Analysis of Racial/Ethnic Disparity in TriMet Fare Enforcement Outcomes on the MAX 2016-2018

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Introduction

This report is a follow-up to the first TriMet fare enforcement study that was conducted on the years 2014-2016 and released in December of 2016. This new report focuses on the last two years of fare enforcement incidents since the first report occurring from March 28, 2016 to March 28, 2018. The purpose of this report is to first examine whether there exist racial/ethnic disparities in TriMet fare enforcement outcomes. If disparities exist a second purpose of the report is to ascertain what factors may be contributing to the disparity, including racial/ethnic bias. This report only focuses on fare enforcement conducted on the MAX light rail. Out of 49,540 fare enforcement incidents recorded by TriMet during this two-year time frame, *97% occurred on the MAX*, therefore fare enforcement on the MAX accounts for almost all enforcement activities.

An "official" fare enforcement incident can entail the following actions: 1) a warning, 2) a citation, or 3) exclusion. The incident is "official" because a record including the rider's name, date of birth, and perceived race/ethnicity has been recorded in a centralized database. The numbers and demographics of riders who show inspectors valid fare are not officially recorded in a database. Fare enforcement incidents can also entail an arrest, which is not part of the data received for this report. TriMet fare enforcement officers and representatives of local law enforcement agencies conduct fare enforcement.

The term "disparity" used in this report refers to differences in enforcement outcomes between racial/ethnic groups of riders *based on an expectation of each group's likelihood* of receiving a warning, citation, or exclusion. Differences in warnings, citations, and exclusions between the following racial/ethnic groups are examined:

1) African American
2) Asian
3) Hispanic
4) Native American
5) Multi-Racial
6) Other
7) White
8) *Non-White* (an aggregation of racial/ethnic groups 1 through 6)

Disparity and the Expected Likelihood of Being Caught

Determining whether a disparity exists between racial/ethnic groups begins with an assessment of the expected likelihood of each group being caught on the MAX for having no fare or improper fare.

A common approach in disparity studies is to assume that the percentage of warnings, citations, and exclusions for each racial/ethnic group *should be equal to their percentage of the local population*, if enforcement is conducted in a random fashion. However, *this traditional assumption can be fallible* for four reasons:

1) Certain racial/ethnic groups may utilize public transportation at higher rates than their percentage of the general population, thus putting them at greater risk for fare enforcement activity.
2) Certain racial/ethnic groups may commit fare enforcement violations at higher rates than their percentage of the general population, thus putting them at greater risk for fare enforcement activity.
3) Local census population figures cannot accurately measure racial/ethnic populations using transit because an unknown percentage of transit riders come from counties or states outside the Portland metro area.
4) Deployment of enforcement personnel may tend towards a MAX line or stop that happens to be frequented by higher proportions of certain racial/ethnic groups increasing their likelihood of an enforcement incident.

These measurement issues have been referred to as the "baseline problem" common to race disparity studies. Attention to the baseline problem was recognized in a recent transit fare enforcement report conducted by *Metro Transit* in Minneapolis (2015, p. 2, 13).

> Since *true incident rates* by racial group *are unknown*, this analysis cannot distinguish whether uneven enforcement rates are due to bias in enforcement or reflect differences in actual incident levels across racial groups.
>
> Caution is advised in interpreting the results of this report as true incident rates by demographic group are not known. Therefore, incident rates by demographic group cannot be directly compared to known baselines.

To rephrase the Metro Transit study, the best baseline for determining if racial/ethnic disparity in fare enforcement exists is knowledge of the "true incident rates" or *what proportion of riders of each race/ethnicity are actually evading fare*.

Disparity, Bias, and Profiling

The act of fare enforcement shares some similarities with general law enforcement by police, therefore concern over "profiling" or "enforcement bias" can be relevant to transit fare enforcement. This report will use the terms "profiling" or "enforcement bias" interchangeably and defines this phenomenon in the following manner:

> *"Profiling" and "Bias" means that an authorized transit enforcement officer uses (consciously or unconsciously) the race or ethnicity of an individual as a primary motivator for suspicion of a fare violation and additional fare investigation. Bias can also mean that institutionalized practices of fare enforcement may inadvertently have a differential impact on some races/ethnicities.*

The methodological tests used in this study *look for patterns in fare*

enforcement data that indicate thresholds large enough to determine if disparities between racial/ethnic groups are unlikely due to random statistical or measurement issues. If a threshold in disparity is reached it could signify systemic causes within organizational policy, practices, enforcement officers, or ridership demographics is causing the pattern, including racial bias or profiling. A more thorough investigation of the issue is then warranted.

It is critical that the reader understand the following three principles that guide the analysis and frame the conclusion discussion:

> *Principle 1: Descriptive and statistical evaluation of fare enforcement data is limited to finding racial and ethnic disparities that may be "indicative" of systemic racial and ethnic bias but that, in the absence of more extensive examination, cannot be considered comprehensive evidence or proof of profiling.*
>
> *Principle 2: The best strategy for assessing racial and ethnic disparities is to apply multiple benchmarking approaches. Each statistical benchmarking approach has empirical limitations impacting the validity of the results; therefore, a holistic approach is necessary.*
>
> *Principle 3: Even if the results are not indicative of a pattern of systemic bias it does not mean a transit agency should be any less vigilant in ensuring its enforcement practices are fair and un-biased through continued training, data monitoring, and policy reflection.*

Developing a Baseline: Ridership and Fare Evasion Surveys

Instead of using racial population census estimates for a comparison baseline, survey estimates obtained from a *Fare Evasion Survey* of MAX riders were used for estimating the baseline comparison population. The Fare Evasion survey is sponsored by TriMet and the data estimates were provided to Portland State University for this report. The researcher and author of this report was not involved in the survey design or data collection effort.

Fare Evasion Surveys 2016 – 2018

The Fare Evasion Survey addresses what Metro Transit study in Minneapolis recommends – the need for an estimate of the "true incident rate" of fare evasion to compare enforcement outcomes to. The TriMet fare evasion survey has been conducted in partnership with TriMet fare enforcement officers since 2011. Contractors hired by TriMet shadow inspection personnel and note the number of passengers with valid fares, no fares or invalid fares. The perceived race/ethnicity of persons with no fares or invalid fares is recorded by the contractor. Persons with no fare or invalid fare who are approached by the surveyors are not given citations or exclusions, thus no official fare enforcement action is undertaken. The race/ethnicity of persons with valid fares are not

recorded, but a count of riders with valid fares is estimated.

A recent google search of fare evasion studies, revealed that the 2016 TriMet Fare Evasion Study is the only research conducted using a fare evasion survey for the baseline to examine racial/ethnic disparity in fare evasion incidents. Although the Minneapolis Metro Transit report recommends this approach they have yet to implement it to our knowledge. Other cities like San Francisco, Vancouver (BC), and New York City have conducted fare evasion surveys and observations of fare evasion, but do not report on any racial/ethnic breakdown in violators. It is safe to conclude there are still few social science examinations of disparity in transit fare enforcement.

The 2016 fare evasion survey entailed 10,740 fare inspections, the 2017 survey 11,584 inspections, and the 2018 survey entailed 11,510 inspections. The percent of riders with *no fare* was 13% in 2016, 11.6% in 2017, and 14.7% in 2018. An additional 1.5% of riders had an *improper fare* in both the 2016 and 2017 surveys, and 1.9% in 2018. Thus, the *estimated percent of MAX riders engaging in fare evasion* is 14.5% in 2016, 13.1% in 2017, and 16.6% in 2018. The data for this report uses a 3-year average of the fare evasion survey results that span the study timeframe of 2016 to 2018. The race/ethnicity breakdown of fare evaders based on the survey is averaged from to 2016 to 2018 surveys and shown in Table 1 below.

Table 1: Fare Evasion Survey Results 2016 to 2018

Perceived Race	% Fare Evaders (2016-2018)
African American	17.8%
Asian	5.3%
Hispanic	13.1%
Native American	0.3%
Multi-Racial	1.3%
Other	1.1%
Unknown	NA
Non-White	38.9%
White	61.1%

Fare Enforcement Incidents: Warnings, Citations, and Exclusions

Table 2 provides a breakdown of fare enforcement incidents and outcomes for both the initial report, based on two years of enforcement activity from March 2014 to March 2106, and the most recent 2 years, from March 2016 to March 2018. We can directly compare these two timeframes because they both represent exactly two years of enforcement data. There were less fare enforcement incidents in the last two years

(2016-2018) compared to 2014-2016, a reduction of 9.3% (54,594 to 48,060). Total citations were down by 5.5% (42,836 to 39,464), warnings decreased 25.7% (5,854 to 4,228), and exclusions decreased by 20.5% (5,904 to 4,368). The reduction in incidents, citations, warnings, and exclusions occurred for all racial/ethnic groups. There was also a change in the distribution of fare evasion incidents away from individual communities of color and towards a classification of incidents involving an "uncertain" race/ethnicity of individuals. Incidents involving persons classified as "uncertain" race/ethnicity went from 962 to 2,706 in 2016-2018. This change in the classification of race/ethnicity should be examined with more detail. For example, is this change the result of new rules governing inspectors' decisions about how to code a person's race/ethnicity or an influx of new personnel. An alternative explanation could be the increased attention to race/ethnicity in fare enforcement outcomes has caused some inspectors to be more reticent about "guessing" race/ethnicity and see "unknown" as a safer choice. Further analysis revealed a small number of inspectors were driving this trend.

In 2016-2018 there were 48,060 fare enforcement incidents on the MAX. During this time frame over three-fourths of incidents entail a citation given (39,464; 82%), followed by exclusions (4,368; 9%), and warnings (4,228; 9%). It is important to note that *these raw counts of incidents, citations, warnings, and exclusions do not measure individuals.* Because of repeat fare evasion, the number of discrete individuals these numbers represent is smaller, which is an issue we'll explore further.

Table 2: Fare Enforcement Outcomes (4 years March 2014 to March 2018)

Race	2014-16 incidents	2016-18 incidents	2014-16 citations	2016-18 citations	2014-16 warnings	2016-18 warnings	2014-16 exclusions	2016-18 exclusions
Grand Total	54,594	48,060	42,836	39,464	5,854	4,228	5,904	4,368
African American	9,807	8,093	7,579	6,454	906	673	1,322	966
Asian	2,595	2,394	2,063	2,083	358	248	174	63
Hispanic	4,796	3,515	3,628	2,843	605	338	563	334
Native American	415	178	316	94	48	14	51	70
Unknown	962	2,706	692	2,111	178	454	92	141
Non-White	18,575	16,886	14,278	13,585	2,095	1,727	2,202	1,574
White	36,019	31,174	28,558	25,879	3,759	2,501	3,702	2,794

[1] Note: "excl" refers to the percentage of exclusions for each racial/ethnic group.

Table 3 provides a breakdown of the percent of fare enforcement incidents, citations, warnings, and exclusions by each race/ethnic category as perceived by the fare inspector. Differences in the percentages for each race/ethnicity between the past two years and prior two years do not indicate any meaningful changes to the racial/ethnic makeup of persons involved in fare evasion incidents, citations, warnings, and exclusions. The exception to this is the percentage of incidents involving persons of "uncertain" race/ethnicity as already noted. In 2016-2018 White MAX riders comprise 66% of fare enforcement incidents followed by African American (18%) and Hispanic (8.8%) riders.

Table 3: Fare Enforcement Outcomes (4 years March 2014 to March 2018)

Race	2014-16 % incidents	2016-18 % incidents	2014-16 % citations	2016-18 % citations	2014-16 % warnings	2016-18 % warnings	2014-16 % exclusions	2016-18 % exclusions
African American	18.0%	16.8%	17.7%	16.4%	15.5%	15.9%	22.4%	22.1%
Asian	4.8%	5.0%	4.8%	5.3%	6.1%	5.9%	2.9%	1.4%
Hispanic	8.8%	7.3%	8.5%	7.2%	10.3%	8.0%	9.5%	7.6%
Native American	0.8%	0.4%	0.7%	0.2%	0.8%	0.3%	0.9%	1.6%
Unknown	1.8%	5.6%	1.6%	5.3%	3.0%	10.7%	1.6%	3.2%
Non-White	34.0%	35.1%	33.3%	34.4%	35.8%	40.8%	37.3%	36.0%
White	66.0%	64.9%	66.7%	65.6%	64.2%	59.2%	62.7%	64.0%

[1] Note: "excl" refers to the percentage of exclusions for each racial/ethnic group.

Disparity Test 1: Comparing Baseline Populations to Fare Enforcement Outcomes

The first disparity test involves comparing enforcement outcomes (warnings, citations, exclusions) to a baseline expectation for each racial/ethnic group's risk for fare enforcement. Tables 4 & 5 present results for the first test used to examine racial/ethnic disparity in fare enforcement outcomes. The fare evasion survey results are re-presented in Table 4 along with the fare enforcement outcome percentages by race/ethnicity for 2016-2018. The differences between the survey proportions (i.e. baseline populations) and fare enforcement outcome percentages, a measure of disparity, are shown in Table 5. As previously discussed, the Fare Evasion Survey conducted by TriMet provides the best baseline option for comparing enforcement outcomes to because it is the closest approximation of "true incident rates".

Table 4: Racial/Ethnic Proportions for Baseline Survey and Fare Enforcement Outcomes 2016-2018

Race	Baseline % Evaders	% incident	% warn	% cite	% excl[1]
African American	17.8%	16.8%	15.9%	16.4%	22.1%
Asian	5.3%	5.0%	5.9%	5.3%	1.4%
Hispanic	13.1%	7.3%	8.0%	7.2%	7.6%
Unknown	NA	5.6%	10.7%	5.3%	3.2%
Non-White	38.9%	35.1%	40.8%	34.4%	36.0%
White	61.1%	64.9%	59.2%	65.6%	64.0%

[1] Note: "excl" refers to the percentage of exclusions for each racial/ethnic group.

A critical question for disparity research is assessing how big should a disparity difference be to raise concern and need for further assessment? The study will draw upon the threshold used in law enforcement racial profiling literature which *recognizes enforcement disparity differences above 5% the resident population percentage as being noteworthy* (Lovrich, et al. 2007; McMahon, et al. 2002).

Table 5: Disparity Between Fare Evasion Baselines and Fare Enforcement Outcomes 2016-2018

Race	Differences between fare evasion survey % and enforcement outcome %			
	Incident% - evasion%	Warn% - evasion%	Cite% - evasion%	Excl% - evasion%
African American	-1.0%	-1.9%	-1.4%	4.3%
Asian	-0.3%	0.6%	0.0%	-3.9%
Hispanic	-5.8%	-5.1%	-5.9%	-5.5%
Unknown	NA	NA	NA	NA
Non-White	-3.8%	1.9%	-4.5%	-2.9%
White	3.8%	-1.9%	4.5%	2.9%

The results in Table 5 do not indicate any comparison that is above the 5% threshold being applied to indicate noteworthy disparity/overrepresentation. The difference between the baseline fare evasion estimate for African American riders of 17.8% and their proportion of exclusions (22.1%) is 4.3, which is elevated, but does not exceed the 5% threshold. This difference is also lower than the prior report which found a difference of 7.6% comparing the exclusion rate from (2014-2016) to fare evasion surveys.

The results of Table 5 yield a similar conclusion reached in the prior report for 2014-2016: *Differences between the fare evasion survey results and enforcement outcomes are small and indicate little to no disparity. Exclusions of African American Riders is still elevated, but less than the noteworthy threshold standard and lower than the previous report. A more in-depth examination of exclusions will be presented in other sections of this report to understand key factors related to exclusion rates.*

Repeat Fare Evasion

One of the important discoveries in the 2016 report was the presence of repeat fare evasion violators in the data and the relationship between repeat violations and exclusions, which will be replicated in this report.

Definition: ***Repeat Fare Evasion Violator*** *= a rider who is identified as having one or more fare evasion incidents within a two-year span (includes citations, warnings, and exclusions)*

Enforcement incidents involving riders with the same exact last name and date of birth were flagged in the two-year data set. The results of the search for repeat violators are presented in Table 6. The first column in Table 6 shows the percentage of enforcement incidents that involved a repeat violator broken out by race/ethnicity.

The results indicate that *33.9% of enforcement incidents over the two-year period involved the same person at least once*.

Table 6: Repeat Fare Enforcement Violators 2016-2018

Race	% repeat (all)	% repeat (within race)	# of incidents involving repeat persons
Total Repeat	33.9%		
African American	22.8%	46.0%	3719 (out of 8,093)
Asian	2.8%	19.3%	462 (out of 2,394)
Hispanic	4.7%	21.8%	768 (out of 3,515)
Native American	0.5%	47.2%	84 (out of 178)
Unknown	5.1%	30.8%	834 (out of 2,706)
Non-White	36.0%	34.7%	5,867 (out of 16,886)
White	64.0%	33.5%	10,446 (out of 31,174)

The second column within Table 6 shows the percentage of enforcement incidents within each race/ethnicity that involved a repeat violator. The results indicate that 46% of fare enforcement incidents with African American riders involved a repeat violator. Similarly Native American riders (a much smaller group) also had a high repeat violator rate of 47.2%, which was the highest percentage of any race/ethnicity.

Similar to the prior report, repeat violations are important because they are much more likely to result in an exclusion (i.e. the harshest form of punishment). Repeat violations is the strongest predictor of getting an exclusion. Thus, the elevated rate of African American exclusions noted in Table 5 is partly due to a higher repeat fare evasion rate.

Developing a better understanding of the underlying individual and situational dynamics of repeat violations is an important next step. Are punishments given to repeat violators having a desired impact (e.g. lower rate of evasion over time, actual payment of fines) or unintended consequences? In particular, future research should explore economic, health, and other hardship factors that may trigger repeat violations. Since the 2016 report, TriMet has been working with the Oregon Legislature, District Attorneys and others to make changes in the fine and adjudication process of fare evasion in an attempt to promote compliance and reduce repeat violations.

Exclusions and Repeat Violators

Table 7 continues the examination of repeat violations by looking at its relationship to receiving an exclusion. The table shows the relationships between the race/ethnicity of excluded riders and the proportion of persons excluded that were repeat violators and the agency type involved in the exclusion decision. In the column titled "% Repeat Violator" we find that 64% of African American riders who were excluded (n = 966) were repeat violators. Overall 58.3% of all exclusion incidents involved repeat violators. Keep in mind the data used for this analysis is only two years. It's quite possible if the data went further back, the percent of exclusions involving repeat violators would be higher. Table 7 also shows the unique nature of exclusion incidents, which can involve other criminal offenses, thus local law enforcement is often involved in issuing the exclusion. Table 7 shows that 46% of exclusions involved local law enforcement and 54% were by TriMet inspectors.

Table 7: Exclusions by Repeat Violations and Fare Inspector Agency 2016-2018

Race	Total Excl[1]	% Repeat Violator	% Non-Repeat Violator	% TriMet Inspector	% Local LE agency
Total Avg.		58.3%	41.7%	54%	46%
African American	966	64.3%	35.7%	50.3%	49.7%
Asian	63	52.4%	47.6%	61.9%	38.1%
Hispanic	334	38.6%	61.4%	40.1%	59.9%
Native American	70	72.9%	27.1%	37.1%	62.9%
Unknown	141	51.1%	48.9%	56.0%	44.0%
White	2,794	58.7%	41.3%	44.6%	55.4%

[1] Note: "excl" refers to the percentage of exclusions for each racial/ethnic group.

African American Exclusions

Since the African American exclusion rate is slightly elevated, a deeper examination of these exclusion incidents is warranted. As Table 7 notes over two years there were 966 exclusions involving persons perceived to be African American. These 966 exclusions involved approximately 732 individuals. *A further breakdown reveals that 56 of these individuals accounted for 26% of all African American exclusions or 249 exclusions* (see Table 8 below). *These same 56 riders also accounted for 297 citations in two years.* In short, these 56 individuals were involved in 546 separate TriMet MAX incidents over a two-year period. This finding illustrates that within the repeat violator population there is a smaller group of individuals involved in chronic exclusion (3 or more exclusions in 2 years) and fare evasion activity. For the sake of argument, if these 56 individuals were only excluded once during the two-year period (instead of 3 or more) the percentage of all exclusions involving African Americans would be reduced by 4%. The elevated rate of African American exclusions appears due to the chronic exclusion/fare evasion incidents of a few individuals. A similar pattern of chronic evasion/exclusion was also found for other racial/ethnic groups, but the issue is more acute among African American riders. Table 8 shows that among White riders, persons with 3 or more exclusions represent a smaller proportion of White persons excluded and proportion of all exclusions involving White persons.

Table 8: Chronic Exclusions among African American and White Riders 2016-2018

Race	Persons excluded	Persons with 3 or more exclusions (in 2 years)	% of exclusions	% of persons
African American	732	56	26% (249 exclusions	1%
White	2683	142	20% (572 exclusions)	.4%

Exclusions can also be examined for the violation sub-type category the exclusion represents (i.e. no fare, improper fare, riding while excluded). There does not appear to be any unique variation in exclusion types across race/ethnicity of riders, which is shown in Table 9 below. Approximately 56% of the 966 African American exclusions were based on no fare or proof of payment. The next most common category of African American exclusions at 20% were exclusions for criminal activity, which primarily involved riding while already excluded. The remaining 27% of exclusion situations involved smaller numbers entailing harassment and threatening behavior, interference with train operation/trespassing (e.g. blocking train, presence in prohibited areas), smoking on platform, non-transit use/loitering, and intoxication/drinking.

Table 9: Exclusion Violations by Type 2016-2018

Exclusion Type	African American	Asian	Hispanic	Native American	Unknown	White
Fare related	56.4%	56.4%	55.1%	44.3%	61.7%	52.7%
Prohibited activities	4.5%	4.5%	5.7%	4.3%	5.7%	8.6%
Prohibited misuse	6.4%	6.4%	12%	18.6%	7.8%	10.3%
Criminal activity	20.6%	20.6%	16.5%	22.9%	16.3%	17.8%
Prohibited risks to security and order	12.1%	12.1%	10.8%	10%	8.5%	10.6%

Exploration of Geographic Variation in Fare Enforcement Incidents

A potential factor that could influence racial/ethnic distributions of fare enforcement incidents is the geographic deployment of fare enforcement officers. If fare enforcement officers are differentially deployed to stop locations in more racially diverse neighborhoods or areas where riders are more diverse regardless of residential demographics that would increase the likelihood of finding fare violators in those areas and lead to unfair distributions in fare enforcement outcomes. An examination of this perspective is presented in Table 10. Out of the 48,060 fare enforcement incidents examined in this report, approximately 50% occurred at just 10 stop locations. These top 50% stop locations are examined in Table 10. The racial/ethnic distribution of incidents across these 10 stop locations is very similar to the distribution across all stops combined and all other locations combined. In other words, there is no particular stop location that appears to be a potential driver of any racial/ethnic distributions. In addition, these top 10 incident locations also represent common entry and exit points for all MAX riders.

Table 10: Top 50% Stop Locations Where Fare Enforcement Occurs by Race/Ethnicity

	Number of incidents	% of total incidents	African American	Asian	Hispanic	Native American	Other	White
All stops, % of incidents	48,060		**16.8%**	**5.0%**	**7.3%**	**0.4%**	**5.6%**	**64.9%**
Top 50% of stop locations								
Rose Quarter TC	7,494	15.6%	17.9%	4.7%	6.8%	0.3%	5.6%	64.6%
Old Town/Chinatown	3031	6.3%	16.4%	6.1%	7.4%	0.3%	5.5%	64.3%
Gateway TC	2509	5.2%	20.9%	3.7%	8.2%	0.5%	4.9%	61.7%
Hollywood/42nd Ave	2330	4.8%	17.8%	4.2%	7.3%	0.3%	5.5%	64.8%
82nd Ave	2056	4.3%	21.2%	5.2%	7.5%	0.3%	5.1%	60.7%
Lloyd Center/11th	1776	3.7%	19.9%	4.6%	6.8%	0.2%	4.0%	64.4%
Providence Park	1431	3.0%	13.6%	4.2%	7.0%	1.0%	6.6%	67.6%
PSU South/5th & Jackson	1140	2.4%	12.3%	8.8%	3.9%	0.1%	5.3%	69.7%
Sunset TC	1125	2.3%	11.6%	7.6%	8.8%	0.5%	7.6%	63.8%
Interstate/Rose Quarter	1058	2.2%	21.1%	3.6%	6.0%	0.2%	4.8%	64.4%
% of incidents at top 50% stops		49.8%	17.8%	5.0%	7.1%	0.4%	5.5%	64.3%
% of incidents at all other stops		50.2%	15.9%	5.0%	7.6%	0.4%	5.8%	65.4%

Disparity Test 2: Relationship Between Race/Ethnicity of Riders and More Serious Enforcement Outcomes

There are three outcomes of fare enforcement incidents that this study has been able to examine: warnings, citations, and exclusions. These outcomes range in seriousness with a warning being the least serious, followed by a citation, and finally an exclusion being the most serious enforcement outcome. A suspected rider could also be arrested during an incident, but that is not part of the data received for this study. This second disparity test examines whether the race/ethnicity of riders is related to more serious enforcement outcomes while simultaneously controlling for other factors that may explain the outcome. The relationship between race/ethnicity of riders and enforcement outcomes is tested by comparing the likelihood of an enforcement outcome for White riders to African American, Asian, Hispanic, Native, and all Non-White riders in separate analyses. The test focused on two comparison models: 1) Is perceived race/ethnicity of rider related to receiving a citation over a warning? 2) Is perceived race/ethnicity of rider related to receiving an exclusion over a citation? The results are presented in Table 11.

Logistic regression is used to determine if the race/ethnicity of a rider is related to an increased odds of receiving a more serious outcome. The regression models control for six other factors that could also be related to increased odds of receiving a citation or exclusion. A "Yes" in the table below indicates the regression model controls for this variable.

Control Variables	Model 1: Citation v. Warning	Model 2: Exclusion v. Citation
1. Perceived **male rider** (66.5% of incidents the rider was a male)	Yes	Yes
2. Whether the enforcement incident occurred at one of the **top 5 MAX citation locations** (36.2% of all incidents occurred at these 5 stops)	Yes	
3. Whether the enforcement incident occurred at one of the **top 5 MAX exclusion locations** (33% of all exclusions occurred at these 5 stops)		Yes
4. Whether the incident involved one of the **top 3 inspection officers** (these officers were involved in 27.3% of incidents).	Yes	Yes
5. Whether the incident occurred on a **weekend** (15.8% of incidents occurred on the weekend, according to ridership survey weekend riders are more racially diverse).	Yes	Yes
6. Whether the violation entailed "**no proof of payment**" compared to all other violations (No proof of payment comprised 91.3% of all incidents compared to other types like fare amount, expired time, zone)	Yes	Yes
7. **Number of citations rider received** over the 2-year timeframe	Yes	

8. **Number of exclusions rider received** over the 2-year timeframe		Yes

The results of the regression analyses are presented in Table 11. The results in the table indicate whether the race/ethnicity of the rider in the comparison was significantly-related (or not) to the odds of receiving a citation or warning (Model 1) or receiving an exclusion or citation (Model 2), while controlling for other factors. For the race/ethnicity of a rider to be considered to have a statistically significant relationship it needed to occur in both a bivariate relationship (no control variables used) and in an analysis with all the control variables (called a "full model"). A result that is "statistically significant" means there is a probability level of less than .05 that the difference in enforcement outcome between the specific race compared to Whites *is large enough that it didn't occur by chance*. In other words, there appears to be "something" about the race of MAX riders that still exerts an influence on the enforcement outcome even after the relationship between race and the other variables is taken into consideration. Exactly what is causing that influence between race of the rider and the enforcement outcome *is unknown*.

Even though a relationship may be "statistically significant" it may not be of "practical significance." This is an issue faced by this study because the number of enforcement incidents (i.e. sample size) is very large, close to 50,000 incidents, which increases the likelihood that the analysis will find a statistical relationship. Therefore the "strength" of the relationship should be examined too. Strength of the relationship was examined in two ways. First, the size of the odds ratio is considered. The odds ratios are noted in a separate column in Table 11. Odds ratios close to 1 illustrate a small effect size. An odds ratio close to 2 or above indicates a large effect size and means that the odds of that race receiving a citation or exclusion is two times the odds for Whites (or 100% greater odds). A second way to explore the strength of the relationship is to examine a Chi-Square table for the bivariate relationship between the two races and the outcomes. These tables illustrate what the expected results of fare enforcement outcomes would be if there were no statistically significant race differences. These numbers can be compared to the actual enforcement outcomes to assess whether any significance was based on small or large differences in the data and how that may look on a daily or monthly context of enforcement activity.

The results for model 1 presented in Table 11 reveal that most of the analyses were non-significant. In other words, the race/ethnicity of a rider (African American, Asian, Hispanic) was not related to receiving a citation over a warning when compared to White riders. However, when all the riders of color were combined together into a Non-White measure the results indicate that non-white riders had a lower odds of receiving a citation as opposed to warning compared to White riders. It is not clear what is driving this result, but it is a small relationship. The factor that exhibited the strongest relationship to receiving a citation versus a warning was the total number of citations a rider had over the two-year timeframe. This makes sense given an inspector's ability to look up a rider's incident history over the past two years.

The results for model 2 show that African American, Hispanic, and Non-White riders are no more likely to receive an exclusion compared to White riders when controlling for other factors. The results of Model 2 in Table 11 indicate that when controlling for other factors related to getting an exclusion, the race/ethnicity of the rider is no longer relevant. In fact, the relationship between African American riders and the odds of receiving an exclusion compared to White riders only goes away when the model controls for the number of exclusions a rider has received over the prior two years. The strongest factor to receiving an exclusion compared to a citation is the number exclusions one had over the prior two years.

In short, the results in Table 11 appear to indicate that the elevated rate of African American exclusions is more likely an issue with a small population of riders engaging in chronic fare evasion and receiving multiple exclusions (see p. 11-12) and less likely the result of systemic racial/ethnic biases in enforcement. It is also quite possible that riders who fit into this chronic incident category, which cuts across race/ethnicity (see Table 8), become known persons to inspectors and TriMet police and thus their presence on a platform or train immediately raises suspicion. The question of how to address the population of chronic fare evaders and exclusion recipients, particularly those that become known "regulars", forms an important policy discussion. Continued citations and exclusions alone does not appear to address the issue.

Table 11: Relationship between race/ethnicity and warnings, citations, and exclusions using logistic regression

Race	Model 1: Comparing Citations vs. Warnings	CI Odds Ratios	Model 2: Comparing Exclusions vs. Citations	CI Odds Ratios
African American	Non-significant	.595-.781	Non-significant	935-1.162
Asian	Non-significant	.869-1.363	Small negative, but statistically significant[1]	.289-.536
Hispanic	Non-significant	.903-1.325	Non-significant	1.080-1.490
Non-White	Small negative, but statistically significant[1]	.710-.868	Non-significant	.872-1.041
White	*Comparison group*		*Comparison group*	

[1] Note: "significant" means that the p-value in the relationship between race/ethnicity and a citation or exclusion, compared to Whites, was less than .05 controlling for other factors in both a the full model and a reduced model with just the race/ethnicity variable.

Conclusions

The analyses for this report are based on the approach established in the 2016 report that focused on fare evasion incidents from 2014-2016. There are some similar patterns to the findings in this new report based on the most recent two years of fare evasion data from 2016-2018. A new approach of looking at individual-level involvement in fare evasion incidents, developed for this report, helps to explore these consistent patterns in more depth.

Here are the **noteworthy findings** in this report:

1 – Overall fare enforcement incidents on the MAX have declined by 9.3% in the recent two years, which includes reductions in citations, warnings, and exclusions. These declines include a 20% reduction in exclusions given, which is notable to report give its more serious nature. Declines in fare evasion incidents and types occurred roughly equally for all racial/ethnic groups.

2- Within the context of the lower number of enforcement incidents, there was a marked increase in the number of riders whose race was perceived as "unknown" from 970 incidents to 2,706 in 2016-2018. Understanding this increase is important because it does have a potential impact on the report analyses and the accuracy of the racial/ethnic representations in the data. Further analysis revealed a small number of inspectors were driving this trend.

3 – Comparing the racial/ethnic breakdown of fare evaders in the 2016-2018 fare evasion surveys to the racial/ethnic disparity in actual fare evasion outcomes reveals little to no disparity. There was an elevated percentage of African American riders being excluded, but it was lower than the 5% threshold and is declining over time.

4 - Repeat fare evasion violators still comprise a large proportion of fare evasion incidents in a two-year period. In 33.9% of incidents the rider involved had at least one other incident in the two-year time frame. Repeat fare evasion incidents remain higher for African American riders (46% had at least one other incident in the two years). Repeat fare evasion among all racial/ethnic groups continues to represent a unique challenge for TriMet fare enforcement.

5 – A more in-depth examination of exclusions of African Americans was undertaken to examine potential causes of the elevated exclusion rate. The results of this effort illustrated the presence of a small group of chronic fare evaders and persons receiving repeated exclusions. For example, 56 out of 732 persons accounted for approximately 25% of all African American exclusions given over the past two years. If these persons had only 1 exclusion (instead of 3 or more) over the past two years the exclusion rate for African Americans would be reduced by approximately 4%.

6 - The results appear to indicate that the elevated exclusion rate for African Americans is more likely an issue with a small population of riders engaging in chronic fare evasion and receiving multiple exclusions (see p. 11-12) and less likely the result of systemic

racial/ethnic biases in enforcement. It is also quite possible that the riders that fit into this chronic incident category, which cuts across race/ethnicity, become known persons to inspectors and TriMet police and thus their presence on a platform or train immediately raises suspicion. The question of how to address the population of chronic fare evaders and exclusion recipients, particularly those that become known "regulars", forms an important policy discussion. Continued citations and exclusions alone does not appear to address the issue.