Lost and Found: On the Effects of Failure to Include Hard-to-Reach Respondents in Public Health Research

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Attrition Bias and Low Response Rates in Hard-to-Reach Populations

- Differential attrition and low response rates (RRs) can bias study findings
  - Change sample composition
  - Lead to inaccurate estimates
  - Reduced power to detect effects (Type II error)
- Increased RRs may not lead to more precise estimates if efforts are not made to retain hard-to-reach and costly-to-find respondents (Mainieri & Danziger 2001, Sullivan et.al, 1996)
- High response rates alone do not guarantee freedom from bias (Groves, 2006)

Who are the “Hard-to-Reach?”

- Reputedly hard-to-reach: Low-income, drug users, youth, undocumented immigrants, criminals, those with high residential mobility, unstably housed, or experience social exclusion

- No coherent standard for defining “hard to reach,” or developing tracking protocols

Research Questions

- Are study respondents who are empirically hard to reach (found using extended tracking efforts) different from other respondents?
- What are the effects of extended tracking effort on overall and sub-group RRs?
- Does excluding hard-to-reach respondents bias study findings?

Data Source: Welfare Client Longitudinal Study (WCLS)

- Survey of 688 cash aid recipients in a California county
  - TANF (adults raising children), GA (childless adults)
  - First i.v. at aid application, sampled at aid receipt
  - Oversample of heavy drinkers/drug users
- Extensive follow-up procedures used to track respondents over 5+ years
- This study
  - All 498 women from the main WCLS cohort
  - Data from baseline WCLS survey (2001)
  - Participation status at one-year follow-up (2002)

Extended Follow-up Efforts

- Fieldwork agency, WCLS scientific staff, including a special tracker/private investigator
  - Letters, telephone calls, residential visits, nonresidential visits, information searches
  - File-sharing among interviewers and staff
  - No limit on contact attempts/search length
  - Up to 12 letters, 57 calls, 28 field visits
  - Cash incentives of $40-50

Measures and Analysis

- Identify hard-to-reach (HTR) respondents
  - Found using extensive tracking efforts
  - Code/quantify trackers' field notes
- Compare HTR to other continuing respondents using baseline data (b.v. chi-sq)
- RRs including and excluding HTR (descriptive)

- Data weighted for sampling design and baseline nonresponse

Nonresponse Simulation

- Simulation using female WCLS respondents
  - Based on study of violent victimization among WCLS female TANF and GA applicants Lown, Schmidt & Wiley, 2006

Reanalyzed for

- 1) Full baseline cohort of recipients
- 2) All recipients found at Wave 2
- 3) Easily found Wave 2 recipients only

(b.v. logistic regression, following Lown)

Identifying HTR Respondents

- Used criteria developed from the survey research and public health literature and interviews of researchers at multiple survey research centers

- HTR: >14 calls, >5 letters, >3 residential visits, 1 or more nonresidential visits, >60 search days, fieldwork agency returned file to WCLS staff

Follow-up Status of Respondents 12 Months Post-baseline

Baseline cohort (0 months)	498
Found using standard effort at 12 months (easily found)	339
Found using extended effort at 12 months (hard to reach)	100
Lost to follow-up at 12 months	59

Comparison of Response Rates at 12 Months, with and without Hard-to-Reach Respondents

	Achieved RR	RR Excluding HTR
Full sample	89	71
White	90	72
Black	89	68
Hispanic	90	75
Other race	91	71
TANF	90	71
GA	83	65
Health Status		
poor/fair	89	67
good/excellent	90	72
Substance dependence	81	48
Past-year homelessness	84	68
Violent victimization	90	75

Little Difference Between Hard-to-Reach and Easily-Found Respondents

- HTR recipients significantly more likely to be substance dependent (14% vs. 6% $p<.001$)

- No significant differences in

  race/ethnicity, age, education, marital status, parental status, income, employment, disability, housing stability, program type, health status, problem drinking, frequent drug use, jail history, or violent victimization

Nonresponse Simulation

- Based on published study of 1235 WCLS female aid applicants (Lown, Schmidt, & Wiley, 2006 *AJPH*)
- Lown et. al's findings
  - More violent victimization among women of GA
  - There is even more need for violence prevention services among GA women, despite current focus on providing services for TANF women and families
- Our simulation used WCLS cohort of aid recipients (n=498)

Odds of Violent Victimization among Female GA Recipients, Compared to Female TANF Recipients

Type of violence	All (I&f) (n=498)	Found (n=439)	Easily found (n=339)
Any violence	2.1	2.0	1.5
Severe violence	2.9	2.9	2.4
Assault	1.9	1.8	1.3
Rape	3.1	3.0	3.3
Partner Violence	2.1	1.8	1.3
Assault	2.0	1.7	1.3
Assault (moderate)	1.9	1.6	1.3
Assault (severe)	2.7	2.3	1.9

Significant ($p<.05$) in applicant sample (n=1235) (Lown et al 2006) Significant in simulation

Discussion

- Extended effort substantially raised RRs
- Little observed difference HTR/others
  - Substance dependence possibly related both to violence and decreased propensity to be found
- Unpredictably, prevalence of violence increased among TANF women w/children, decreased among childless GA women in simulation, reducing the odds ratios
- Excluding HTR reduced evidence that GA women experience more violence and have even greater need for violence prevention services than TANF women
  - Only two of eight categories showed evidence of difference

Conclusions

- Including HTR can increase RR and reduce attrition bias
- Extended follow-up efforts are worth the considerable increase in time and money
- Possibly even more important in general population studies
- Attaining high RRs should be high priority for public health researchers and funders

Strengths and Limitations

- Baseline survey data, 12-month participation
  - Determine at outset who may be HTR at 12m?
  - Baseline variables may change over time
- Study population
  - Included many reputedly hard-to-reach respondents
  - Women in one CA county: Caution in applying results to other low-income populations, or men in poverty
- Access to working field notes
  - Not collected as data for analysis
  - Working documents; allowed *a posteriori* identification of hard-to-reach respondents

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