



Respondent-Driven Sampling: An Epidemiological Tool with Interventional Potential

Sunil S Solomon,^{1,2} Aylur K Srikrishnan,³ S Anand,³ Allison M McFall,² P Balakrishnan,³ David D Celentano,² M Suresh Kumar,³ Gregory M Lucas,¹ Shruti H Mehta²

¹Johns Hopkins University School of Medicine, MD; ²Johns Hopkins Bloomberg School of Public Health, USA; ³YR Gaitonde Centre for AIDS Research and Education, India

BACKGROUND

- UNAIDS has set an ambitious target of 90-90-90 by 2020
- Achieving these targets in hard-to-reach populations such as MSM and PWID in RLS will likely be challenging
- The largest drop-off in the care continuum particularly among MSM and PWID is in the first step – awareness of HIV status
- RDS is an epidemiological tool that is commonly used for surveillance but appears to have potential to help achieve the first “90” of the UNAIDS 90-90-90 target

METHODS

RESPONDENT-DRIVEN SAMPLING

- We used respondent-driven sampling (RDS) to recruit MSM and PWID from 27 sites (26 Indian cities) in India as part of the baseline assessment of a cluster-randomized trial.
- Target sample size was 1000 per site
- Ethnography was initially conducted to identify “seeds” for RDS
- RDS in all sites was initiated with two “seeds” – a third “seed” was added in Delhi (MSM site) and Gangtok (PWID site)
- Each recruit was given two coupons to distribute to their network
- Participants were reimbursed USD 4 for the participation and USD 1 per recruit referred who completed study procedures

ELIGIBILITY CRITERIA

Men who have sex with men (MSM)

- 18 years of age or older
- Provide verbal consent
- Self-identify as male
- History of oral or anal intercourse with another man in the prior 12 months
- Present a valid RDS coupon

Injection drug users (IDUs)

- 18 years of age or older
- Provide verbal consent
- History of injecting drugs for non-medical purposes in the prior 24 months
- Present a valid RDS coupon

STUDY PROCEDURES

- Participants underwent a survey and provided a blood specimen
- HIV testing was performed on-site (three rapid tests) and results were delivered to participants with pre- and post-test counseling
- Awareness of HIV-positive status and linkage to HIV medical care were self-reported
- This study was approved by the JHMI, JHSPH and the YRGCARE Institutional Review Boards

STATISTICAL METHODS

- All samples satisfied RDS process measures with respect to equilibrium and homophily
- RDS recruitment tree was drawn using RDS-Analyst version 0.52 (<http://hpmrg.org>)
- Pincode of residence by wave was mapped using ArcGIS version 10.2 (Redlands, CA)
- Statistical analyses were conducted using Stata v.13 (College Station, TX)

RESULTS

	Overall (27 sites)	MSM sites only (12 sites)	IDU sites only (15 sites)
Total number recruited (seeds)	26,447 (56)	11,997 (25)	14,450 (31)
Median recruitment time in days (range)	112 (52 – 200)	99 (70 – 157)	135 (52 – 200)
Median number of waves (range)	21 (11 – 50)	21 (11 – 28)	22 (12 – 50)
Median site-level HIV prevalence (%) (range)	13.1 (2.0 – 43.3)	8.6 (2.0 – 18.8)	19.7 (6.1 – 43.3)
Median site-level proportion of HIV positive unaware of status (%) (range)	38.9 (0 – 92.4)	36.4 (0 – 92.4)	43.3 (2.8 – 92.2)

Table 2. Characteristics of HIV-infected MSM and PWID aware of their status across 26 sites in India (n=1726)

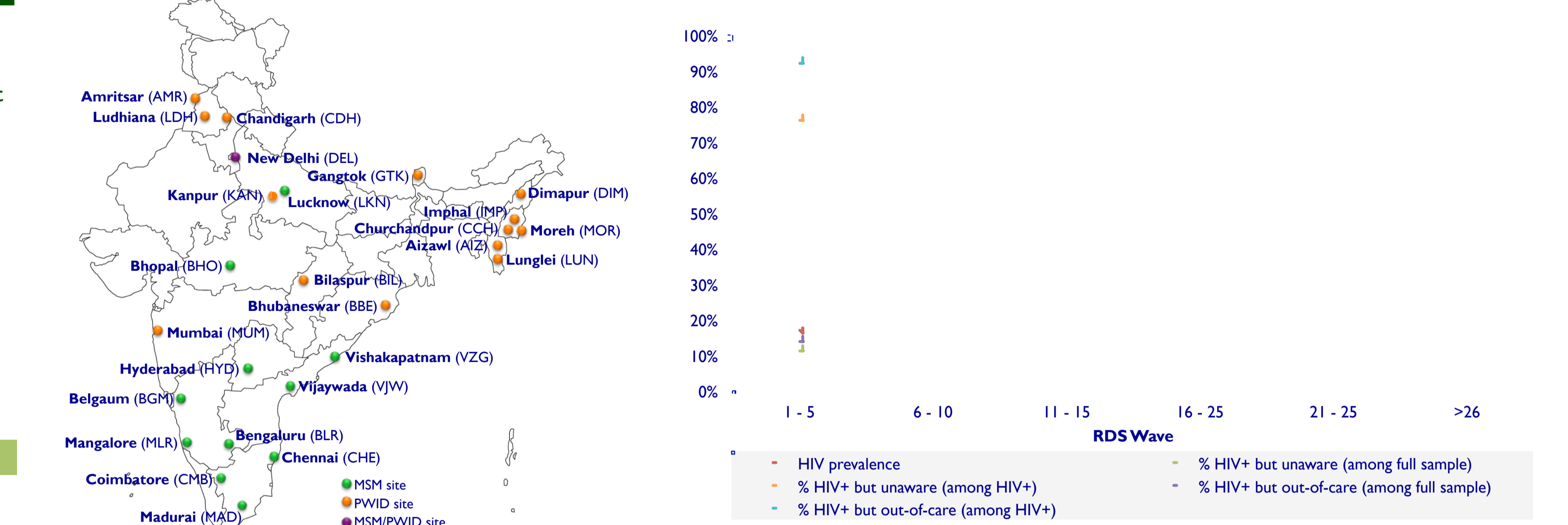


Figure 1. Study sites. Figure 2. RDS recruitment dynamics by wave

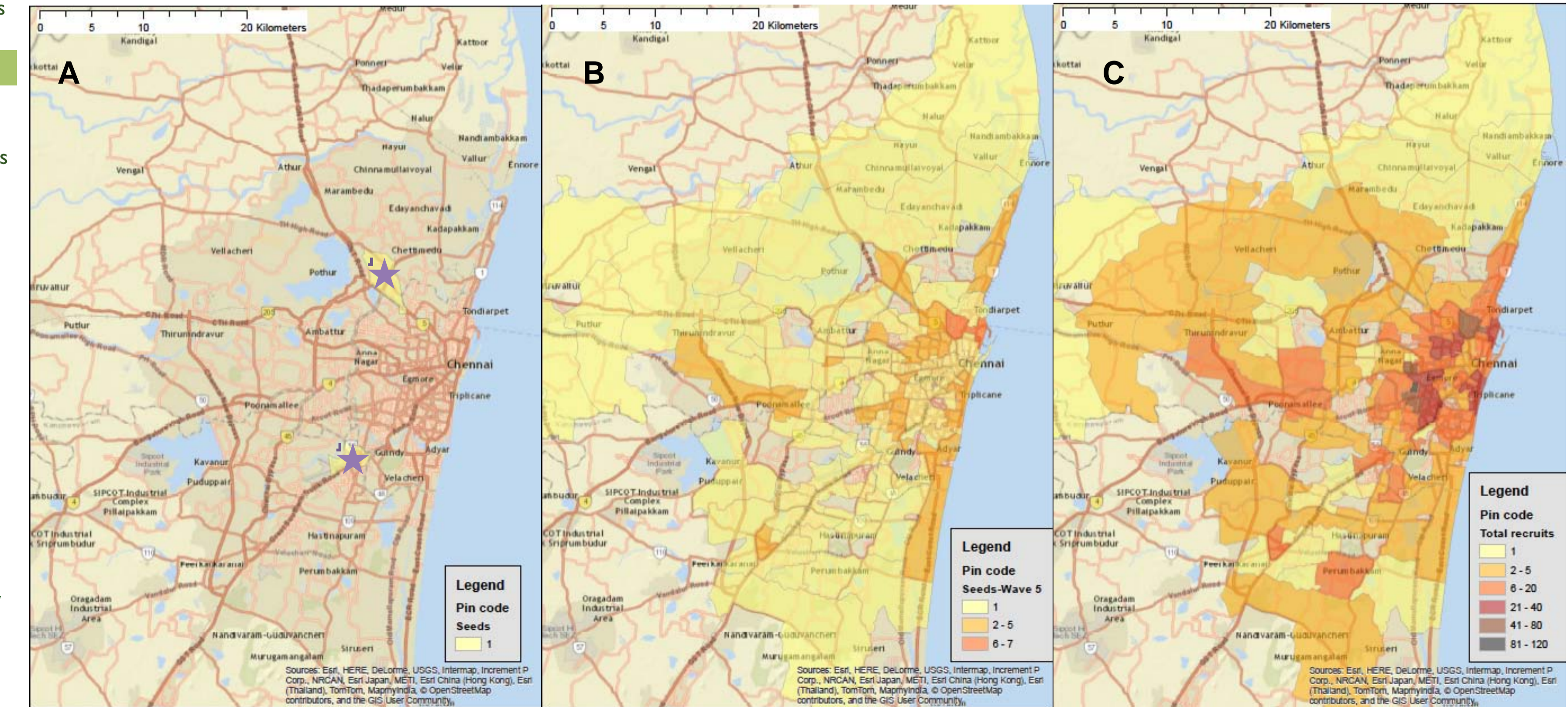


Figure 3. RDS Recruitment among men who have sex with men in Chennai, Tamil Nadu. Panel A: 2 seeds; Panel B: Recruitment waves 1 thru 5 including seeds; Panel C: Complete sample (n=1002)

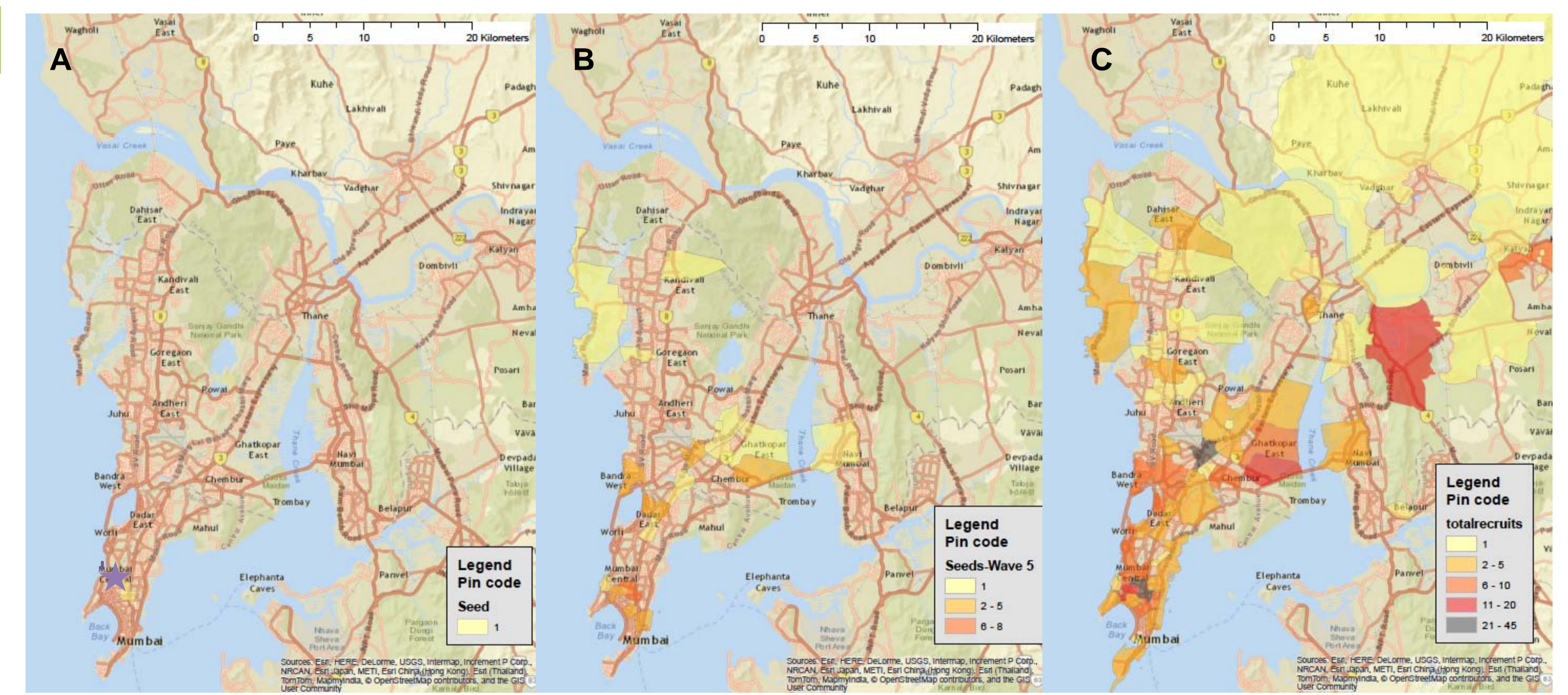


Figure 4. RDS Recruitment among people who inject drugs in Mumbai, Maharashtra. Panel A: 2 seeds; Panel B: Recruitment waves 1 thru 5 including seeds; Panel C: Complete sample (n=1002)

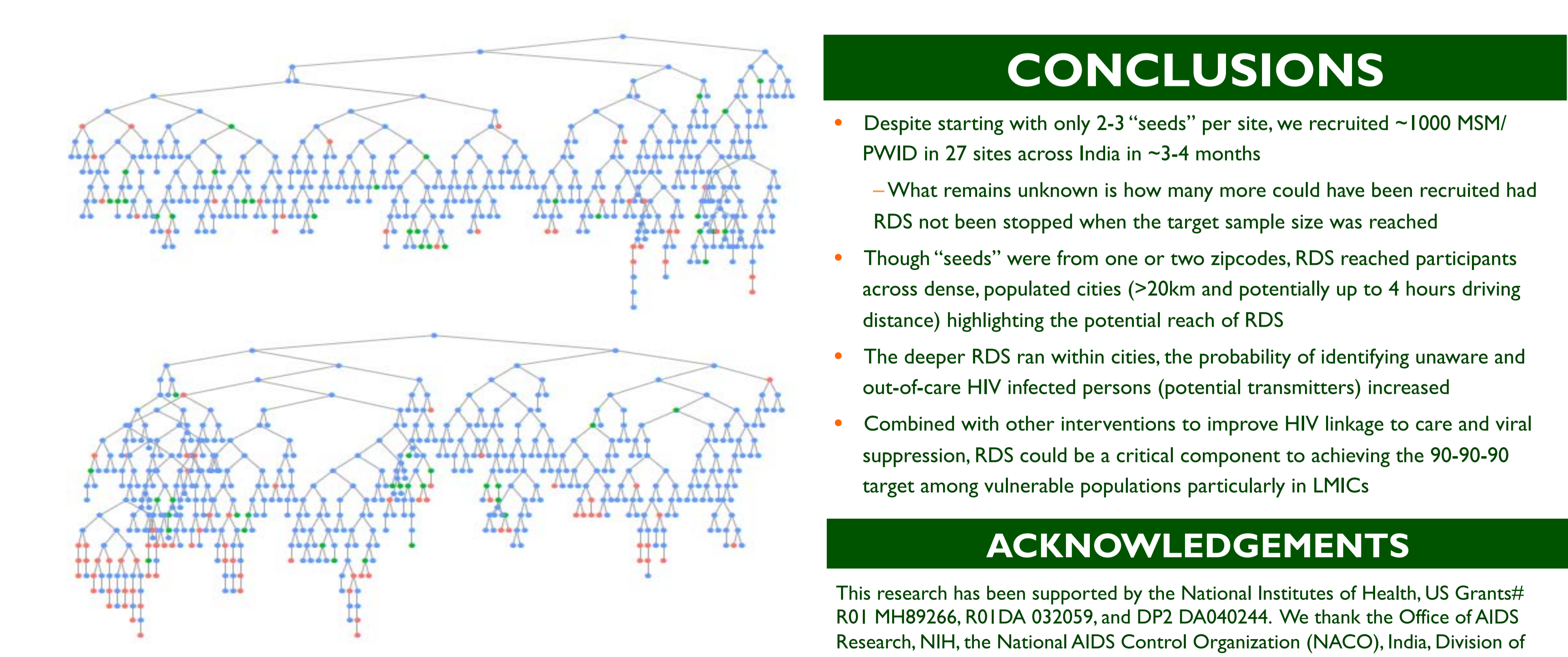


Figure 5. Recruitment of MSM in Coimbatore, Tamil Nadu by HIV+ awareness. Light Blue = HIV negative; Green = HIV positive and aware of status; Red = HIV positive but unaware of HIV status

CONCLUSIONS

- Despite starting with only 2-3 “seeds” per site, we recruited ~1000 MSM/PWID in 27 sites across India in ~3-4 months
 - What remains unknown is how many more could have been recruited had RDS not been stopped when the target sample size was reached
- Though “seeds” were from one or two zipcodes, RDS reached participants across dense, populated cities (>20km and potentially up to 4 hours driving distance) highlighting the potential reach of RDS
- The deeper RDS ran within cities, the probability of identifying unaware and out-of-care HIV infected persons (potential transmitters) increased
- Combined with other interventions to improve HIV linkage to care and viral suppression, RDS could be a critical component to achieving the 90-90-90 target among vulnerable populations particularly in LMICs

ACKNOWLEDGEMENTS

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