

# Measurement Consequences of Mode Switching in Multimode ABS Surveys: Experiments in Case Flow Design

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# Introduction

- Address-Based Sampling (ABS) coupled with multimode designs are viewed as an important solution to declining response and coverage rates and rise of cell phone-only households.
- U.S. Postal Service lists used in ABS achieve 93-95% population coverage and can be used for mail, phone, and field.
- Phone-to-address matching can be used to conduct ABS telephone surveys.
- Most large scale ABS surveys implement some form of multimode design.

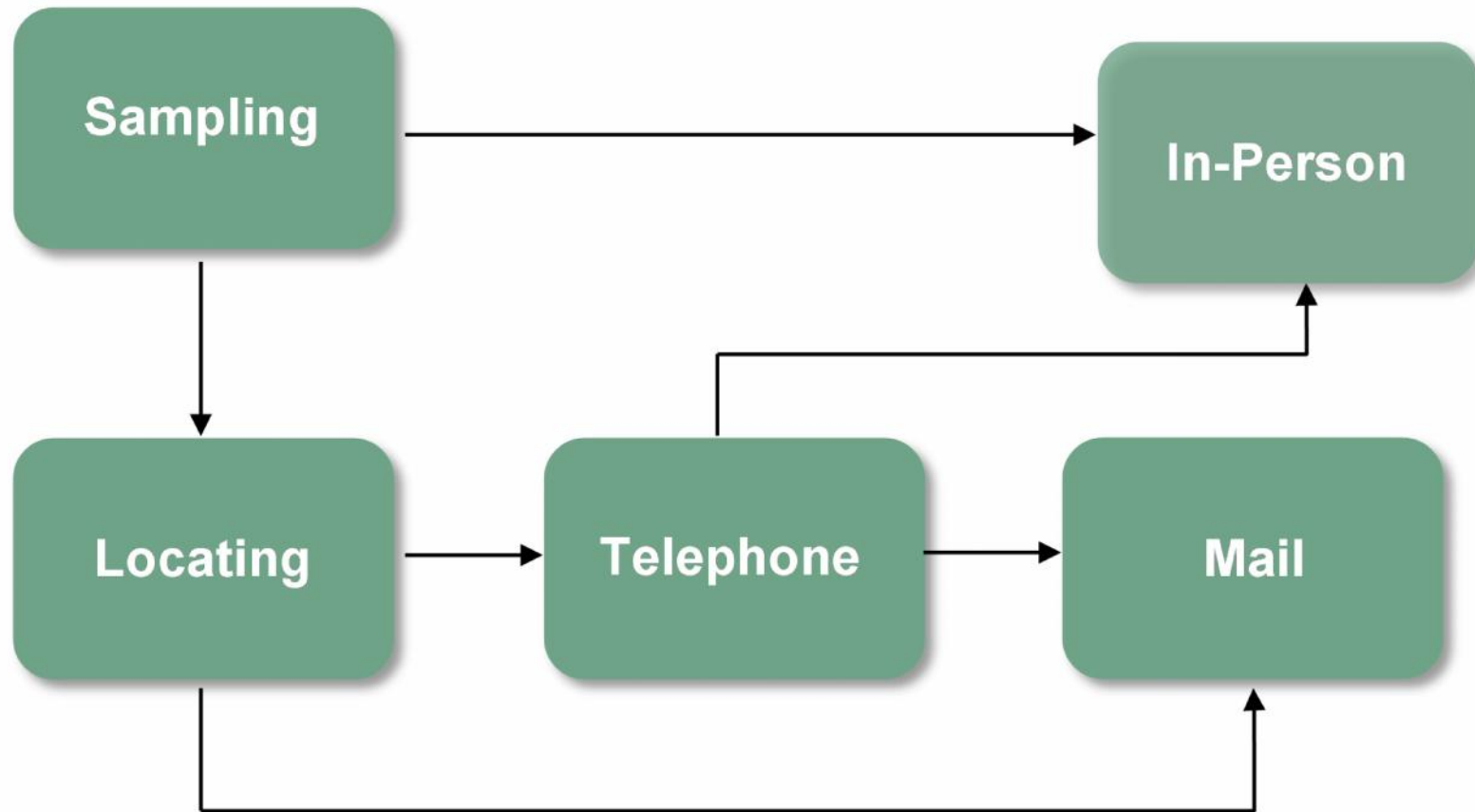
## Research on Mode Sequencing and Mode Effects

- Little research on starting mode or mode sequencing and the consequence for mode effects.
- Brick et al. (2011) found in a mail first experiment that mail-only condition improved response rates and switching to telephone lowered rates.
- Messer and Dillman (2011) also found in ABS web and mail multimode survey that a mail-only design improved response rates.

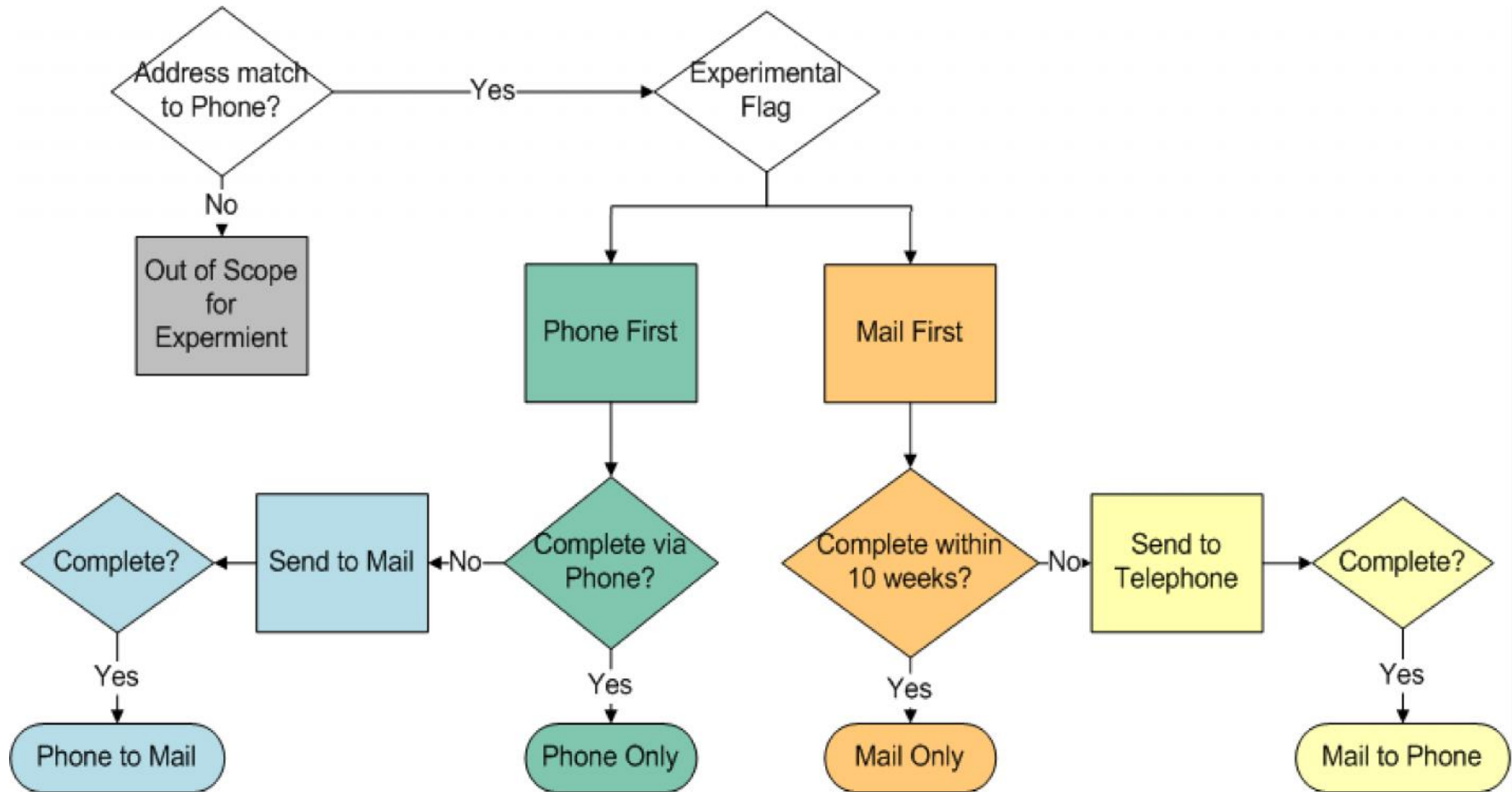
## REACH U.S. Background

- Racial and Ethnic Approaches to Community Health Across the U.S. Risk Factor Survey
- Multi-mode ABS survey design since 2008
- Community-specific racial/ethnic target groups
- Sequential multi-mode design: telephone, mail, and field

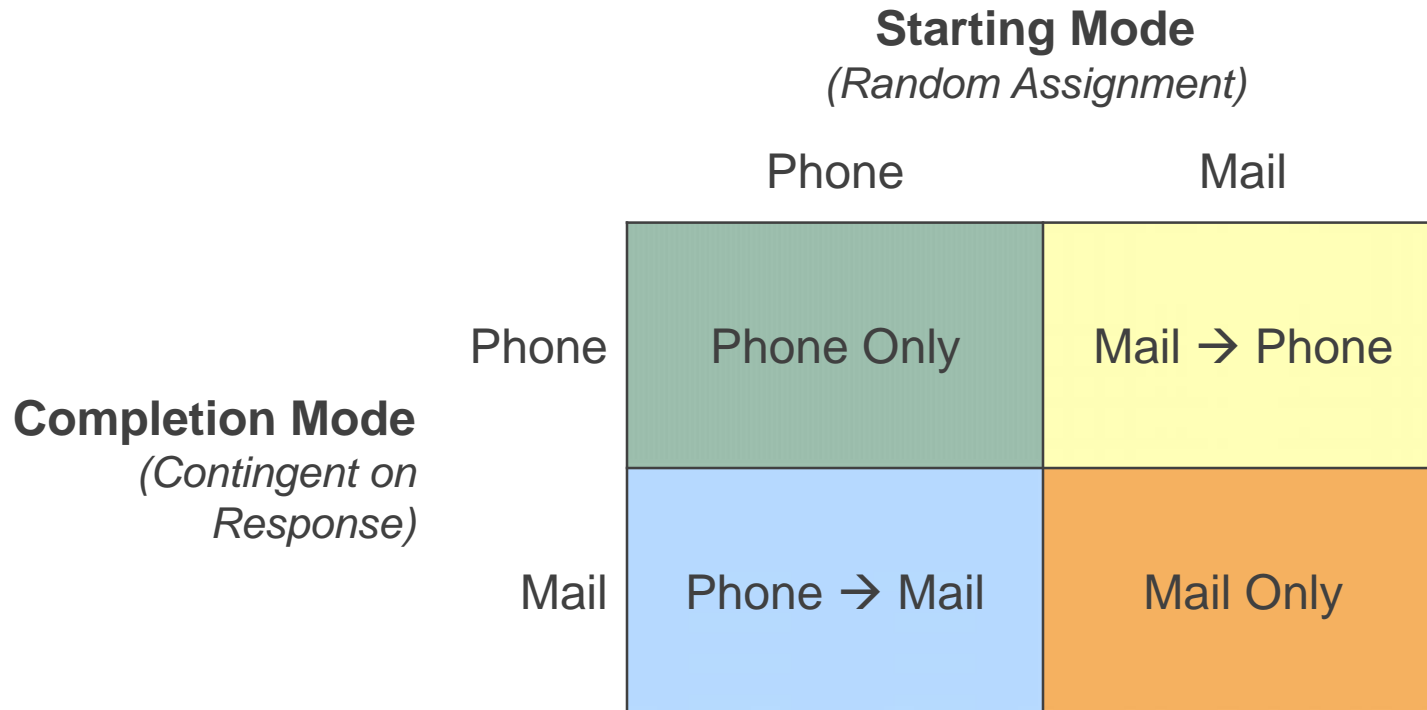
# Mode Movement in REACH U.S.



# Mail First Experiment Design



# Mode Progressions



## Research Questions

- Does case flow improve the efficiency of survey operations?
  - Increase response rates, yield rates
- Does the case flow affect data quality?
  - Measurement error, item non-response
- Are there mode effects from different forms of mode sequencing?



## Survey Performance by Mode Progression

	Mail Only	Phone to Mail	Phone Only	Mail to Phone
Yield Rate	24.6%***	19.1%	14.0%**	11.5%
Screener Response Rate	32.6%***	25.5%	25.8%***	19.8%

	Mail-First	Phone-First
Yield Rate	32.0%***	27.0%
Screener Response Rate	48.8%***	44.8%

\*\* $p$  .01, \*\*\* $p$  .001

## Household Characteristics and Contact Paradata Across Mode Progressions

	Mail Only	Phone to Mail	Phone Only	Mail to Phone	Overall
Total Households	1,578	3,173	1,508	3,216	9,475
Percent of Total	16.7%	33.5%	15.9%	33.9%	--
Average Number of Adult HH Members	1.95	1.90	2.05	2.11	2.00
Black Households <sup>a</sup>	34.9%	38.6%	39.8%	42.3%	38.5%
Latino Households <sup>a</sup>	11.9%	13.9%	15.6%	20.4%	15.1%
American Indian Households <sup>a</sup>	10.6%	11.4%	8.9%	10.3%	10.3%
Household Income under \$25,000 <sup>b</sup>	52.8%	48.2%	44.3%	50.4%	49.24%
Average Call Count	--	9.9	15.2	14.5	13.4
Average Days in Telephone	--	42.5	55.9	57.4	52.4
Average Days to Return SAQ	32.9	30.5	--	---	32.0

<sup>a</sup> Households with at least one Black/Latino/American Indian household member

<sup>b</sup> Self-reported income; highest income reported if more than one member responded

# Item Nonresponse by Mode Progression

Item non-response (selected)	Percent missing			
	Mail Only	Phone to Mail	Phone Only	Mail to Phone
General health*	1.7%	1.3%	0.3%	0.7%
Physical health	3.0%	1.5%	4.0%	2.1%
Mental health	2.1%	1.2%	2.8%	1.5%
Time since last physical exam	1.2%	0.7%	0.5%	1.1%
Physical activity*	4.9%	4.4%	0.8%	1.7%
Diabetes*	4.0%	2.8%	0.0%	1.9%
Pneumonia vaccine*	3.0%	2.5%	8.8%	6.5%
Influenza vaccine	0.7%	0.8%	0.3%	1.1%
Hepatitis B test*	2.6%	2.8%	14.3%	8.9%
Household income	8.3%	7.2%	8.8%	7.1%
Employment status*	3.9%	4.8%	0.9%	1.7%
Height/weight	3.2%	3.5%	2.5%	5.2%

Item non-response reported only for questions asked of all respondents. Missing responses include “Don’t Know” and “Refused” (telephone only).

\*p < 0.05 (Chi-sq)

## Item Nonresponse by Mode Progression

Item non-response (selected)	Percent missing			
	Mail Only	Phone to Mail	Phone Only	Mail to Phone
General health*	1.71%	1.31%	0.31%	0.74%
Physical health	3.01%	1.48%	3.96%	2.05%
Mental health	2.11%	1.15%	2.77%	1.49%
Time since last physical exam	1.20%	0.66%	0.46%	1.12%
Physical activity*	<b>4.91%</b>	<b>4.43%</b>	0.77%	1.68%
Diabetes*	<b>4.01%</b>	<b>2.79%</b>	0.00%	1.86%
Pneumonia vaccine*	3.01%	2.46%	<b>8.77%</b>	<b>6.52%</b>
Influenza vaccine	0.70%	0.82%	0.31%	1.12%
Hepatitis B test*	2.61%	2.79%	<b>14.31%</b>	<b>8.94%</b>
Household income	8.32%	7.22%	8.77%	7.08%
Employment status*	<b>3.91%</b>	<b>4.76%</b>	0.92%	1.68%
Height/weight	3.21%	3.45%	2.46%	5.21%

Item non-response reported only for questions asked of all respondents. Missing responses include “Don’t Know” and “Refused” (telephone only).

\*\*p < 0.05 (Chi-sq)

## Estimated Odds Ratios for Selected Health Variables

Variable	Obesity	Current Smoker	Fruit and Vegetable Consumption	Diabetes	High Cholesterol
Mail to Phone	1.10	0.61	1.16	1.01	0.85
Phone Only	0.98	0.66	1.53**	1.06	0.73
Phone to Mail	1.19	0.64	1.09	0.89	0.94
Hispanic	0.78	0.68*	0.82	1.21	1.27
API/American Indian	0.98	1.82	1.70*	2.19	0.53
Other Race	0.90	1.97	0.80	2.32	0.58
High school degree	1.16	0.43***	1.75**	0.98	0.79
College or higher	1.11	0.86	1.45	1.00	0.94
Out of workforce	0.81	0.94**	1.04	2.13***	1.77***
Unemployed	1.00	2.06***	0.79	1.12	0.87*
Born in U.S.	1.51*	2.25**	0.77	0.97	0.97
Non-English speaker	1.16	0.69	1.29	1.21	0.97

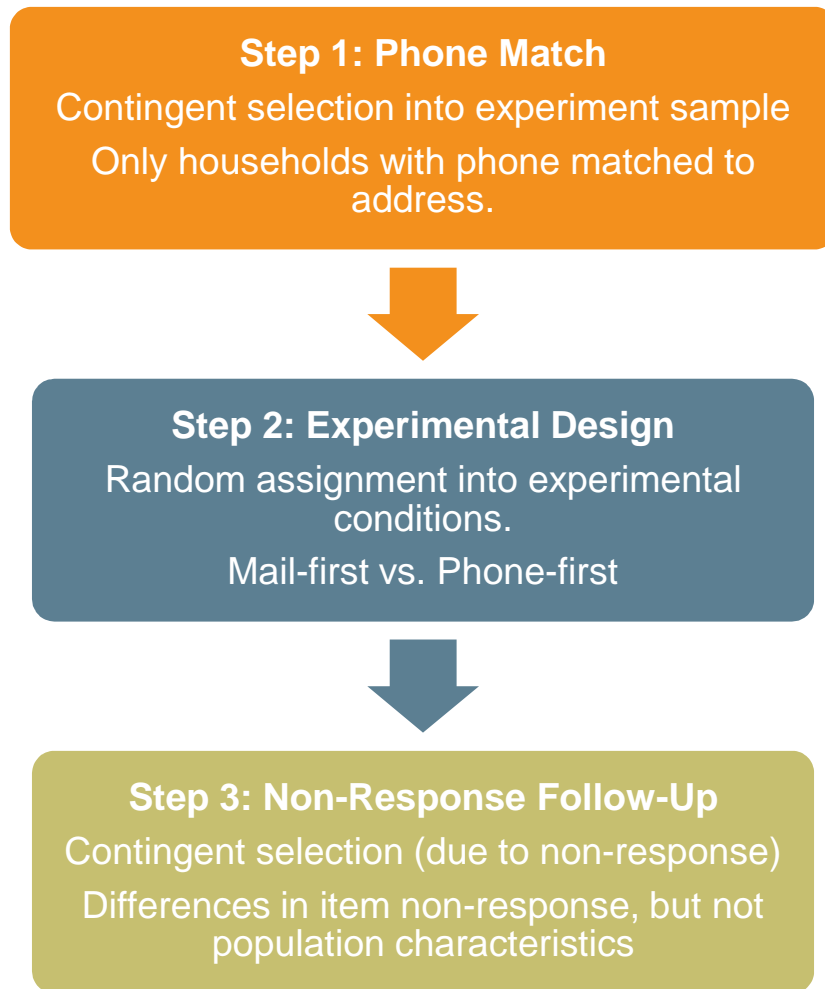
Odds ratios from logistic regressions, with robust standard errors to control for multiple respondents within households. Comparison group: Mail only, African American, less than high school degree, employed, foreign born, English speaker.

\*  $p$  .05, \*\*  $p$  .01, \*\*\*  $p$  .001.

## Results

- Overall response rate advantage to mail-first condition
- The different mode progressions do not appear to select particular types of respondents
- Differential item non-response by mode of completion, depending on item
- Little or no mode progression effects on key health statistics

# Results



## Limitations

- The experiment is limited to only those households that can be matched to a phone number. This initial selection causes a problem.
- REACH U.S. is limited to minority populations and thus may have more limited generalizability.
- The key health statistics examined may not be as vulnerable to mode effects as other types of questions and, thus, not a good test.



## Conclusions

- Starting mode and mode of data collection have an impact on survey operations and item non-response.
- For this study population, there appear to be no selection effects in mode progression.
- There are no measurement effects (mode effect) across modes or by mode progression.
- Suggests multimode surveys may have limited impact on measurement.

## References

- Brick, J. Michael, Williams, Douglas, & Montaquila, Jill M. (2011). Address-based sampling for subpopulation surveys. *Public Opinion Quarterly*, 75(3), 409-428.
- Messer, Benjamin L., & Dillman, Don A. (2011). Surveying the general public over the internet using address-based sampling and mail contact procedures. *Public Opinion Quarterly*, 75(3), 429-457.

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