PDH Certification Information

1.5 Professional Development Hours (PDH) – see follow-up email

You must attend the entire webinar.

Questions? Contact Andie Pitchford at TRBwebinar@nas.edu

The Transportation Research Board has met the standards and requirements of the Registered Continuing Education Program. Credit earned on completion of this program will be reported to RCEP at RCEP.net. A certificate of completion will be issued to each participant. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the RCEP.

ENGINEERING
RCEP
REGISTERED CONTINUING EDUCATION PROGRAM

Purpose Statement

This webinar will discuss the use of multimethod sample for travel surveys, including recruitment via community outreach, panels, and regional organizations or agencies to better reach populations of importance and increase representation. Presenters will examine the decision-making process during the initial sample design phase and considerations for weighting data from multiple sources.

Learning Objectives

At the end of this webinar, you will be able to:

- (1) Identify how probability and non-probability samples can effectively complement one another in travel survey datasets

- (2) Assess and evaluate existing methods and considerations for weighting multimethod samples

- (3) Implement travel survey best practices from case studies that leveraged multimethod sampling techniques

Questions and Answers

- Please type your questions into your webinar control panel

- We will read your questions out loud, and answer as many as time allows
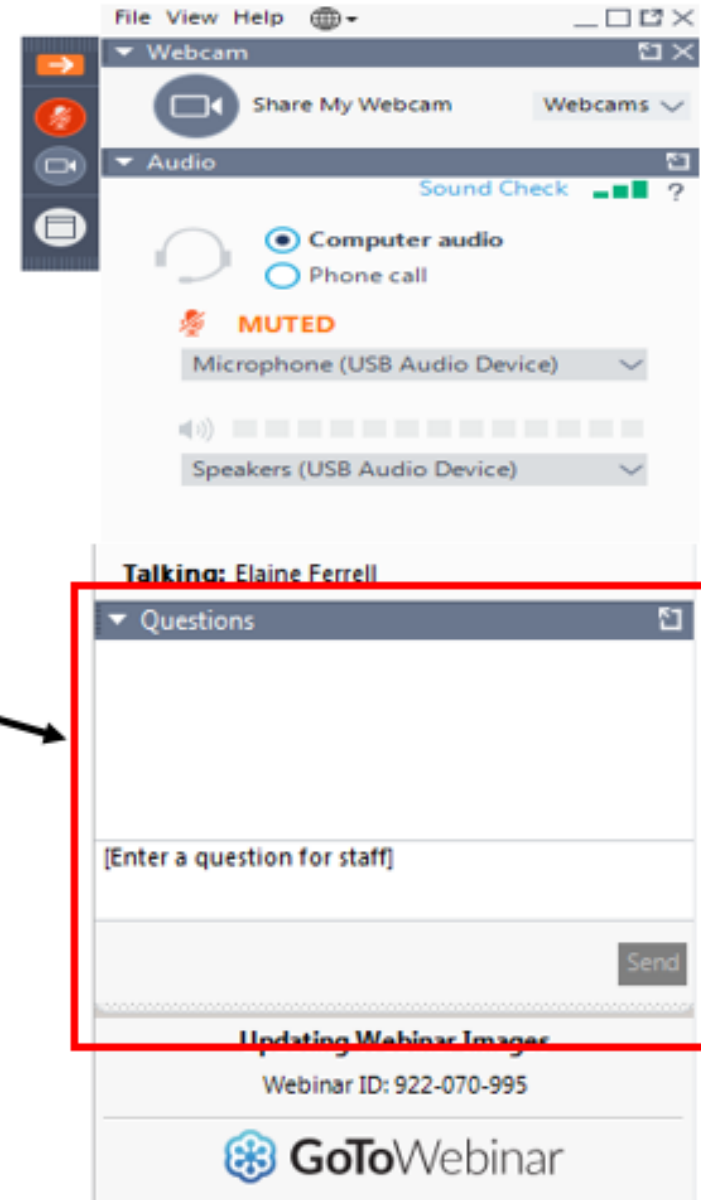
Today's presenters

Abigail Rosenson

abigail.rosenson@rsginc.com

Jonathan Ehrlich

Jonathan.ehrlich@metc.state.mn.us

Dr. Jared Coopersmith

Jared.Coopersmith@ipsos.com

Dr. Deborah Salon

Deborah.Salon@asu.edu

Multimethod Sampling in the Twin Cities Metro Region's Travel Behavior Inventory

TRB Webinar: Unveiling the Art of Multimethod Sampling for Travel Surveys

April 4, 2024   Jonathan Ehrlich   metrocouncil.org

MSP TBI Overview

Travel Behavior Inventory Program– Household Travel Survey

Regional household travel survey conducted regularly for decades (every 10 years from 1949-2010, every 2 years from 2019).

Informs regional travel forecasting, and widely used in the region to inform planning and performance management

Continually evolving survey methods, technologies, and policy focus

Metropolitan Council

Historical Sampling Methods

Year	Sample Method	Completed Households	Survey Mode
1949	DU sample	5%	Personal interview
1962	?	?	Personal Interview
1970	RDD	6000	Personal Interview
1982	RDD	2,461	Paper diary
1990	RDD	9,746	Paper diary
2000	RDD	6,219	Paper diary
2010	ABS + Matched Sample	10,363	Paper diary / GPS sub-sample
2019	ABS	7,837	Smartphone / web diary
2021	ABS + Add-on	7,952	Smartphone / web diary
2023	ABS + Add-on	3,700	Smartphone / web diary
2025			

2019 Sample Profile

Age	Demographic Breakdown	Unweighted Sample	Weighted Sample
Age	Under 18	19%	25%
	18 – 24	4%	6%
	25 – 44	28%	28%
	45 – 64	29%	27%
	65 and older	21%	15%
Race	American Indian or Alaska Native	0%	0%
	Asian	3%	6%
	Black or African American	3%	7%
	Native Hawaiian or other Pacific Islander	0%	0%
	White	90%	82%
	Two Races or More	3%	3%
	Other	1%	2%

	Demographic Breakdown	Unweighted Sample	Weighted Sample
Ethnicity	Not of Hispanic, Latino, or Spanish Origin	98%	94%
	Hispanic, Latino, or Spanish Origin	2%	6%
Income	Under $25,000	10%	13%
	$25,000-$49,999	17%	19%
	$50,000-$100,000	37%	31%
	$100,000 or more	36%	36%
Employment	Employed	66%	71%
	Not employed	34%	29%
Disability Status	No disability	96%	95%
	Any disability	4%	5%

Lessons Learned: 2019

Differential Incentives:

      Increase completion rates for hard-to-survey populations

      Effective

Targeted Oversampling:

      Increase proportion of hard-to-survey households in the sample

      Effective

Door-to-door Outreach:

      Encourage hard-to-survey households to participate

      Not cost-effective, limited effectiveness

Travel Date Reassignment:

      Provide a second chance to complete

      Limited effectiveness

Types of Differential Incentive Offerings

INCENTIVE AMOUNTS

	Sample Orders 1 & 2	Sample Order 3
Online/call center standard offering	$10 per household	$10 per household
Online/call center hard-to-reach offering	$20 per household	$20 per household
Smartphone standard offering	$15 per adult participant	$20 per adult participant
Smartphone hard-to-reach offering	$25 per adult participant	$30 per adult participant

CRITERIA FOR A HOUSEHOLD TO QUALIFY FOR THE HIGHER HARD-TO-REACH INCENTIVE

Sample Orders 1 & 2	Sample Order 3
In sample segments 1 or 2* (offered in invitation)	In sample segments 1 or 2 (offered in invitation)
Recruited via supplemental sampling methods	Recruited via supplemental sampling methods
Member 1 is Hispanic (offered at end of signup survey)	Member 1 is Hispanic (offered at end of signup survey)
Member 1 is a Person of Color (offered at end of signup survey)	Member 1 is a Person of Color (offered at end of signup survey)
Household income is less than $35,000 (offered at end of signup survey)	Household income is less than $35,000 (offered at end of signup survey)
	Household has 4 or more members (offered at end of signup survey)

*Sample segments 1 and 2 were comprised of the block groups in the Twin Cities seven-county metropolitan area which are designated as Urban in the Thrive MSP 2040 Community Designations and whose population is at least 60% Hispanic and/or People of Color.

Metropolitan Council

2021/2023 Surveys- Targeted Oversample

Sample Segment	Oversample Rate	Recruit Rate	Conversion Rate	Completion Rate	Estimated BIPOC/ Hispanic Share	Observed BIPOC/ Hispanic Share*
Core Urban- Group 1	300%	1.9%	78%	1.5%	88%	33%
Core Urban- Group 2	200%	2.5%	78%	1.9%	71%	21%
Core Urban- Group 3	150%	3.2%	80%	2.5%	49%	17%
Core Urban- Group 4	125%	3.4%	80%	2.7%	29%	17%
Core Urban- Group 5		3.9%	75%	2.9%	11%	12%
Core Rural		2.9%	73%	2.1%	8%	7%
Ring		2.1%	72%	1.5%	8%	7%

*mid survey update

Supplemental Sample Experiments

Transit Assistance Program List (2021)

- Owned by Metropolitan Council
- Primary contact mode- email and text #
- Invited 8,400 households
- 9% completion rate
- Significant improvement in sample representatveness

- Looking for further similar sample opportunities

Public Outreach Direct Recruitment (2021 and 2023)

- Engagement firm works with community-based organizations for direct recruitment opportunities
- Experiments to date have had limited effectiveness both in completed households and in cost/household

Metropolitan Council

Sample Representation – Race

The TBI continues to match the Census Bureau's ACS in terms of representation by race. 89% of the unweighted ACS respondents are white.

**UNWEIGHTED TBI DATA COMPARED TO WEIGHTED ACS DATA**
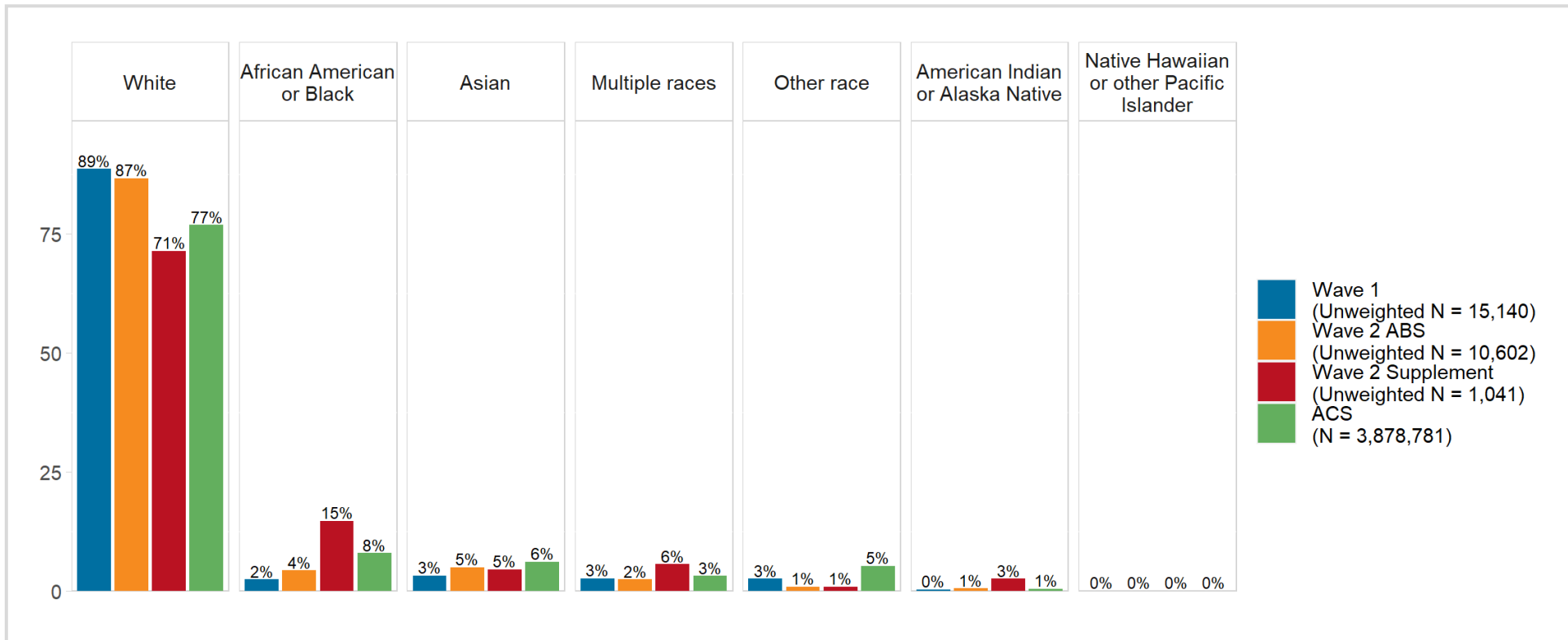
Race/Ethnicity were only asked of adults and the survey allowed respondents to not answer.

Metropolitan Council

Sample Representation – Income

The Wave 2 TBI obtained a more than representative sample of households with incomes less than $35,000 in both the ABS and supplemental sample methods.

UNWEIGHTED TBI DATA COMPARED TO WEIGHTED ACS DATA
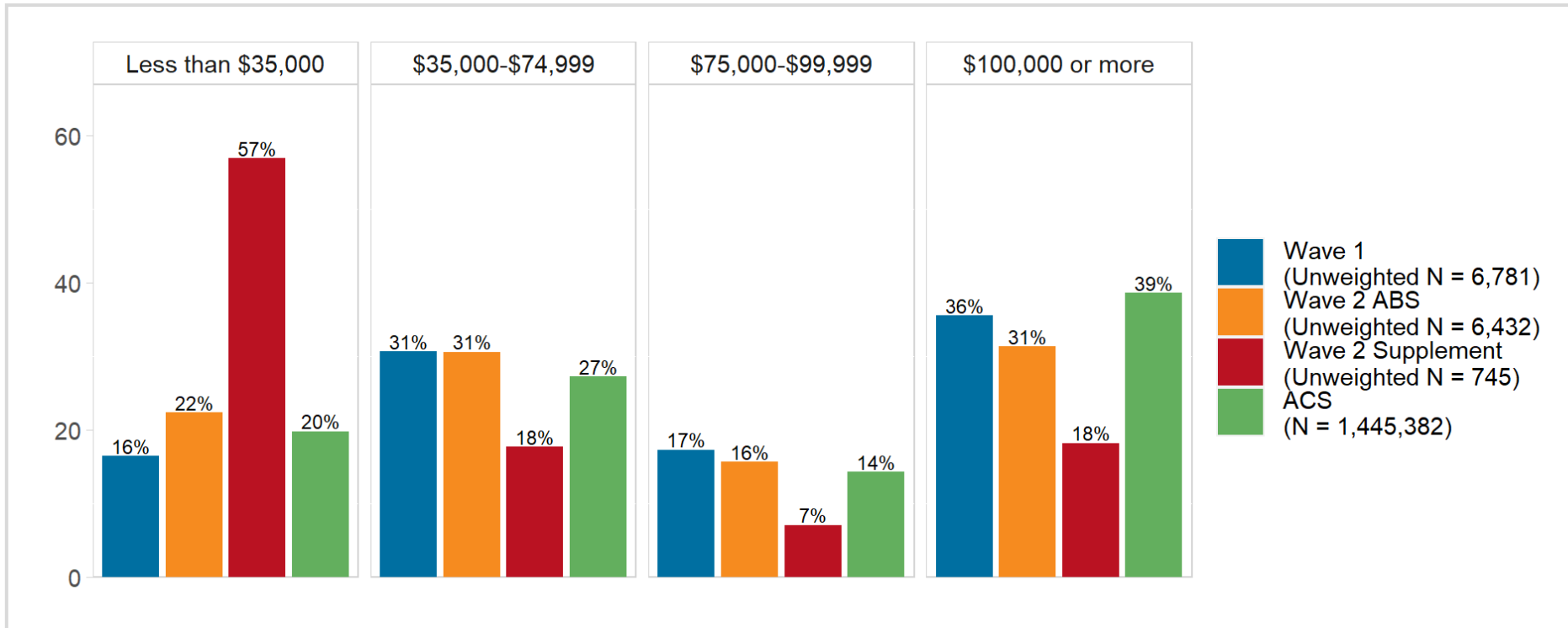
Observations

- Sample mode, contact mode, and survey mode are inter-related

- Increased attention will continue to be on representativeness, credibility of survey is at stake

- Low response rates limit potential of oversampling

- Mixed success to-date with non-proportional methods

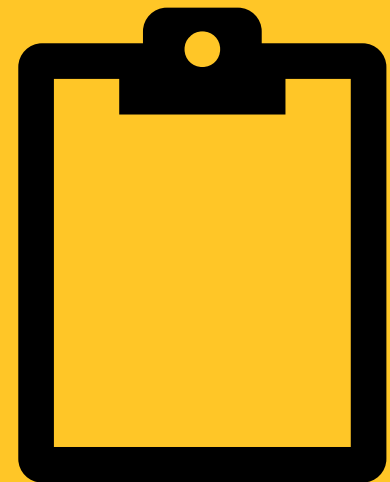- What made the transit supplemental so successful?

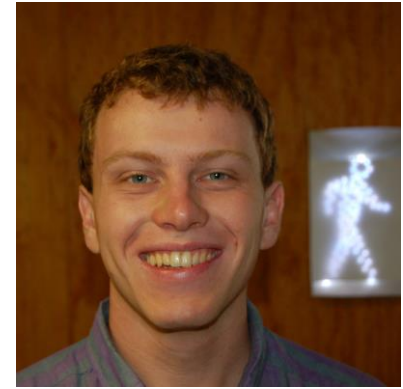# How Survey Recruitment Channels Affect Research Results: The COVID Future Survey

Deborah Salon

School of Geographical Sciences and Urban Planning

ASU® Arizona State University

COVIDFUTURE
Panel Survey

The Original Research Team

Survey Sections
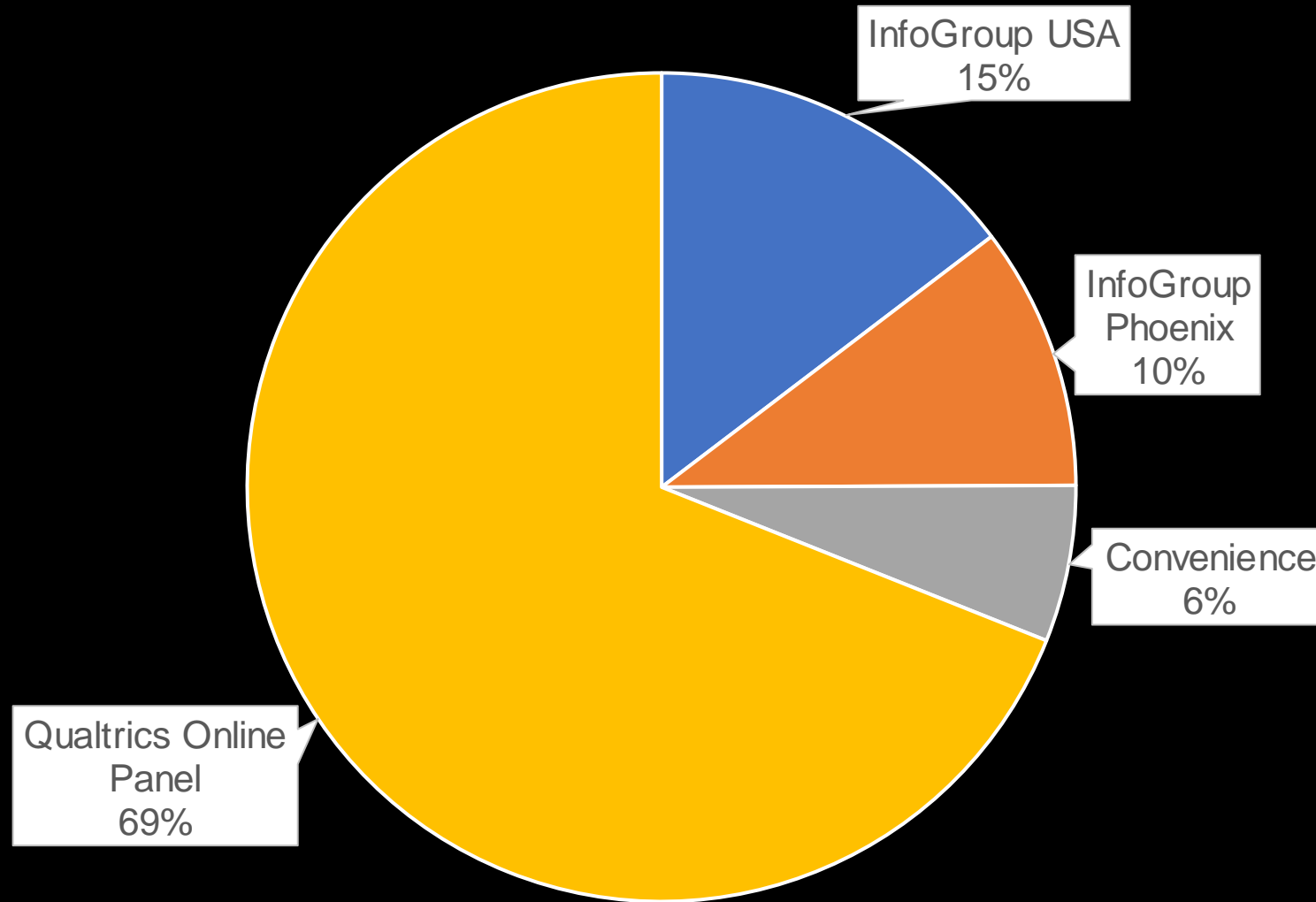
I. Employment

II. Working and Studying

III. Shopping and Dining

IV. Transport

V. Attitudes

VI. Demographics

Length: Between 15 and 30 minutes

Wave 1: June 2020 – Oct 2020
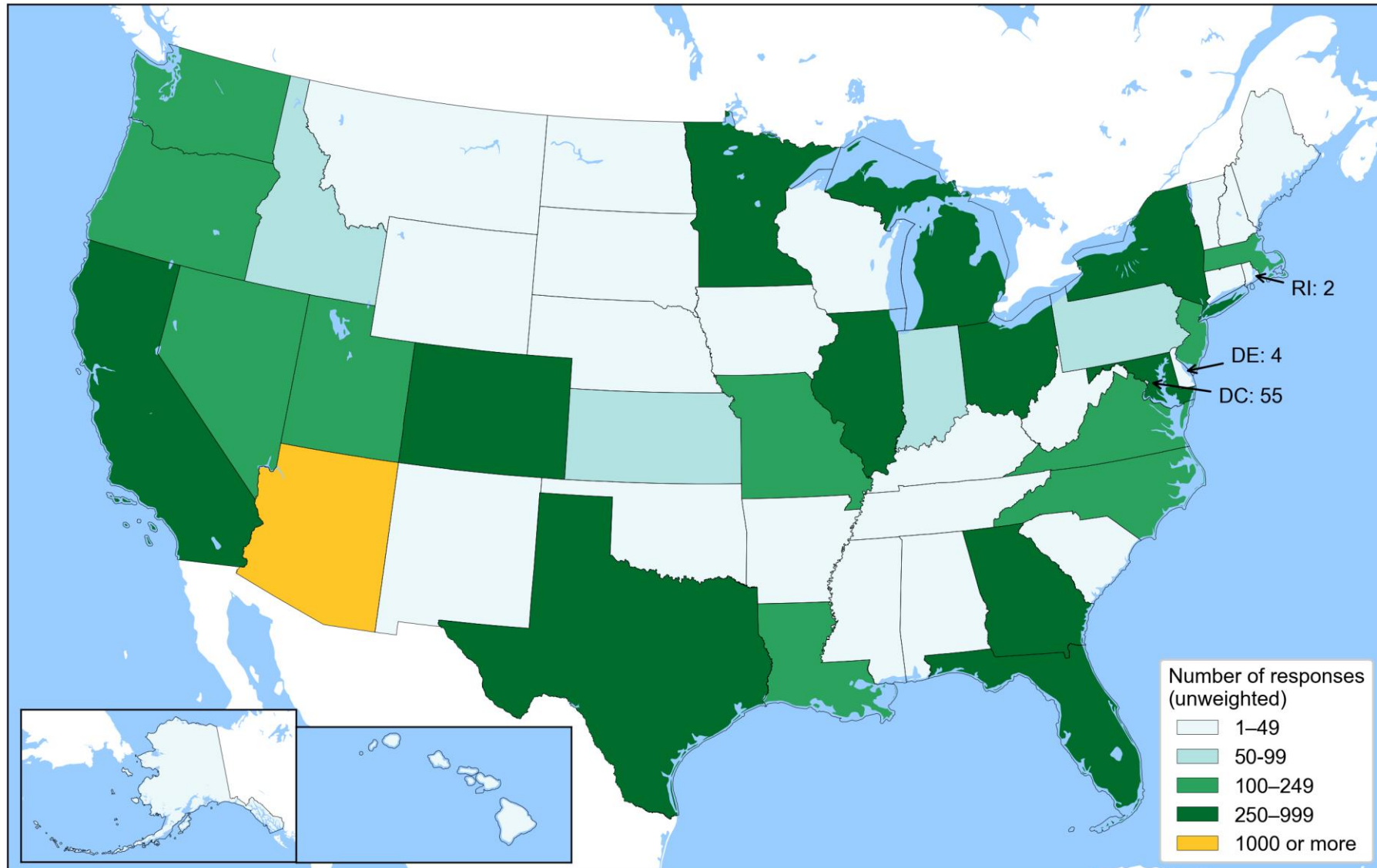
Sample size: 7,613

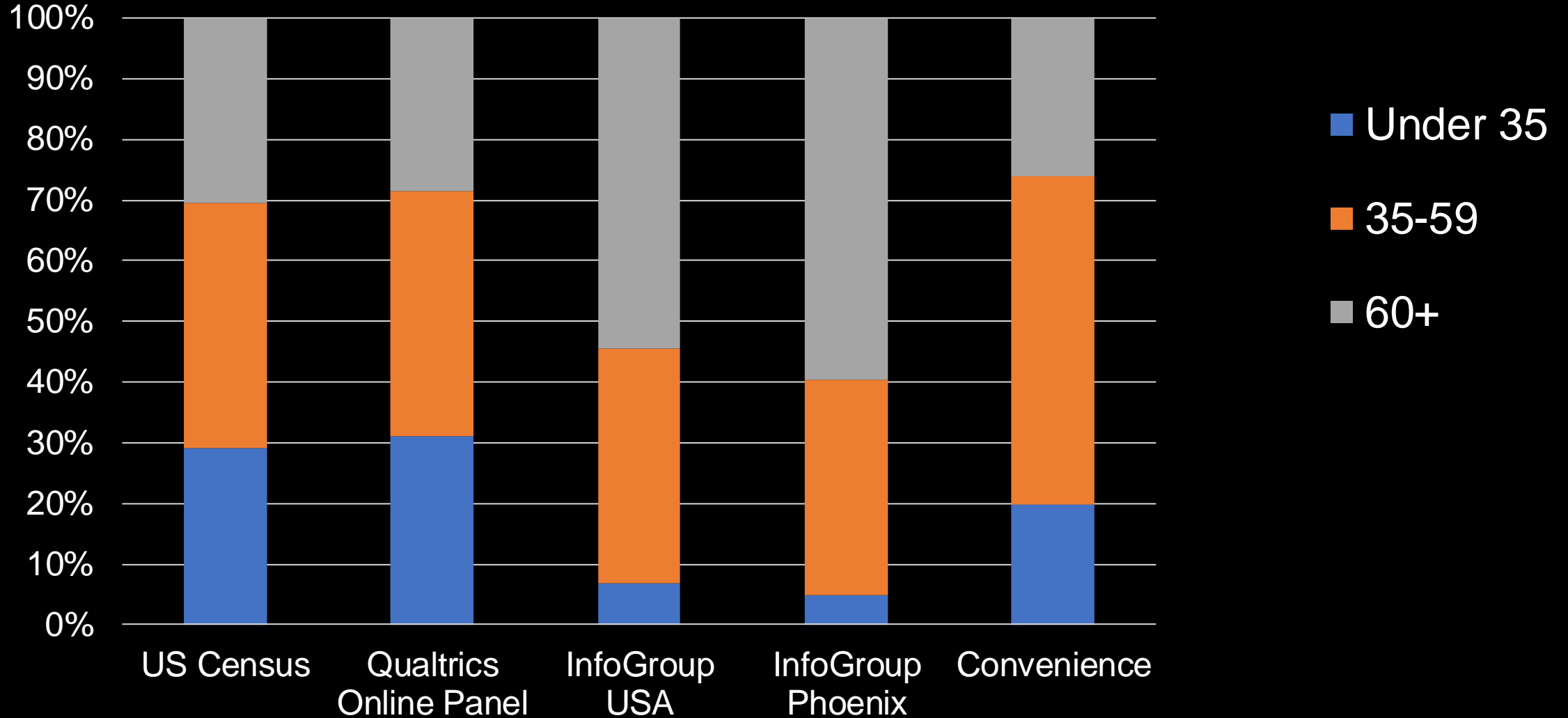# Recruitment Channels

Qualtrics:
Quota Sampled

InfoGroup:
Email Marketing

Convenience:
Website, Media
Links

Pie chart labels:
- InfoGroup USA 15%
- InfoGroup Phoenix 10%
- Convenience 6%
- Qualtrics Online Panel 69%

Spatial distribution of respondents

RI: 2

DE: 4

DC: 55

Number of responses
(unweighted)

1–49

50-99

100–249

250–999

1000 or more

Color scheme courtesy ColorBrewer
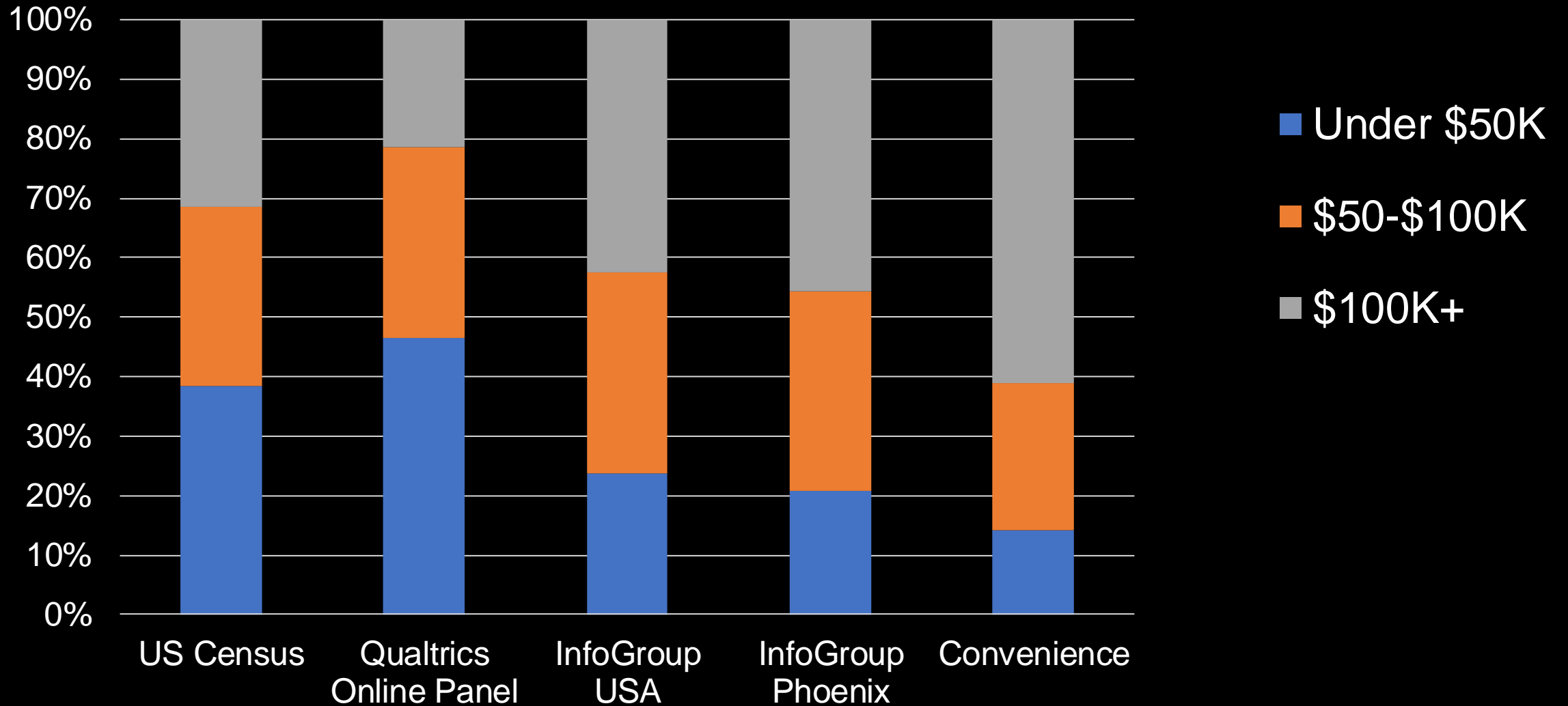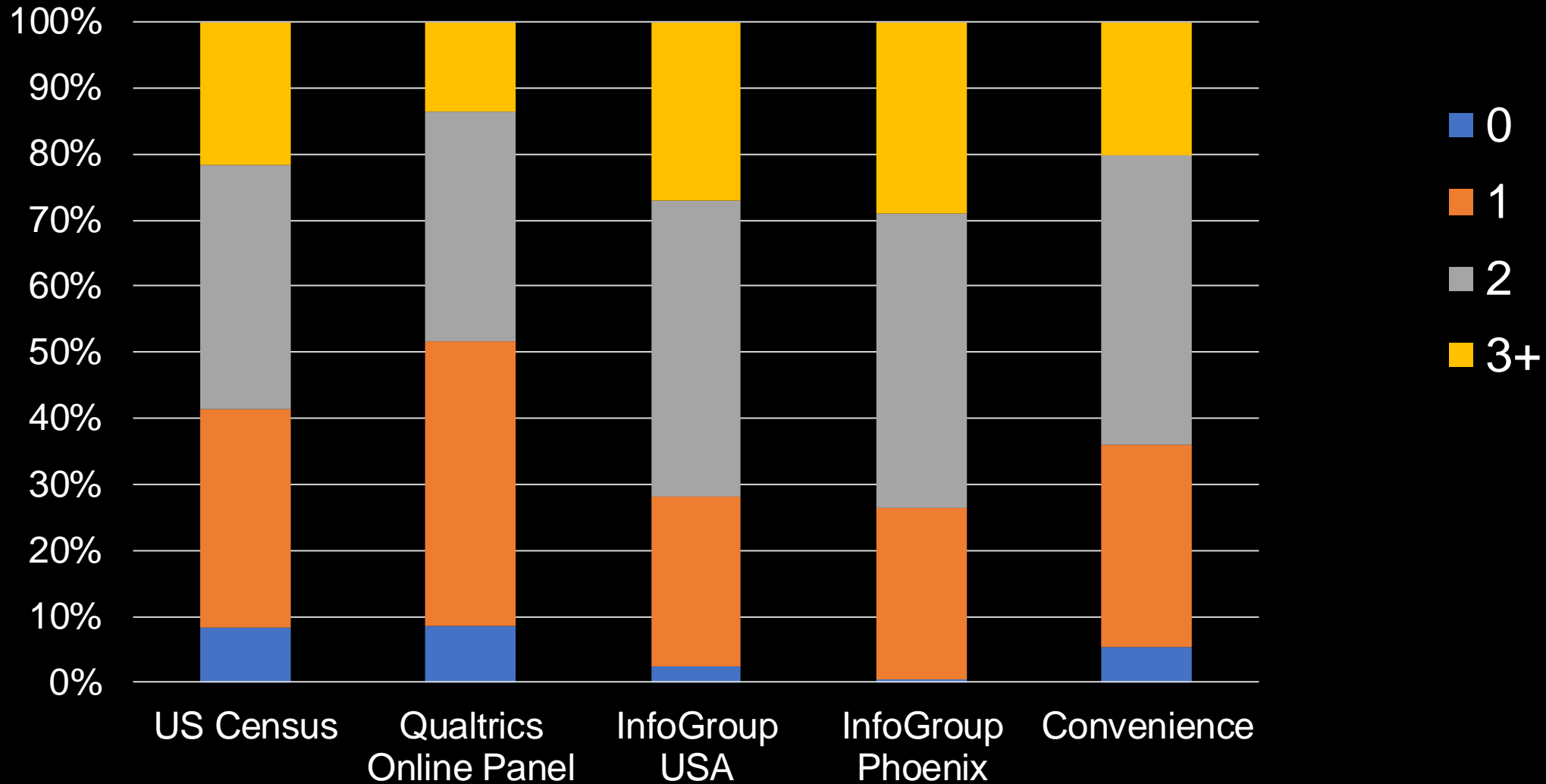
Survey Weighting to match **REGIONAL** distributions of

AGE
GENDER
EDUCATION
HISPANIC

VEHICLES
INCOME
CHILDREN

Post-stratification weights force our full sample proportions to match each region on these characteristics.

But we just have to **hope** that this will also mean that our results will be **representative on other variables**.
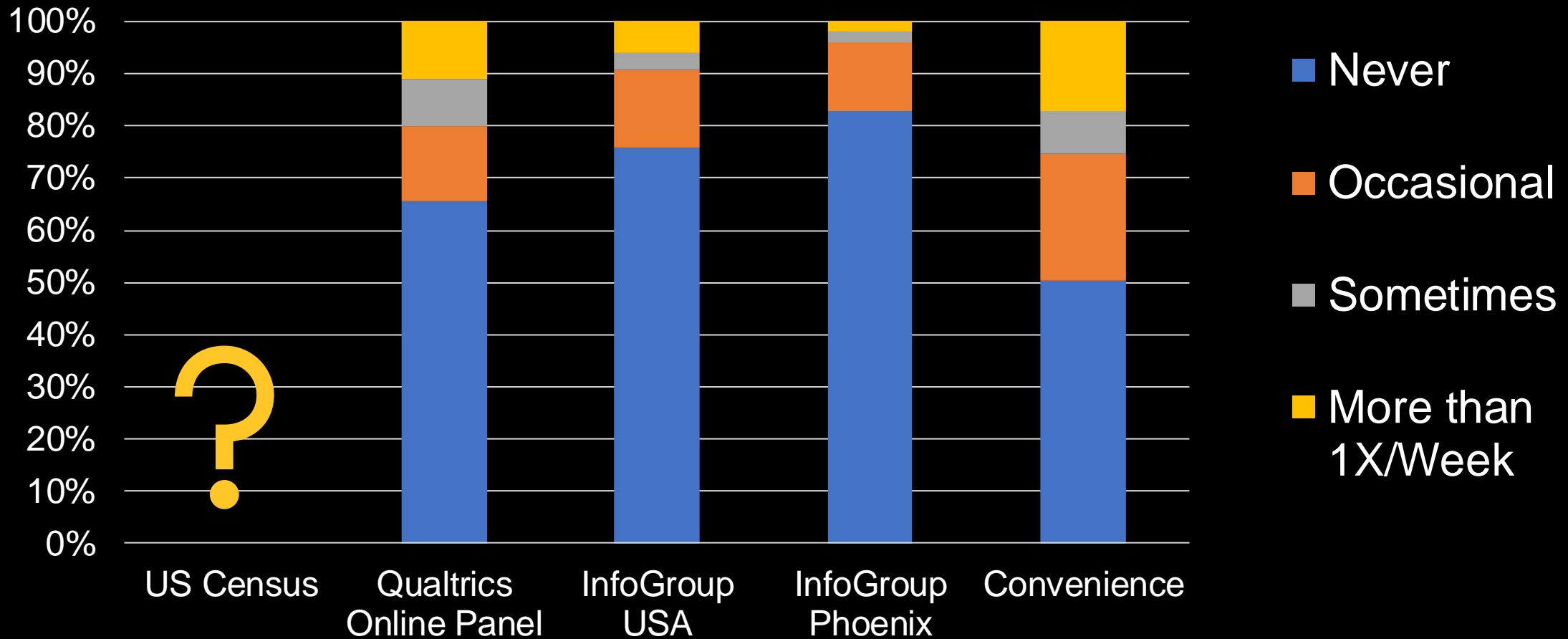
That chart was created using the weights, but clearly still the recruitment channel mattered.

Does Recruitment Channel Change Research Answers in Multivariate Analyses?

What factors are associated with the ability to work from home?

Did the pandemic change these?

Marginal Effects on Pre-COVID Ability to WFH

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

	All	Conv.	Qualtrics	InfoUSA	InfoPHX
Education					
No Bachelor's	base	base	base	base	base
Bachelor's	0.11***	0.14**	0.12***	0.08*	0.02
	(0.02)	(0.06)	(0.02)	(0.04)	(0.05)
Graduate	0.19***	0.25***	0.19***	0.17***	0.01
	(0.02)	(0.06)	(0.03)	(0.05)	(0.06)
Income					
<$50K	base	base	base	base	base
$50-$100K	-0.02	-0.06	-0.00	-0.03	-0.03
	(0.02)	(0.07)	(0.02)	(0.06)	(0.09)
>$100K	0.09***	0.08	0.09***	0.07	0.07
	(0.02)	(0.07)	(0.03)	(0.06)	(0.09)
Job Category					
All Other Jobs	base	base	base	base	base
Essential	-0.17***	-0.02	-0.18***	-0.16***	-0.16***
	(0.02)	(0.07)	(0.02)	(0.05)	(0.06)
Professional	0.13***	0.07	0.10***	0.27***	0.26***
	(0.02)	(0.06)	(0.03)	(0.06)	(0.07)
Education	-0.14***	-0.00	-0.19***	-0.11*	-0.13
	(0.02)	(0.07)	(0.03)	(0.06)	(0.08)
Administrative	0.02	-0.01	0.01	0.15	0.09
	(0.03)	(0.09)	(0.04)	(0.09)	(0.12)
Dense Urban	0.06***	0.03	0.06**	0.00	
Neighborhood	(0.02)	(0.05)	(0.02)	(0.07)	
N	4,785	726	3,006	645	415

Marginal Effects on Post-COVID Ability to WFH

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

	All	Conv.	Qualtrics	InfoUSA	InfoPHX
Education					
No Bachelor's	base	base	base	base	base
Bachelor's	0.13***	0.19***	0.12***	0.12***	0.15***
	(0.02)	(0.06)	(0.02)	(0.04)	(0.05)
Graduate	0.20***	0.29***	0.17***	0.21***	0.16**
	(0.02)	(0.05)	(0.03)	(0.05)	(0.06)
Income					
<$50K	base	base	base	base	base
$50-$100K	-0.01	0.03	-0.01	0.01	-0.04
	(0.02)	(0.06)	(0.02)	(0.06)	(0.08)
>$100K	0.10***	0.15**	0.09***	0.09	0.04
Job Category					
All Other Jobs	base	base	base	base	base
Essential	-0.17***	-0.13**	-0.15***	-0.20***	-0.20***
	(0.02)	(0.06)	(0.02)	(0.05)	(0.06)
Professional	0.24***	0.12**	0.21***	0.31***	0.33***
	(0.02)	(0.05)	(0.03)	(0.06)	(0.07)
Education	-0.13***	-0.11*	-0.16***	-0.15**	-0.22***
	(0.02)	(0.06)	(0.03)	(0.06)	(0.08)
Administrative	0.10***	0.01	0.07*	0.29***	0.16
	(0.03)	(0.07)	(0.04)	(0.08)	(0.11)
Dense Urban	0.07***	-0.06	0.10***	0.09	
Neighborhood	(0.02)	(0.04)	(0.03)	(0.07)	
N	4,874	733	3,070	656	422

Encouragingly, recruitment channel did not matter much in determining key research findings in this case.

More work is needed to test datasets and recruitment channels for research findings robustness.

Data Available for Download and Links to our Publications At:

tomnet-utc.engineering.asu.edu/data/

Contact: Deborah Salon, dsalon@asu.edu

Thank you for listening!

Deborah Salon

dsalon@asu.edu

REACHING POPULATIONS OF IMPORTANCE THROUGH PROBABILITY PANELS

April 2024

GAME CHANGERS

Ipsos

SUMMARY

1. **Evolving Sampling Methods to Address Response and Representation Issues in HTS**

2. **Panel Frame Sample Case Study**
   - **FHWA's 2022 NextGen NHTS**

3. **Future Applications**
   - **National**
   - **State and Local**

Ipsos

HTS SAMPLING METHODS NEED TO EVOLVE TO OVERCOME REPRESENTATION CHALLENGES

CHALLENGES OF CURRENT METHODS

ABS alone has been the gold standard for past decade, but challenges for this method are growing:

– Historic underrepresentation of key demographic groups (e.g., people of color)

– Overall response rates are declining year-over-year and impacting underrepresented groups most

INNOVATION AREAS – WHERE & HOW WE CAN IMPROVE

Can we utilize multiple sample sources to overcome these challenges? Can this be done while maintaining rigor in our research?

– Maintain a segment of ABS sample for benchmarking and supplement with a Probability Panel Sample

– If a recurrent program? Maintain a panel of participants

– Decline in transit ridership? Utilize a targeted oversample of transit customers from a rider list.

Ipsos

CASE STUDY: U.S. DOT FHWA NEXTGEN 2022 NATIONAL HOUSEHOLD TRAVEL SURVEY

The NHTS provides a national data source on personal and household travel for trend analysis. It informs on non-commercial travel by all modes, including characteristics of the people traveling, their household, and their vehicles.

NEXTGEN RESEARCH & EVOLUTION

Comparison of traditional address-based sample (ABS) and a probability-based panel frame sample (PFS).

15,000 Households in the National Sample

- 7,500 Address-based Sample (ABS)
- 7,500 Panel Frame Sample (PFS) from Ipsos KnowledgePanel

2022 NHTS COMPARISON OF SAMPLE SOURCES

Address-based Sample (ABS)

- Geographically stratified sample using Census Block Group data from the most recently available American Community Survey 5-year estimates (ACS)

- Invited to survey through mailed survey materials

- Trust must be established in invitation and outreach materials

- Participation is offered in Spanish and English

- Incentive distribution is handled by survey administrators

Panel Frame Sample (PFS)

- Panel members are recruited via ABS

- Representative sample selected from panel for NHTS

- Non-internet households are provided a tablet to participate

- Trust is established with panel members improving response and answers to sensitive questions

- Invited to survey through email invitation

- Participation is offered in Spanish and English

- Incentives are handled by panel administrators via normal system

Ipsos

DEMOGRAPHIC COMPARISON OF NHTS SAMPLE METHODS

Our analysis will compare unweighted American Community Survey (ACS), unweighted NHTS ABS, and unweighted NHTS PFS to weighted ACS data across:
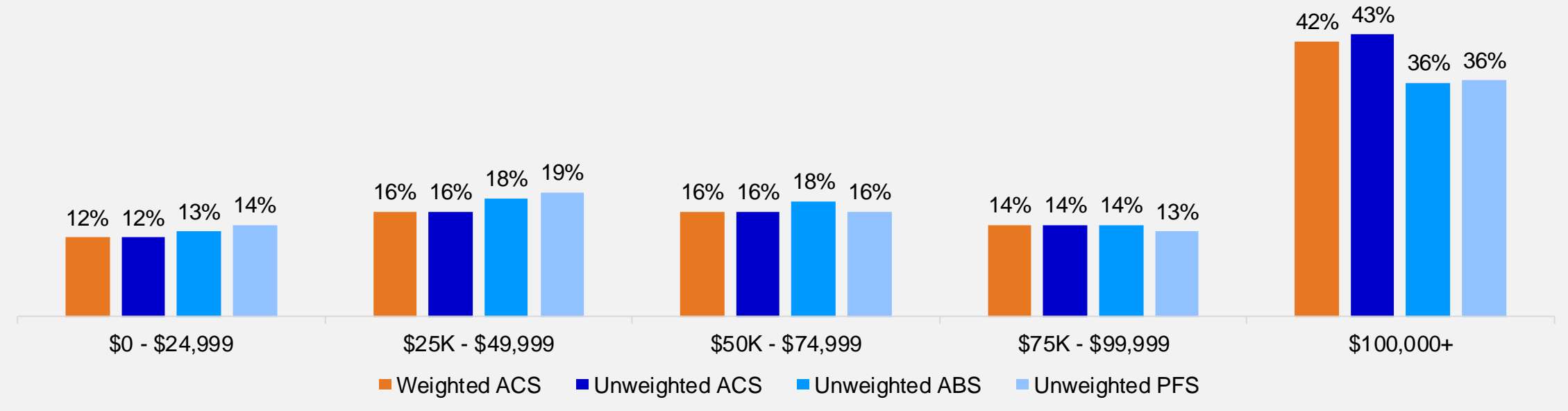
- Income
- Race
- Ethnicity
- Age
- Vehicle ownership

Goal is to compare how representative each source is in terms of demographics for the unweighted samples.
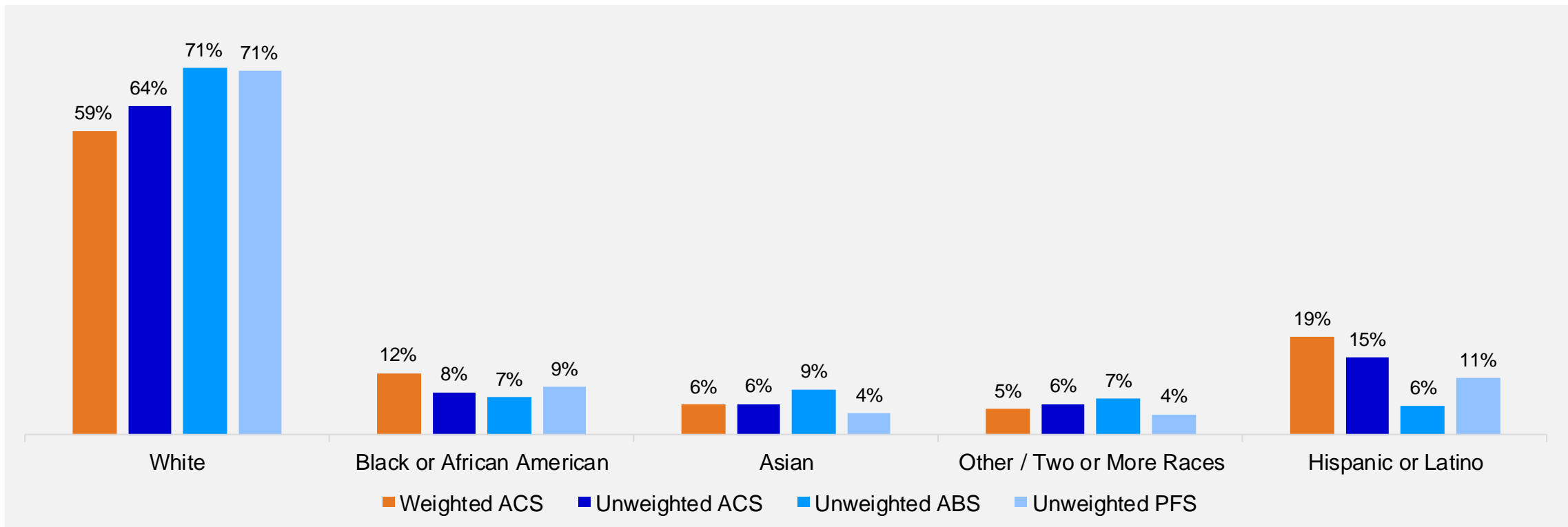
REPRESENTATION: HOUSEHOLD INCOME

The NHTS ABS and PFS are reaching historically hard-to-survey households, obtaining a higher share of low-income households than the ACS in the unweighted sample, with underrepresentation of high-income households.

How much does your household earn annually?

	$0 - $24,999	$25K - $49,999	$50K - $74,999	$75K - $99,999	$100,000+
Weighted ACS	12%	16%	16%	14%	42%
Unweighted ACS	12%	16%	16%	14%	43%
Unweighted ABS	13%	18%	18%	14%	36%
Unweighted PFS	14%	19%	16%	13%	36%

Legend: Weighted ACS, Unweighted ACS, Unweighted ABS, Unweighted PFS

Ipsos

REPRESENTATION: AGE

NHTS ABS and PFS samples perform very similarly across age brackets, both overrepresent age 55-74.

What is your age?

|	0 - 17	18 - 34	35 - 54	55 - 74	75+
Weighted ACS	18%	23%	27%	25%	7%
Unweighted ACS	16%	20%	25%	29%	9%
Unweighted ABS	18%	17%	24%	32%	9%
Unweighted PFS	17%	17%	25%	32%	9%

■ Weighted ACS ■ Unweighted ACS ■ Unweighted ABS ■ Unweighted PFS
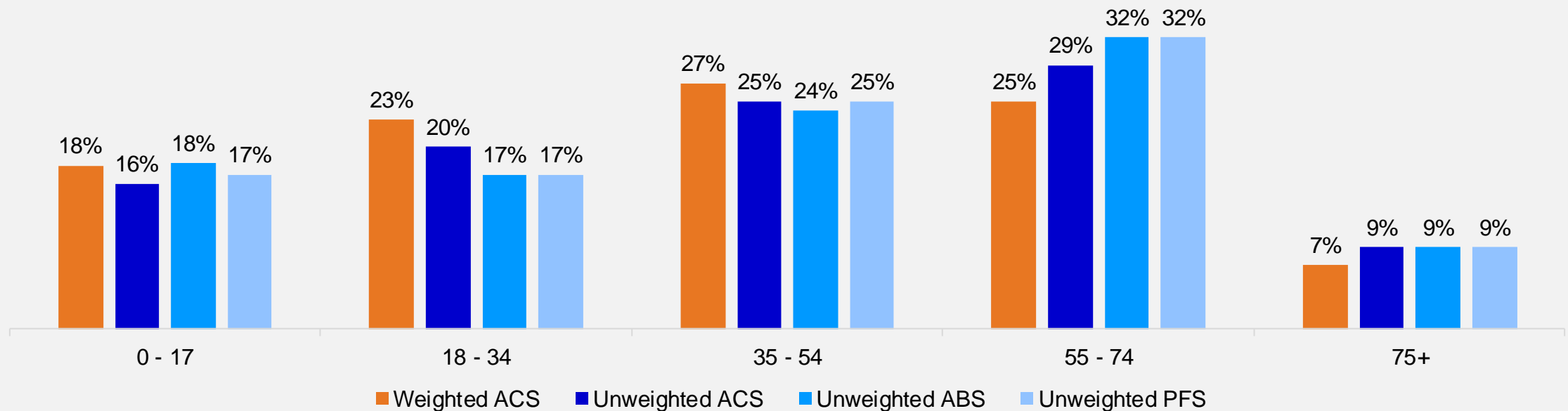
REPRESENTATION: HOUSEHOLD VEHICLE OWNERSHIP

NHTS ABS and PFS again perform similarly with slightly better representation of zero-vehicle households than unweighted ACS data.

How many vehicles are in your household?

	0 Vehicles	1+ Vehicles
Weighted ACS	6%	94%
Unweighted ACS	5%	95%
Unweighted ABS	7%	93%
Unweighted PFS	7%	93%
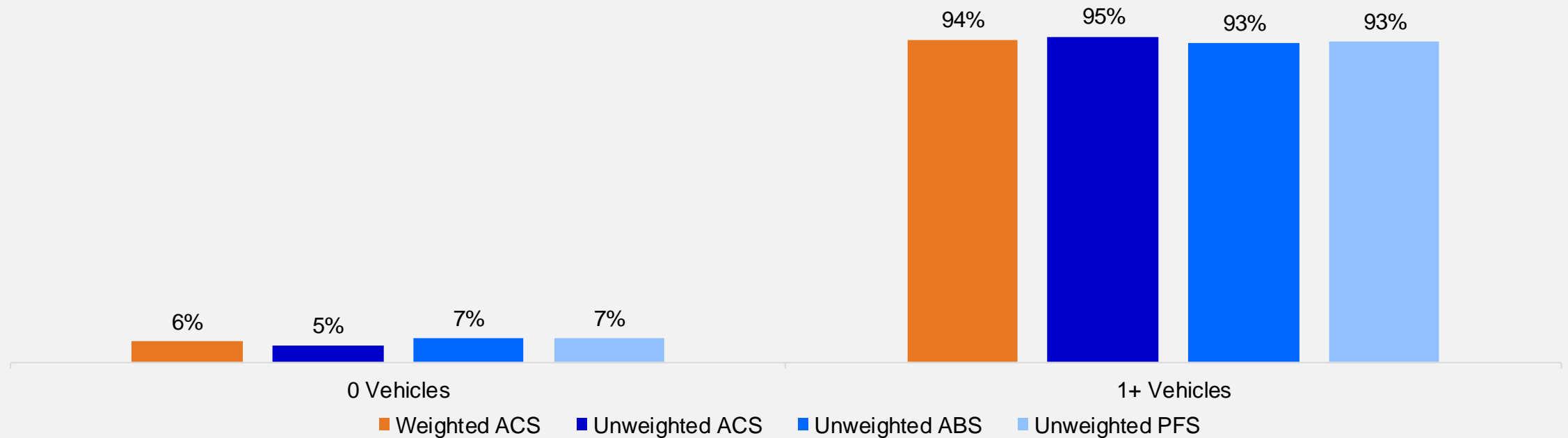
WEIGHTING MIXED-METHOD SAMPLES

ABS supplemented with a probability panel sample

Weight each sample separately to account for designs and any oversampling

- *Adjust to population demographic and geographic characteristics*
  - *Use same benchmark targets if possible*

- *Make other adjustments in a parallel fashion for both samples (e.g., distribute weights by day or month)*

- *Scale separate weights prior to combining samples (e.g., scale to the effective n)*

- *Combine and re-assess population demographics*
  - *Re-adjust if needed*

- *Examine design effect and whether weight trimming should be used*

Ipsos

NHTS FURTHER RESEARCH & UPDATES

American Association of Public Opinion Research Conference 2024

Bob Torongo will present "Innovations in Sample Design: A Comparison of Address-Based Sample and Panel Frame Sample for Federal Transportation Statistics" digging deeper into performance of the PFS and ABS on key travel behavior and mode metrics.

NHTS Program

The 2022 NHTS program includes an independent evaluation of the PFS and ABS sample sources by Battelle and FHWA has posted a report with this analysis to inform future research.

Ipsos

FUTURE APPLICATIONS & INNOVATION

Reviewing a menu of sample sources to identify the right fit for your research program and priorities

Maintaining a segment of ABS sample for benchmarking.

Supplementing with:

- – Probability Panel Frame Sample (PFS)
- – Recurrent program? Maintaining a panel of participants and gaining longitudinal data.
- – Decline in transit ridership? Utilize a targeted oversample of transit customers from a rider list.
- – Community-based organization partnership and recruitment

Sample design based on research priorities and feasibility given constraints

THANK YOU

CONTACT

Jared Coopersmith (jared.coopersmith@ipsos.com)
Vice President & Chief Statistician KnowledgePanel

GAME CHANGERS

Ipsos

Today's presenters

Abigail Rosenson

abigail.rosenson@rsginc.com

Jonathan Ehrlich

Jonathan.ehrlich@metc.state.mn.us

Dr. Jared Coopersmith

Jared.Coopersmith@ipsos.com

Dr. Deborah Salon

Deborah.Salon@asu.edu

Upcoming events for you

June 23-26, 2024

2nd International Roadside Safety Conference

https://www.nationalacademies.org/trb/events

NATIONAL ACADEMIES *Sciences Engineering Medicine*
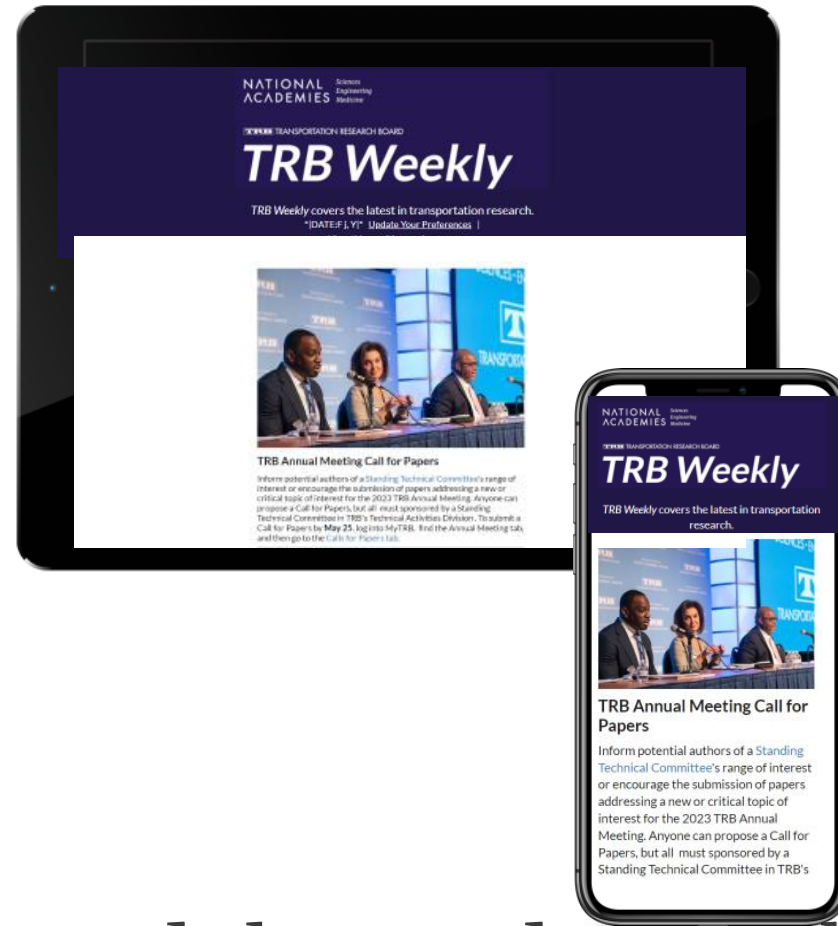
TRB | TRANSPORTATION RESEARCH BOARD

Subscribe to *TRB Weekly*

If your agency, university, or organization perform transportation research, you and your colleagues need the *TRB Weekly* newsletter in your inboxes!

Each Tuesday, we announce the latest:

- RFPs
- TRB's many industry-focused webinars and events
- 3-5 new TRB reports each week
- Top research across the industry

Spread the word and subscribe!

https://bit.ly/ResubscribeTRBWeekly

Discover new
TRB Webinars weekly

Set your preferred topics to get the latest listed webinars and those coming up soon every Wednesday, curated especially for you!

https://mailchi.mp/nas.edu/trbwebinars
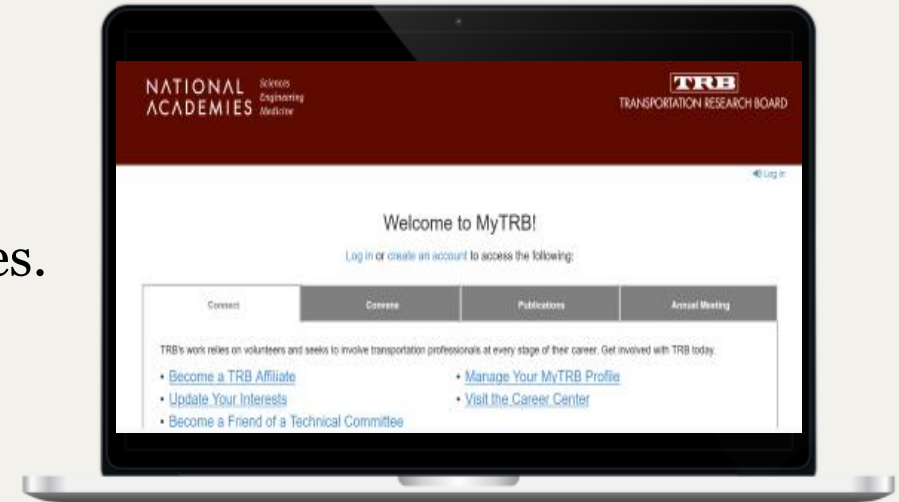
And follow #TRBwebinar on social media

Get involved

TRB mobilizes expertise, experience, and knowledge to anticipate and solve complex transportation-related challenges.

TRB's mission is accomplished through the hard work and dedication of more than **8,000 volunteers**.

https://www.nationalacademies.org/trb/get-involved

We want to hear from you

- **Take our survey**

- **Tell us how you use TRB Webinars in your work at trbwebinar@nas.edu**

NATIONAL ACADEMIES *Sciences Engineering Medicine*