Nagoya University COI-NEXT
My-mobility Co-creation Center

Comparison of Household Escorting Responsibilities Across Regions

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Research Background: COI-NEXT

～Current status of local public transportation in Japan～

- Most areas in Japan except for Tokyo and Osaka metropolitan areas are quite **car-dependent** and the service level of public transportation is low, resulting in that those who don't use private cars are forced to **low mobility**.
- The car-dependent transportation system also has social issues such as **congestion, accidents, air pollution and green-house-gas emission**.
- Even when autonomous vehicles become widespread, **mass transit is indispensable** to cities because of low capacity of automobiles.
- But public transportation except heavy rail in big cities has been facing the **continuation crisis due to decrease both in users and drivers**.

Still sustainable

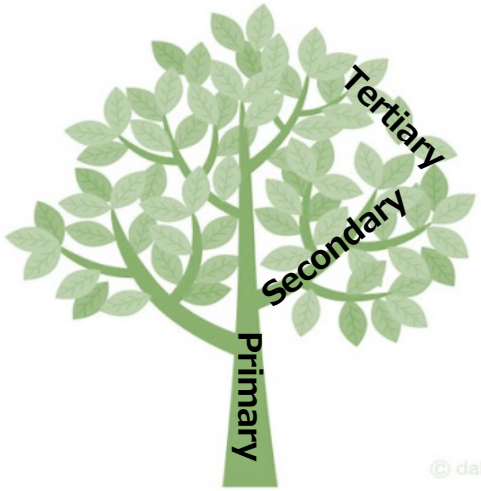
Difficult to maintain

No service by PT

Trunk : primary
e.g., commuter rail, subway, arterial bus

Branch : secondary
e.g., bus, taxi, drive/pick-up by family

Leaf : tertiary
e.g., walk, bicycle, drive/pick-up by family



What is Household Escorting Responsibilities and “Mobility of Care” ?

✓ **Regional Transport Gaps and Household escorting trips**
Service levels in secondary/tertiary transport decline outside Tokyo and Osaka –due to population decline, aging, and driver shortages, and **household escorting plays alternative and supplemental mode** of public transport

✓ **Hidden Household Burden**
However, the burden on family members providing escort trips **has not properly recognized** in planning processes, and thus largely overlooked

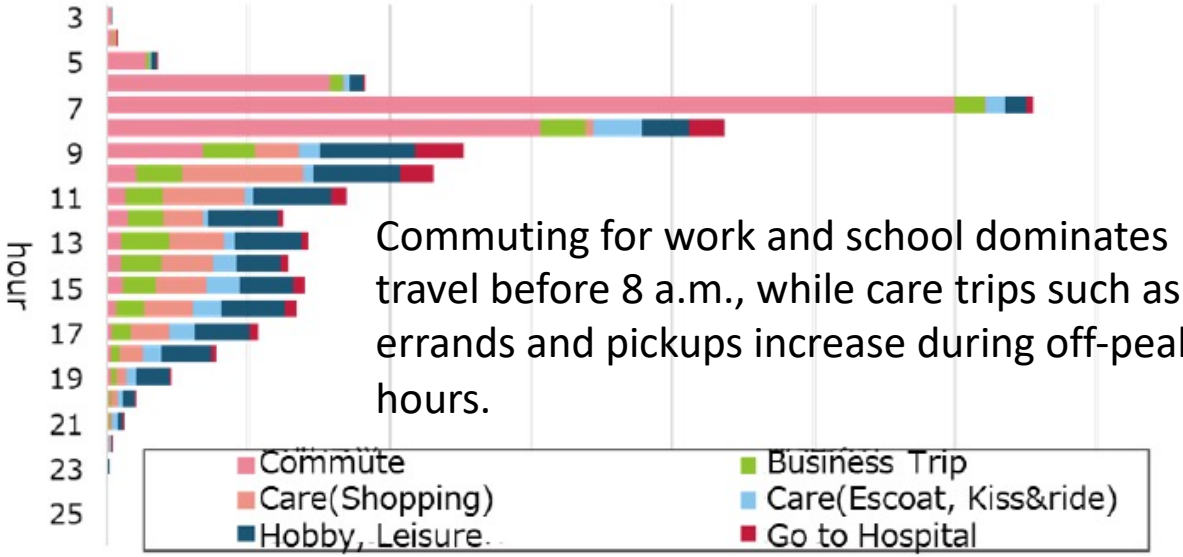
✓ **Mobility of Care**（Sánchez de Madariaga, 2013）
Unpaid family-related travel highlights **gender and social inequalities**.

In this research, “Household Escorting” refers a particular focus on **family-related pick-up and drop-off transportation by privately owned vehicle.**

Background: Mobility of Care and Transportation Planning

In Japan, public transportation systems are **optimized for peak commuting hours**, such as weekday mornings and evenings, **with little attention paid to off-peak travel needs**—including care trips.

Image: adobe stock



Commuting for work and school dominates travel before 8 a.m., while care trips such as errands and pickups increase during off-peak hours.

Data: Person Trip Survey in Chukyo Metropolitan Region (2011)

- The image of public transportation users may have become narrowly focused—**primarily people commuting from the suburbs to the city center in the morning and returning in the evening**.

- If individuals can travel independently without relying on others for transport, both those providing and those receiving care trips could enjoy **expanded choices**.

Children and Youth in Japan: A Growing Accessibility Challenge

Longer and Harder School Commutes

- School consolidation and closures driven by declining birthrates have increased commuting distances.
- This trend is especially pronounced in rural and regional areas facing rapid depopulation and aging.

Declining Public Transport Services

- Bus and rail services are being reduced or discontinued in many local areas.
- Students who cannot drive—particularly junior high and high school students—face growing difficulties in accessing schools.
- In some cases, limited transport access directly constrains high school enrollment opportunities.

Lasting Impacts on Life Choices

- Experiences up to high school strongly shape young people's future aspirations and decisions.
- Growing up with limited daily accessibility accelerates youth outmigration toward metropolitan areas offering better opportunities.

Research Objectives

Two main research questions

- How do escorting responsibilities differ between **urban, suburban, and rural areas**?
- What socio-demographic factors, especially gender, shape the likelihood of being an escort provider?

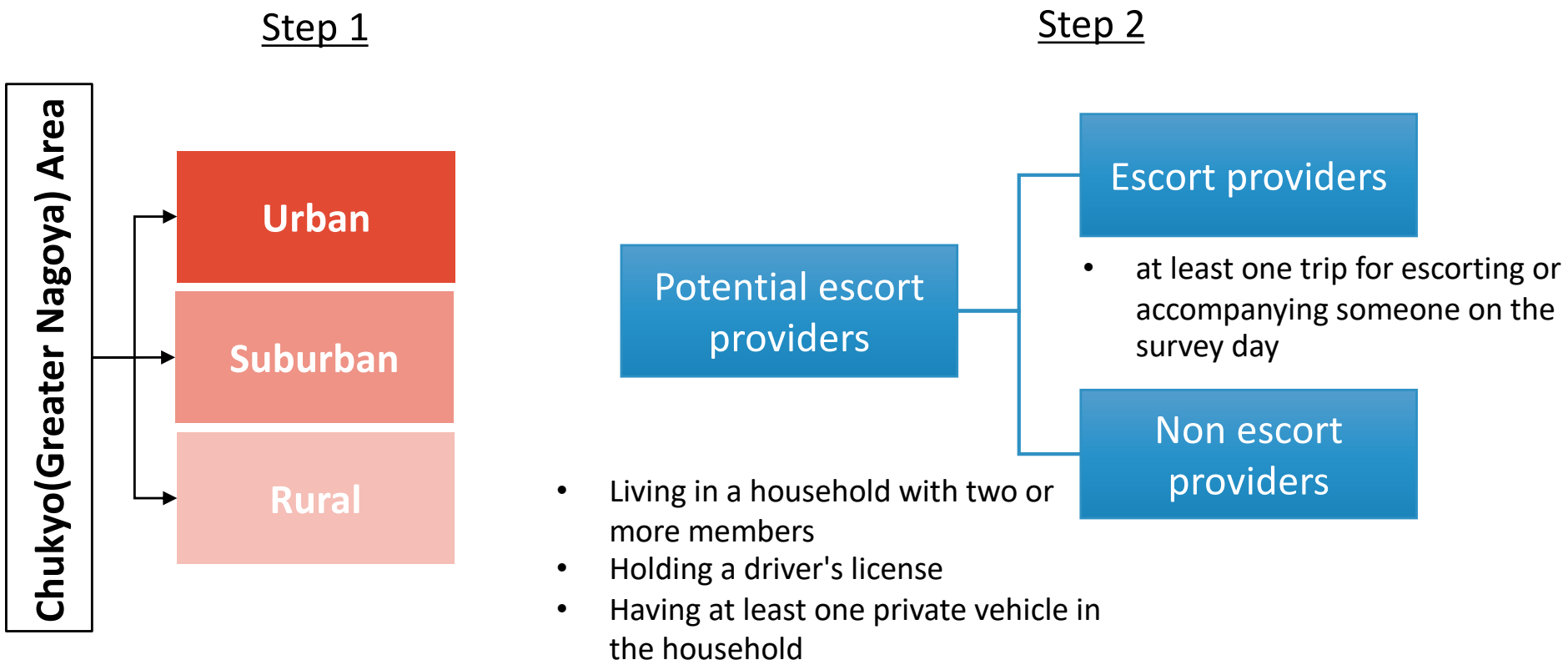
This study aims.....

to reveal regional and gender disparities in household escorting with useing Chukyo Metropolitan Region data

Data and Methodology

- Dataset: 2011 Chukyo Area Person Trip Survey
- Steps:

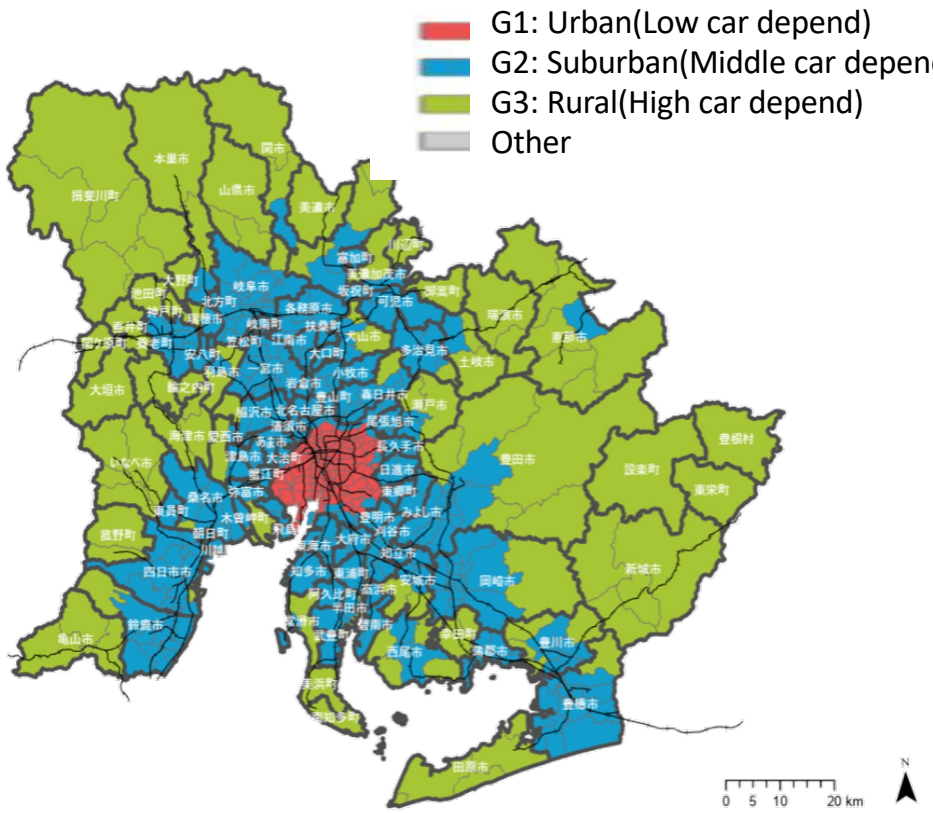
1. **Hierarchical cluster analysis** to classify three research areas :urban, suburban, and rural areas
2. **Binomial logistic regression** to identify determinants of escort provision, focusing on gender, age, household composition, and vehicle ownership



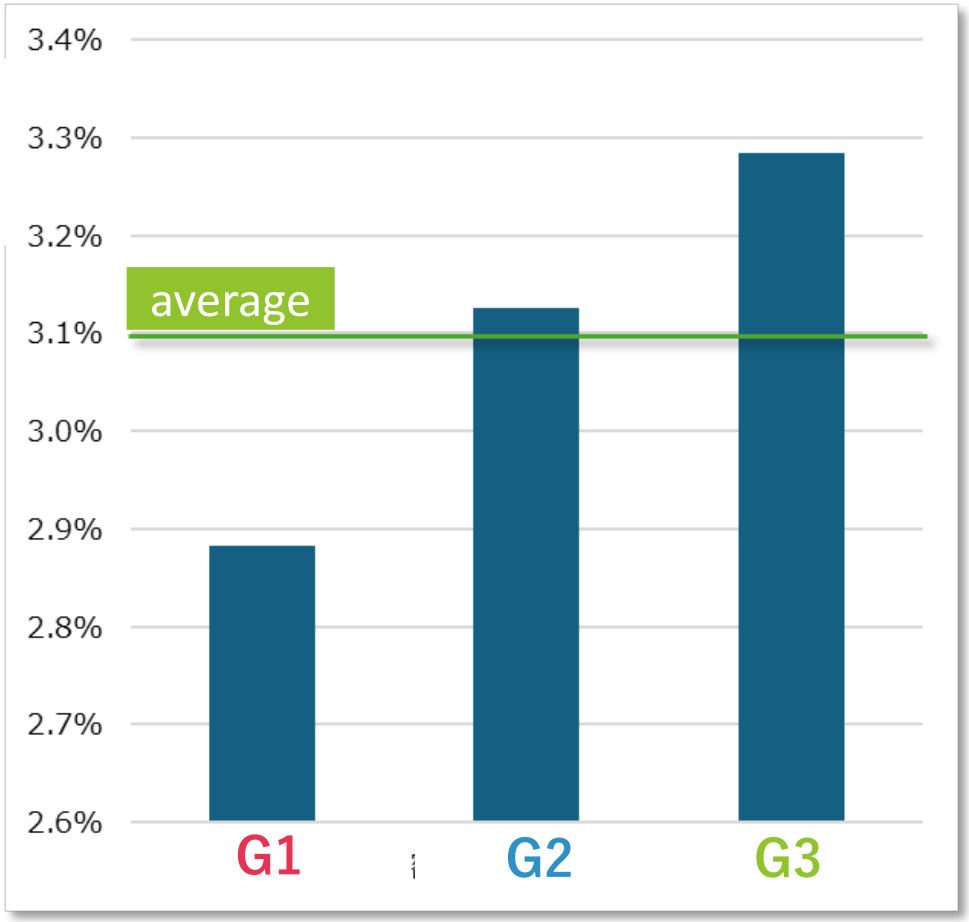
Car dependence and pick-up/drop-off

- Areas with **"high" car use have more pick-ups and drop-offs**.
  - The aspect of public transportation supplemented by home transportation will grow.

Regional classification by urban density and car use



Percentage of care trips (based on the numbers of trips)

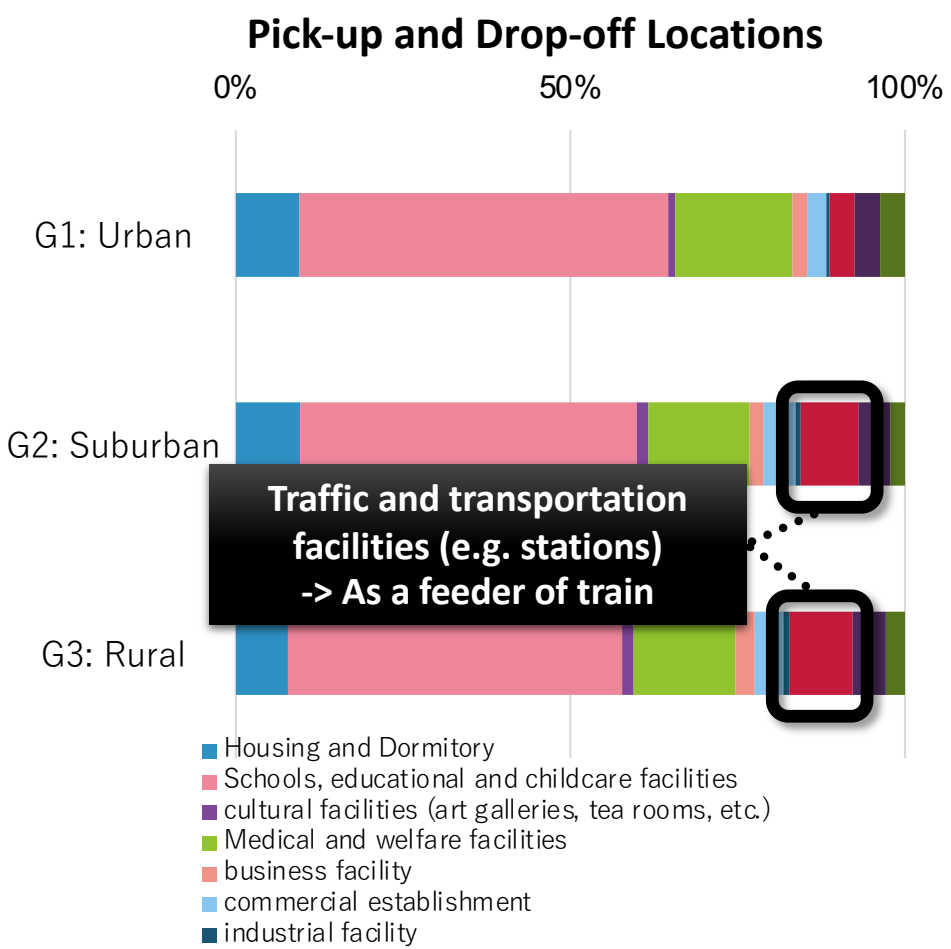


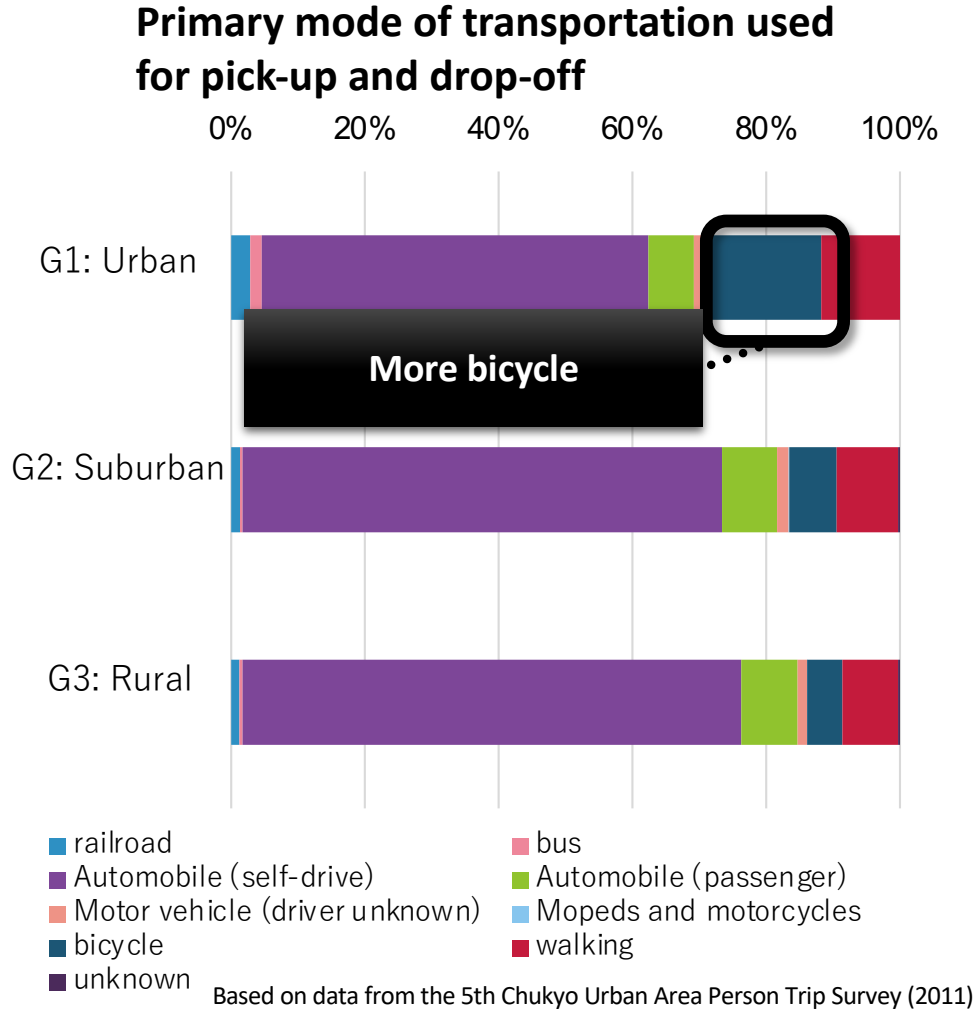
Based on data from the 5th Chukyo Urban Area Person Trip Survey (2011)

Where to pick up and drop off

- In G2-3 areas, the percentage of direct transportation to and from schools, etc. increases.

-> Family-based transportation complements poor public transport services.





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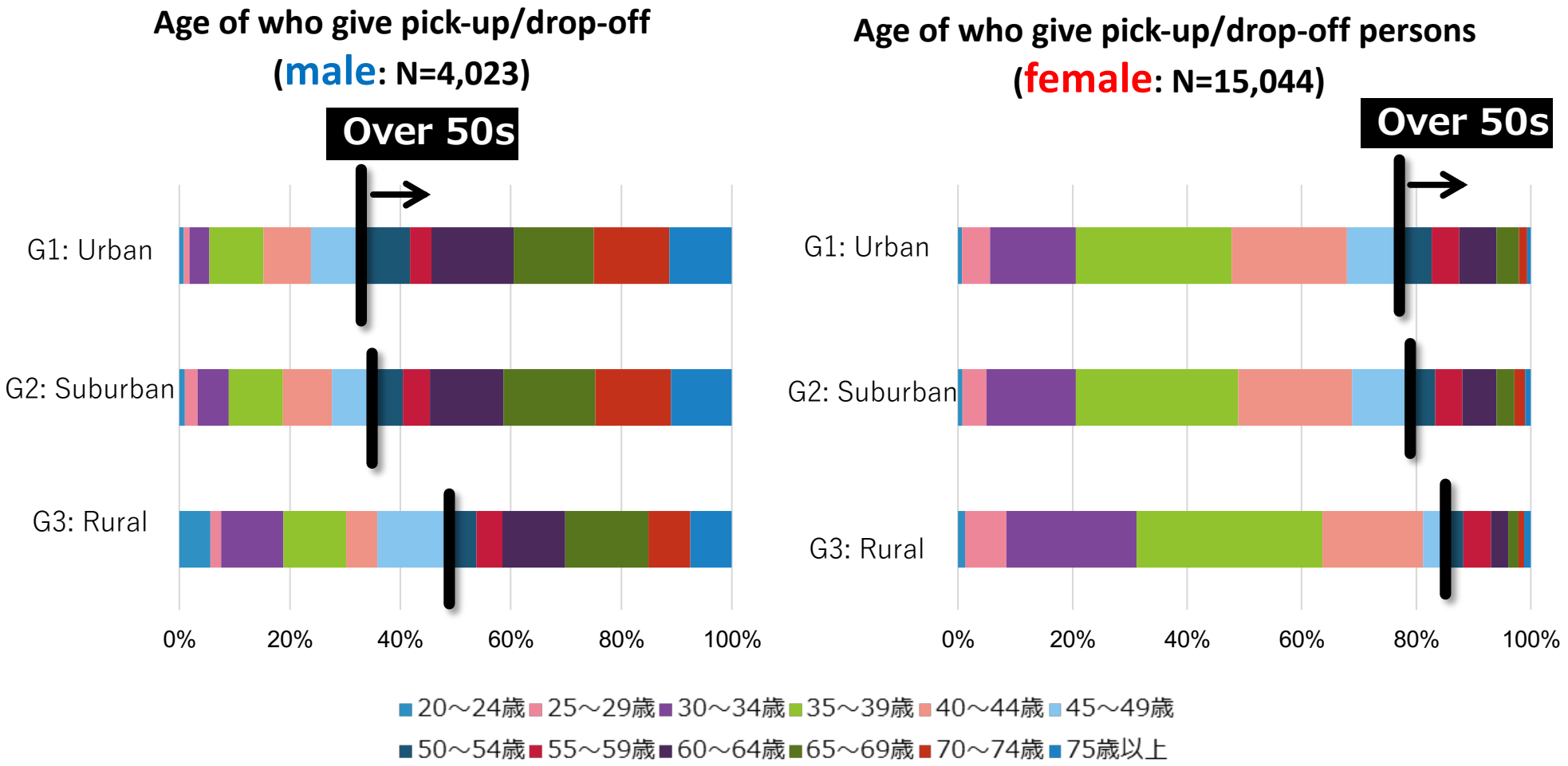
Who is picking you up and dropping you off?

- In all areas, women are more likely to be "pick-up/drop-off persons" and are in a younger age group



Based on data from the 5th Chukyo Urban Area Person Trip Survey (2011)

Results (1): Gender Gap

- **Women are more likely** than men to be escort providers across all regions.
- The gender variable shows a strong and consistent effect.
- In suburban areas, the coefficient of -1.109 corresponds to an odds ratio of approximately 0.33, meaning that **men are only one-third as likely as women to serve as escort providers**.

Explanatory Variables	G1: Urban Area N = 29,876		G2: Suburban Area N = 110,298		G3: Rural Area N = 20,577	
	Estimate	p-value	Estimate	p-value	Estimate	p-value
Intercept	-4.790	***	-4.590	***	-4.092	***
Gender	-0.957	***	-1.109	***	-1.121	***
Age(*0.1)	-0.025		-0.064	***	-0.135	***
Occupation	-0.772	***	-0.731	***	-0.717	***
Family members with 0-5 years old	1.115	***	0.816	***	0.714	***
Family members over 75 years old	-0.265	**	-0.379	***	-0.250	**
Family members with disabilities	0.196	*	0.150	***	0.165	.
Number of vehicles owned	-0.247	***	-0.393	***	-0.505	***
Number of trips	0.759	***	0.815	***	0.826	***
Household size	0.266	***	0.360	***	0.439	***

***: $p < 0.001$, **: $p < 0.01$, *: $p < 0.05$, ".": $p < 0.1$, " ": $p<1$

Results (2): Age

- **In urban areas (G1)**: no statistically significant correlation, implying that **age does not have a direct impact** on escort provision.
- However, in **rural areas (G3)**, younger individuals are more likely to be escort providers. When considered alongside the gender variable, this suggests that **young women are particularly taking on escorting roles**.

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Results (3): Household

- **Household composition also influences escort provision likelihood.**
- In **urban areas** (G1), **households with children have a higher probability** of having an escort provider.
- Conversely, **households with elderly members** exhibit a **negative correlation.**
- On the other hand, households with **disabled family members tend to have a higher likelihood** of escort provision across all three regions.

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Results (4): Number of vehicles

- Interpreting the coefficient for the number of vehicles owned, we find a significant negative association across all regions.
- **Additional vehicle in a household reduces the odds of being an escort provider**.
- This finding suggests that greater vehicle availability allows household members to travel **independently, thereby reducing the need for shared escorting roles**.

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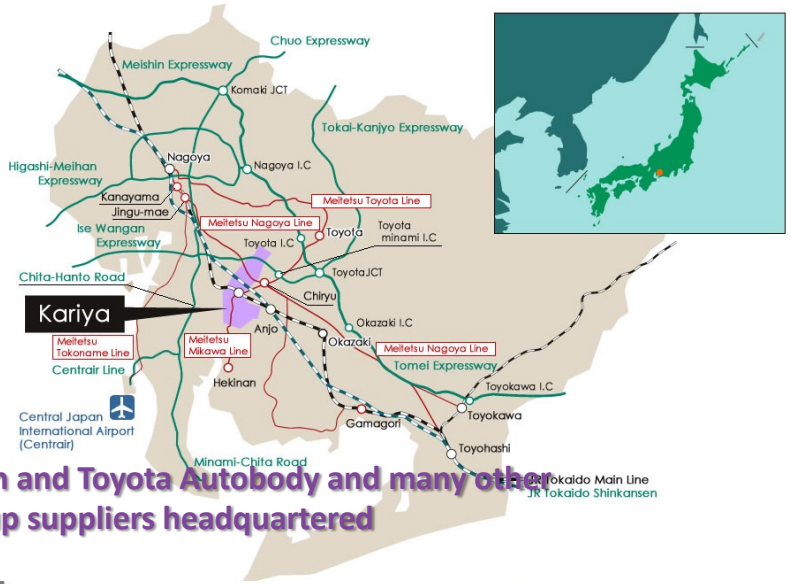
New service to save children pick-up and drop-off in Kariya-city, Aichi

- Kariya City provides “After School Station" as a after-school place to spend time and as a function for transportation hub. (demonstration in 2024).



Denso, Aisin and Toyota Autobody and many other Toyota group suppliers headquartered

Source: Kariya Smart City website

- Children make a group based on home location
- Taxi system make an optimized route to travel each children’s home
- Taxi drivers can (somehow) take care about children

Results

■Escorting as a Gendered Role

- **Women are the primary providers of escort trips across all regions.**
- It is not only determined by household structure or car ownership, but by socially embedded gender expectations.

■Urban–Rural Gradient

- Gender disparities are more pronounced in **suburban and rural areas**.
- Limited public transport and alternative services increase **women's escorting burden**.

■Policy Implications

- **Care-related mobility must be aware as a mobility resource** and take into account as a needs for alternate choice for less burden.

Future Work

■Potential for Mobility Services to Substitute Escorting

- There is a need to examine how existing and emerging mobility services can substitute escort trips, particularly the care-related components.

■Limitation

- This study used the **2011 Person Trip Survey**, which cannot fully capture recent changes such as the COVID-19 pandemic.

■Next steps

- Less data for children's trip survey – needs for Children's person trip survey for more independent mobility for children
    - no one knows where, how and with who does children or teenagers travel

Thank you !

Acknowledgment: JST COI-NEXT (JPMJPF2212)

Contact: Yurie Toyama mail@yurietoyama.com