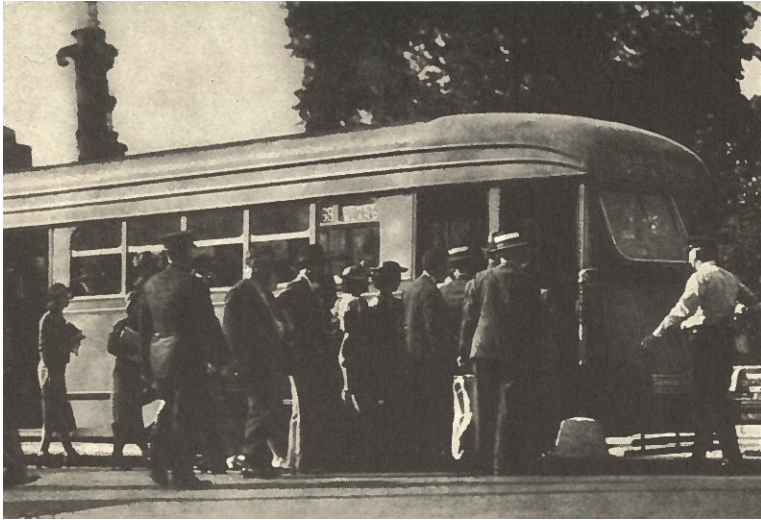# All-Door Boarding Evaluation

December 4, 2014

SFMTA Citizens' Advisory Council (CAC)

San Francisco, CA

All-Door Boarding

Brooklyn, NY (1937)

Akron, OH (1945)

- For generations, the transit industry has had to balance service speed with fare revenues

- Fare collection by the operator has required front-door boarding

- On July 1, 2012, the SFMTA became the first multimodal transit operator in North America to implement All-Door Boarding system-wide after many years of an informal practice

2

SFMTA's Approach

- Many cities have All-Door Boarding and Proof-of-Payment on selected light rail and BRT lines, but not a system-wide policy
- Two main challenges have precluded system-wide adoption by the transit industry

Challenge	SFMTA Approach
Enforcing fares over a large geographical transit network cost-effectively	• Rotate Transit Fare Inspector deployment to different police districts • Creates a customer expectation that they could be checked anywhere anytime
Having ticket vending machines at every stop and incurring installation, servicing and maintenance costs	• Permit customers to enter at the front to pay • Promote Clipper® and pilot mobile ticketing to reduce cash transactions (only about 1 of 10 boardings at busy stops at peak times)

An Agency-wide Implementation Effort

Supported by the SFMTA Board, the six-month coordinated implementation effort involved most SFMTA divisions

- Finance & Information Technology

- Sustainable Streets

  - Security, Investigations and Enforcement

- System Safety

- Taxi & Accessible Services

- Transit

  - Transit Management

  - Operations Planning & Schedules

Implementation Steps

Transit Fare Inspector Staffing Increase

- Increased active TFIs from 44 to 63 over two years

Transportation Code Amendments

- Requested that Board of Supervisors to legalize rear-door entries

Fare Survey

- Conducted abbreviated fare survey to benchmark fare compliance levels

Vehicle Preparation

- Removed "Stop" signs and affixed language-neutral decals illustrating policy

Public Outreach

- Installed car cards, outreached to community groups, held media event and created YouTube videos

Internal Communications

- Issued bulletins to Transit Operators explaining protocols and safety procedures

Communication Initiatives

Car Cards in English, Spanish and Chinese

"Professor Muni" YouTube Video

Language-Neutral Vehicle Decals

Transit Operator Bulletin

Evaluation Methodology

Goal	Performance Metric	Data Sources
Speed the boarding process	• Dwell Times • Percentage of Customers Entering through Rear Door	• Physical Observations at Busy Stops • Ride-Along Observations
Reduce travel time	• System Speed	• Automatic Passenger Counter (APC) Travel Time Data
Maintain or improve fare compliance levels	• Fare Compliance Levels • Total Fare Revenue	• On-Board Fare Surveys • Financial Records

Transitioning to Official All-Door Boarding

Dwell Time Findings

The boarding distribution through each door affects dwell times

**Average Dwell Times per Boarding and Alighting
(2-Door High Floor Buses and Streetcars)**

Boarding Distribution	Definition	Before	After	Combined
"Even"	25-75% through rear door	2.5 s	1.8 s	2.0 s
"Uneven"	<25% or >75% through rear door	4.9 s	4.1 s	4.7 s

Dwell Time Findings

All-Door Boarding has encouraged boarding customers to distribute themselves more evenly, thereby reducing average dwell times.

Metric	Before	After
"Even" Boarding Distribution Occurrence	28%	63%
Customers entering through rear doors	22%	48%
Average Dwell Times	4.3 s	2.7 s

All-Door Boarding has also reduced dwell time variability.

Metric	Before	After
Standard Deviation of Dwell Times	3.6 s	2.1 s

Note: Data shown above is for 2-door high floor buses and streetcars

Dwell Time Findings

Dwell Times for Two-Door High-Floor Buses and Streetcars

Pre-Implementation
Dwell Time per Boarding & Alighting
    Average: 4.3 s
    Standard Deviation: 3.6 s
Total Vehicles Observed: 135

Post-Implementation
Dwell Time per Boarding & Alighting
    Average: 2.7 s
    Standard Deviation: 2.1 s
Total Vehicles Observed: 123

Dwell Times per Boarding and Alighting (in seconds)

Uneven Boarding Distribution (<25% or >75% through rear door)
Even Boarding Distribution (25% to 75% through rear door)

- With more rear-door entries, "even" boarding distributions have increased
- Average dwell times have decreased

Diverse All-Door Boarding Ridership Markets

Percentage of Rear-Door Boardings by Stop Typology

For methodological consistency across survey periods, data include high-floor buses and streetcars only.

Dwell Time Reductions

Average Dwell Times by Stop Typology

For methodological consistency across survey periods, data include high-floor buses and streetcars only.
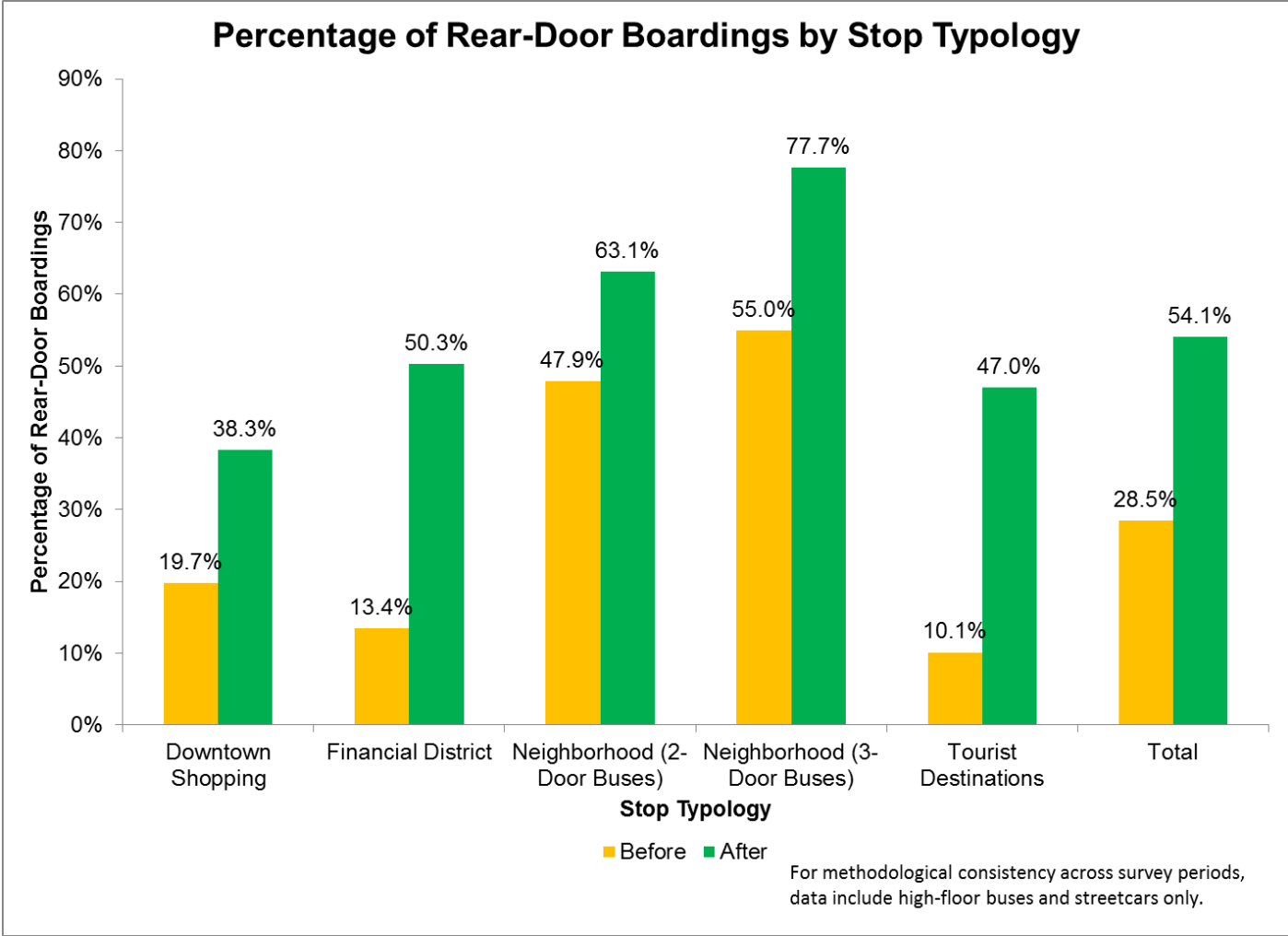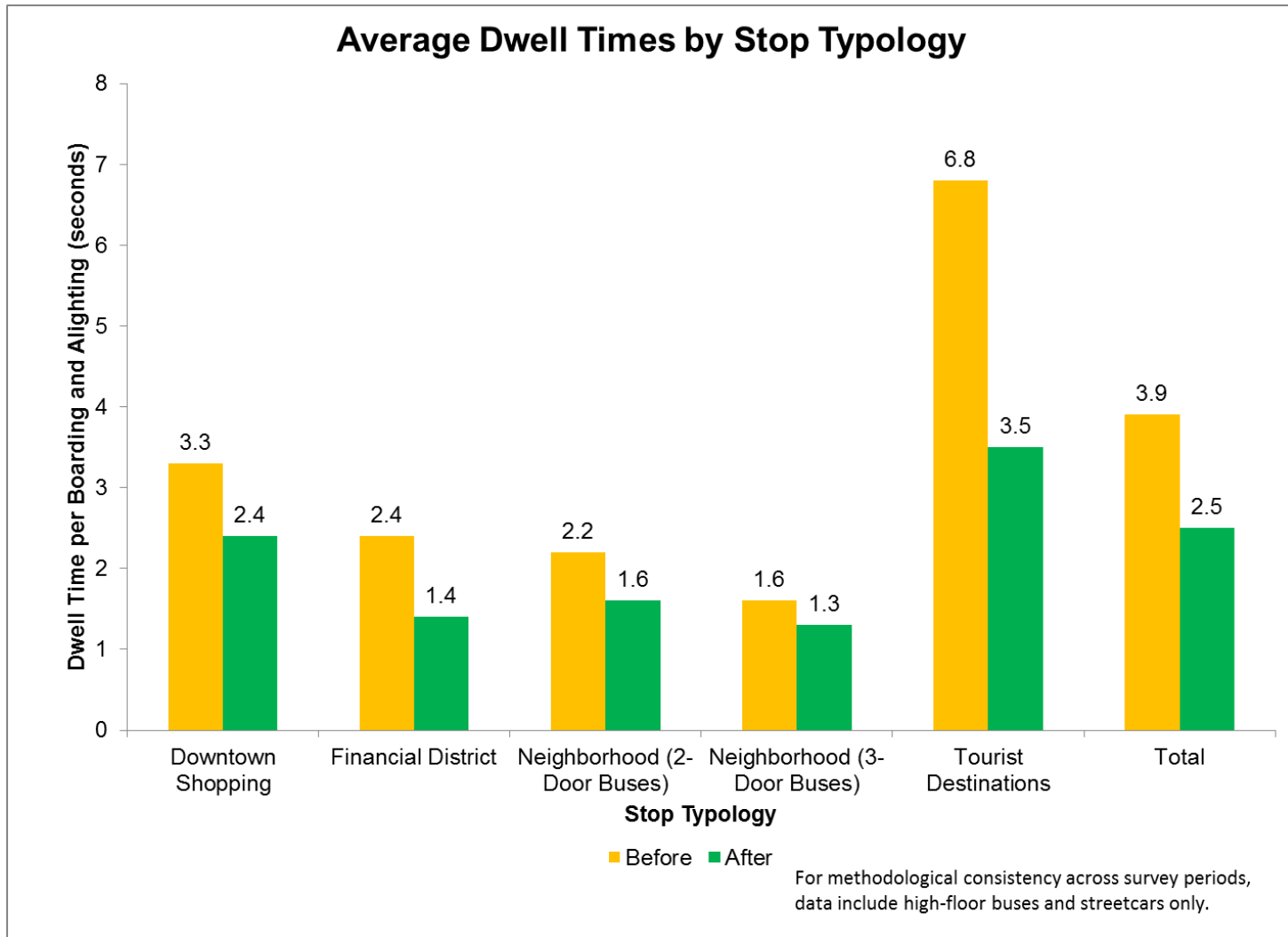
Boarding Patterns and Dwell Times

Dwell Times vs. Boarding Distribution by Door

○ 2-Door Low-Floor Motor Coach

✖ 3-Door High-Floor Trolley Coach

Size indicates aggregated boarding volumes

Average Dwell Time per Boarding and Alighting (seconds)

% of Customers Entering Through the Rear Door(s)
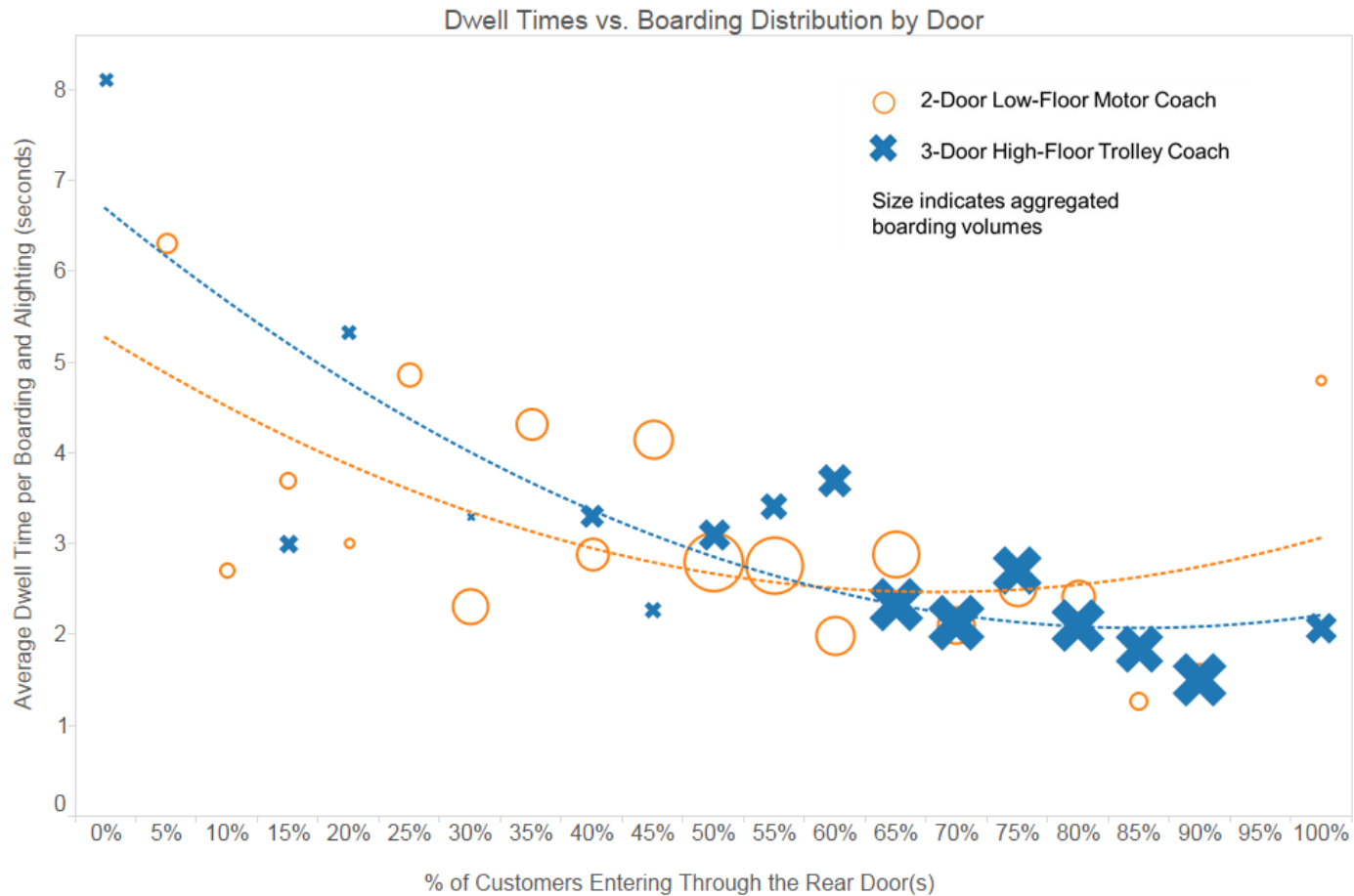
Speed

- Average bus speeds have increased 8.41 to 8.56 mph (2%) from FY 2010-2011 through FY 2013-2014
- Several factors may be reducing overall speed gains despite significant time savings at a stop level
- Approximately 80% of travel time is between stops

External Factors	Change
Population	+32,000 (+4.0%)
Employment	+70,000 (+12.6%)
Bus Ridership	+23,000 (+4.8%)
Vehicle Registrations	+15,000 (+3.2%)

Transit Fare Inspector Deployment
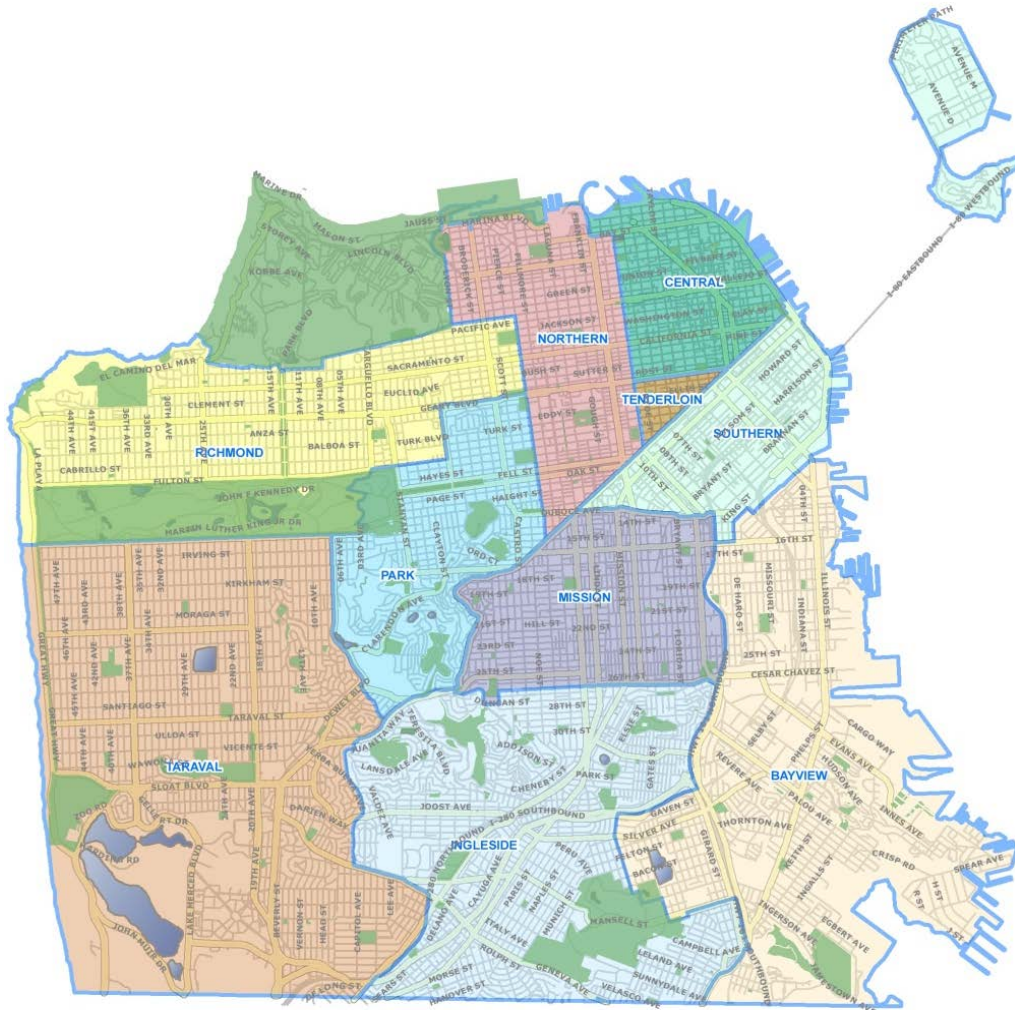
- Expanded Proof-of-Payment from light rail to buses and streetcars in 2010
- With All-Door Boarding, Transit Fare Inspector FTEs increased from approximately 41 to 54
- Police District deployment model ensures all customers have a reasonable expectation of being checked

Fare Compliance

SFMTA Surveyed Fare Evasion Rate

- 9.5%
- 8.6%
- 8.4%
- 7.9%

All-Door Boarding Implementation

- Comprehensive Fare Surveys (2009, 2014)
- Abbreviated Fare Surveys (2010, 2012)

Fare Evasion Rate

Year
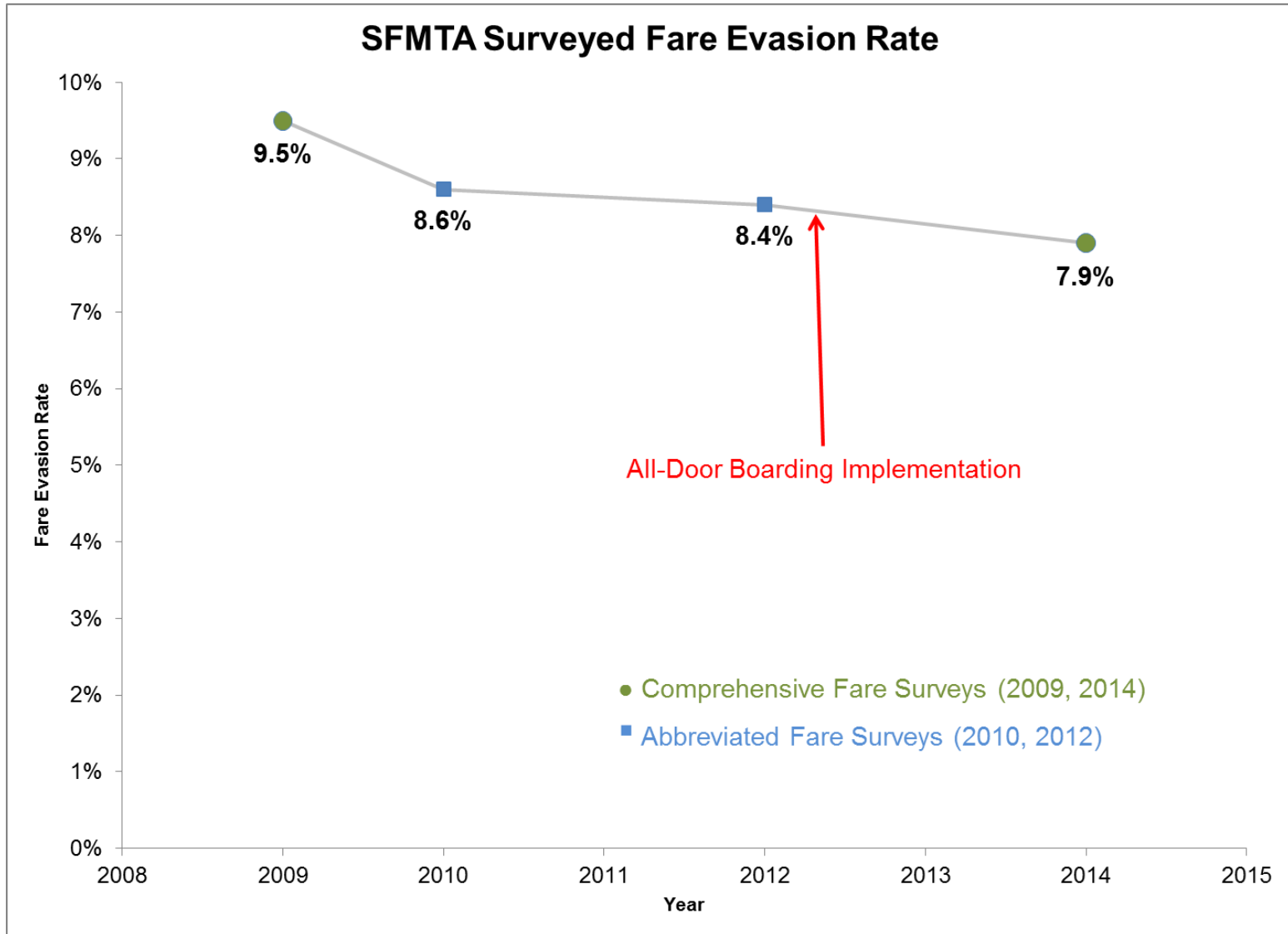
Fare Compliance Patterns

Observed Customers with Invalid Fares
(2014 Fare Survey)
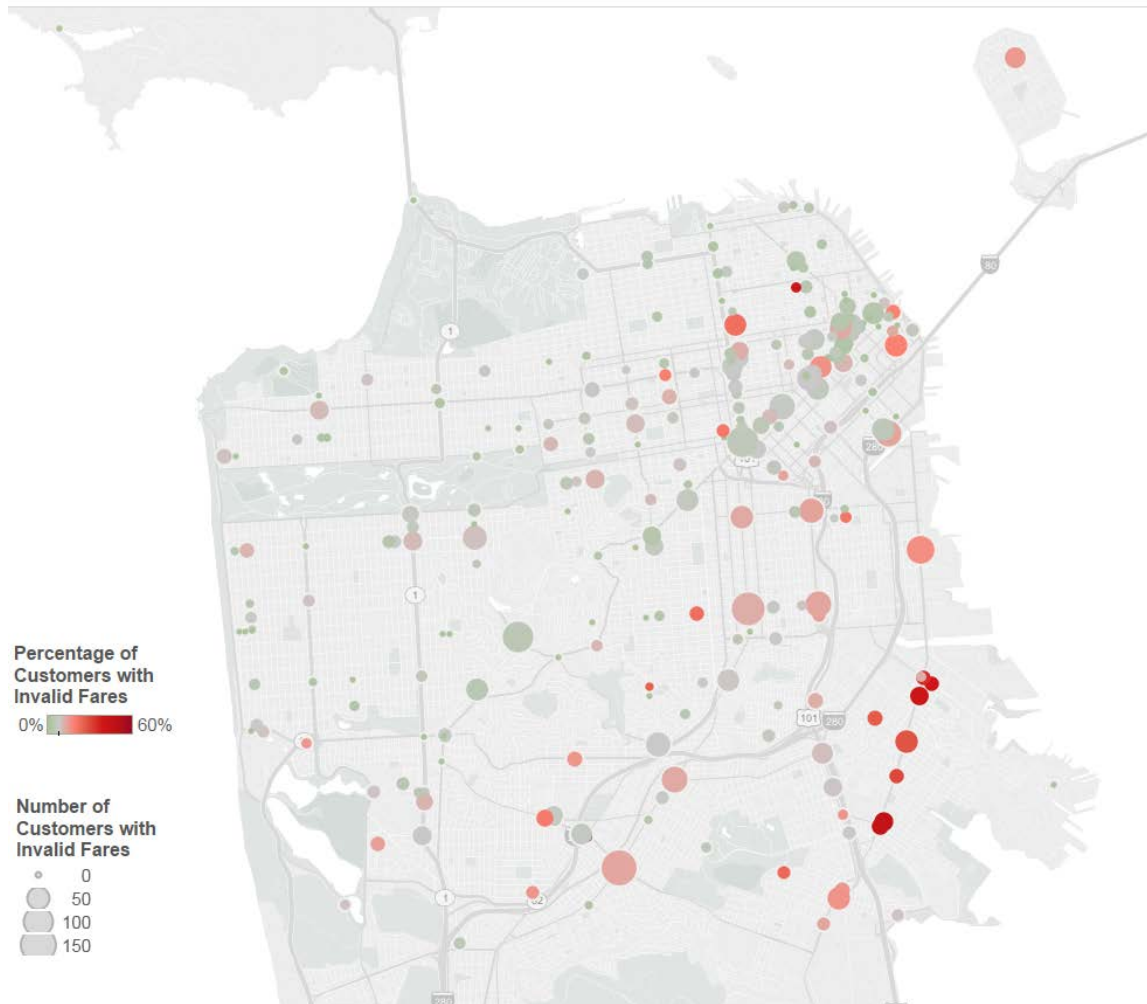
Fare Revenues

- Estimated Uncaptured Fare Revenue from non-compliance has decreased from $19.2 million in 2009 to $17.1 million in 2014
- Decline has not been proportional to the decrease in the fare evasion rate due to inflation-indexed fare increases

Fare Category	Estimated Uncaptured Fare Revenue
No Ticket, Transfer or Pass, Invalid Transfers/Fare Receipts, Walk Away	$14.1 million
Underpayment	$2.8 million
Misused Youth Pass	$0.2 million
Total	**$17.1 million**

- Non-cable car fare revenues increased from $171.6 million in FY 2012 to $179.1 million in FY 2013, not including $2.2 million* ($0.75 million pro-rated) in funding received to defray the costs of Free Muni for Youth passes

  *Estimated by the Budget and Legislative Analyst's Office

Summary

Dwell Times	Speeds	Fare Compliance
• More even boarding distribution between the front and rear doors • Shorter dwell times per customer • Reduced dwell time variability	• Minor speed improvements • Maintained travel speeds despite increases in ridership, traffic congestion, population and employment	• Continued modest gains in fare compliance • Fare revenues up

To reduce travel times substantially, other strategies such exclusive transit lanes, transit signal priority and parking management must accompany All-Door Boarding.