Prioritizing Cases Strategically for the Survey of Income and Program Participation (SIPP) using R-indicator and other Business Rule Criteria

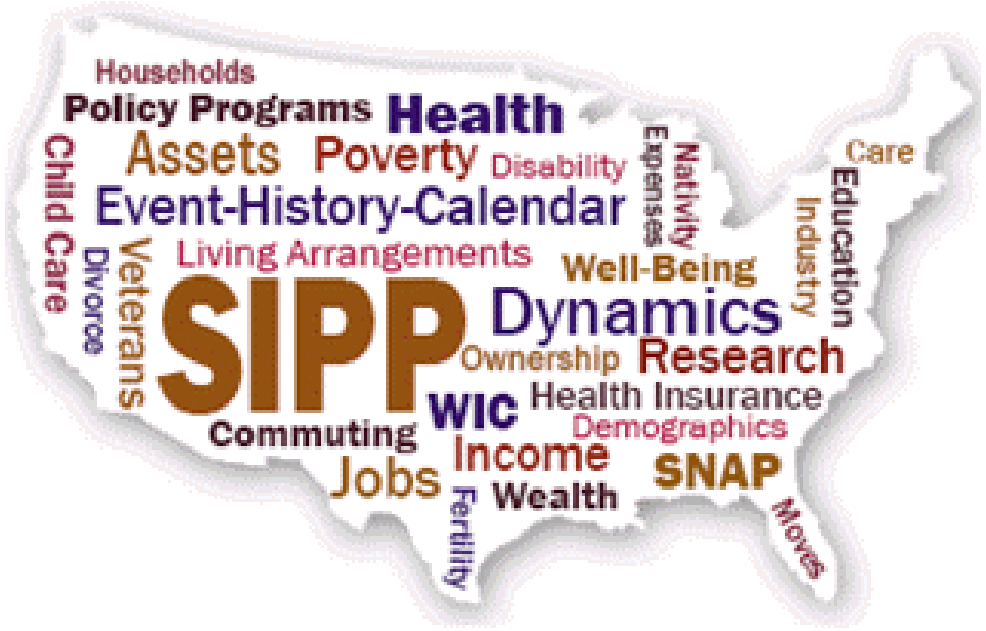
5th Workshop in Adaptive and Responsive Survey Design
November 6th-7th , 2017

Kevin Tolliver (presenter)
Jason Fields, Stephanie Coffey, Ben Reist
Center for Adaptive Design, U.S. Census Bureau

Any views expressed on (statistical, methodological, technical, or operational) issues are those of the author(s) and not necessarily those of the U.S. Census Bureau.

Survey of Income and Program Participation (SIPP)

- National Longitudinal Multi-year panel survey
  - Conducted using CAPI, primarily in person
  - Interviews every member of every Wave 1 respondent household, regardless of whether or not an individual has moved
  - Introduced what was new design in 2014, one four month data collection period of 53,070 households
  - Introducing a newer design in 2018, five one-month data collection periods of approximately 52,817 households
- Challenges:
  - Panel attrition
  - Budget



2017 Goals of Priority Assignment

- **Goal:** To identify and resolve more movers during data collection, to have higher response with records that cannot be linked to administrative data, and to produce a more representative sample

- Static Business Rules prioritize households that:
  - Likely moved between interview periods – based on administrative information
  - Observed movers or split into multiple households during data collection ("spawned")
  - Contain a person that cannot be linked to administrative records

- Dynamic Model-Based Rules prioritize households that:
  - Are the most under-represented
  - Likely to respond

Attaining Under-Represented/ Likely to Respond Households in Practice

- *How do we consider likelihood to respond while actively pursuing under-represented cases?*

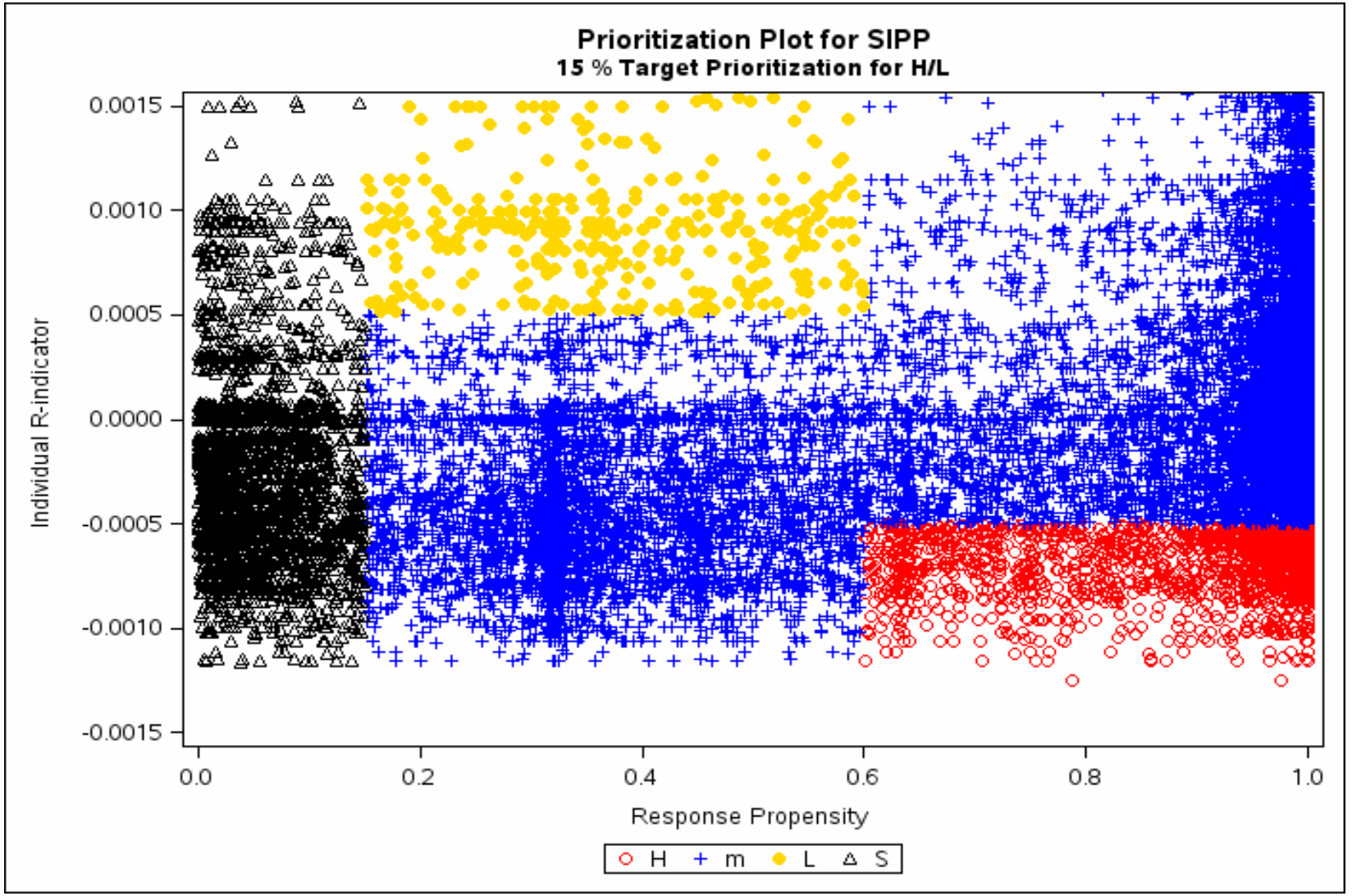
- *How do we intervene on some categories without creating imbalance in others?*

Attaining Under-Represented/ Likely to Respond Households in Practice

- *How do we consider likelihood to respond while actively pursuing under-represented cases?*
  - Use two response models:
  1. Based on auxiliary variables related to program participation, that includes past program participation, poverty status, employment status, etc. for R-indicator
  2. Based on current and previous wave paradata that includes past wave response, past wave number of attempts, current wave number of attempts, interviewee reluctance, etc.
- *How do we intervene on some categories without creating imbalance in others?*
  - Treat each individual household like their own category and monitor unconditional partial R-indicator for "individual"

Model-Based Prioritization

- Prioritize (**H**) under-represented and likely to respond cases
- Deprioritize (**L**) over-represented and unlikely to respond cases
- Stop work (**S**) on cases extremely unlikely to respond
- All other cases defer to business rule priority, where they will either be prioritized or worked as usual (**M**)



2017 Case Prioritization Experiment

- Conducted at interviewer-level
  (this made some later analyses difficult because of case reassignments)

- Three Experimental Groups:
  - Trt 1 Interviewers: Priorities are assigned using only the fixed business rules
  - Trt 2 Interviewers: Priorities are assigned using a combination of the static business rules and dynamic R-indicators and response propensities. The combination constituted the ***True Priority***
  - Control Interviewers: Priorities are set to medium despite their true priority

- Having two treatment groups allow for assessment of the benefits using R-indicators and response propensities to the fixed business rules.

Benefits of Using the Adaptive Design

- Achieved our prioritization goals
  - Both treatments attained more mover respondents (+20.4% for T1 and +15.5% for T2)
  - Treatment 2 has an equivalent response rate for non-spawn non-PIK cases (0.40% higher)
  - Treatment 2 had significantly higher R-indicator from day 70 (p-val = 0.04) until the final day (p-val < 0.01) using a permutation test
  - Treatment 2 had a significantly smaller mean non-response adjustment (-6.7% for CO and -18.5% for T1) and variance of the adjustments (-81.8% for CO and -95.3% for T1) using a simple post-stratification non-response adjustment

- Response rate is nearly maintained
  - Treatment 2 response rate is 0.23% higher than control for non-spawned cases
  - Treatment 1 response rate is 1.25% lower than control for non-spawned cases
  - T1 and T2 weighted response rate is within 0.6 percentage points of control for non-spawned cases

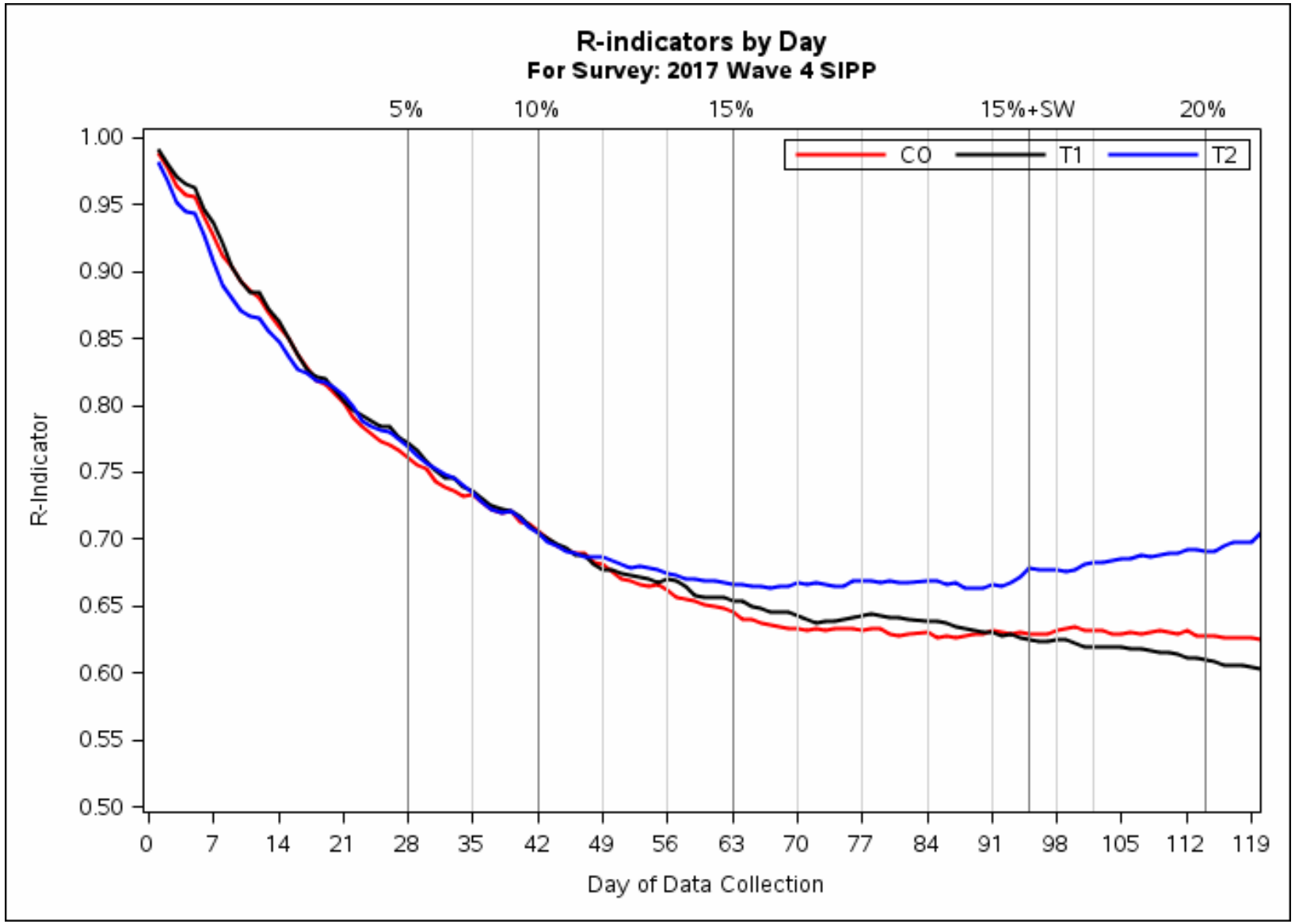
Full-Sample R-Indicators

(by day of data collection)

- Started using the R-indicators during second month of data collection

- T1: Business Rule Prioritization
  T2: Bus Rule/Model-Base Prioritization
  CO : No prioritization

- On average, each interviewer has 40 cases. At 5%, each interviewer had approx. 2 model-based high priority cases and 2 low priority cases.



Modifying the Case Prioritization Procedure to the 2018 Panel

Differences Moving from Wave 4 to Wave 1:

- Wave 1 has no prior wave information
  - We use U.S. Planning Database (PDB) as a proxy (the PDB is a publically available data source that gives descriptive information at the block and tract level)
- Only respondents in Wave 1 are eligible for interviews respondents in future waves
- Wave 1 will not have movers or link administrative data, although they will be reintroduced in 2019 Wave 2

Differences Moving from the 2014 Panel to 2018 Panel:

- Instead of a four month data collection period, the next panel will have five one-month data collection periods

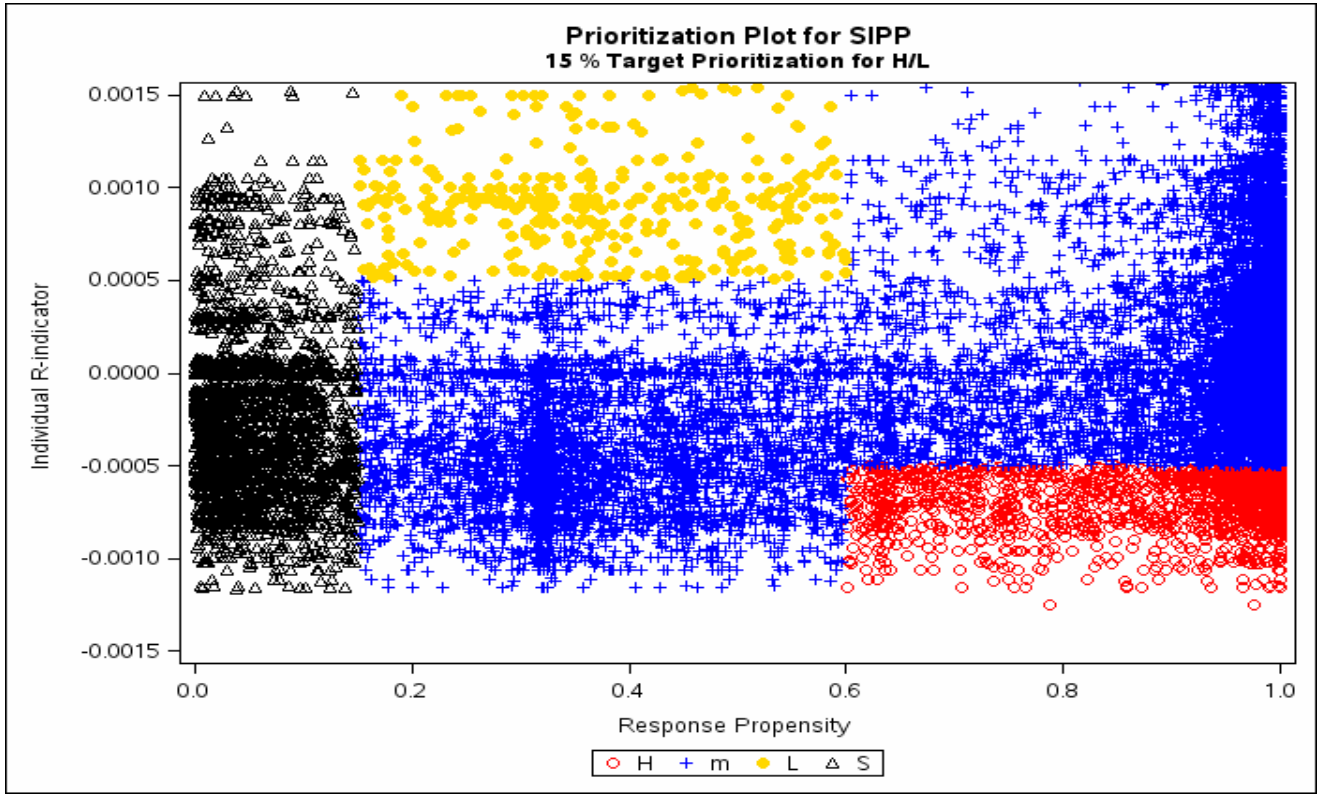
Goal for Wave I: To optimize response and sample balance, understanding there are trade-offs between the two

Determining Under-represented Households

- We plan to use R-indicators to determine under-representation
- Variables that are closely related to Program Participation
  - Percentage of households with no high school education
  - Percent of households receiving public assistance
  - Average household income
  - Percent of Renter-Occupied Units
  - Percent of households that have female householder
  - Percent of households that are below poverty
  - Majority Hispanic
  - Majority Black
  - Census Region

Future Research

- Observe Role of Model Selection
- Create a unified metric that uses R-indicator and response
- Consider using Principal Components for variable reduction instead of observing each household individually



Contact Information:

Kevin Tolliver

Kevin.p.tolliver@census.gov