



***East to West Coast Household Travel Surveys:
Practical Optimization Case Studies for Small and Medium MPOs***



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October 24, 2019

Presentation Overview

- Why Conduct a Household Travel Survey (HTS)?
- Addressing Barriers For Small / Medium MPOs
- **Case Study 1:** Broome & Tioga Counties, NY (BMTS)
- **Case Study 2:** Whatcom County, WA (WCOG)
- Key Findings and HTS Tips





Why Conduct a Household Travel Survey (HTS)?

How can HTS help small and medium-sized MPOs?

HTS data provides current, realistic data to reflect local:

- Demographics
- Geography and land use
- Institutions (e.g., universities, airports, large employers)
- Travel options (e.g., transit usage, Uber/Lyft)

HTS also provides an opportunity to ask custom, regionally-specific questions:

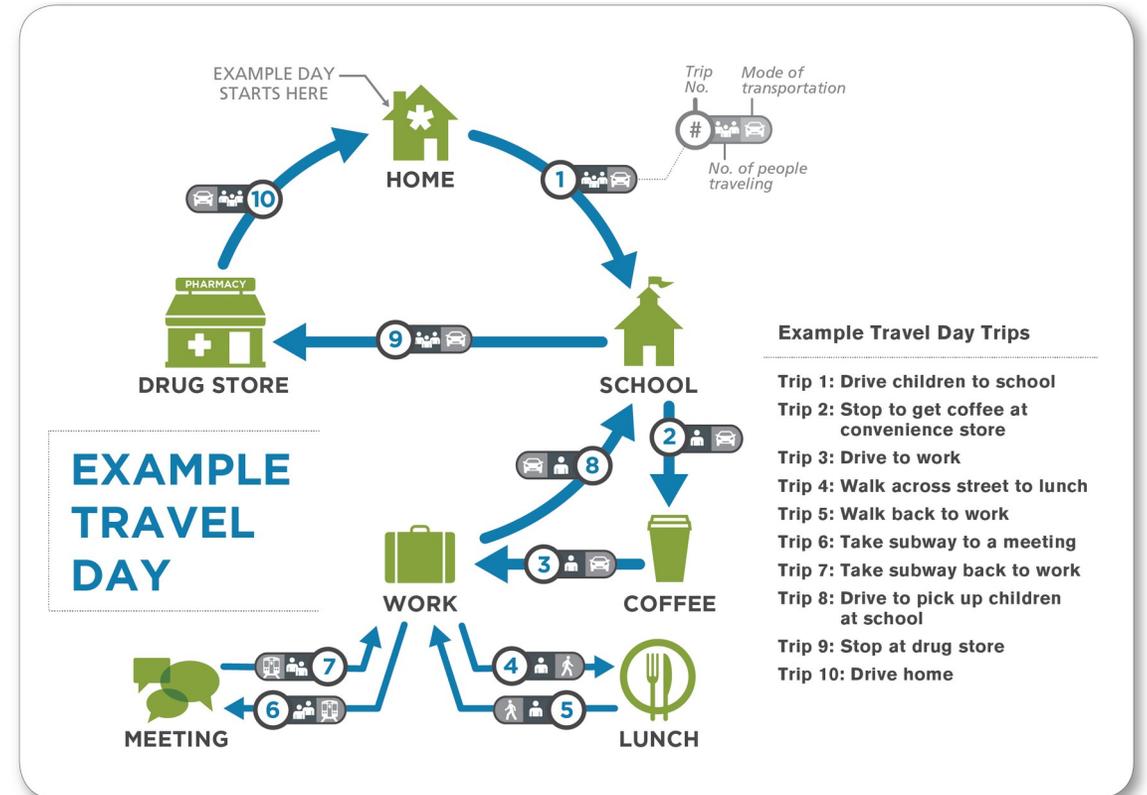
- Recent trends (e.g., bike/scooter share)
- Local program benchmarks (e.g., highway “call boxes”)
- Other local features (e.g., toll roads, cross-border travel)

HTS data is extremely rich compared to other data sources.

HTS DATA INCLUDES:

- Demographic and vehicle information
- Typical and observed travel behavior
- Detailed trip attributes
- Trip paths (using smartphone data collection)

HTS Data can also complement other sources (like Big / Passive Data) that may lack contextual information on their own.



There are many possible applications for HTS data:

General transportation planning

- Regional long-range transportation plan
- County-wide comprehensive plan
- City-level comprehensive plans
- Transit planning
- Corridor and sub-area planning

Active transportation planning

- Bike share / scooter share planning
- TNC (Uber / Lyft) planning

Trip-based travel demand modeling

- Trip rates by purpose and mode
- Trip origins and destinations
- Trip distance and time-of-day distributions

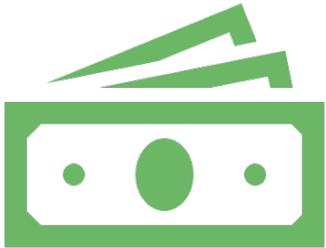
Understanding special travel markets

- College and university student travel
- Long-distance commuters



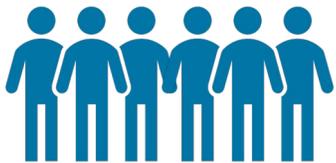
Addressing Barriers for Small / Medium MPOs

High fixed costs and small sample sizes are two major hurdles for small and medium MPOs conducting HTS.



Fixed costs feel “large” for a small project.

- Questionnaire design & survey programming
- Survey branding & invitation / website design
- Pilot study



Sample sizes feel too small for desired analyses.

- Region of 50,000 households \Rightarrow
500 surveyed households* \Rightarrow
small sample of transit riders, bicyclists, Uber/Lyft users, etc.
- ***Such small sample sizes are problematic for analysis.***

Small / Medium MPOs can take steps to make HTS achievable.

-   **Leverage collaboratively-developed materials** (e.g., survey questionnaires and invitations).
-  **Use a “soft launch” approach** instead of a full pilot.
-   **Include smartphone data collection** to get the most data out of your households and increase possible analysis use cases.



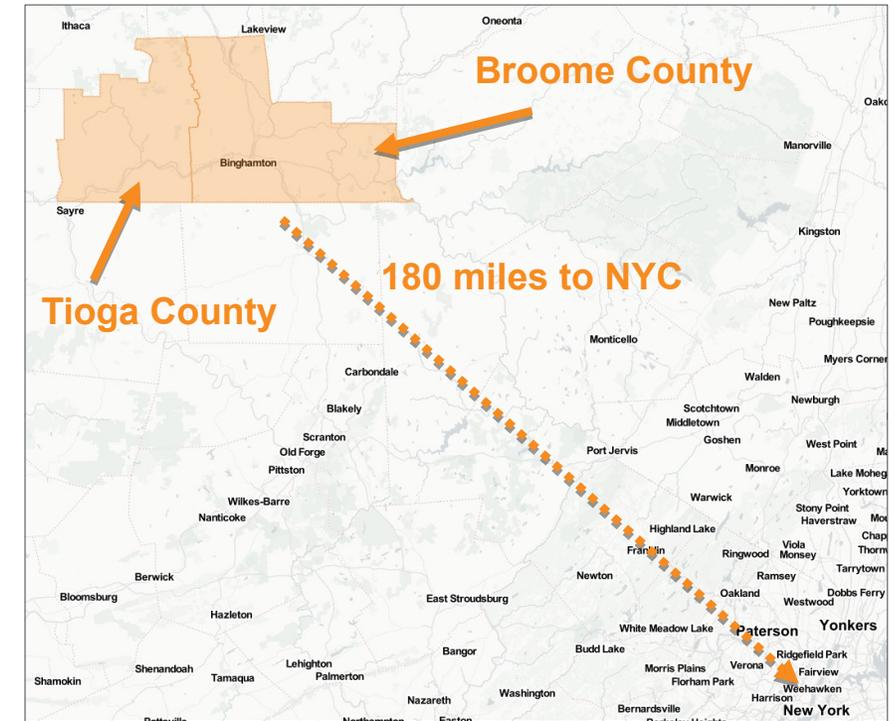
Case Study 1: Broome & Tioga Counties, NY (BMTS)

About BMTS and the Study Region

The **Binghamton Metropolitan Transportation Study (BMTS)** plans for long-range and near-term transportation needs for the 100K and households and 250K residents in the region.

Study Region:

- Comprised of two counties: Broome and Tioga.
- 180 miles (~3 hours) northwest of New York City.
- Population is older, but with 17K university students.
- High share of low-income households.



The 2018 BMTS HTS covered **919 households**, with **51%** using smartphones to collect travel data for up to 3 days.

2018 Study Design:

- Regionalized existing questionnaires & invitations.
- Fall 2017 data collection with soft launch.
- Online “recruitment” survey.
- 3-day smartphone or 1-day online travel diary.
- Gift-card incentives varied by survey method.

High-Level Results:

- 0.9% final sample rate*
- 1,896 persons in complete households
- 3,716 complete person-days of travel
- 13,972 trips on complete travel days



Invitation postcard mailed to all household invited to the study

Multi-day smartphone data collection **doubled the median number of trips captured** in each block group.

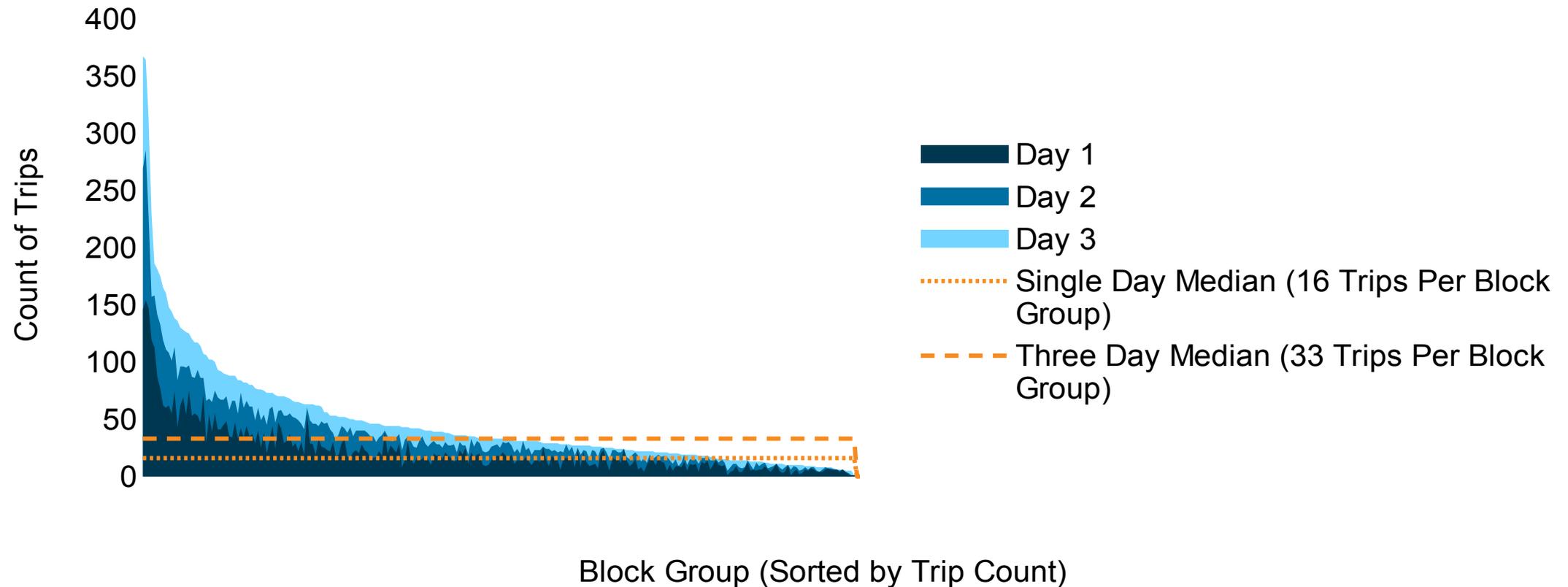
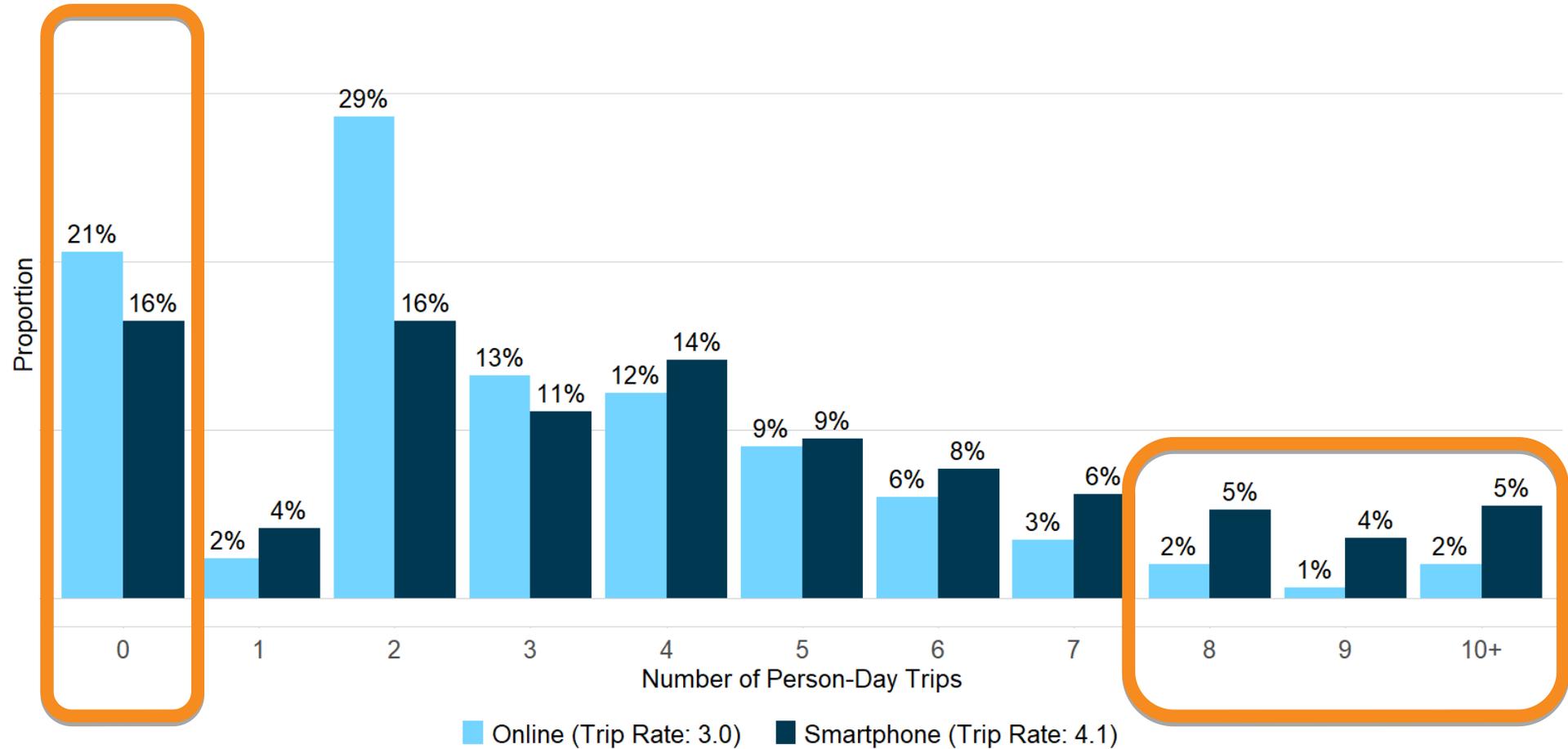
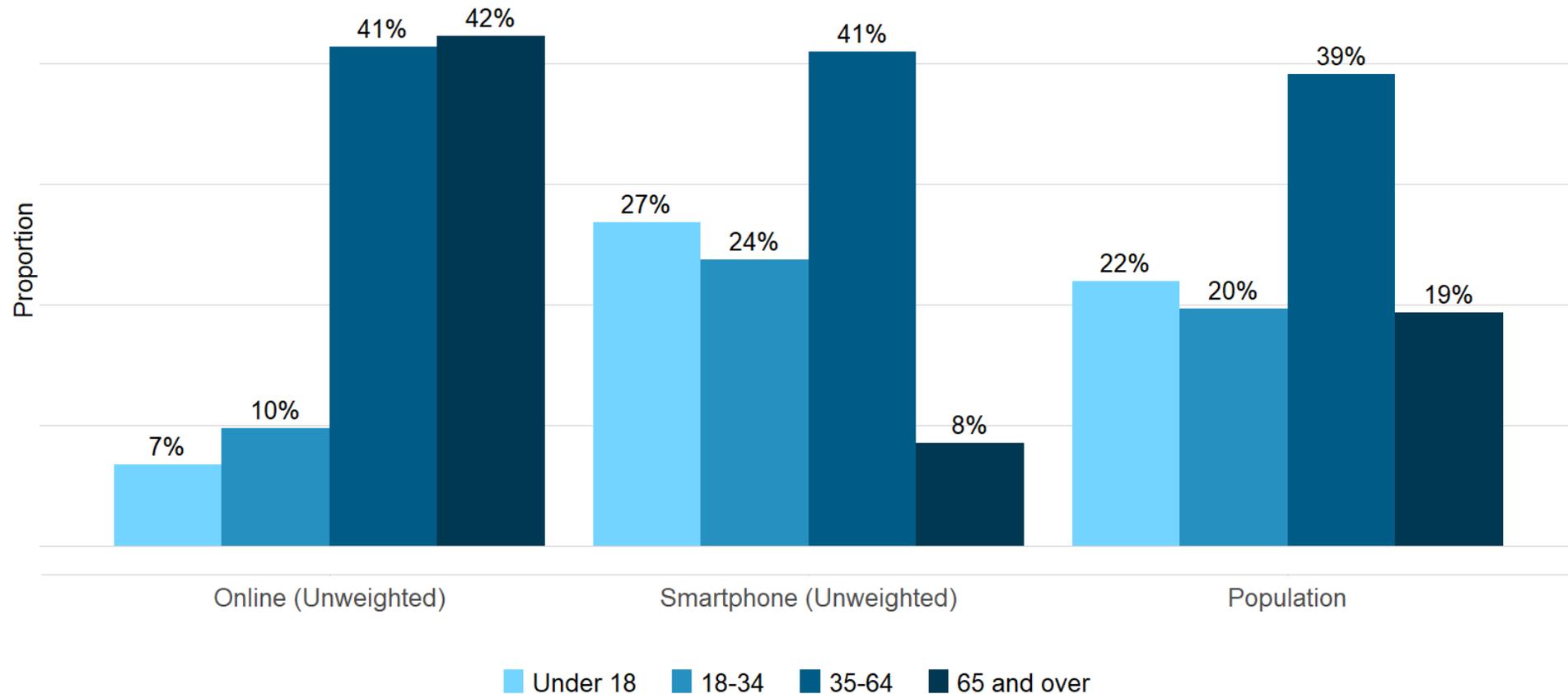


Chart includes data for all participants. Only smartphone participants (51%) traveled on days 2-3.

Smartphone data collection captured **more accurate trip counts** compared to the manual data collection.



Smartphone participants were younger and **matched the population age distribution more closely.**





Case Study 2: Whatcom County, WA (WCOG)

About WCOG and the Study Region

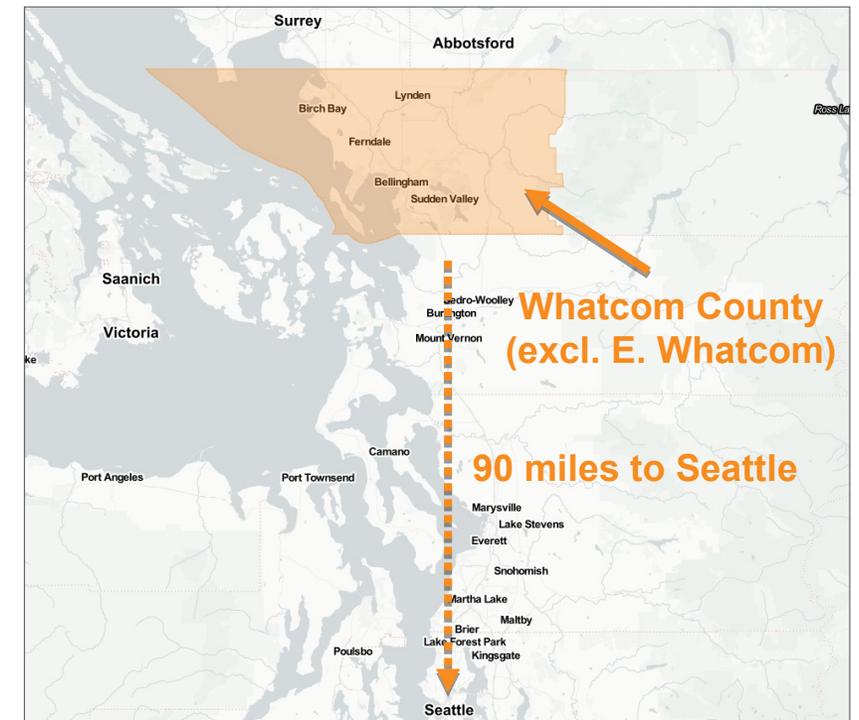
The **Whatcom Council of Governments** (WCOG) provides a variety of services and programs for the 90K+ households (210K+ residents) of Whatcom Region in NW Washington.

Study Region:

- 45 miles south of Vancouver, B.C.
- 90 miles north of Seattle, WA

Key Transportation Topics:

- High passenger and freight volume at U.S. – Canadian border crossing
- Increase in ride-hailing / decrease in bus ridership
- Increase in urban bicycling
- Rapid population growth in past 10 years (many who commute to jobs outside the region)



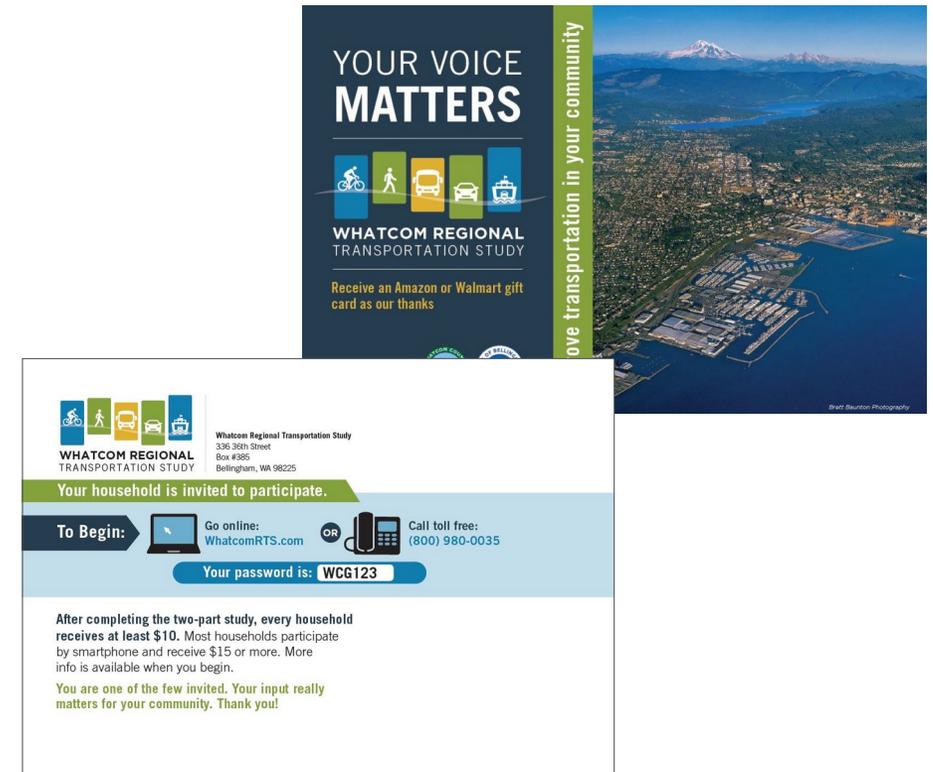
The 2018 WCOG HTS covered **1,451 households**, with **60%** using smartphones to collect travel data for up to 7 days.

2018 Study Design:

- Regionalized existing questionnaires & invitations.
- Fall 2018 data collection with soft launch.
- Online “recruitment” survey.
- 7-day smartphone or 1-day online travel diary.
- Gift-card incentives varied by survey method.

High-Level Results:

- 1.8% final sample rate
- 3,000 persons in complete households
- 13,107 complete person-days of travel
- 47,874 trips on complete travel days



Invitation postcard mailed to all household invited to the study

Multi-day smartphone data collection provided more **insight into rare travel behaviors** and weekend-specific travel.

112

Persons Biked
on Day 1

147

Persons Biked
Only Days 2-7

131%

Increase in Unique
Bicyclists

24

Persons Made Trips to
British Columbia
on Day 1

71

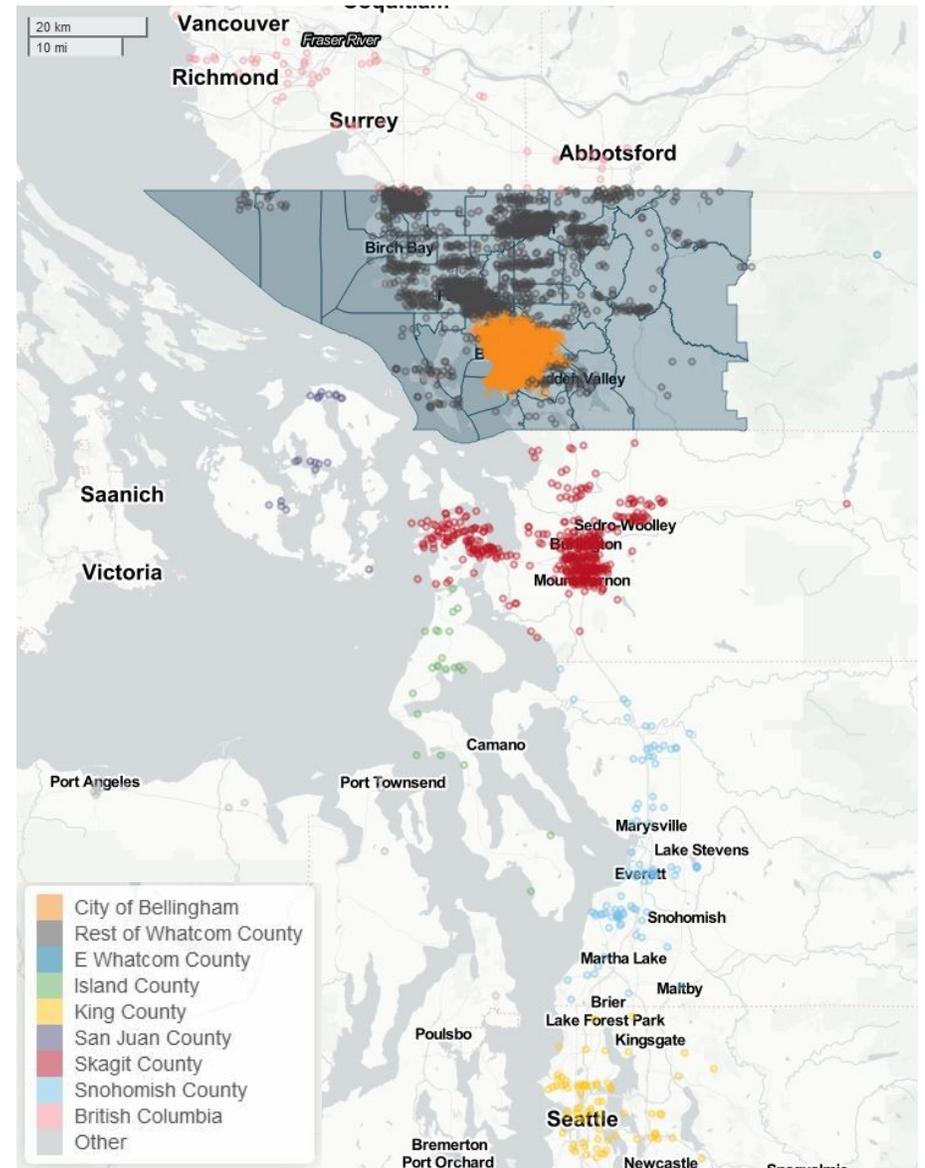
Persons Made Trips to
British Columbia
Only Days 2-7

196%

Increase in
Cross-Border
Travelers

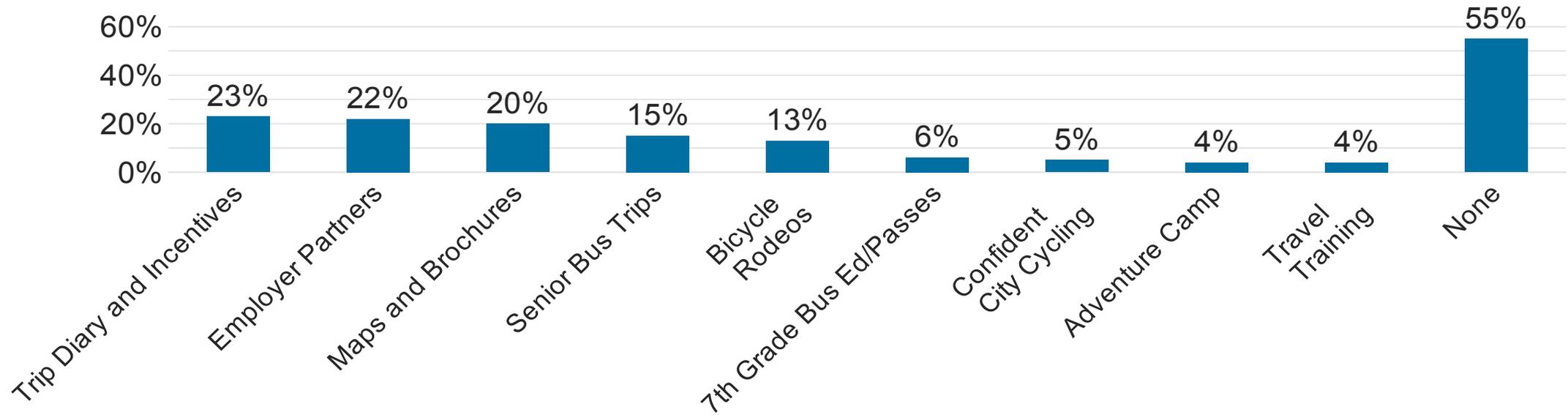
Higher trip counts **increased spatial coverage** across study and neighboring regions.

Destination Region	Work and Work-Related Trips
Bellingham	59.7%
Rest of Whatcom	26.8%
Outside of Whatcom	13.4%



Work trip ends (with added noise to preserve anonymity)

WCOG and RSG also included a regionalized question in the survey to gauge local Smart Trip program awareness.



Whatcom Smart Trips is a local program that encourages people of all ages to make more of their trips by walking, bicycling, sharing rides, and riding the bus.

For more information, visit whatcomsmarttrips.org/



Key Findings and HTS Tips

Key Findings and HTS Tips



Tweaking existing materials and survey questionnaires is a very efficient way to achieve customized results without a fully-customized approach.



Replacing a full pilot study with an extended data collection period (or soft launch) can reduce costs and make the data collection targets more achievable.



Including smartphone data collection dramatically **increases the quantity of data** in the final dataset while **improving the quality** of the data and **increasing data use** cases down the road.



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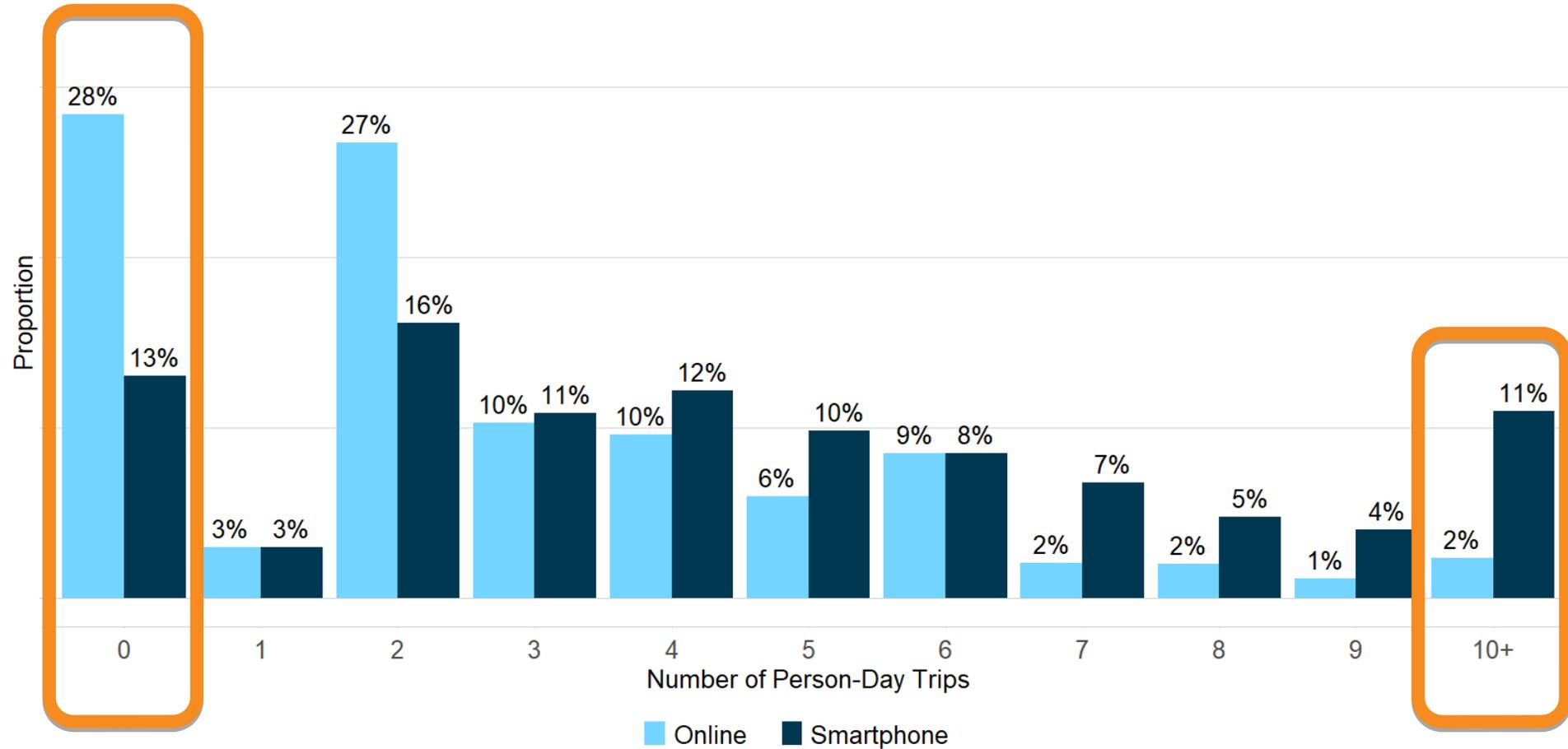


Backup Slides

WCOG: The smartphone approach resulted in **higher trip rates overall, including non-auto trips (walk, bike, transit).**

Mode	2008	2018	% Change
Auto	3.08	3.73	+21
Walk	0.41	0.59	+45
Bike	0.11	0.14	+27
Transit	0.07	0.13	+80
Other	0.13	0.11	-17
Total	3.8	4.7	+24

WCOG: Smartphone data collection captured **more accurate trip counts** compared to the manual data collection.



WCOG: Smartphone participants were younger and matched the population age distribution more closely.

