

Estimating RDD, ABS and Web Panel Mode Effects in a Nationwide Survey of Alcohol Use

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Background

- **National Alcohol Survey (NAS): conducted by the Alcohol Research Group (ARG)**
 - Nationwide sample with 18 and older U.S. Adults conducted about every 5-year since the mid-1960s
 - Measuring current levels and trends for alcohol consumption and many alcohol-related topics
 - The National Alcohol Survey was funded by the National Institute on Alcohol Abuse & Alcoholism (P50AA005595)
- **Random-digit dial (RDD) survey since 2000. Recent changes in telephone interviewing have necessitated transition to a multi-mode design.**
- **N14 conducted September 2019 to April 2020**



N14 design

- **N14 included**

- RDD CATI – nearly 95% cell phone with up to 6 attempts, 40-minute average interview
- ABS push-to-web – invite letter with \$1 cash, 2 reminder postcards; \$10 promised incentive
- A non-probability web panel

- **Survey conducted in English and Spanish**

- **RDD, ABS, Panel all included oversamples of Black and Hispanic populations.**

N14 design

- **The data is weighted based on the probability of selection from the frames (panel respondents received a weight of 1) and then combined into one dataset as follows:**
 - Calibrate the web panel to the ABS data based on demographics and drinking status—wine drinker, beer drinker, spirits drinker, or nondrinker.
 - Individually calibrate the ABS/Panel data and the RDD data to the population based on age, gender, race/ethnicity, marital status, educational attainment, and Census region.
 - Combine the ABS/Panel and the RDD samples by averaging the population weights based on the effective sample sizes.

N14 Results by Frame/Mode

Frame/Mode	Fielding dates	Completes	Current Drinkers	RR
RDD CATI	9/2019 – 4/2020	1,572	1,052	3.4%
ABS web	9/2019 – 4/2020	5,648	4,215	17.8%
Web panel	10/2019 – 3/2020	2,758	1,976	?



Research Objectives

- **Use the multi-mode, multi-frame design to measure:**
 1. A mode effect comparing CATI with self-administered web survey
 2. A frame source effect comparing a probability-based ABS web sample with a nonprobability pre-recruited web panel
- **Remove the mode and source effects to create an RDD-CATI equivalent sample to support trending with earlier iterations of the NAS**

Analytic Methods

- **Regression method to measure/remove mode effect**

- Kolenikov, S., & Kennedy, C. (2014, June). Evaluating Three Approaches to Statistically Adjust for Mode Effects. *Journal of Survey Statistics and Methodology*, 2(2), 126-158

$$\hat{p}_i = 1/(1 + \exp(\beta' x_i + \gamma m_i)), \text{ where } m = \text{mode}; x = \text{other covariates (e.g. age, sex)}$$

- **γ is the estimated mode effect**

- **To get a mode-adjusted estimate, subtract the effect and add the estimated probabilities**

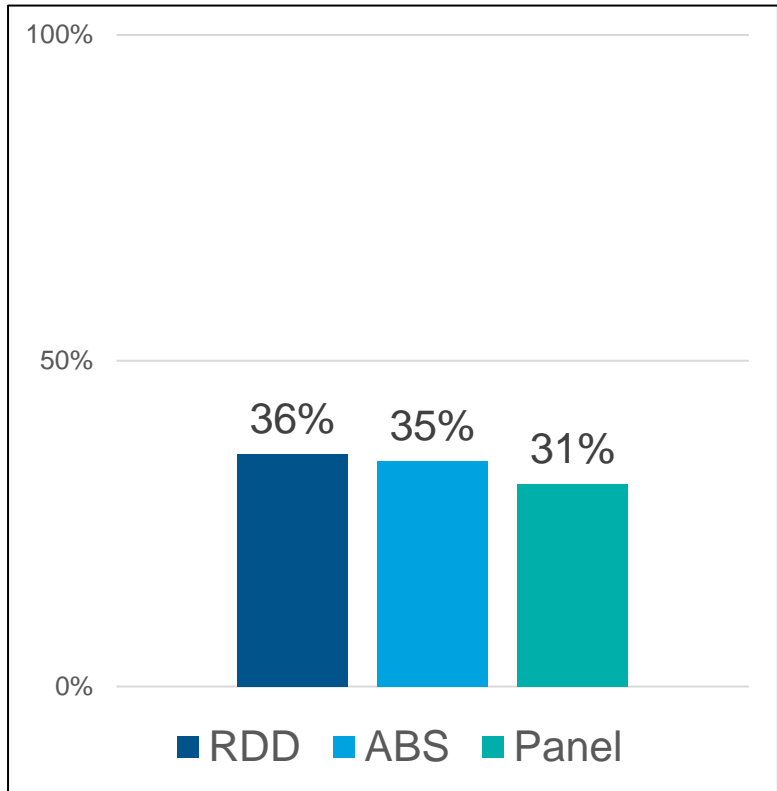
$$\tilde{p} = \sum_i 1/(1 + \exp(\beta' x_i))$$

Analytic Methods, cont.

- **3 heavy drinking measures:**
 - H E D: Heavy episode drinking = 4 (female) or 5 (male) drinks in a single day – Logistic regression
 - Drinkers who “drink enough to feel drunk” in past 12 months – Logistic regression
 - Number of drinks to feel drunk – Negative binomial regression
- **Current drinkers: adjust for age, gender, race/ethnicity, educational attainment, marital status, employment status, general health, physical activity, quality of life, and drinker status (beer, wine, spirits).**
- **Measure mode effect and then mode adjust ABS/Panel to CATI: “telephone equivalent”**
- **The analysis was conducted using Stata svy.**

H E D – past 12 months

Adjusted Percentages:



Model effects (ABS ref):

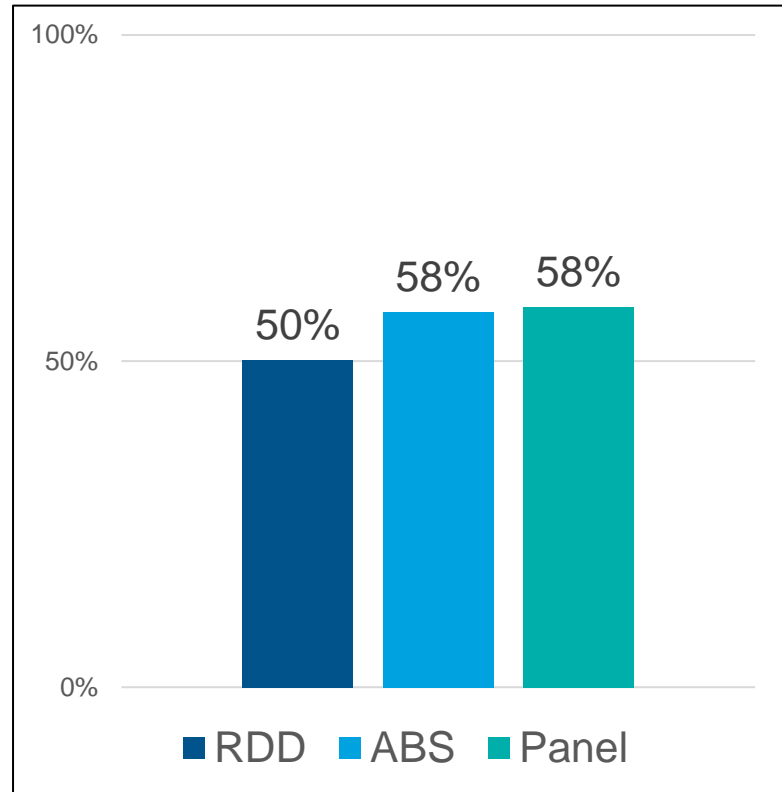
Mode (se)	0.04 (0.10)
Panel (se)	-0.16 (0.09)

Population Estimates:

	Sample size	H E D
N14 Combined	7,017	37.8% (+/-1.5%)
N14 Mode-Adjusted (CATI)	7,017	39.3% (+/-3.4%)
N14 RDD Only	1,031	37.5% (+/-3.7%)
N13 RDD	4,210	40.4% (+/-2.3%)

Drank enough to feel “drunk” – past 12 months

Adjusted Percentages:



Model effects (ABS ref):

Mode (se)	-0.30 (0.10) **
Panel (se)	0.03 (0.09)

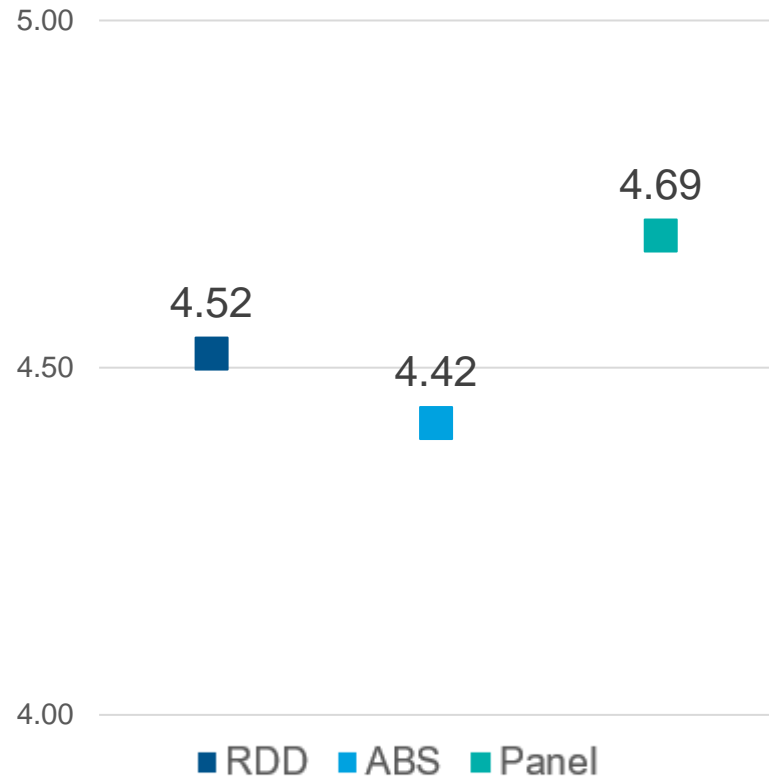
**P<0.01

Population Estimates:

	Sample size	Drank enough to feel drunk
N14 Combined	7,018	55.8% (+/-1.5%)
N14 Mode-Adjusted (CATI)	7,018	51.0% (+/-3.3%)
N14 RDD Only	1,033	48.9% (+/-3.9%)
N13 RDD	4,229	47.8% (+/-2.3%)

Number of drinks to feel drunk

Adjusted Means:



Model effects (ABS ref):

Mode (se)	0.02 (0.03)
Panel (se)	0.06 (0.02) **

**P<0.01

Population Estimates:

	Sample size	Drinks to feel drunk
N14 Combined	6,723	4.59 (+/-0.08)
N14 Mode-Adjusted (CATI)	6,723	4.60 (+/-0.22)
N14 RDD Only	778	4.69 (+/-0.24)
N13 RDD	2,780	4.63 (+/-0.14)

Summary

- **Mode/frame differences in adjusted H E D in past 12 months were not significant.**
 - Combined effect between RDD and Panel was significant.
- **Mode effect for drinking enough to feel drunk in past 12 months**
 - 50% CATI vs 58% for both ABS and Panel
 - Interviewer effect? – Getting “drunk” could be considered a socially undesirable
 - Large impact of mode adjustment—combined (unadjusted) drops from 56% to 51% when adjusted to “telephone equivalent” – more in line with N13 (all CATI)
- **Panel effect for number of drinks to feel drunk**
 - 4.69 Panel vs 4.52 CATI and 4.42 ABS
 - However, removing the effect has little impact on the estimated mean since the higher panel and lower ABS cancel each other out.

Discussion

- **Surveys moving to multi-mode can use regression to both identify and remove mode effects**
 - Large impact if the mode effect is large (e.g. “drunk”)
 - Improve trending with historical CATI surveys
- **However, the se’s of the mode adjusted estimates will be much higher than the unadjusted combined**
 - Across all three estimates, the telephone equivalent se’s are over 2x the combined (unadjusted) se’s
 - Depends on the sample size of the reference mode (e.g. telephone equivalent)
 - If no mode effect, use the combined (unadjusted) estimate for lower se’s



Thank you.

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