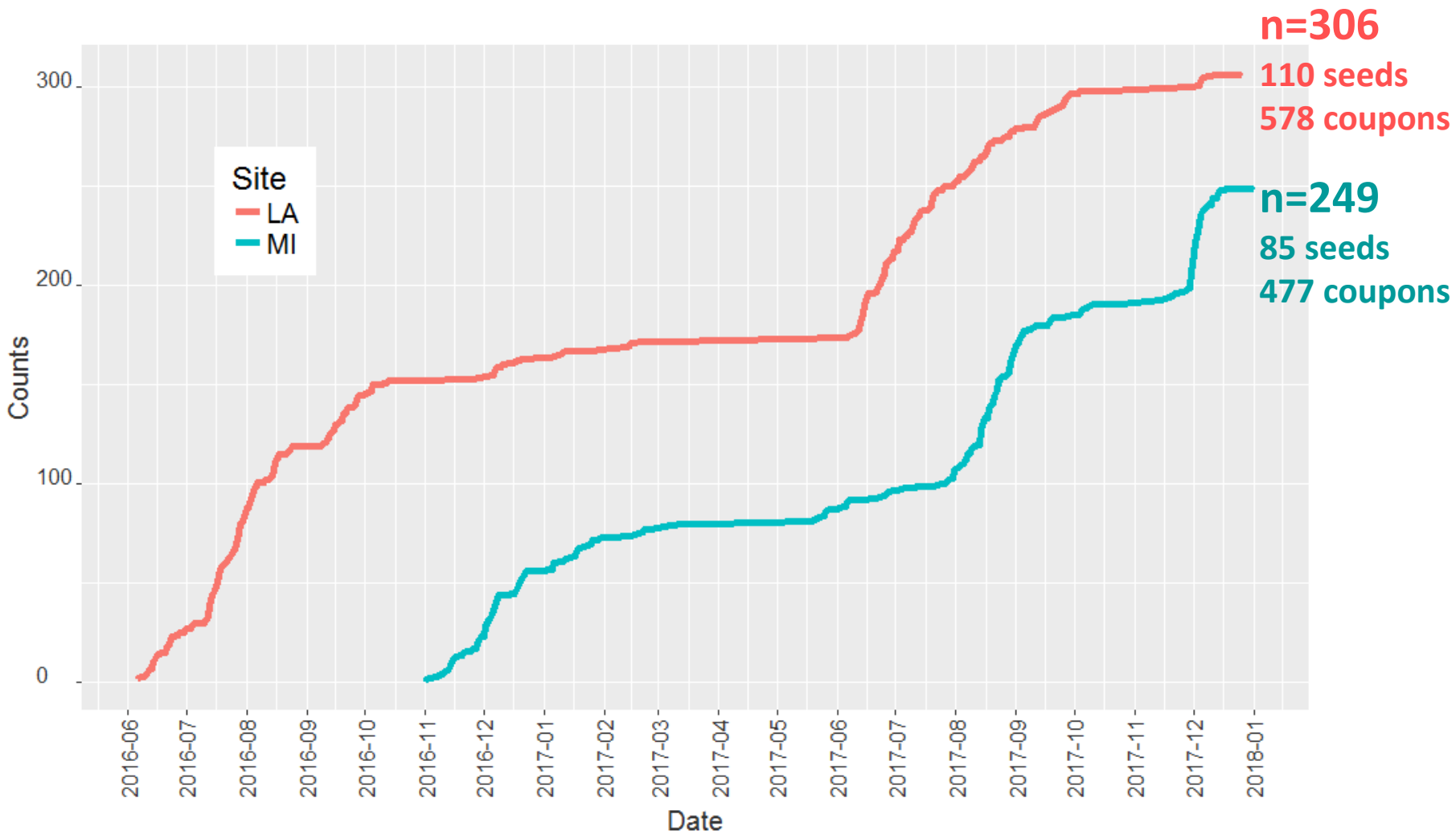
HLSK Data Collection

- Started with 12 seeds in LA in June 2016
- MI added in November 2016

- LA seeds (initially)
  - Recruited through referral
  - Balanced on gender, age, dominant language
  - In-person introduction about the study

→ It became clear the protocols would not work
  - Provide recruitment incentives
  - Add more seeds

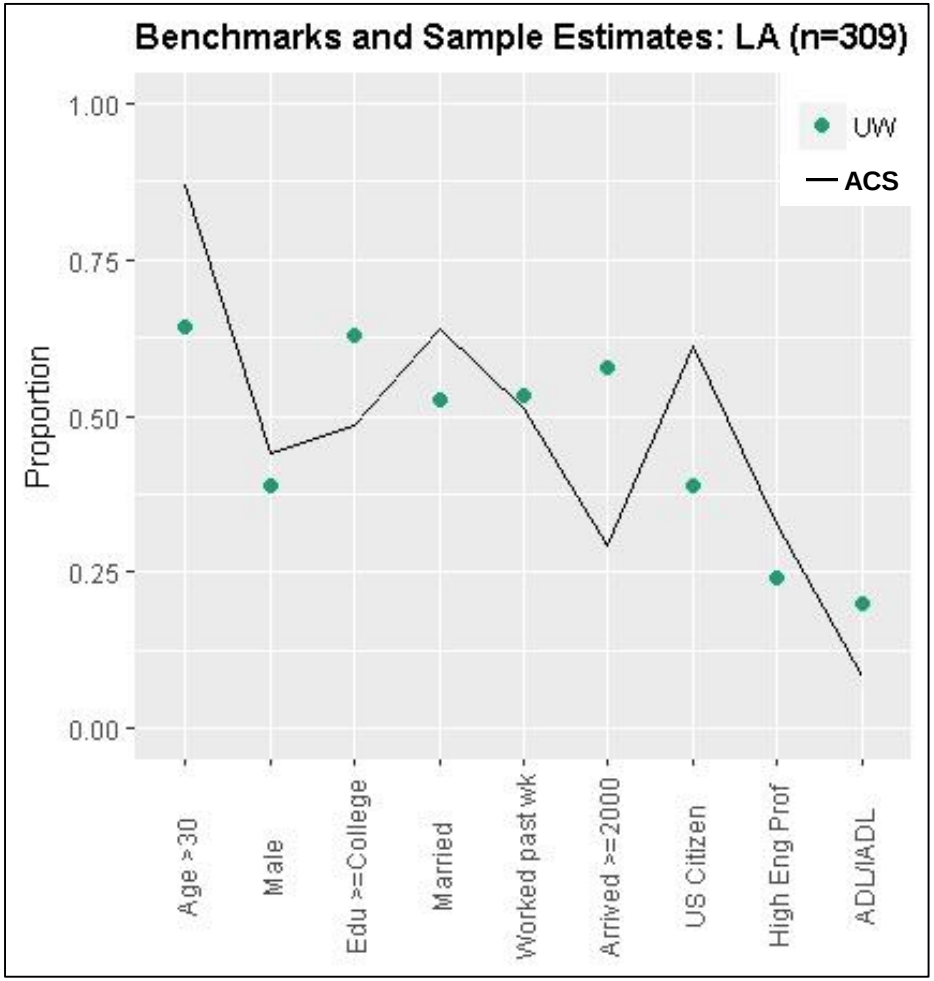
HLSK Data Collection Progress

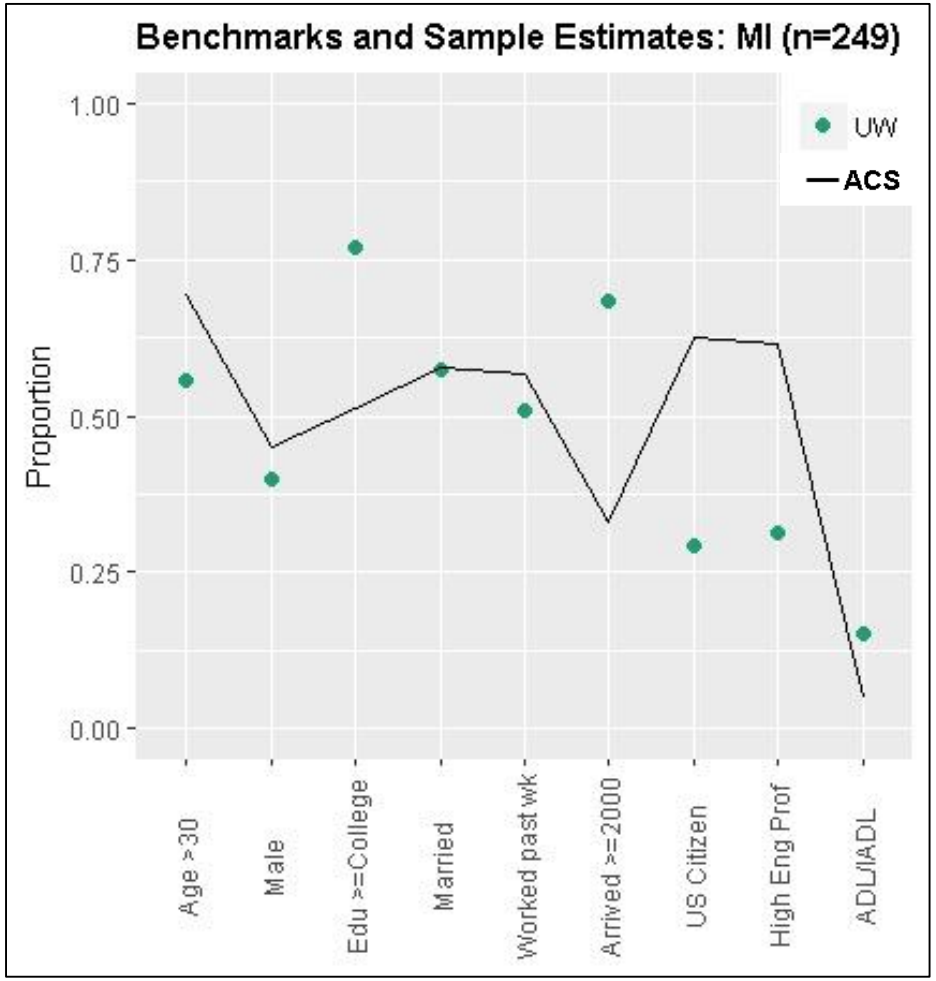


HLSK vs. ACS – 1

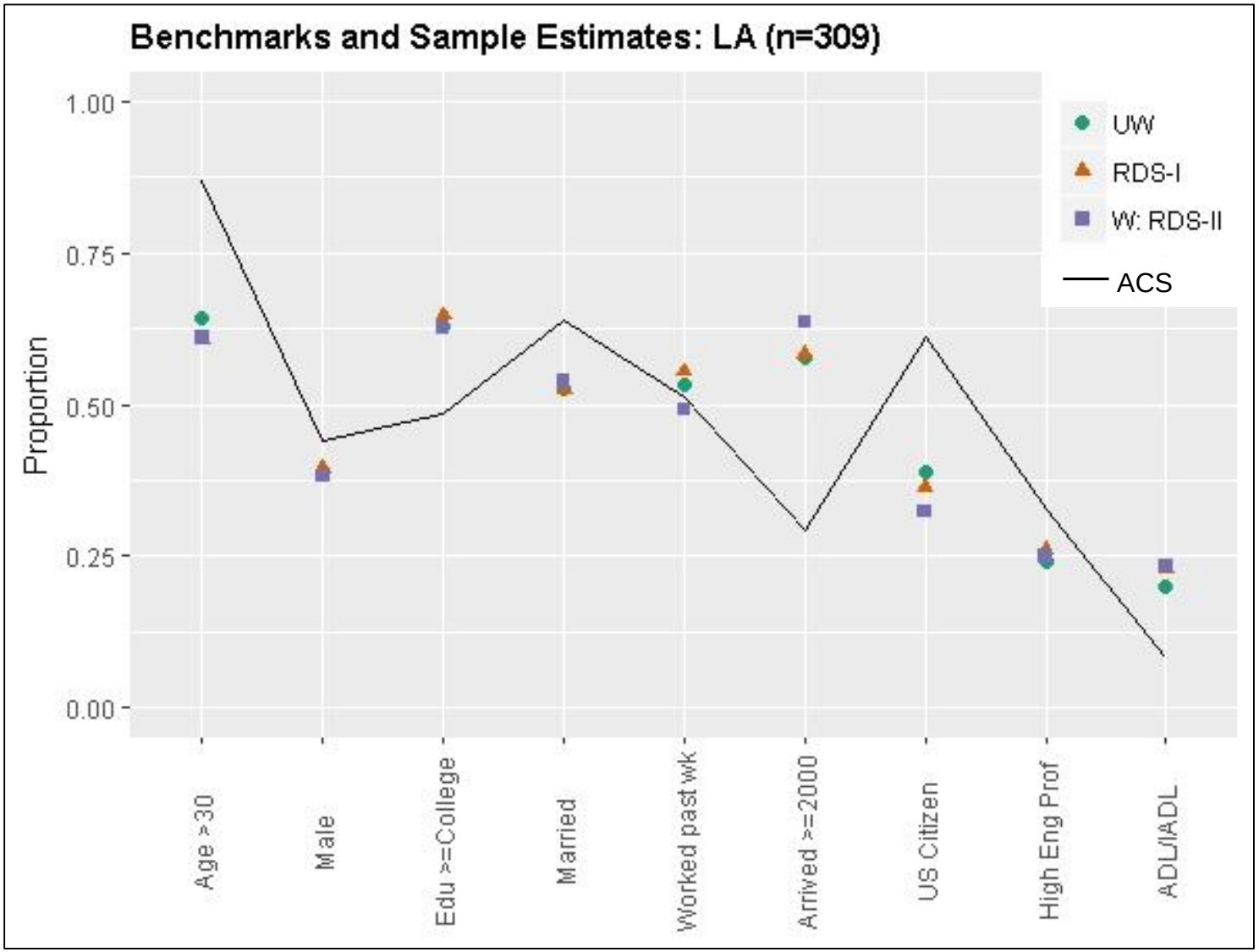
- American Community Survey 2011-2015 data
- HLSK sample estimates
  - Unweighted (UW)
  - RDS-I
  - Weighted: RDS-II
  - Weighted: Post-stratification (PS) by age, sex, educ
  - Weighted: RDS-II + PS

HLSK vs. ACS – 2

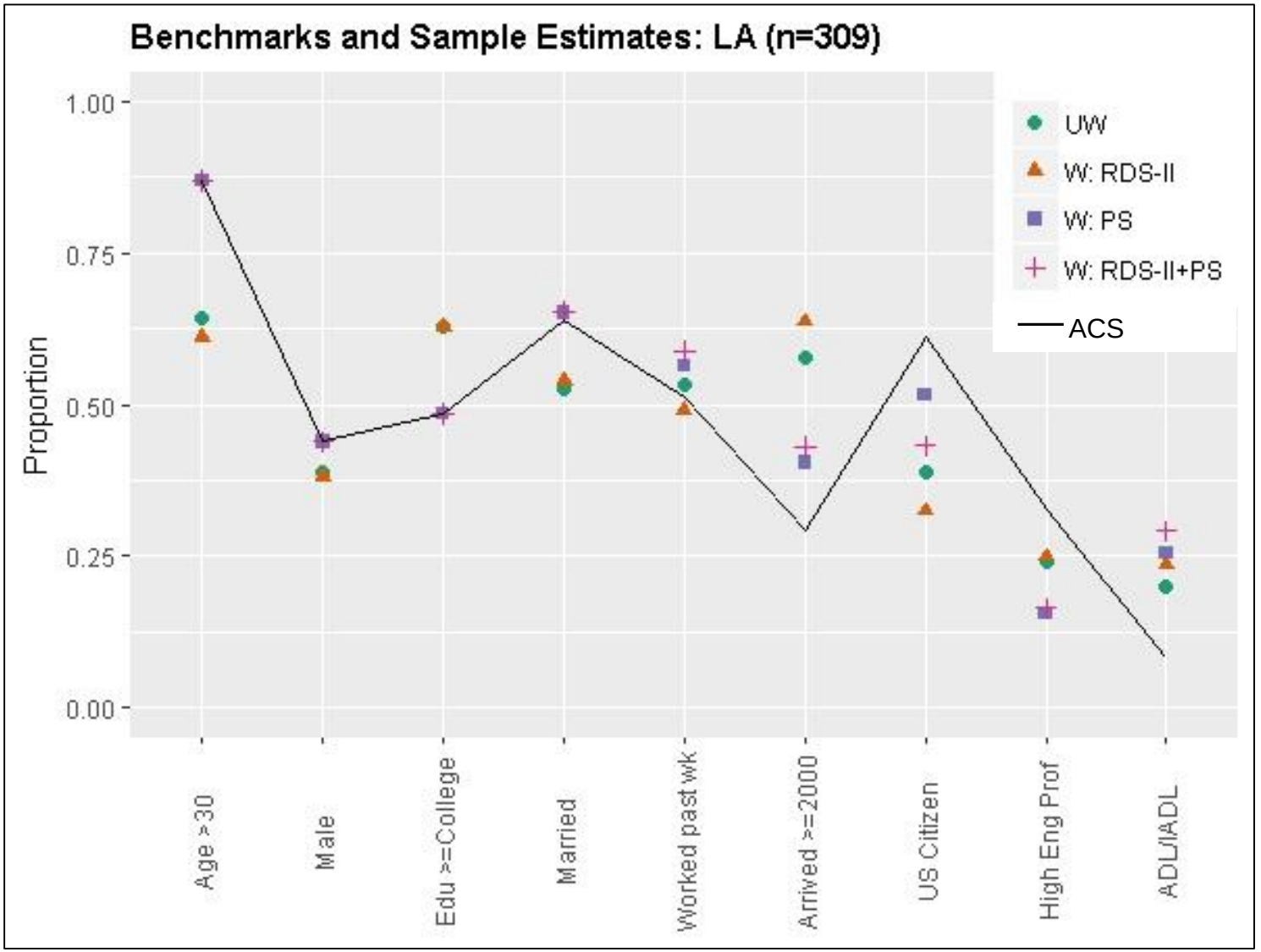

Benchmarks and Sample Estimates: LA (n=309)
Proportion
1.00
0.75
0.50
0.25
0.00
UW
ACS
Age >30
Male
Edu >=College
Married
Worked past wk
Arrived >=2000
US Citizen
High Eng Prof
ADL/IADL


Benchmarks and Sample Estimates: MI (n=249)
Proportion
1.00
0.75
0.50
0.25
0.00
UW
ACS
Age >30
Male
Edu >=College
Married
Worked past wk
Arrived >=2000
US Citizen
High Eng Prof
ADL/IADL

HLSK vs. ACS – 3


Benchmarks and Sample Estimates: LA (n=309)
Proportion
1.00
0.75
0.50
0.25
0.00
UW
RDS-I
W: RDS-II
ACS
Age >30
Male
Edu >=College
Married
Worked past wk
Arrived >=2000
US Citizen
High Eng Prof
ADL/IADL

HLSK vs. ACS – 4


Benchmarks and Sample Estimates: LA (n=309)
Proportion
1.00
0.75
0.50
0.25
0.00
UW
W: RDS-II
W: PS
W: RDS-II+PS
ACS
Age >30
Male
Edu >=College
Married
Worked past wk
Arrived >=2000
US Citizen
High Eng Prof
ADL/IADL

Summary

What did we learn?

- Non-cooperation is an issue for generating long chains (memorylessness unlikely)
- Had to improvise to make RDS "work"
- Sample size (hence, chain length) is a random variable affected by many (mostly unknown) factors
- Inferences limited
- YET, difficult-to sample groups can be recruited
  - E.g., highly-educated young recent immigrants

Where should we go?

- Non-cooperation is critical for
  - meeting theoretical assumptions (hence, inferences)
  - study design
  - replications of the same study

- Yet to be addressed in the literature and accounted for in inferences

Thank you

sungheel@umich.edu