Behavioral Health is Essential To Health

Prevention Works

Treatment is Effective

People Recover
On Moving to the Use of a Hybrid Sampling Frame in the National Survey on Drug Use and Health: Motivations and Challenges

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Overview

• NSDUH Background
• Motivation for Address-Based Sampling
• Description of Hybrid Frame for NSDUH
• Methods Study
• Conclusions
• Next Steps
National Survey on Drug Use and Health (NSDUH)

- A primary source of statistical information on substance use and mental health in the U.S. population
- Sponsored by SAMHSA; planned and managed by the Center for Behavioral Health Statistics and Quality
- Data collection conducted under contract with RTI International in North Carolina
## NSDUH Sample Design

<table>
<thead>
<tr>
<th>Design Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stratification</td>
<td>State Sampling Regions (collection of census tracts)</td>
</tr>
<tr>
<td>Stage 1 sample</td>
<td>Census Tracts</td>
</tr>
<tr>
<td>Stage 2 sample</td>
<td>Census Block Groups (starting in 2014)</td>
</tr>
<tr>
<td>Stage 2(3) sample</td>
<td>Area Segments (collection of census blocks) - Field enumerated by Listers</td>
</tr>
<tr>
<td>Stage 3(4) sample (Screening - 5 min)</td>
<td>Dwelling Units (addresses)</td>
</tr>
<tr>
<td>Stage 4(5) sample (Interview – 1 hr)</td>
<td>0, 1, or 2 persons aged 12+ (12-25 year olds oversampled)</td>
</tr>
</tbody>
</table>
NSDUH Target Population

Civilian noninstitutionalized population age 12 or older in the 50 states and D.C.

• Includes: houses, apartments, and noninstitutional group quarters (e.g., shelters, college dormitories, migratory work camps, halfway houses)

• Excludes: active military, long-term hospital residents, prison populations, homeless not in shelters
Current NSDUH Frame Construction: Field Enumeration (FE)

- Field staff (Listers) completely enumerate each sampled area segment in person on hand-written forms

FE Supplemental Coverage Procedures

- During the screening process, interviewer asks screening respondent if there are any other living quarters on the premises

- Sample is also supplemented during screening process using half-open interval (HOI) by picking up new construction and units missed by Listers.
Address-Based Sampling (ABS)

• Based on mailing lists from the Computerized Delivery Sequence (CDS) file maintained by the USPS

• CDS file includes locatable city-style addresses (street#/name, city, state, ZIP)

• CDS is available to select vendors through licensing agreements
Motivation for ABS

• Lower cost than using FE alone
• Less time to prepare frame
• Use of larger cluster sizes leading to reduced intracluster correlation
ABS Coverage

• Known undercoverage of certain populations:
  – Group quarters
  – Rural areas

• Methods for improving ABS coverage:
  – Supplement ABS using the Check for Housing Units Missed (CHUM) procedure
  – Use of No-Stat file (supplement to CDS file)
  – Develop an FE/ABS hybrid approach
Check for Housing Units Missed (CHUM)

• A frame-linking procedure used to supplement address-based sampling (ABS) frames

• Two components:
  – CHUM1: Starting from the sample dwelling unit (DU), interviewer follows a prescribed path of travel and adds missed DUs until an address on the ABS list is found.
  – CHUM2: In a randomly selected block, interviewer follows the same path of travel as CHUM1 and adds missed DUs; stops when finds an address that is on the ABS list or returns to the starting point.
  – CHUM2 mitigates under-coverage of DUs in blocks with no addresses on the ABS frame.
Proposed Hybrid Frame for NSDUH

• Estimate expected ABS coverage rate for each area segment and establish ABS coverage threshold

• Use ABS supplemented with CHUM where ABS coverage is adequate

• Define ABS areas as CBG or larger to increase accuracy of geocoding

• Use FE supplemented with HOI where ABS coverage is low
2009 NSDUH Field Study

• To evaluate a hybrid sampling frame for the NSDUH
  – Cost savings
  – Coverage
  – Bias
• Probability sample of NSDUH segments
  – 200 segments from Quarter 1 of the 2009 NSDUH
  – 3,878 screened and eligible sample dwelling units (SDUs)
  – 1,725 completed interviews
• Purchased ABS lists and matched to addresses of eligible SDUs obtained from NSDUH’s field enumerated frame
## Hybrid Sampling Frame: Cost Savings

<table>
<thead>
<tr>
<th></th>
<th>ABS Coverage Threshold</th>
<th>FE Only</th>
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<tbody>
<tr>
<td></td>
<td>20%</td>
<td>50%</td>
</tr>
<tr>
<td>ABS Segments</td>
<td>95%</td>
<td>85%</td>
</tr>
<tr>
<td>FE Segments</td>
<td>5%</td>
<td>15%</td>
</tr>
<tr>
<td>Cost Savings</td>
<td>62%</td>
<td>55%</td>
</tr>
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</table>
Hybrid Sampling Frame: Coverage

<table>
<thead>
<tr>
<th></th>
<th>ABS Coverage Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20%</td>
</tr>
<tr>
<td>Urban Segments</td>
<td>98.9%</td>
</tr>
<tr>
<td>Rural Segments</td>
<td>92.3%</td>
</tr>
<tr>
<td>Overall</td>
<td>97.5%</td>
</tr>
</tbody>
</table>
# Hybrid Sampling Frame: Bias

<table>
<thead>
<tr>
<th>Variable</th>
<th>Difference (FE-ABS)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Graduate</td>
<td>-0.0041</td>
<td>0.0210</td>
</tr>
<tr>
<td>Family Income Less than $20,000</td>
<td>0.0065</td>
<td>0.0756</td>
</tr>
<tr>
<td>Percent of Federal Poverty Threshold:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100-199%</td>
<td>0.0068</td>
<td>0.0962</td>
</tr>
<tr>
<td>200% or more</td>
<td>-0.0083</td>
<td>0.0346</td>
</tr>
<tr>
<td>Past Year Treatment for Illicit Drugs</td>
<td>-0.0001</td>
<td>0.0507</td>
</tr>
<tr>
<td>Group Quarter</td>
<td>0.0009</td>
<td>0.0330</td>
</tr>
</tbody>
</table>

*21 comparisons not significant; 4 with insufficient sample
Hybrid Sampling Frame: Bias (continued)

• Very small differences in prevalence estimates between the FE frame and the ABS frame

• Because the estimates based on the FE frame and the estimates based on the ABS frame share a large portion of their cases, these comparisons have the statistical power to declare very small differences in the overall prevalence estimates statistically significant (e.g., 0.002)
Predicting ABS Coverage

- Predicted ABS coverage = 
  \# locatable mailing addresses 
  \#GQs + \#HUs

- Sources of error
  - Geocoding error: mailing address is incorrectly placed inside or outside of the segment boundaries
  - Estimated number of DUs (GQs + HUs) is out of date or out of sync with what is on the ground

- Accuracy of the predicted ABS coverage influences cost and coverage
Comparison of Predicted to Actual ABS Segment Coverage from NSDUH Field Study
Hybrid Sampling Frame: Geocoding Error

• Large percent of addresses were incorrectly geocoded out of segment
  (7.5% Urban, 23.3% Rural)
• This error drops significantly at the Census Block Group Level
  (0.2% Urban, 3.4% Rural)
• Geocoding is more accurate in areas with a low percent of Group Quarters
• Segment size should be considered when designing ABS studies that are based on census geography
USPS No-Stat File

• The No-Stat file is a supplemental list containing 7.0M residential, locatable addresses not found on the CDS file and concentrated primarily in rural areas

• No-Stat file addresses classified as inactive or not currently receiving mail (e.g., new housing developments, vacant rural delivery pts in rural areas vacant for 90+ days, gated communities that do not receive mail delivery to individual units)

• Made available to companies with CDS licenses starting in 2009

• Matched a sample of Qtr 2 2010 NSDUH eligible sampled dwelling units to commercially available versions of the CDS and No-Stat files

• Estimated 1.3M occupied HH in No-Stat file adding 4% coverage in rural areas w/o loss of efficiency (i.e., # of addresses needed to field one HH)
Is a Hybrid Frame Right for NSDUH?

• The hybrid frame is a promising option for NSDUH
• Maintains high coverage of current FE frame
• No measurable bias
• Provides costs savings over FE-only frame and will take less time to implement
Reasons for Not Implementing the Hybrid Frame in NSDUH

• Potential for increased field interviewer/field support staff burden in ABS segments using the CHUM.

• Different procedures may be required to identify missed dwelling units in ABS and FE areas (e.g., no HOI in FE and CHUM in ABS by same interviewer could mean different field materials needed for each area)

• Limited coverage of group quarters population (e.g., only feasible source is GQ–type indicator from 2010 Census to estimate college dormitory housing pop at the block group level. Use of aging Census data in intercensal years is a concern.)
Next Steps

• Only FE to be used in 2014 with HOI eliminated, (accounted for only 0.2 percent of sampled dwelling units) but FE/ABS hybrid still under consideration in future years

• Consider field test to improve CHUM training protocol

• Improve accuracy of predicted ABS coverage estimates

• Explore use of GPS in the development of a revised CHUM that could be used in both FE and ABS segments