TCRP Synthesis 160

Fare Capping: Balancing Revenue and Equity Impacts

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October 26, 2022

Synthesis Goals

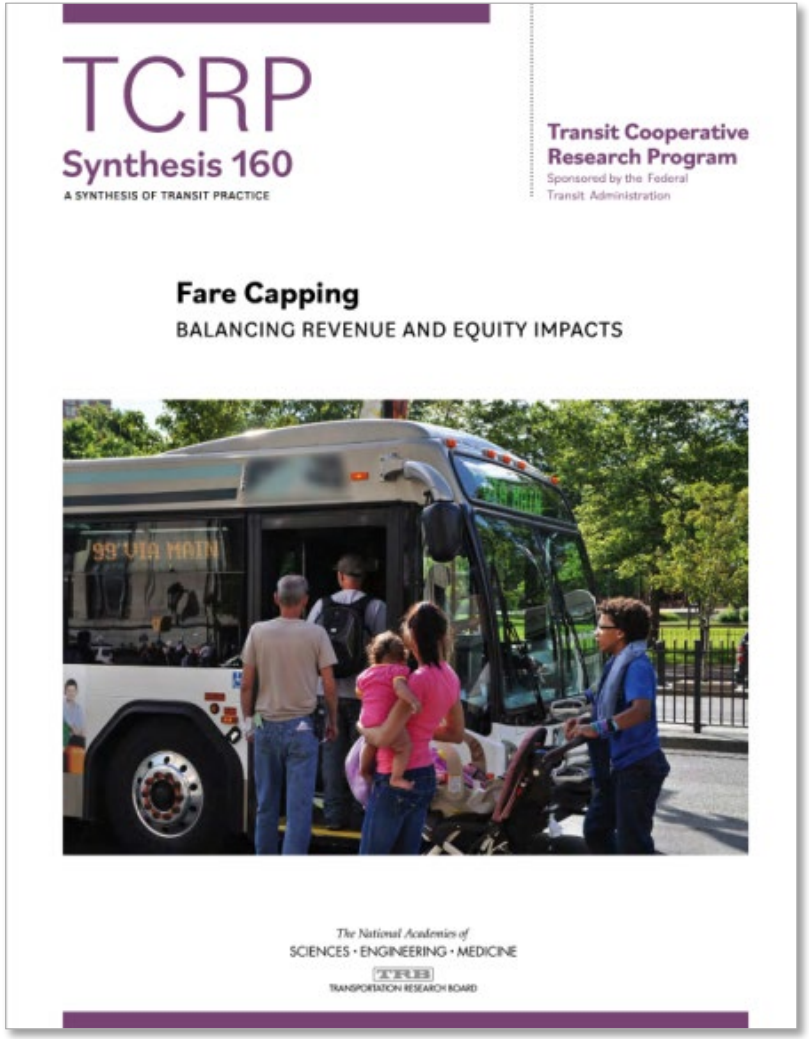
Snapshot of the current state of the practice of fare capping, from early decision making through implementation and evaluation

- Motivations, opportunities, and costs
- Technology and systems required
- How agencies educate and market to customers
- How agencies transition from one fare structure to another
- Other challenges encountered and lessons learned

Source: TransitCenter

Process

- **Literature Review:** Evaluated national and international research on fare policy and fare capping and assessed the history and state of the practice.
- **Transit Agency Survey:** Respondents from 35 US transit agencies shared insight on motivations, planning, implementation, and evaluation of fare capping.
- **Case Studies:** Interviewed staff from five transit agencies and wrote case studies evaluating their experience pursuing and implementing fare capping.
- **Conclusions and Further Research:** Shared key findings including motivations and challenges for agencies, and identified needs for further research.



What is Fare Capping?

A rider's total fares within a set period of time are "capped," typically at the equivalent value of an unlimited pass for the same period of time.

Instead of paying upfront for a daily, weekly, or monthly pass, a rider **pays for trips as they go**.

Once they have spent the cap amount, they pay **no more fares for trips during the rest of that period**.

If they never spend enough to reach the cap, they still have **only paid for the trips they actually took**.

Who has Fare Capping?

- London first implemented daily fare capping in **2005** using Oyster stored value cards, and introduced weekly capping in 2014.
- Fare capping emerged in more places between 2010 and 2020, with notable examples in Dublin, Hong Kong, and systems across Australia, New Zealand, Germany, and Switzerland.
- In the US, Valley Transportation Authority (VTA) in San Jose, CA, introduced daily fare capping in **2012** for riders paying with a Clipper smart card.
- Monthly capping was first introduced in the US with the Hop regional fare system among TriMet, Portland Streetcar, and C-TRAN in the Portland, OR/Vancouver, WA, area.
- At the time of this study, about **28** transit systems in the US have implemented some type of fare cap, with most introduced since 2019.

US Systems with Fare Capping

	Agency(ies)	Location	Fare Cap Period
2012	**Valley Transportation Authority (VTA)**	San Jose, CA	Daily
2014	**Metro**	St. Louis, MO	Daily
2017	**Capital Region Transportation Authority (CDTA)**	Albany, NY	Daily
	TriMet, C-TRAN, Portland Streetcar	Portland, OR-Vancouver, WA	Daily, Monthly
	AC Transit	Oakland, CA	Daily (2017); 7-Day and 31-Day added in 2020
2018	**Dallas Area Rapid Transit (DART)**	Dallas, TX	Daily, Monthly
	The Rapid	Grand Rapids, MI	Daily, 7-Day, 31-Day
	CT*transit*	Connecticut	Daily, 31-Day
2019	**IndyGo**	Indianapolis, IN	Daily, Weekly
	Miami-Dade Transit	Miami-Dade County, FL	Daily
	Piedmont Authority for Regional Transportation (PART)	Greensboro, NC	Daily, Monthly
	SolTrans	Solano County, CA	Daily, Monthly
2020	**Skagit Transit**	Skagit County, WA	Daily, Monthly
	TransIT	Frederick, MD	Daily, Monthly
	Champaign-Urbana Mass Transit District (MTD)	Champaign-Urbana, IL	Monthly, Annual
	The Bus	Honolulu, HI	Daily
	Rochester-Genesee Regional Transportation Authority (RTS)	Rochester, NY	Daily, Monthly
	Rhode Island Public Transit Authority (RIPTA)	Rhode Island	Daily, Monthly
	Portland Metro, South Portland Bus Service, Biddeford Saco Old Orchard Beach Transit	Southern Maine	Daily, Monthly
2021	**Greater Dayton Regional Transit Authority (RTA)**	Dayton, OH	Daily, 31-Day
	Chatham Area Transit (CAT)	Savannah, GA	Daily, Monthly
	Metropolitan Transit System (MTS) *(anticipated)*	San Diego, CA	Daily, Monthly
	Capital Metro *(Pilot)*	Austin, TX	Daily, 31-Day

Why Pursue Fare Capping?

Cost Savings and Convenience

- Riders do not need to pay the upfront cost of a period pass and can pay as they go, but still get the cost savings of the pass by traveling fare-free once they meet the fare cap threshold.
- Riders pay only for the trips they take, and don't risk falling short of their "break even" threshold if they make fewer trips during a period of time.
- The introduction of fare capping can provide an opportunity for an agency to concurrently make their fares simpler.

Why Pursue Fare Capping?

Equity

- Fare equity is one of the most frequent arguments in favor of fare capping schemes.
- There is significant disparity between the cost savings of period passes and the barrier posed by their high upfront cost to riders.
- Fare capping ensures that the best value fare products are available to all riders, not just those who can afford to pay upfront or who have more predictable trip needs.
- “Fair fare” or “best fare” policies often refer to or include fare capping due to addressing this disparity.

Why Pursue Fare Capping?

Ridership

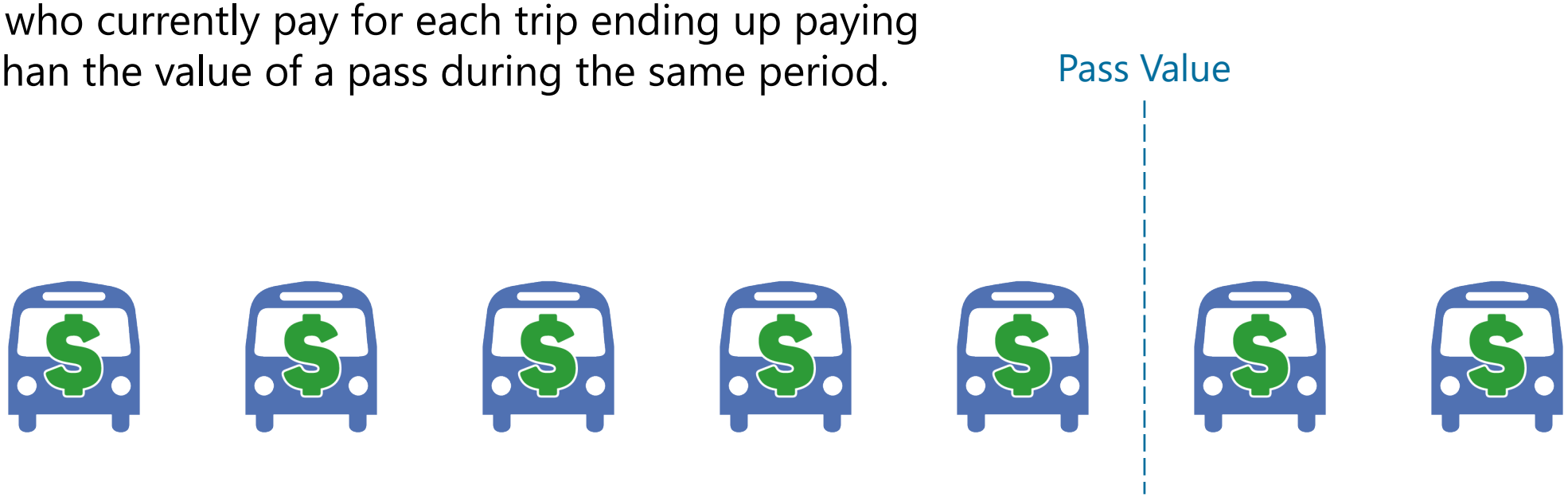
- Convenience, flexibility, and cost savings could attract new riders and keep existing riders loyal to using transit, and perhaps encourage more transit use
- However, there is no evidence that measures how fare capping structures have impacted ridership.
- Current riders who ride frequently enough to reach the cap may be incentivized to take ***more*** trips, knowing they will travel for free once the cap is reached.
- On the other hand, some riders who use period passes may take ***fewer*** transit trips. Today, period passholders may be induced to travel more since trips are already "free" and they want to get their money's worth, while under fare capping they would need to consider the cost of each trip until they meet the cap.

Challenge: Potential Loss of Fare Revenue

- With fare capping, revenue may decline from both riders who currently pay per ride *and* riders who currently use period passes.
  - Frequent riders who currently pay per ride end up paying more than they would with a period pass, and they would ultimately pay ***less*** with fare capping.
  - Riders who currently pay a flat upfront cost for a period pass but do not necessarily take enough trips to break even would only pay for the rides that they make, and they may end up paying ***less*** in total fares than they would pay for a pass.

Impact on Cash (Pay per Trip) Riders

Riders who currently pay for each trip ending up paying more than the value of a pass during the same period.



Impact on Cash (Pay per Trip) Riders

Riders who currently pay per trip would no longer pay for trips after reaching the cap.

The difference in revenue would be a savings for them…

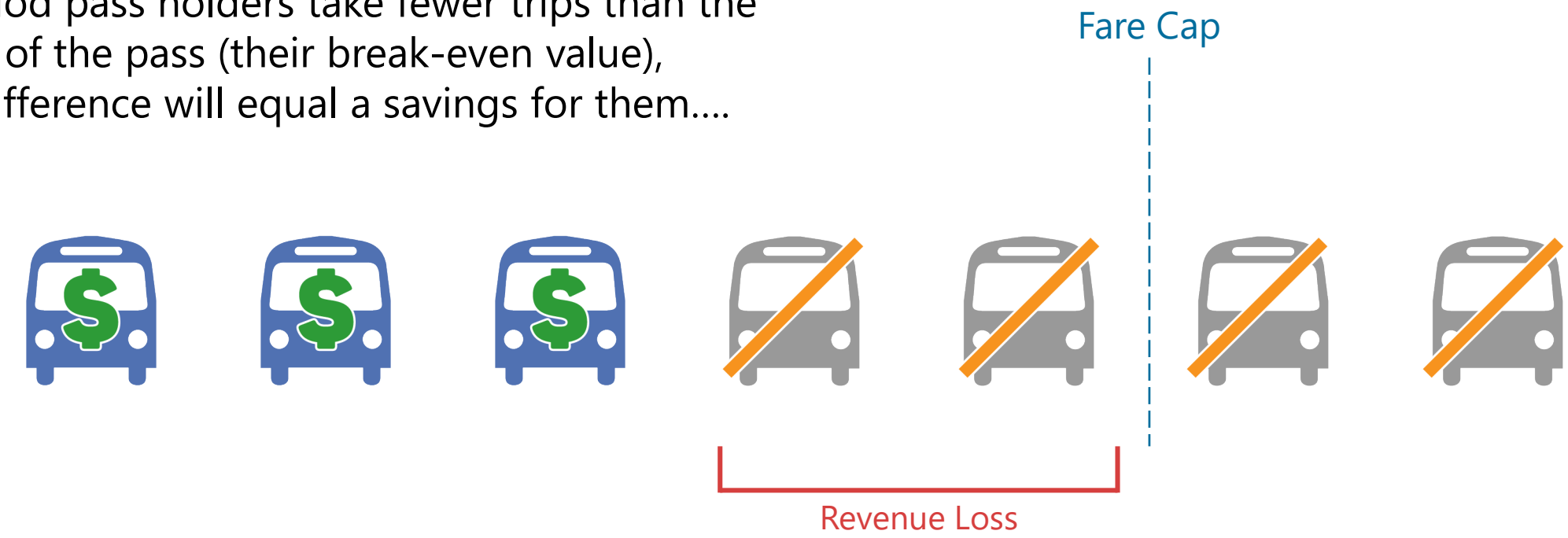
…and a loss to the agency.

Impact on Period Pass Riders

Period pass holders pay upfront for trips they may not end up taking.

Impact on Period Pass Riders

If period pass holders take fewer trips than the value of the pass (their break-even value), the difference will equal a savings for them….



…and a loss to the agency.

Potential Loss of Fare Revenue is a Concern

However, transit agencies should consider these potential revenue challenges with the tradeoff of addressing fare equity.

- In effect, some portion of this lost revenue may have come at a ***social cost***, generated by those who could only afford to pay per trip, resulting in lower-income riders paying disproportionately more for service.
- A transit agency can make their system more equitable and deliver on a commitment to the social good by making best value fare products are available to all riders.
- Pursuing fare capping as part of a larger set of fare price changes may provide an opportunity to introduce the benefits of the capping mechanism while maximizing potential revenue.

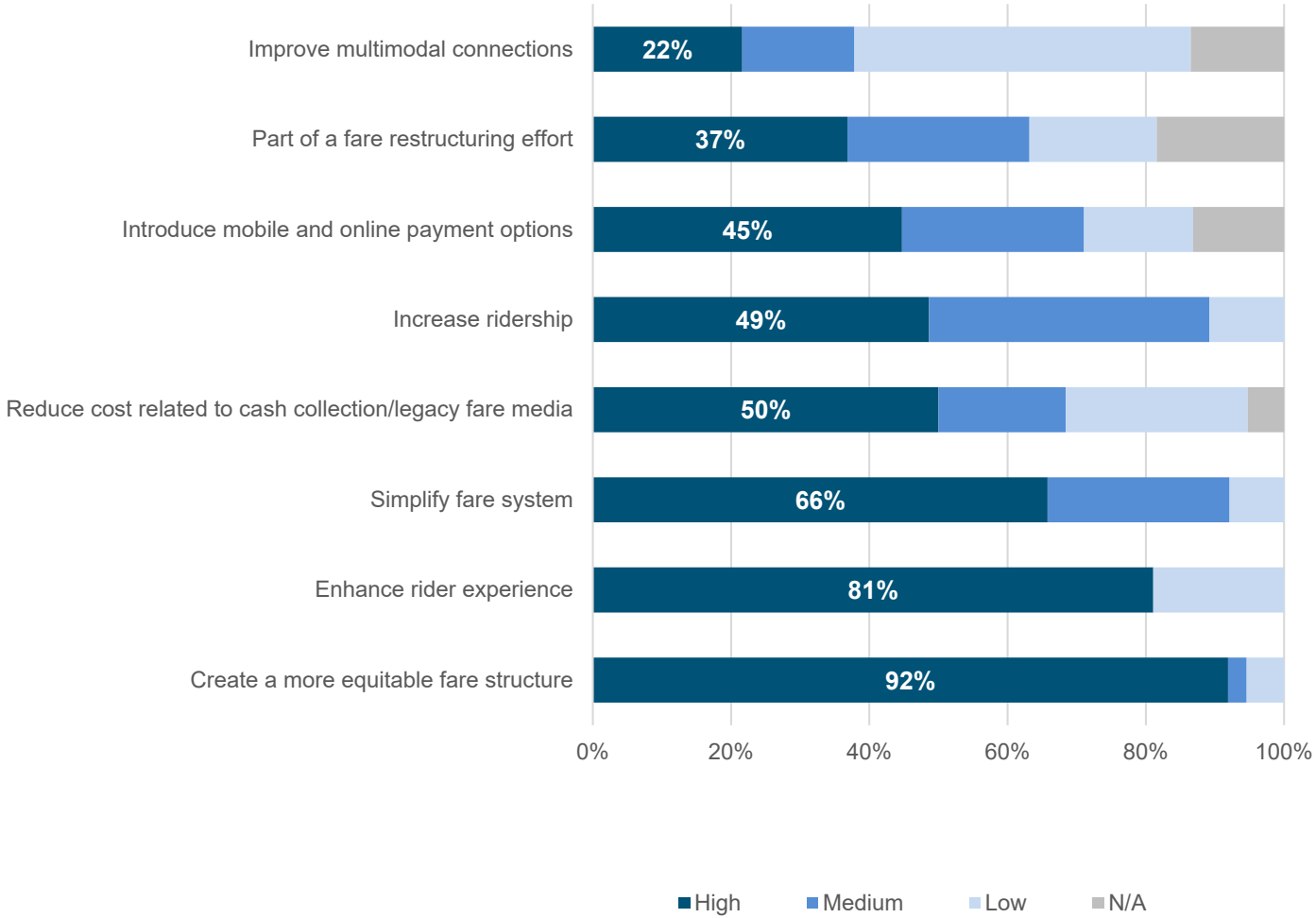
Technology Makes Fare Capping Feasible

Fare capping as a practice only emerged within the last two decades, as developments in fare technology have made it feasible to implement.

- Smart cards, mobile fare payment, and account-based systems, and the declining costs of associated technology.
- Agencies can adopt more innovative fare structures and offer a wider variety of fare products and pricing strategies, including a *guaranteed lowest fare* calculated based on the trips a rider takes.
- Many systems have implemented fare capping as part of introducing new investments in fare payment technology, especially mobile payment solutions like fare payment apps and digital wallets.

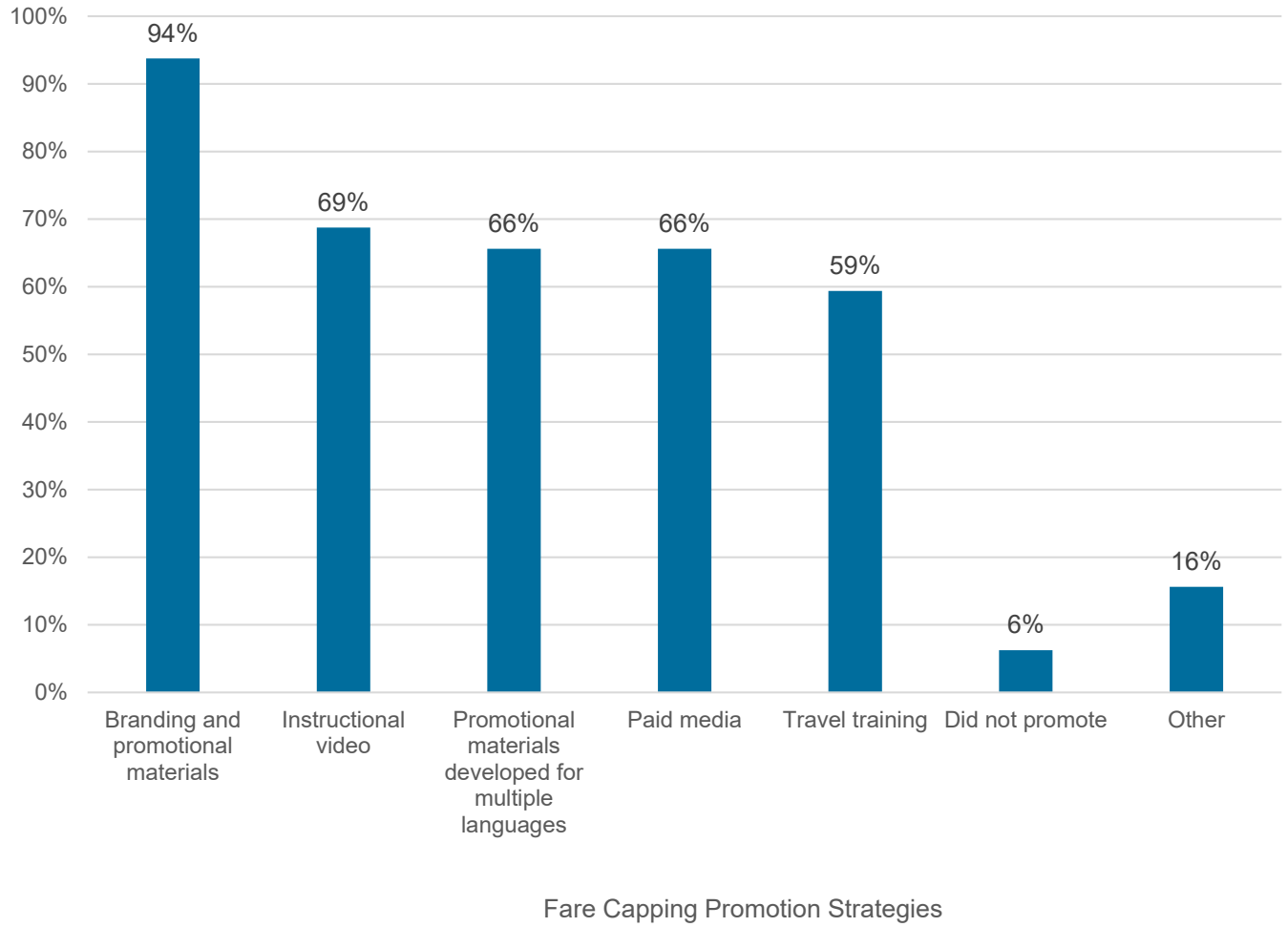
Survey: Motivations to Pursue Fare Capping

- Create a more equitable fare structure (92%)
- Enhance the experience of riders (81%)
- Simplify the fare system (66%)



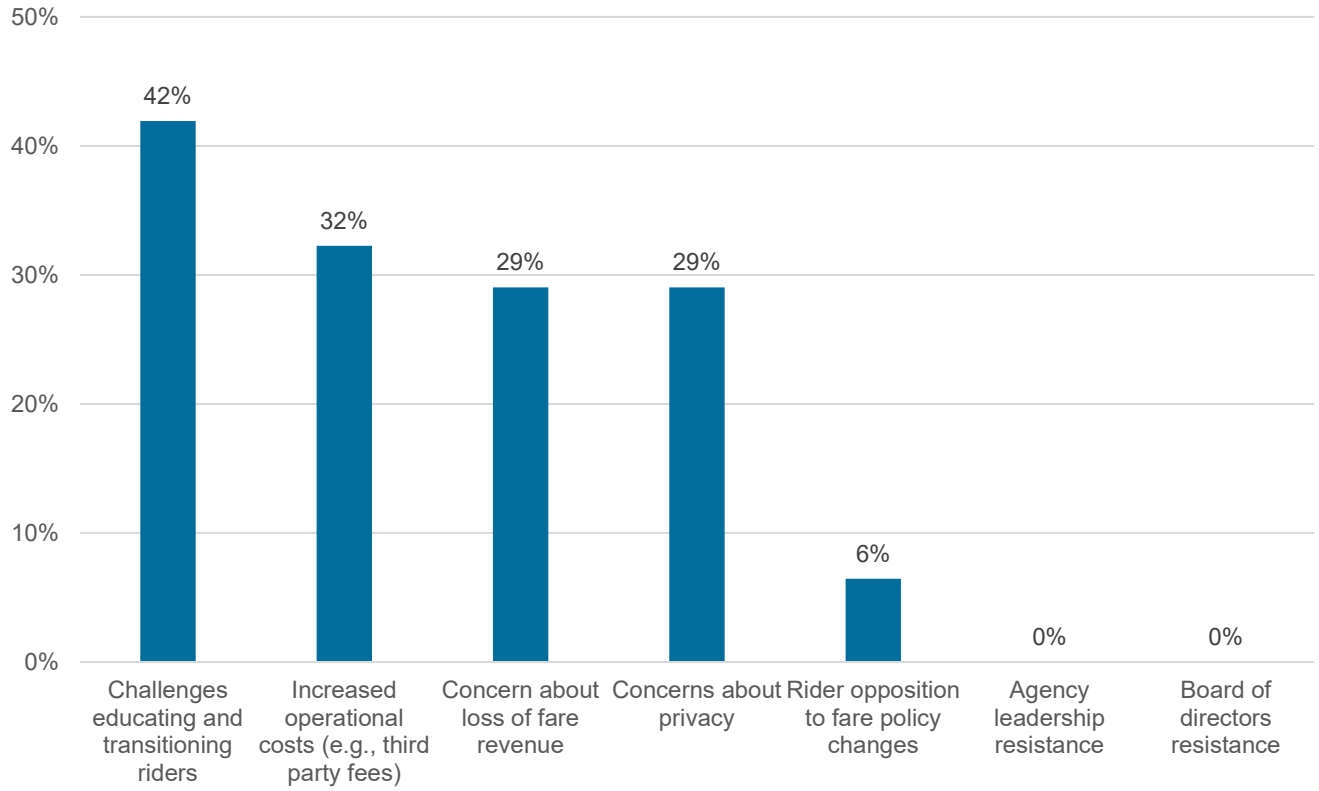
Survey: Promoting Fare Capping

- Branding and promotional materials (94%)
- Instructional video (69%)
- For some, explaining and promoting fare capping was the most important step in developing a fare capping program
- Other tactics included pop-up events, bus cards, and special promotions to engage specific audiences and customer markets



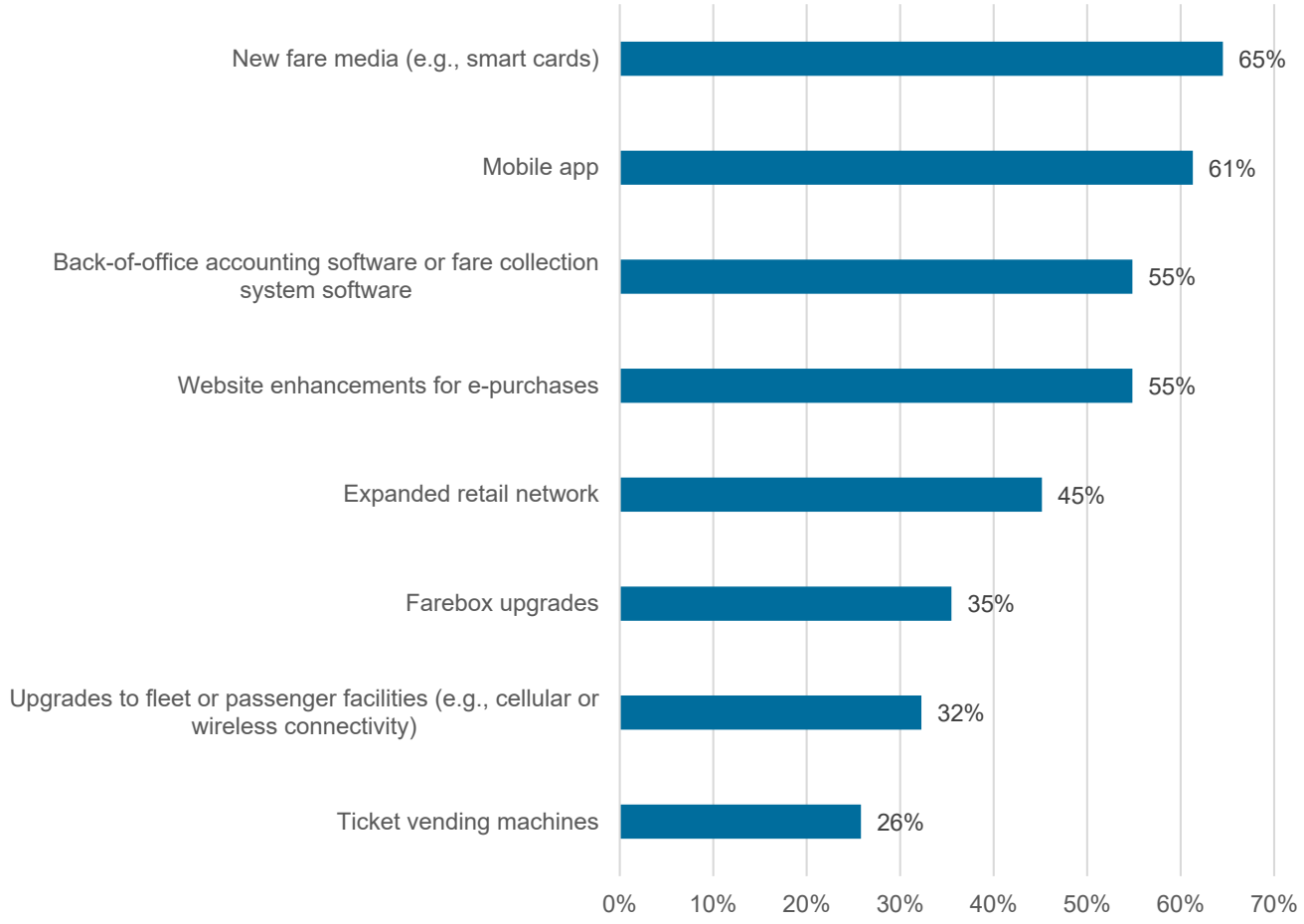
Survey: Challenges to Implementing Fare Capping

- Challenges educating and transitioning riders (42%)
- Increased operational costs (such as third-party fees) (32%)
- Concern about loss of fare revenue (29%)
- Concerns about privacy (29%)



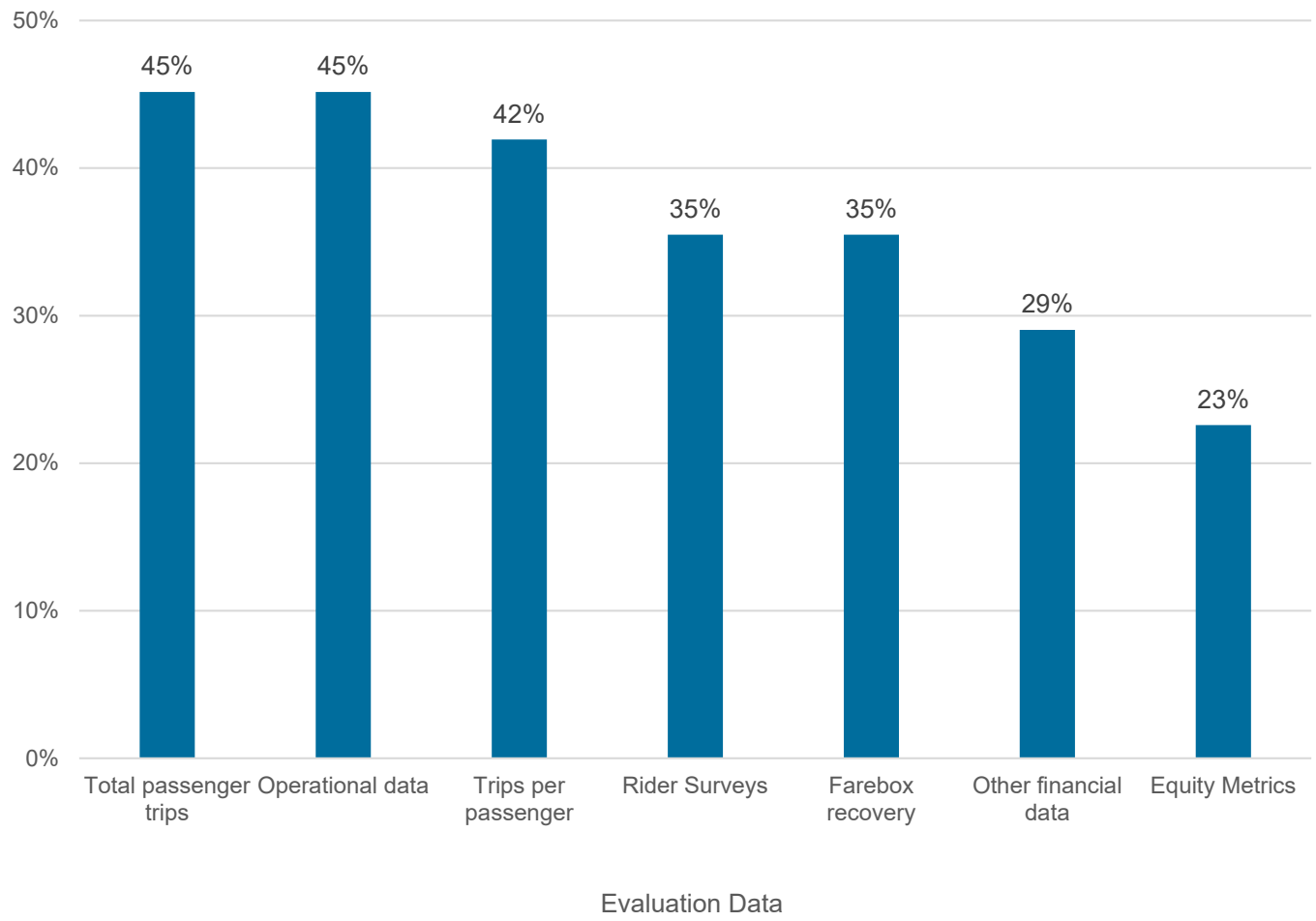
Survey: Investments to Support Fare Capping

- New fare media (65%)
- Mobile app (61%)
- Back-of-office accounting software or fare collection system software (55%)
- Website enhancements for online purchases (55%)



Survey: Evaluating Fare Capping

- Total passenger trips (45%)
- Operational data (45%)
- Trips per passenger (42%)



Agency Case Studies: Purpose for Fare Capping and Lessons Learned

Agency	Purpose	Lessons Learned
Greater Dayton RTA *Dayton, OH*	▪ Equity ▪ Modernize fare payment system ▪ Simplify riding experience	▪ Having a clear purpose is important ▪ Riders face a learning curve during the transition ▪ Anticipate a revenue loss that will need long-term solution
Miami-Dade Transit *Miami-Dade County, FL*	▪ Introduce integrated fare system ▪ Expand fare cap program beyond credit and debit card users ▪ Market transit services	▪ Understanding how riders use system helps inform daily vs. monthly caps ▪ Open payment reduces the liability of stored value cards ▪ Fare capping helps market services by making the system easier to use
C-TRAN *Clark County, WA*	▪ Integrate transit fares across multiple regional providers ▪ Modernize fare payment system ▪ Improve rider experience	▪ Regional fare system has benefits for smaller and midsize systems ▪ Anticipate costs associated with administration and data processing
NFTA Metro *Buffalo, NY*	▪ Reduce onboard transactions ▪ Eliminate security concerns ▪ Increase flexibility for riders	▪ Internal coordination requires dedicated staff ▪ Implementation can take longer than expected; public outreach must be timed accordingly ▪ Developing metrics at the outset will inform decision-making and help measure revenue impacts
IndyGo *Indianapolis, IN*	▪ Equity ▪ Modernize fares as part of long-term efforts to improve services ▪ Become a more data-driven agency	▪ Inexperienced vendor will delay implementation ▪ Marketing and outreach have huge impact on adoption of new fare program ▪ Limited staff capacity can also impact success of program

Key Issue: Equity and Underbanked Riders

More equitable fare policy and pricing can be achieved through capping, but only if it is available to all riders.

- Underbanked populations must have the ability to load value onto a smartphone or smart card, which may require a more enhanced sales network.
- Most fare cap programs have considered points of purchase, the needs of cash riders, and paratransit implementation. Most agencies did a Title VI analysis, but few performed additional analysis beyond that.

Key Issue: Technology and Fare Systems

Fare capping requires changes to an agency's fare revenue collection and financial systems, and often requires a major upgrade to modernize technology.

- Costs may include new fare media, enhancements for mobile apps, web purchases, new software, farebox upgrades/validators, facility investments including ticket vending machines at transit centers, and costs of working with and expanding third-party retail outlets.
- The level of investment may impact adoption rates and also help realize larger agency benefits such as eliminating onboard purchases, less cash handling, faster boarding, etc.

Key Issue: Impact on Ridership

While most systems cited a desire to increase ridership, no one has seen this yet.

- Fare capping is often introduced as part of a larger set of changes, such as a network redesign or a new fare system or structure.
- This makes it difficult to discern whether and how much fare capping is responsible for any ridership impacts.
- Due to ridership fluctuations during the COVID-19 pandemic, it is difficult to isolate the impact of fare capping on passenger trips.

Challenges for Transit Agencies

- Equity, rider experience, and simplified fare system are the greatest motivators for fare capping, but the case for fare capping is also a business one: attract more riders. Revenues or farebox recovery will never cover the total cost of service, but they are an important revenue stream for many transit systems, and **support for fare capping may require a shift in how fares are measured with respect to farebox recovery and revenue**.

- Mobile and online transactions can greatly increase credit card transactions, and **fees from credit card companies and mobile & retail vendors** can have a major impact on fare revenue.

- Transition to mobile and reloadable smart cards requires thoughtful branding, promotion, and lots of public education, especially for older riders who are less likely to transition to electronic forms of payment. **Upfront investment in education and increased customer service support** can help riders adapt to fare capping.

Future Research

- Comparative analysis of fare capping in relation to fare relief programs and fare-free policies
- Approaches to fare technology
- Impacts to underbanked or cash riders
- Modeling of fare revenue and ridership impacts
- Relationship between fare policies and service planning
- Use of data to improve agency operations

TCRP Synthesis 163: Considering the Unbanked in Cashless Fare Payment

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October 2022

Motivation, Objective & Method

- **Motivation:**
  - Removing cash fare collection from onboard buses has many potential benefits for operations, safety, and security

- **Objective:**
  - The objective of this synthesis was to inform bus operators of the impacts of going cashless

- **Method:**
  1. Literature review
  2. Detailed case examples using telephone interviews (staff from 9 transit agencies)

Image: Dayton RTA

Summary of Literature Review

Four Part Literature Review

1. Prior TCRP Reports
2. Unbanked Populations
   - Nationwide, state, city (MSA) trends
   - Unbanked transit riders
3. Policy and Regulatory Considerations
4. International Examples of Cashless

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Part 2: Unbanked Populations

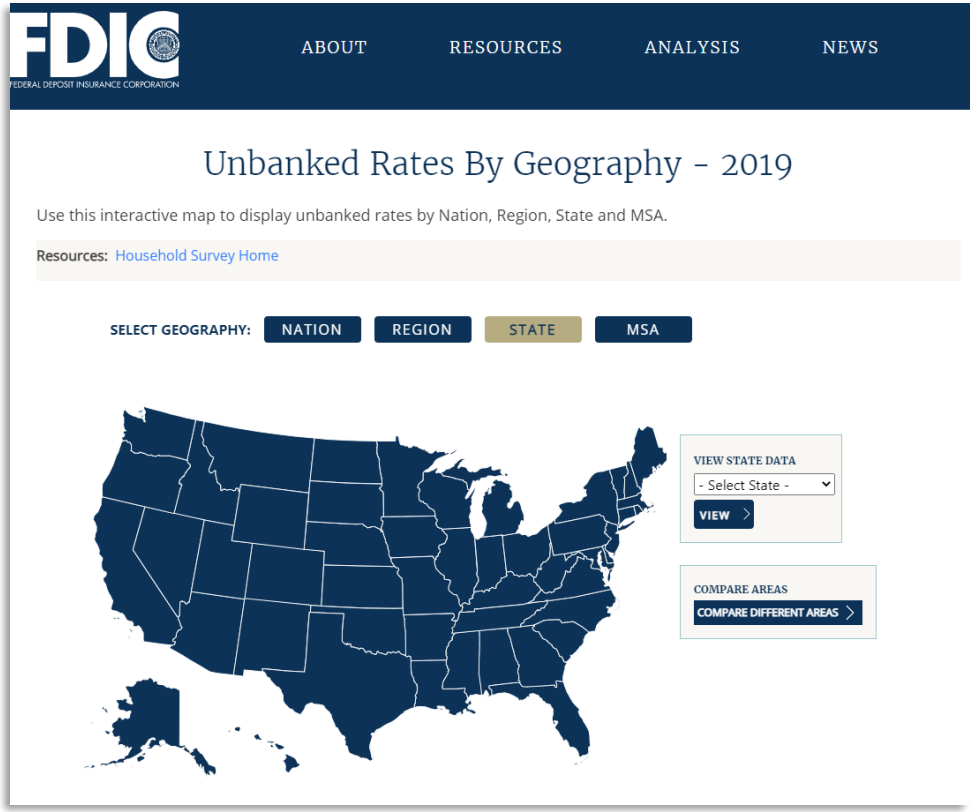

Image source: https://household-survey.fdic.gov/survey-map?year=2019

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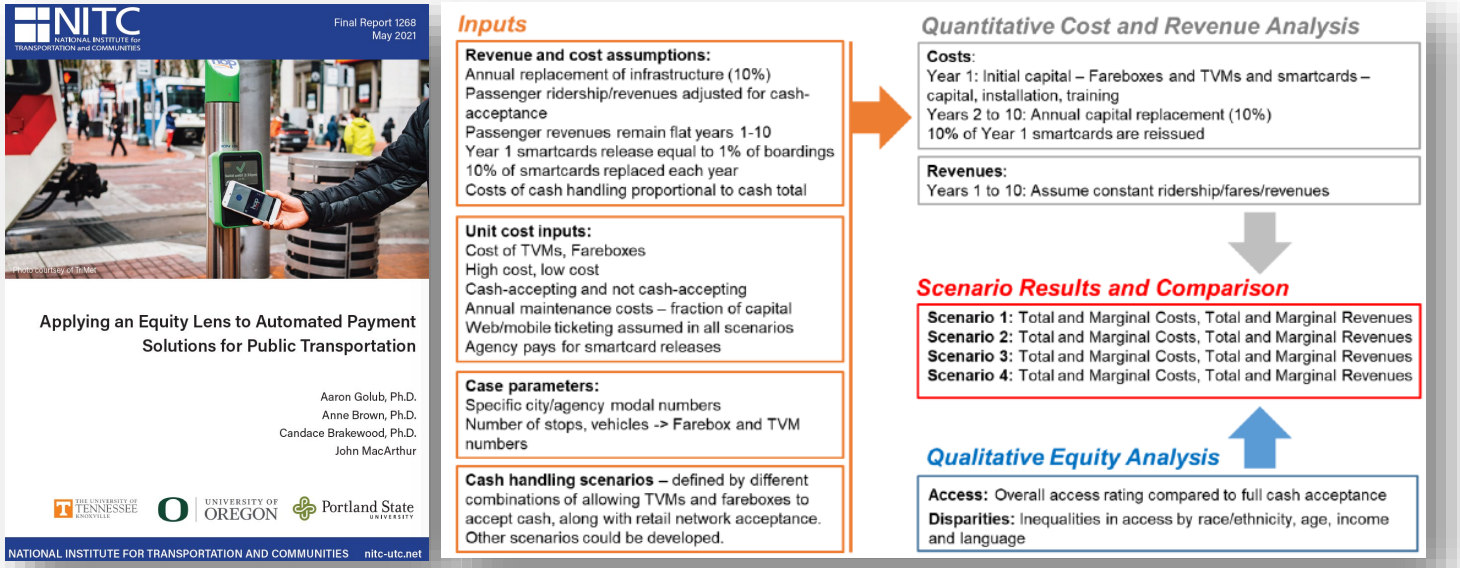
Part 2: Unbanked Transit Riders & Cashless Fares



Source: https://nitc.trec.pdx.edu/research/project/1268

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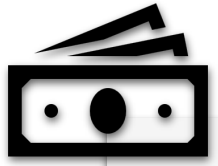
Transit Agency Examples (total of 9)

Small-scale pilot program of cashless fare collection

- **Muni** (San Francisco, CA) - 2019 pilot program moving toward cashless cable cars
- **WMATA** (Washington, DC) - cash free pilot program for one year on a single bus route that was not continued

Temporarily suspended cash fares due to COVID-19

- **TriMet** (Portland, OR) - temporary suspension of cash fares onboard buses
- **NJ TRANSIT** (New Jersey) - temporary suspension of cash fares onboard bus and commuter rail
- **Port Authority of Allegheny County** (Pittsburgh, PA) - temporary suspension of cash fares onboard buses



Considering, planning or implementing cashless systemwide

- **COTA** (Columbus, OH) - considering cashless fare collection
- **RTA** (Dayton, OH) - permanently eliminated cash onboard buses in fall 2021 as part of a new account-based fare collection system
- **Big Blue Bus** (Santa Monica, CA) - conducted a systemwide cashless pilot program on buses in 2021
- **MBTA** (Boston, MA) - planning to remove cash fare collection from onboard buses as part of a new unified, fare system

Notes:
Transit agency staff interviews were conducted in 2021.

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Additional transit agency examples included in the Synthesis are COTA, MBTA, and Port Authority of Allegheny County.

Transit Agency Example 1 (of 6): Muni

- Historic cable cars have unique fare collection challenges (no fare collection equipment and multiple points of entry).
- The market for cable cars is primarily tourists.
- Pilot program in 2019 that took a step toward cashless by aiming to significantly reduce onboard cash fare payments.
- Motivation: to improve operator safety (conductors also help with braking the cable car) and improve security by reducing cash handling.
- One lesson learned: work with conductors to identify scenarios that could lead to confusion or conflicts with customers.

Cable Cars

Muni Ticket Sales Kiosk

Image source: MUNI

Transit Agency Example 2 (of 6): WMATA

- Beginning in June 2018, WMATA launched a one-year pilot program on a single bus route to evaluate "cash free" boarding.
- Both customer surveys and operator surveys were done; both groups generally liked the pilot program.
- WMATA conducted a detailed technical evaluation; however, operational changes showed limited impact. Therefore, WMATA decided that the pilot program would lapse at the end of 1 year.

Metric	Impact of the 79 Cash-Free Pilot
Ridership ✗	Mildly negative. Some shifting from Route 79 to Route 70?
Fare Evasion ●	Fare evasion did not increase as a result of the pilot
Dwell Time ✓	Dwell time per person fell (less than 30 seconds per bus trip)
Running Time ●	No discernable running time savings
Cash Customers' Response ●	Shifted to Route 70, rail stations, and other sales outlets
Operating Cost Savings ●	Minimal difference

- A key finding of WMATA's evaluation was low baseline cash use prior to the pilot program likely limited the potential benefits.

Image sources: WMATA

Transit Agency Example 3 (of 6): TriMet

- TriMet temporarily suspended cash fare collection onboard buses during the COVID-19 pandemic for approximately six months to install barriers at the front of vehicles.

- The primary motivation was public health concerns.
- TriMet customers were encouraged to pay fares by using the account-based Hop system.

- The results of temporarily suspending onboard cash fare collection are unclear since there were numerous other service and policy changes.
- TriMet reinstated cash fare collection onboard buses in October 2020.

Hop image source: TriMet Website

Transit Agency Example 4 (of 6): NJ TRANSIT

- NJ TRANSIT temporarily halted onboard cash fare collection on both bus and commuter rail service for approximately 4-6 months in 2020 during the COVID-19 pandemic.
- The primary motivation was public health concerns.
- The results of temporarily moving to cashless fare collection during the COVID-19 pandemic are unclear.
- Cash fare payments resumed onboard bus and commuter rail services in the summer of 2020.

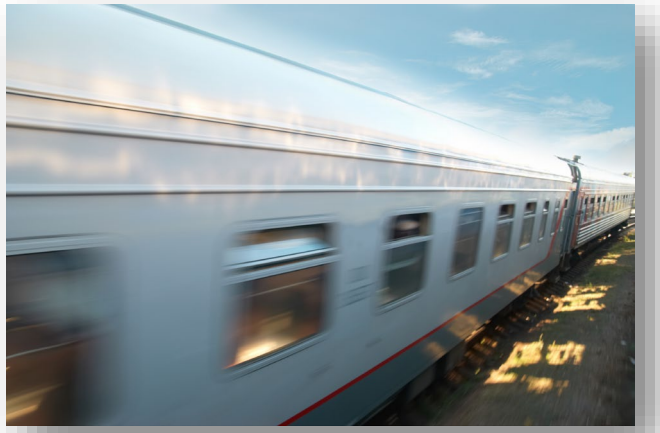


Image source: stock photos

Transit Agency Example 5 (of 6): Big Blue Bus

- In the summer of 2021, the Big Blue Bus began a pilot program to evaluate cashless fare collection on their bus network.
- Motivating factors: public health concerns, potential operational improvements.
- Customers surveys were conducted in advance and used in a Title VI Fare Equity Analysis.
- Riders got one free 30-day pass to help increase adoption of contactless fare payment options.
- Preliminary customer research suggests that many riders did intend to use cash again; however, there were concerns about disenfranchising vulnerable groups.

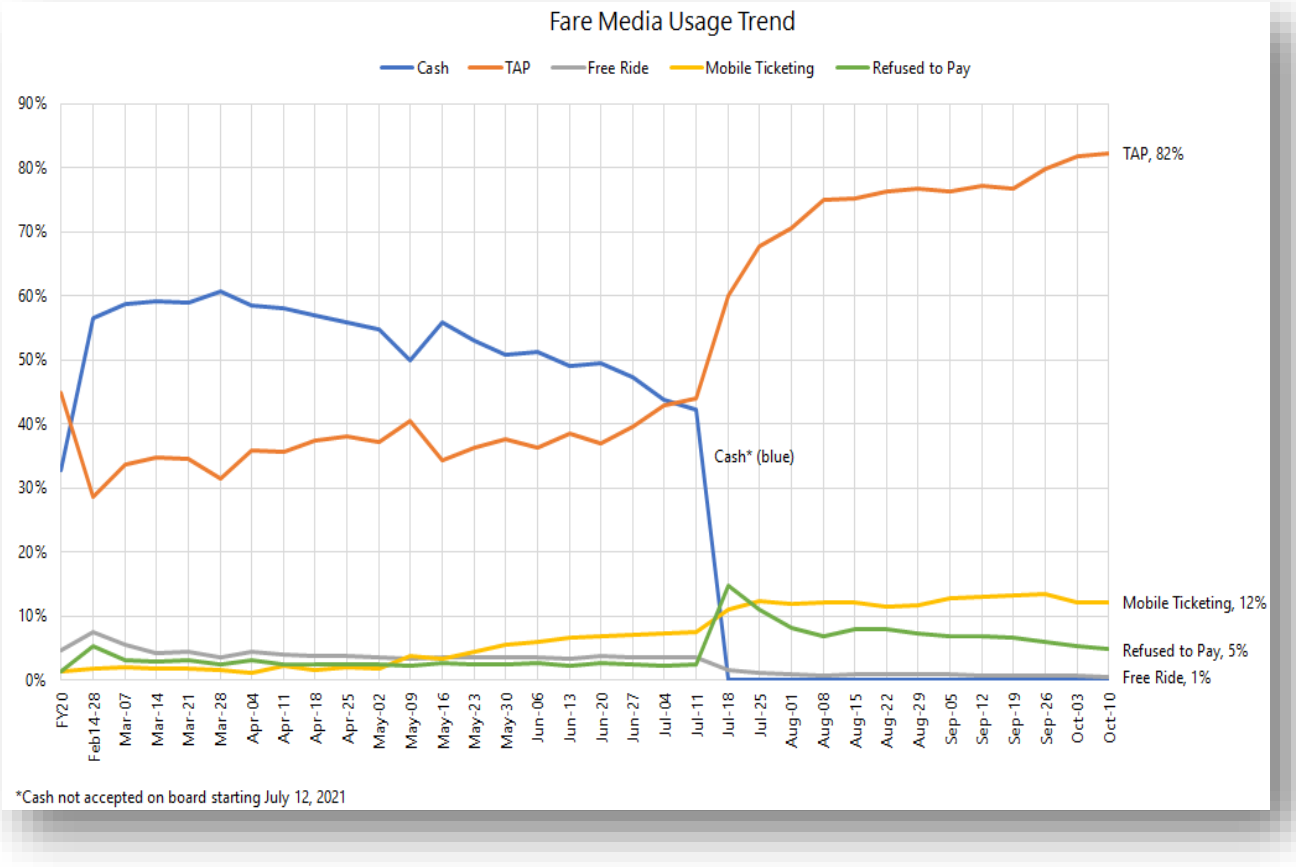
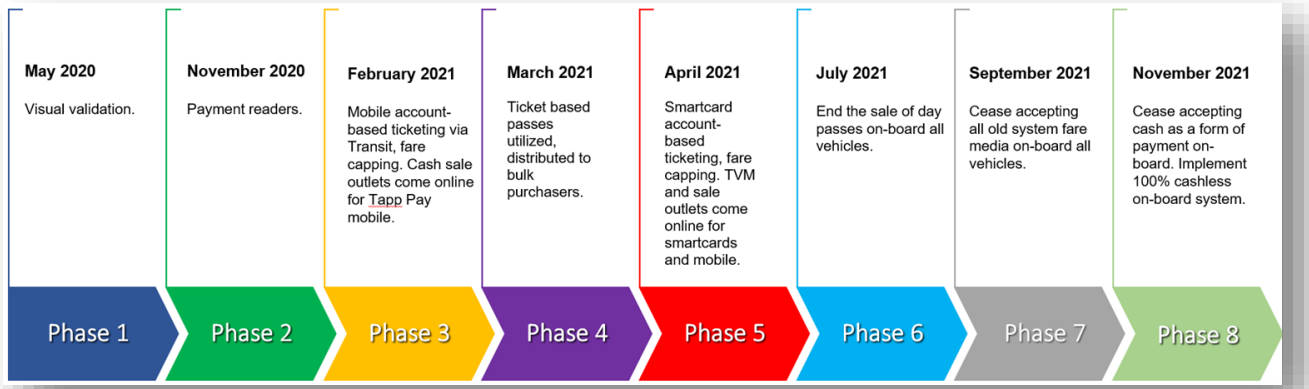


Image source: Big Blue Bus

Transit Agency Example 6 (of 6): Dayton RTA

- From 2020-2021, the RTA launched a new, account-based system (“Tapp Pay”). Phase 8 eliminated cash fare payment onboard buses in November 2021.
- In early 2021, the RTA collected rider surveys, held public meetings, and did community outreach in a Title VI process.
- The RTA and partner companies provide a large retail sales network; the Title VI analysis identified retail sales locations within one quarter mile of a bus route or Transit Center.
- The RTA has daily and monthly fare capping; to encourage adoption of Tapp Pay, the RTA temporarily offered fare capping discounts.
- RTA also has a “one more ride” feature - an account can go negative by 1-2 trips in order to ensure riders are not stranded.



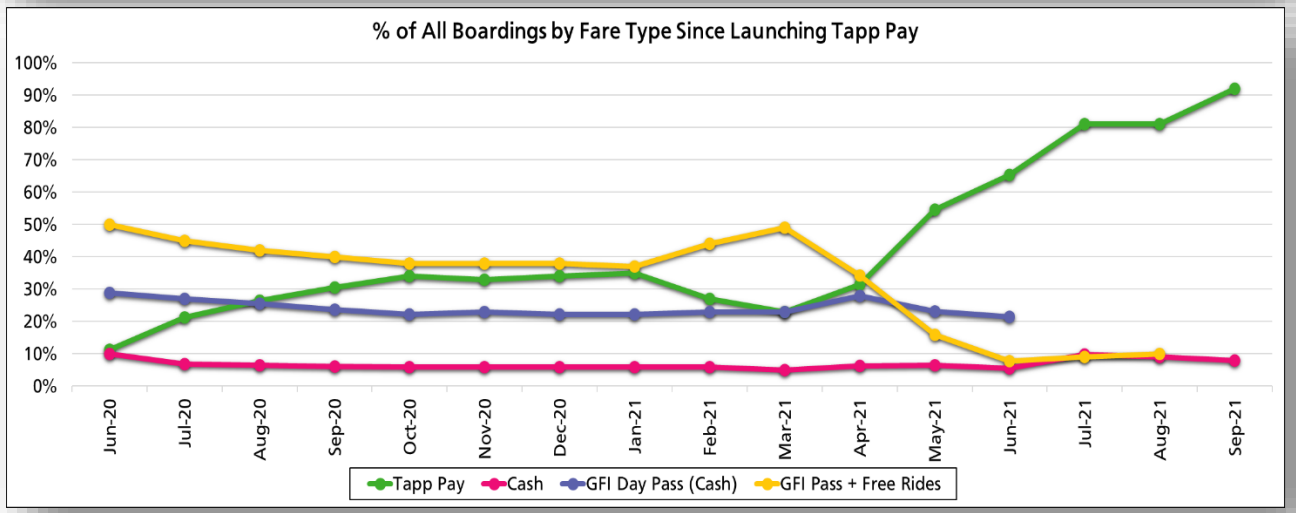


Image sources: Dayton RTA

Summary of the 6 Transit Agency Examples

Small-scale pilot program of cashless fare collection

- **Example 1:** Muni (San Francisco, CA) – 2019 pilot program moving toward cashless cable cars
- **Example 2:** WMATA (Washington, DC) – cash free pilot program for one year on a single bus route that was not continued

Temporarily suspended cash fares due to COVID-19

- **Example 3:** TriMet (Portland, OR) - temporary suspension of onboard cash fares on buses due to COVID-19
- **Example 4:** NJ TRANSIT (New Jersey) - temporary suspension of bus and commuter rail onboard cash fare collection due to COVID-19

Planning or implementing cashless systemwide

- **Example 5:** Big Blue Bus (Santa Monica, CA) - conducted a systemwide cashless pilot program on buses in 2021
- **Example 6:** RTA (Dayton, OH) – permanently eliminated cash onboard buses in fall 2021 as part of a new account-based fare collection system

Notes:
Transit agency staff interviews were conducted in 2021.
Additional transit agency examples included in the Synthesis are COTA, MBTA, and Port Authority of Allegheny County.

Emerging Trends and Key Findings (1-5 of 10)

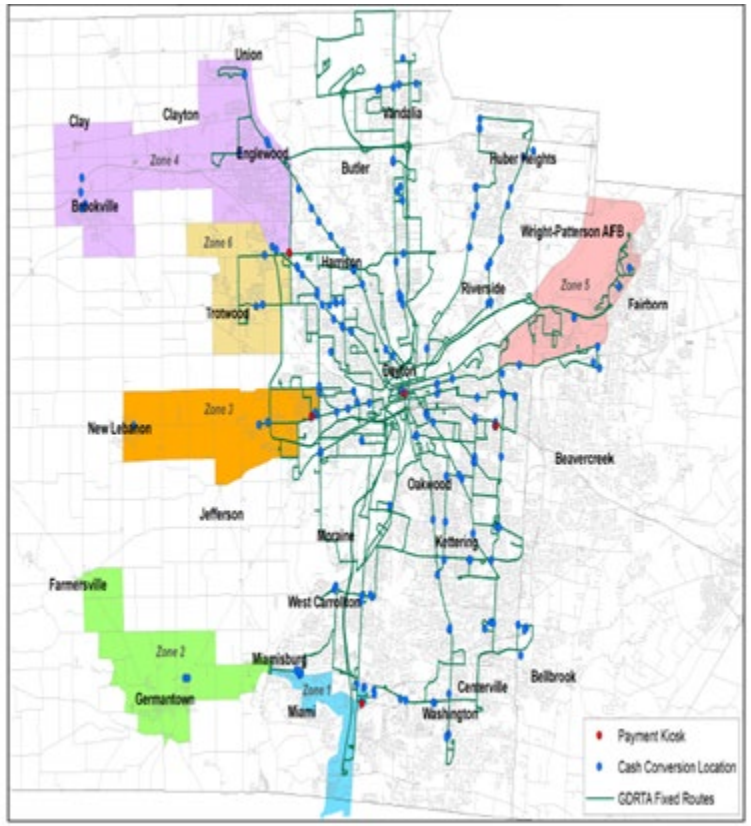
1. Nascent idea: Nearly all local bus operators at large- and medium-size metropolitan transit agencies in the USA continue to accept cash onboard buses. The concept of "cashless" is a nascent idea.

2. Terminology: The industry lacks standard terminology to describe "cashless" fare collection systems.

3. Convenient alternatives: One of the most critical elements in preparing for cashless fare collection systems is to provide transit customers with convenient alternative options to pay cash, including a robust retail sales network (see figure) and ticket vending machines.

4. One more trip policy: Some new fare policies – particularly "one more ride" or "one more trip" – are likely to be implemented by agencies with account-based fare collection systems.

5. Vehicle operators: A key motivating factor for removing cash onboard is operator health, safety, and security.



Dayton's Analysis of Retail Sales Outlets in Close Proximity to RTA Routes

Image source: Dayton RTA

Emerging Trends and Key Findings (6-10 of 10)

6. **Operational improvements:** Operational improvements are a potential advantage of removing cash from vehicles; however, more research is needed to quantify these impacts.

7. **Facilitating all door boarding:** Some agencies view removing cash fare collection from vehicles as a way to facilitate all door boarding.

8. **Unbanked:** Transit agencies considering cashless fare collection systems want to understand how many riders are unbanked and how to meet their needs, as well as other populations that may have specialized needs.

9. **Title VI:** Title VI Fare Equity Analyses are likely to be needed as transit agencies plan for cashless fare collection systems.

10. **Outreach:** Public outreach and communication are a key part of the planning process for cashless fare collection.

Image: Big Blue Bus Signage in Vehicles Explaining Contactless Fares (in Spanish)

Areas for Future Research

1. Add financial instrument question on rider surveys
2. Conduct geographic analyses of fare sales channels
3. Study cashless post-implementation (e.g., Dayton RTA)
4. Consider cashless on paratransit
5. Analyze impacts “one more trip” fare policies

Example Survey Question:

Which of the following do you have access to? Please select all the apply:

Credit card
Debit card
Prepaid card
Checking account
Savings account
Other: _____”

Thank you!

For more information, download TCRP Synthesis 163 at:
https://www.trb.org/Publications/Blurbs/182724.aspx

You may also be interested in TCRP Synthesis 148 about Mobile Fare Apps