June 30, 2022

Cleveland State University's School of Urban Affairs has just completed the second wave of interviews on implementing the automated no-touch EZfare transit payment system at public transit authorities in Ohio and Northern Kentucky. The project is funded by a 3-year Federal Transportation Administration IMI grant.

The research looks at determining the effect of EZfare on the quality of life of transit riders, including but not limited to determining the number of trips to work, medical, shopping, worship, etc. We also inquire about travel modes, COVID-19, and about overall life satisfaction. We also consider the effectiveness of contactless EZfare smart cards to prevent the spread of COVID-19, and to minimize customer interaction. We are especially interested in under-banked and low-income transit users.

The project is led by Professor Robert (Roby) Simons working with Assistant Professor Tom Hilde, Mark Henning, and Samuel Owusu-Agyemang. We are supported by a steering committee comprised of NEORide transit partners in developing and vetting surveys and in accessing transit customers. 11 transit agencies based in Ohio and Northern Kentucky are participating: Akron Metropolitan Regional Transit Authority (METRO); Butler County Regional Transit Authority (BCRTA); Laketran; Lancaster-Fairfield Public Transit; Medina County Public Transit (MCPT); Sandusky Transit System; South East Area Transit; Southwest Ohio Regional Transit Authority (SORTA); Stark Area Regional Transit Authority (SARTA); Transit Authority of Northern Kentucky (TANK); and Western Reserve Transit Authority. The data set includes over 1,600 participants, re-surveyed (panel-study) every six months, over two years.

Results

The second survey was the first time that survey participants had been interviewed since the installation of validators on transit vehicles that allow for contactless fare payment with EZfare. These validators have been installed so far on vehicles at the following agencies: TANK, WRTA, MCPT, Akron METRO, SORTA, BCRTA, and Laketran. This report summarizes results for participants from these seven agencies who completed both the first and second surveys.

A total of 615 people completed the second survey between September 2021 and February 2022 out of the 1,306 participants from these agencies who completed the initial first wave survey

between November 2020 and April 2021, a follow-up success rate of 47%. The average participant took 16 minutes to complete the second survey, which was the same amount of time taken to complete the first one.

Ridership Patterns Before, During, and After COVID

Respondents were asked about the number of weekly trips they made to various destinations for both surveys. As part of the first survey, which was administered during the early stages of COVID-19, respondents were also asked how many weekly trips they recalled making to different destination types before the onset of the pandemic. Among the 615 transit riders that participated in both the first and second surveys, there was a noticeable decline in weekly trips to work, to go shopping, and to medical appointments during the initial onset of COVID compared to before. While the average number of weekly trips made by these survey participants to go to work has since recovered slightly, trips to medical appointments and to go shopping have not.
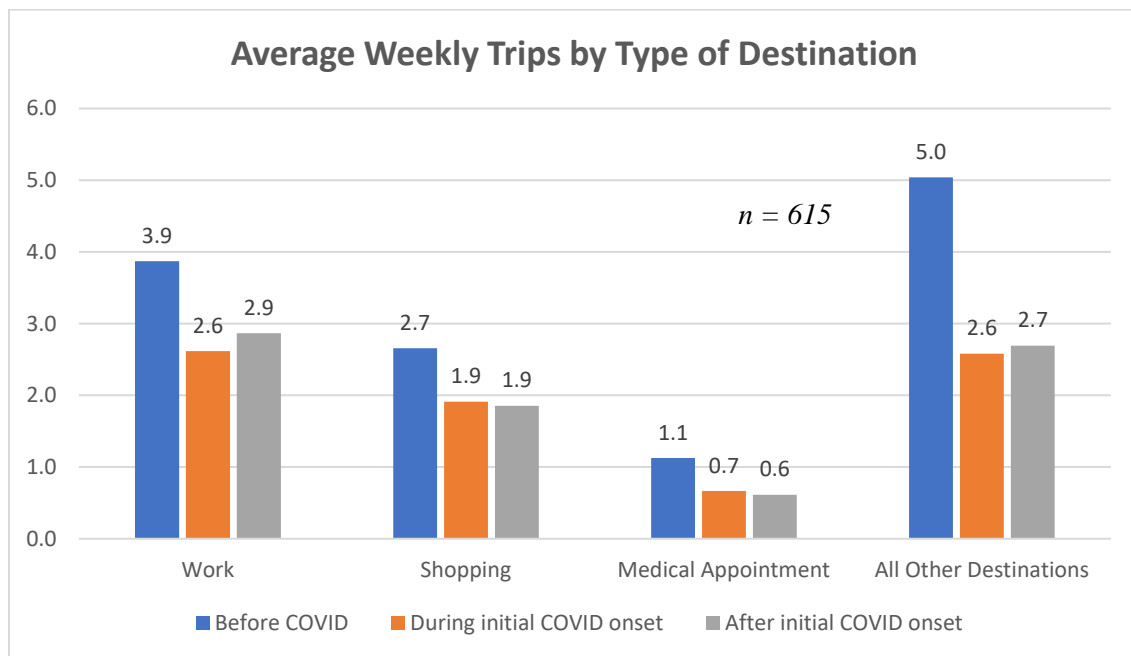
Concern Over Catching COVID-19

Respondent concern over contracting COVID has lessened somewhat since the first survey was administered. When asked during the first round of surveying how concerned they were about contracting COVID, 43% of participants said they were moderately or extremely concerned about catching COVID from other transit passengers. When asked more recently, 38% of this same group of respondents expressed moderate or extreme concern about catching COVID from other transit riders, a decrease of 5 percentage points.

EZfare Adoption

For the 615 riders who completed the second survey, 245 used EZfare to pay for their most recent trip on public transportation, a 9% increase in EZfare use among these participants compared to when they were initially surveyed. The share of riders using cash to pay for transit decreased by 11% for this group between the first and second surveys.
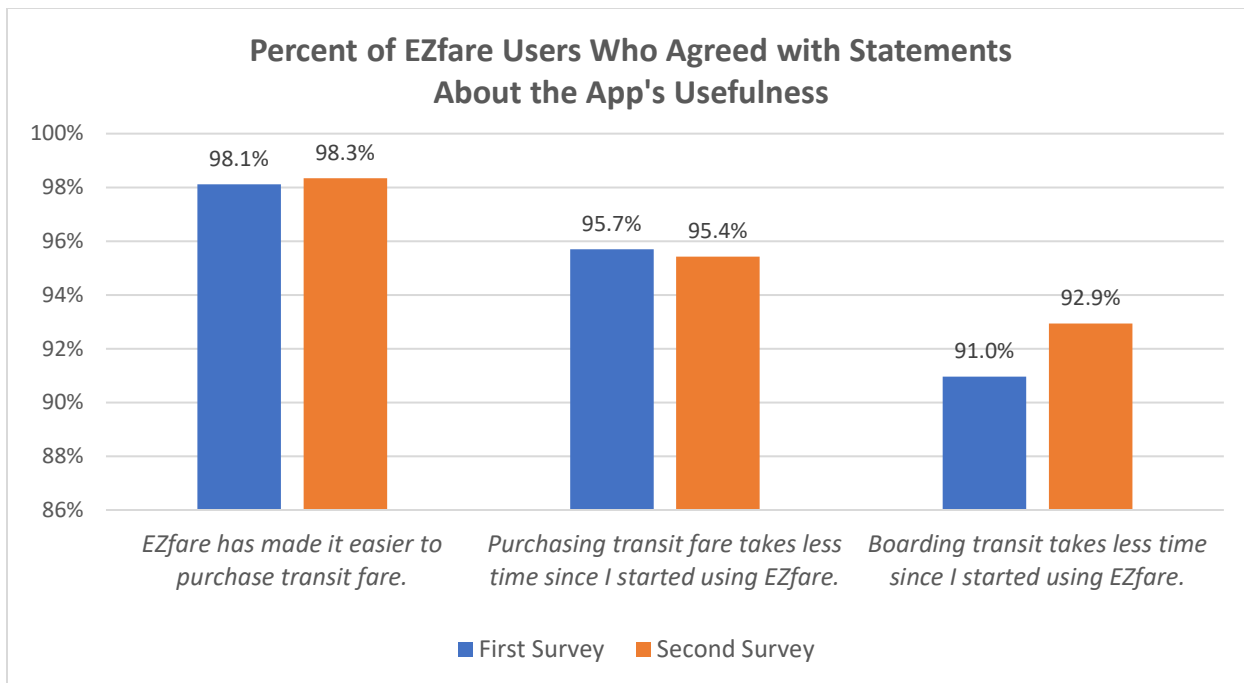
Among non-EZfare riders, 87% were at least familiar with the mobile ticketing platform. For these same riders, 53% said they learned about EZfare from a bus sign, while 24% said they learned about it from a website or social media.

We examined the demographic attributes of the EZfare customers in the survey sample, compared with respondents who were not EZfare users. We found that riders on government assistance and those above 45 years of age are less likely to be EZfare users. During the first survey, respondents with annual household income above $100,000 were more likely to be EZfare users, while respondents in the lowest income group (under $10,000) were less likely to be EZfare users.

However, with an increase in overall EZfare adoption during the second survey, EZfare users and non-users are no longer statistically different based on household income alone. Respondents living in public housing, with no driver's license, or no vehicle are more likely to be use EZfare. On the other hand, underbanked riders, those with accessibility issues, and unemployed riders are less likely to be EZfare users. Preliminary analysis of the impact of EZfare on trip patterns has also revealed that, for some user subgroups, EZfare use may be associated with a significantly greater frequency of work trips, but not for other trip destinations.
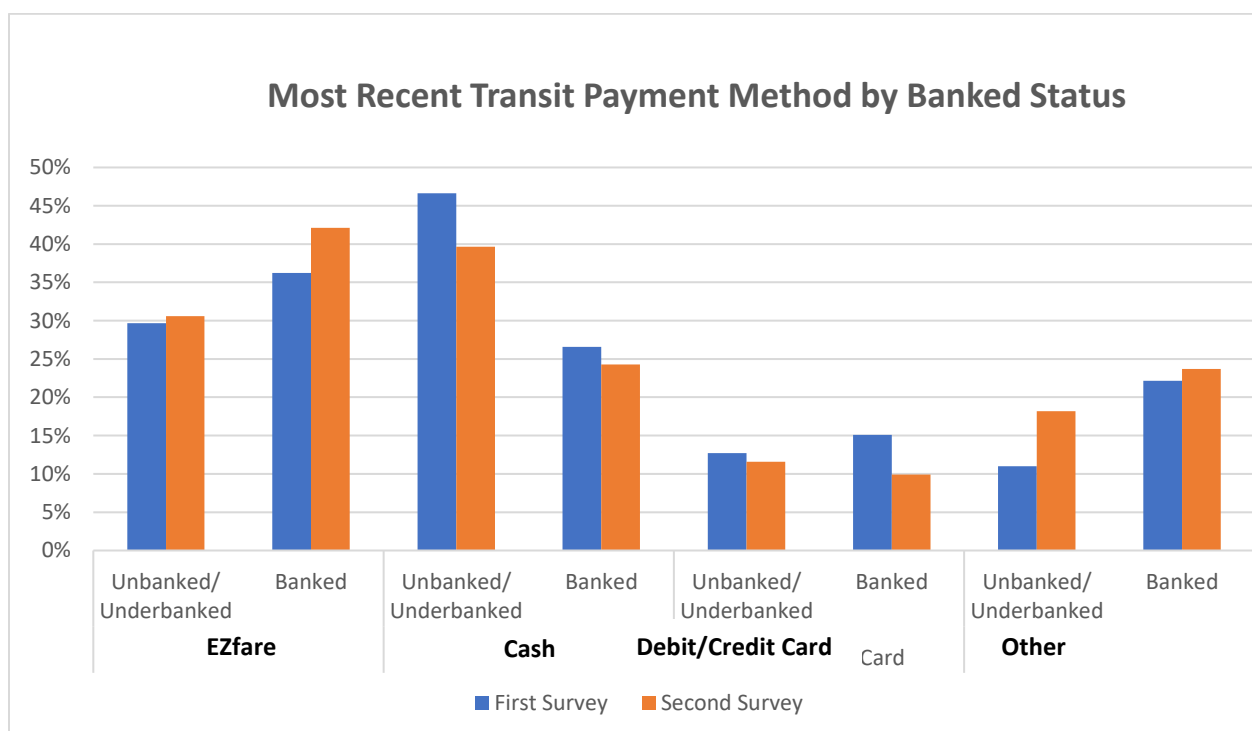
EZfare: Overall Impressions On Ease of Use

Among all EZfare users, impressions of how this payment method can make purchasing and boarding transit faster and easier remained strong. When initially surveyed, 98.1% of these riders believed that purchasing transit fare was easier, 95.7% believed that purchasing transit fare took less time, and 91.0% believed that boarding transit took less time since they started using EZfare. When these same riders were surveyed more recently, 98.3 % said they believed that purchasing transit fare was easier, 95.4% said they believed that purchasing transit fare took less time, and 92.9% said they believed that boarding transit took less time since they started using EZfare.

Percent of EZfare Users Who Agreed with Statements About the App's Usefulness

	First Survey	Second Survey
EZfare has made it easier to purchase transit fare.	98.1%	98.3%
Purchasing transit fare takes less time since I started using EZfare.	95.7%	95.4%
Boarding transit takes less time since I started using EZfare.	91.0%	92.9%

EZfare Use Among the Unbanked and Underbanked

An important part of this study is looking at how individuals pay for transit who either do not have a bank account (the unbanked), or who may have a bank account but also use alternative financial services such as check cashing services and payday loans (the underbanked). There were 118 participants identifying as either unbanked or underbanked for the first survey, and 121 identifying as such for the second. Among these riders, 30% were EZfare users in the first survey while 31% were EZfare users in the second one, an increase of one percentage point.

Most Recent Transit Payment Method by Banked Status

| Payment Method	Banked Status	First Survey	Second Survey
EZfare	Unbanked/Underbanked	~29.5%	~30.5%
EZfare	Banked	~36%	~42%
Cash	Unbanked/Underbanked	~46.5%	~39.5%
Cash	Banked	~26.5%	~24%
Debit/Credit Card	Unbanked/Underbanked	~12.5%	~11.5%
Debit/Credit Card	Banked	~15%	~10%
Other	Unbanked/Underbanked	~11%	~18%
Other	Banked	~22%	~23.5%

EZfare Validators

The second survey was the first time that survey participants had been interviewed since the installation of validators on transit vehicles that allow for contactless fare payment with EZfare. Of the 245 EZfare users who were surveyed, 82% had used an EZfare validator to scan a mobile ticket while boarding a bus. Among those riders who both participated in the survey and have used an EZfare validator, 77% said that boarding is easier when using this form of contactless validation while 86% were either moderately or extremely satisfied with using a validator to scan their ticket when boarding.

Trend of EZfare Validator Scans

From October 2021 to March 31 2022, a total of 20,841 EZfare validator scans were recorded among 257 survey respondents. SORTA accounted for 53% (136) of all EZfare users and 63% of scans during that period. TANK, Akron METRO, and Laketran had 79, 46 and 38 EZfare users, respectively. BCRTA and PARTA had 1 and 3 users, respectively, with a total of 174 trips over the five-month period. Although the total volume of EZfare use varied across the four biggest agencies, the trend of monthly use was similar.
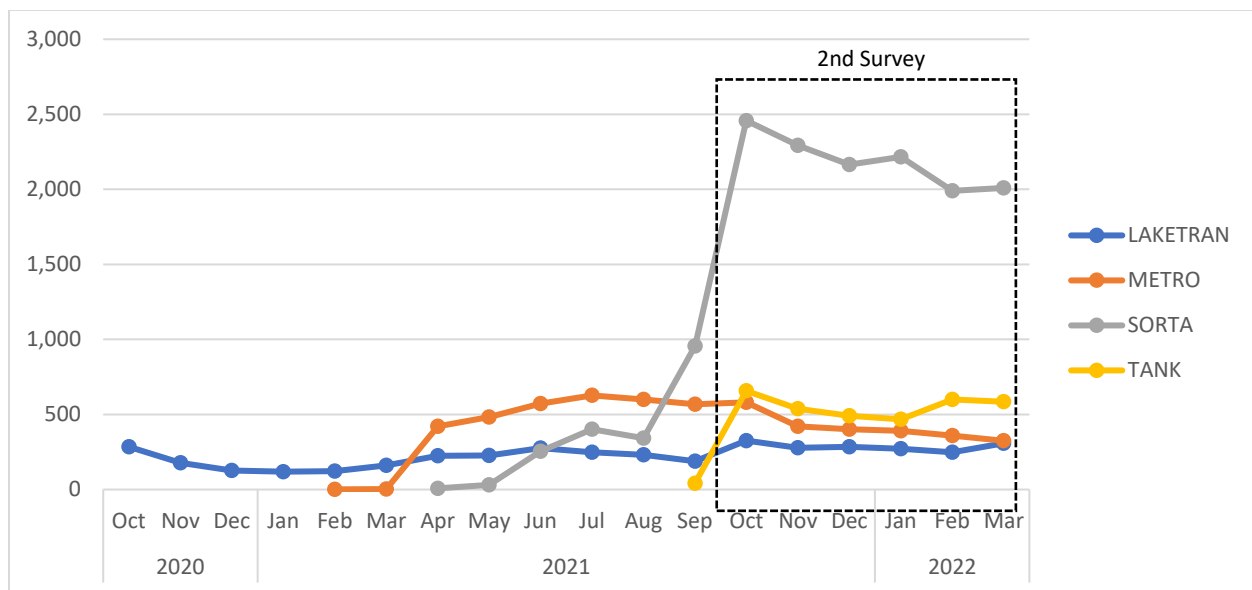

METRO EZfare Validator Scans: Spatial Distribution and Cluster Locations

We also have the ability to map the spatial distribution of the location of EZfare validator scans by various demographic groups in the survey sample. Several illustrative maps are provided below for there study areas: Lake County, Metro Akron, And Cincinnati (including SORTA and TANK). These "travel space" maps reflect the aggregated distance traveled among the group of interest.

LAKETRAN Banked EZfare Participants
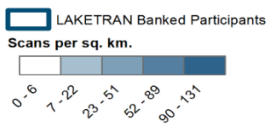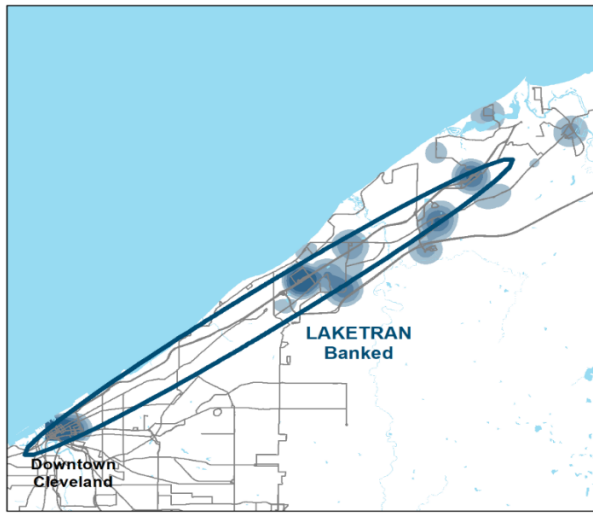
**LAKETRAN Unbanked, Underbanked, and/or ELI EZfare Participants**
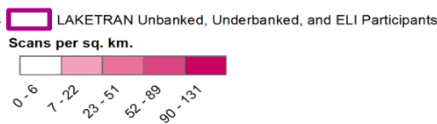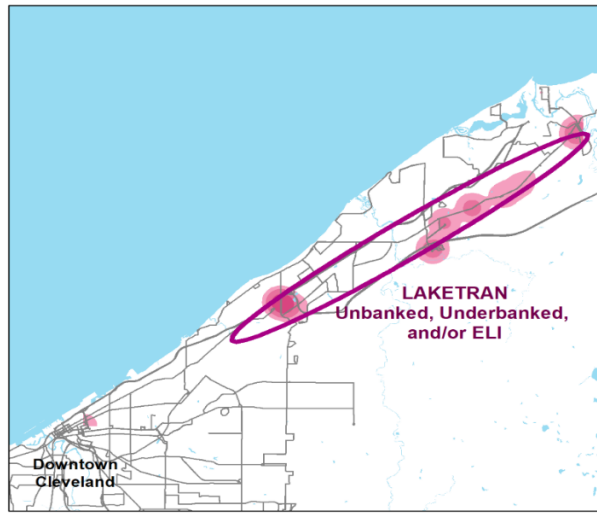
For example, we found that Laketran riders who are unbanked, underbanked or extremely-low income transit riders have a shorter travel space compared to banked riders. The banked riders commute to downtown Cleveland, and likely utilize Park-N-Ride facilities in Lake County.
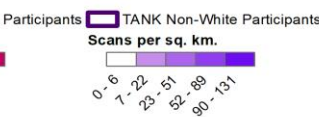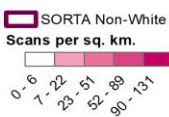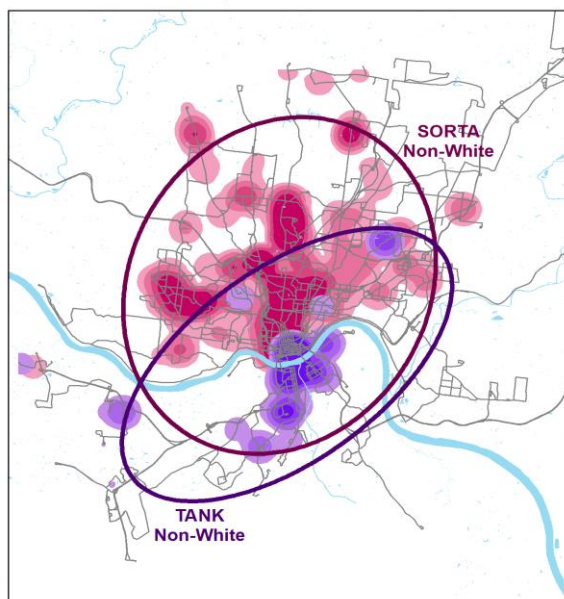
SORTA and TANK (Cincinnati)

The density plots of EZfare validator scans in Metropolitan Cincinnati, serviced by SORTA and TANK are shown below.


White EZfare Participants
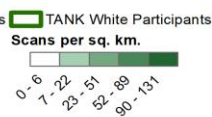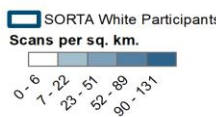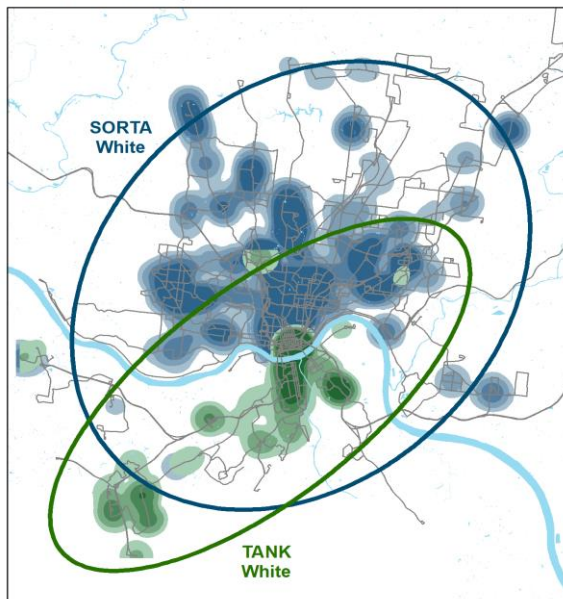
Non-White EZfare Participants

They compare the spatial distribution of white (left) and non-white (right) EZfare participant scans. The overall activity spaces of the non-white participant groups are notably smaller. This likely reflects shorter trip distances, more centrally located residences and workplaces, and/or smaller individual activity spaces for the non-white group.

METRO (Akron)

In Akron, serviced by Metro, differences in the activity spaces of household vehicle owners (left) and those without access to vehicles (right) are displayed.

EZfare Participants: At least One Household Vehicle

EZfare Participants: No Household Vehicle
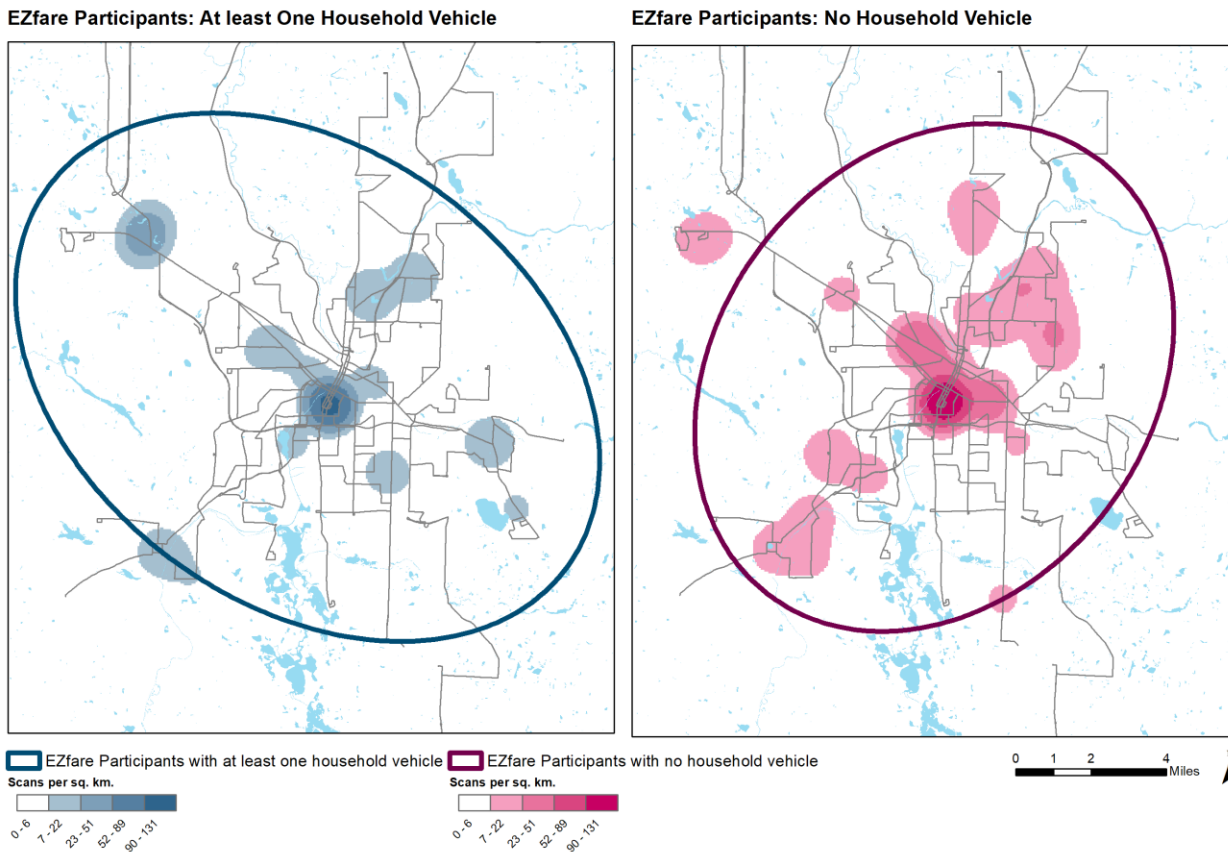
The map above shows that while the space is slightly larger for those with access to cars, the North-South axis is different, and those without cars have a more concentrated activity pattern.

The third survey phase began in May 2022 and is likely to finish in September 2022.

Questions? Dr. Simons can be reached at r.simons@csuohio.edu.