Report on Fare Evasion on Metro Transit

April 2010

King County

Department of Transportation
Metro Transit

Executive Summary

The King County Council included Proviso P1 in the Metro Transit Division 2010-11 budget that requires the County Executive to report detailed information about fare evasion on Metro Transit: "The report shall provide an estimate of the extent and cost of fare evasion… [and] shall also include recommended strategies to address fare evasion."

Fare evasion was measured by Metro's transit operators using fareboxes on one weekday and one weekend day between Feb. 18 and March 14, 2010. The days rotated among the bus bases.

In a composite week of data collection (a projection of five weekdays, Saturday, and Sunday), there were about 53,000 boardings for which fare evaders paid nothing and 35,000 boardings for which there was a partial payment. The total of 88,000 is about 4.8 percent of total Metro boardings (excluding the Ride Free Area and children under 6 who ride free), of which 2.9 percent paid no fare and 1.9 percent paid a partial fare. These are *indicators* of fare evasion, not precise measures, because there are many challenges in measuring fare evasion, as detailed in this report.

The routes with the largest number of riders paying only a partial or no fare during the week were Route 7 (about 6,200 evaders, or 8.0 percent of the route's ridership), the Route 15 family (including routes 18, 21, 22, 56, and 57— 4,900, 4.7 percent); Route 358 (4,400, 7.2 percent), routes 3 and 4 (3,700, 4.9 percent), and routes 1 and 36 (3,500, 4.7 percent). These were also among the highest ridership routes, and their fare evasion rates were not necessarily higher than the overall average.

The estimated revenue loss through fare evasion was about $62,000 during the week, which is roughly 2.5 percent of total fare revenue. This is based on several measures and assumptions about partial payments and about whether fare evaders would pay or choose not to ride.

In response to a survey, transit operators identified the following as their top ideas for reducing fare evasion: fare simplification (eliminating zones and peak surcharges), eliminating the Ride Free Area (and its pay-on-exit policy), and more Transit police and fare checkers.

Metro is recommending the following strategies to address fare evasion:

- Fare simplification as a means of addressing fare evasion will be an important factor in Metro's work with Sound Transit and other agencies to develop recommendations for further regional fare coordination pursuant to Metro's 2010-2011 budget proviso P6. This will also play an important role in Metro's response to the 2009 audit recommendation to propose revised fare policy goals clearly tied to Metro's strategic plan.

- The data collected for this study will be further analyzed to determine the extent to which fare evasion is related to the pay-on-exit policy on trips outbound from Seattle's Ride Free Area. The results of this additional analysis will be used in the work Metro is doing with the City of Seattle to assess the estimated costs and benefits of the Ride Free Area in response to 2009 audit findings.

- Metro will use data collected by this study to conduct a limited-duration demonstration of fare enforcement emphasis patrols by Transit Police. The results of this demonstration will be used in determining the effectiveness of this strategy, whether to revise procedures for assigning Transit Police or whether to propose the hiring of additional Transit Police or security officers for fare enforcement.

- Metro will also be conducting a proof-of-payment demonstration on the RapidRide A Line on Pacific Highway South beginning in Fall 2010. The results of this demonstration will be used to assess whether proof of payment should be used on subsequent RapidRide lines, and whether proof of payment should play a larger role throughout the system.

Introduction

Fare evasion is a problem for all transit agencies, and King County Metro Transit is no exception. Fare evasion results in lost revenue, makes the riding experience less pleasurable for law-abiding customers, and above all, fare evasion causes disputes which can lead to operator assaults.

To better understand the extent of fare evasion on Metro Transit and to address ways to reduce it, the King County Council included a Proviso P1 in the 2010-11 budget that directed the County Executive to report on fare evasion by April 30. "The report shall provide an estimate of the extent and cost of fare evasion based upon the results of an intensive, limited duration, data collection effort that will involve a representative sampling of the entire system and be collected in collaboration with the transit operators. The report shall also include recommended strategies to address fare evasion."

There is very little published information regarding fare evasion at agencies around North America. The American Public Transportation Association (APTA) and the Transportation Research Board (TRB) websites do not show any fare evasion research. Some transit agencies have published fare evasion data for at least some of their service and some of their fare media over the past decade. The reported percentages of trips that are evaded vary greatly: Toronto (0.7 percent), Vancouver, BC (2.5 percent), San Francisco (3.3 percent), Los Angeles (5 percent), and Portland, (8.2 percent).

Summary of Methodology

After weighing various fare evasion measurement options, it was decided the best measure of fare evasion would come from asking all operators to record activity on the fareboxes. Such a "census" has better precision than a random sample and the results would be detailed enough to analyze at the route level. Also, operators are much better able to identify fare evasion than an observer who is riding in the coach.

The development of the data collection methodology involved operators at every key phase. Metro staff met with representatives of Local 587 who were supportive of this effort. An article in the union newsletter encouraged participation. A focus group of operators was held to develop the data collection instruments and methodologies which were then tested onboard a selection of coaches. Informational materials and alerts were posted at the bus bases several days in advance of the data collection. First-line supervisors and the security and safety teams of operators provided information when operators signed in for that day's assignment. After the first day of data collection at Atlantic Base on Feb. 18, debriefings were held with supervisors and operators to help refine the process for the remaining bases.

The vast majority of the fare evasion data was collected via farebox entries by all transit operators on one weekday and one weekend day.[1] The dates were:

- Atlantic Base – Thursday, February 18 and Saturday, March 13
- Bellevue Base – Friday, March 12 and Sunday, March 14
- Central Base – Wednesday, March 10 and Saturday, March 13
- East Base – Friday, March 12 and Sunday, March 14
- North Base – Thursday, March 11 and Saturday, March 13
- Ryerson Base – Thursday, March 11 and Saturday, March 13
- South Base – Tuesday, March 9 and Sunday, March 14

Results from the collected data were projected into a measurement of fare evasion during a *composite week* – five weekdays, a Saturday, and a Sunday.[2]

Operators were instructed to use the A, B, and C keys on the farebox instead of the usual 3 key to record fare evaders on those days. The A key was for adults who paid no fare, the B key was for youths, seniors, and disabled passengers who paid no fare, and the C key was for partial payments from any customer. A copy of the farebox instruction card is in the appendix of this report.

In addition to the farebox data collection, a random sample of 20 operators was surveyed to obtain details about partial fare evasion to help calculate an estimate of the dollar value of the partial payments. All operators were also given the opportunity to fill out a questionnaire asking for their ideas to reduce fare evasion.

More details about the methodology are presented in the Appendix.

Findings

Number of Fare Evaders

Based on the data collected, during the composite week of data collection there were approximately 53,000 boardings for which no payment was received. There were another 35,000 boardings for which there was a partial payment. The total of 88,000 represents 4.3 percent of total Metro boardings. If the Ride Free Area and children under 6 are excluded from the Metro ridership, fare evasion accounts for 4.8 percent of boardings.

The following shows the routes with the highest numbers of fare evaders per week. The "rate" shows the percentages of the routes' ridership that evaded the fare (either paid no fare or paid a partial fare). The results for all routes are shown in the Appendix.[3]

[1] No data were collected on DART service (which uses a different type of farebox and accounts for less than 1 percent of Metro boardings) and the Vashon Island Base (which operates less than 0.3 percent of Metro's trips).

[2] An average week during a year has slightly fewer than 5 weekdays because of holidays, but no holidays fell within the study period.

Route	Evaders	Est. Ridership[4]	Rate
7	6,167	77,393	8.0%
15/18/21/22/56/57	4,943	105,093	4.7%
358	4,368	60,612	7.2%
3 / 4	3,697	74,840	4.9%
1 / 36	3,497	75,102	4.7%
5 / 54 / 55	3,020	71,958	4.2%
26 / 124	2,896	36,798	7.9%
71-74 / 76-79	2,770	99,693	2.8%
2 / 13	2,656	54,147	4.9%
120	2,568	46,021	5.6%

Routes operated out of Atlantic Base have the highest *number* of fare evaders. Routes from South and Atlantic Bases have the highest fare evasion *rates*. Routes from Eastside bases are the lowest on both measures.[5]

Base	Evaders	Est. Ridership	Rate
Atlantic	23,983	500,037	4.8%
Bellevue	2,840	103,924	2.7%
Central	18,568	434,188	4.3%
East	3,085	95,869	3.2%
North	11,369	314,426	3.6%
Ryerson	13,505	319,345	4.2%
South	15,040	299,515	5.0%
Total	88,390	2,067,304	4.3%

It must be emphasized that it is very difficult to measure some types of fare evasion:

- Counterfeit passes and transfers are hard to detect.
- Transfers can be given from one passenger to another.
- Many flash passes do not have a date on their face and may have expired.
- It is difficult to get uniform measurement among 2,800 transit operators.
- ORCA is still new and results in unintentional non-payment and false readings of fare evasion.[6]

---

[3] Many routes are grouped together. Some are through-routed (i.e., Route 1 becomes Route 36 and vice-versa), so exactly where the fare evasion occurs can't be measured accurately. Likewise, many vehicle assignments cover multiple routes that serve somewhat similar areas (i.e., one coach assignment can cover Routes 15, 18, 21, 22, 56, and 57). The farebox data system is not designed for such detailed analysis to identify the exact routes where a fare evasion occurred.

[4] This includes trips entirely in the Ride Free Area and children under 6 (who ride free) because there is no measurement of this ridership at the route level.

[5] Calculated on the parent bases of the routes. Again, total ridership includes trips entirely in the Ride Free Area and by children under 6.

In addition to the fare evasion measured through the fareboxes, there also is fare evasion by passengers exiting the back door on pay-on-exit trips and not coming forward outside the bus to pay. On crowded coaches, the operator may announce that the back door will open, and request passengers to come up on the sidewalk and pay cash or flash or tap a pass. Some passengers do not come forward to pay. Based on Automatic Passenger Counter (APC) data, less than 0.8 percent of systemwide boardings exit through the backdoor outside the Ride Free Area on pay-on-exit trips. Of these, some do walk forward to flash or tap a pass or pay cash and others re-board through the back door after letting other passengers off. An effort was made to find crowded coaches and measure the percent of back door alightings that do not pay fares. However, given the infrequency of such trips, and the fact that not all operators open the back door in these situations, a reliable sample was not found. Thus, there is some additional fare evasion not included in the findings above. The routes with the most backdoor alightings on pay-on-exit trips (regardless of whether a fare is evaded) are routes 3 and 4, (almost 500 per weekday) and Route 7 (over 400). No other route has more than 200 per weekday.[7]

Given all of the limitations in measuring fare evasion, plus the issues discussed in the Detailed Methodology in the Appendix, the findings in this report are a reasonable *indicator* of the degree of fare evasion, but not necessarily a precise measurement.

Cost of Fare Evasion

As hard as it is to measure the *number* of fare evaders, it is even more difficult to measure of the *cost* of fare evasion. Cost goes beyond lost revenue. Operator assaults are a major example of an immeasurable cost. However, even lost revenue cannot be precisely measured. One significant unknown is whether fare evaders would still ride if they were required to pay, or if they would not ride and thus provide no revenue. In addition, it is hard to measure:

- The lost revenue from partial fare payments
- If the fare evader is a youth or adult or senior
- If an evasion is of a one-zone or two zone peak trip
- If the fare evader would be eligible for a Human Service ticket which is sold at an 80 percent discount
- If the fare evader is "transferring" (making more than one unlinked trip within a two hour window when the second trip would not have collected a fare).

[6] The first and last weeks of the month were not included in the study because of time lags when loading value onto ORCA cards, which occur mainly around the start of a month.

[7] There is concern that the APCs sometimes assign passenger activity to an adjacent bus zone. Thus, some of the backdoor offs might actually have occurred at the last stop of the Ride Free Area. In this instance, the bias is towards over-reporting backdoor offs outside the RFA. There normally are few backdoor offs outside the RFA that could get mistakenly classified into the RFA, but there are many within the RFA that could get classified outside the RFA. Given this, plus the fact that passengers who exit the back door may go forward to pay, and others get back on after letting other passengers off, this form of fare evasion makes up a small share of total fare evasion.

The data collection methodology asked operators to record the following on the farebox: an adult who paid no fare; a youth, senior, or disabled passenger who paid no fare; and any passenger who paid a partial fare. For the purposes of estimating lost revenue from this data, the following assumptions were made.

- Fare evaders make the systemwide average of about 1.35 boardings per linked trip, so about one quarter of the boardings that are evaded would not have had a fare collected anyway.
- The "fareset" of the trip recorded in the farebox reflects the appropriate fare (off-peak, one-zone, and two-zone peak) from each weekday adult fare evasion.
- Partial fare evaders are distributed among adults, youths, and seniors in the same proportion as the evaders who pay no fare.
- Partial fare evaders pay an average of two-thirds of the full fare, an estimate gathered from interviews with randomly selected operators.
- If there was no fare evasion, 30 percent of current fare evaders would not ride, and 70 percent would pay full fare.[8]

Based on these assumptions, we estimate Metro lost roughly $62,000 in revenue as a result of fare evasion in the composite week of data collection. Most of this ($41,000) is from adults who paid no fare, $6,000 is from youths and seniors who paid no fare, and $15,000 is from partial payments. This sum of $62,000 is roughly 2.5 percent of total weekly fare revenue. This is lower than the 4.8 percent fare evasion rate for three reasons: the high proportion of fare evasion for which we receive partial payments (40 percent); the estimate that we already collect two-thirds of the fare in those partial payments; and the assumption that 30 percent of fare evaders would not ride and thus would not have provided revenue anyway.

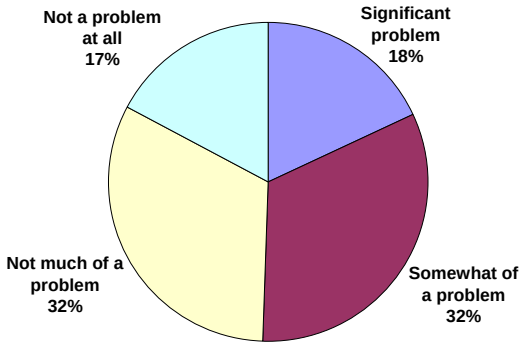
Operator Survey

Operators were provided the opportunity to participate in a survey to provide feedback on the issue of fare evasion. Paper questionnaires were distributed to all operators on March 16 and 18. There are about 2,800 operators, and there were 1,224 responses. This resulted in a self-selected sample, and there is no way of knowing whether, and how many, operators responded more than once. Therefore, it may or may not be representative of all operators. But these survey results provide a good insight into the opinions of a large number of operators.

[8] A 2000 Pierce Transit study showed that when operators challenged passengers with invalid passes or transfers, about 70 percent ended up paying the fare and 30 percent chose not to ride. This factor is not applied to the partial payments where we are getting about the same percentage of fares (67 percent) as in the assumption of the 70 percent who would pay full fare and ride.

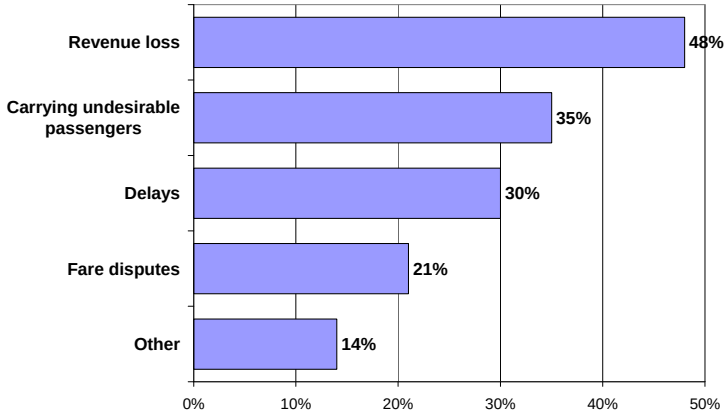
Operators' perceptions of the problem of fare evasion were mixed. When asked how much a problem fare evasion is <u>for them</u>, 18 percent said it is a "significant problem", 32 percent said it is "somewhat of a problem", 32 percent said it "not much of a problem", and 17 percent said it is "not a problem at all". Operators at Atlantic and South Bases, where fare evasion rates are highest, were the most likely to report fare evasion as a "significant problem" (28 percent and 25 percent, respectively).

As a transit operator, is dealing with fare evasion a problem for you or not?



When asked what they see as the biggest issue that results from fare evasion, 48 percent said "revenue loss", 35 percent said "carrying undesirable passengers", 30 percent said "delays", and 21 percent said "fare disputes". Among operators who said fare evasion is a "significant problem" for them, the responses were about the same as among all operators.

If fare evasion is a problem, what do you see as the biggest issue that results from it?



Half (50 percent) of the responding operators identified **eliminating the Ride Free Area** (and thus eliminating the pay-on-exit policy) as one of their top three strategies to reduce fare evasion. When asked to rank various strategies, 32 percent ranked eliminating the Ride Free Area as the first strategy, far more than the other strategies. Another 18 percent ranked it as their second or third top strategy.

Fare simplification was another strategy that garnered strong support among operators. Three of the possible responses on the questionnaire dealt with fare simplification: make all of King County one zone; eliminate the peak surcharge; and both eliminate the peak surcharge and have just one zone. Most operators (65 percent) chose at least one of these in their top three strategies. There was more support for consolidating zones (60 percent chose one of those two responses in their top three) than eliminating peak surcharges (48 percent).

Providing more Transit Police and fare checkers was chosen as the top strategy by 17 percent and as the second or third strategy by another 24 percent.

Top Three Strategies to Reduce Fare Evasion				
	1st	2nd	3rd	Total
Eliminate the RFA (and thus eliminate pay-on-exit)	32%	7%	10%	50%
Provide more Transit Police or fare checkers	17%	13%	11%	41%
Eliminate peak surcharge and have one zone	11%	17%	11%	39%
Make all of King County one zone	10%	14%	9%	33%
Eliminate paper transfers	9%	13%	14%	36%
Eliminate all special passes and accept ORCA only	8%	10%	15%	33%
Proof-of-payment for riders travelling beyond RFA	7%	5%	5%	17%
Eliminate the peak surcharge	2%	6%	5%	14%
Install back door ORCA card readers	1%	2%	3%	6%
Reduce Ride Free Area hours of operation	0%	2%	0%	3%
Other	4%	2%	3%	8%
Base: 984 operators who ranked at least one of the strategies.				

Recommendations

Metro recommends pursuing the following strategies to address fare evasion.

Fare Simplification

One of the factors contributing to fare evasion and underpayment is Metro's complicated fare structure. The current structure requires customers to pay different fares based on their age or disability status, whether or not their trip crosses the City of Seattle boundary and the time of day during which they are taking that trip. Fare payment for riders in King County is further complicated by the different fare structures among transit agencies within the region, particularly differences between Metro and Sound Transit, both of which serve significant numbers of riders in King County. With implementation of the ORCA system for regional fare payment in 2009, the six transit agencies in the central Puget Sound area have achieved a level of fare media integration that is unique in the nation. However, differing fare structures among agencies remains a source of customer confusion. Simplifying Metro's fare structure and more closely coordinating fare structures with Sound Transit and other agencies could reduce customer and operator confusion and ultimately lower the fare evasion and underpayment rates.

During the coming months, Metro staff will be examining the issue of fare simplification in response to an additional budget proviso and two County Auditor recommendations. This work will involve recommending prioritized fare goals, recommending policies to better coordinate regional fares, and assessing the costs and benefits of the downtown Seattle Ride Free Area.

Budget Proviso P6 adopted by the County Council with the 2010-2011 budget provides that "[t]he transit division shall undertake a fare coordination effort with, at a minimum, Sound Transit, and other regional transit agencies if possible…. and the executive shall transmit recommended changes to fare policies or fares, or both, by July 1, 2010."

Metro staff is working with staff at the other transit agencies in the region, in particular Sound Transit, to develop proposals for further fare coordination and simplification. Policies currently under review include:

- Phasing out fare media valid only on one agency.
- Establishing a single fare for youth for all bus and light rail travel within King County.
- Establishing a single fare for seniors and disabled riders for all bus and light rail travel within King County.
- Minimizing the number of different fares for adult riders on bus and light rail service in King County.

The 2009 "Performance Audit of Transit" by the County Auditor recommended "Transit should develop and propose fare policy goals to the Regional Transit Committee and King County Council that are clearly tied to Transit's strategic plan and are representative of Transit's agency wide goals and objectives. These goals should be used as a basis for making fare policy decisions." In response to this recommendation, Metro is reassessing fare goals for alignment with overall agency goals and objectives. The results of the fare evasion study reported here will be an important part of this reassessment and will be reflected in recommended fare goals to be forwarded with the recommended Comprehensive and Strategic Plans.

Ride Free Area

Half of the transit operators who responded to the survey identified eliminating the downtown Seattle Ride Free Area (RFA) as one of their top three strategies for reducing fare evasion. Riders boarding outbound trips in the RFA pay on exiting outside the RFA, and this is thought by many operators to result in an increase in fare evasion and problem riders on outbound trips.

The 2009 Transit Performance Audit recommended "Transit should update and fully document the formula used to assess the City of Seattle's payment for the Downtown Seattle Ride Free Area to reflect current ridership and operating conditions including trips that are attracted by virtue of free fares. Transit and the Council should then consider revising the agreement with the City of Seattle." Metro is moving forward with the recommended update of RFA costs and benefits. This will involve updating estimated RFA ridership and lost revenue, and updating the estimated operating benefits of the RFA on surface streets and in the transit tunnel. One element of this effort will be to further analyze data collected for the fare evasion study to determine if there is increased fare evasion on pay-on-exit trips, and if so, to estimate the resulting lost revenue.

Greater Emphasis on Fare Enforcement.

Another factor which may be contributing to fare evasion and fare underpayment is a limited emphasis on fare enforcement. The second most popular recommendation by operators for addressing fare enforcement was to provide more Transit Police or fare checkers. Currently, operators are in the primary position of monitoring and enforcing fare payment. Metro's procedure for operators' involvement in fare collection is to record the non- or short-payment and to state the correct fare to the customer, "if you (the operator) feel it is safe to do so." This procedure reflects the long-standing operations policy to avoid fare disputes and potential assaults that could result.

A more robust fare enforcement system could potentially reduce the rate of fare evasion. Metro is pursuing two initiatives to assess whether the benefits would justify the added costs involved.

First, Metro will conduct a number of fare enforcement emphasis patrols by Transit Police on routes and at times identified by this study as having the greatest number of fare evasions. In this limited-duration demonstration, Transit Police will record the number of citations issued as well as the number of arrests made on outstanding warrants. The results of this demonstration will be used in determining the effectiveness of this strategy in achieving the primary objective of reducing fare evasion as well as any secondary benefits. These would be weighed against the benefits of other competing deployment objectives and/or the cost of hiring addition Transit Police or security officers for fare enforcement.

Metro will also be conducting a proof-of-payment demonstration on the RapidRide A Line on Pacific Highway South beginning in Fall 2010. Off-board fare collection equipment will be installed at major stops to speed boarding by allowing riders to prepay and board through all doors. This demonstration will provide data to assess whether the benefits of proof-of-payment (faster operations, reduced fare evasion) outweigh the costs (capital and maintenance of equipment and fare enforcement). The success of this demonstration could lead to proof-of-payment on subsequent RapidRide lines, and to broader use within the system.

Appendix I – Fare Evasion by Route

Following are the estimated weekly number of fare evasions for each route. Also shown is the percent of each route's total ridership that the fare evaders comprise. The potential overstatement of fare evasion by some operators greatly affects some route-level numbers, even though it has minimal impact at the system-wide level.[9]

Route(s)	Weekly Evaders			% of Route's Boardings
	Full	Partial	Total	
1/36	2335	1162	3497	4.7%
2/13	1458	1198	2656	4.9%
3/4	2496	1201	3697	4.9%
5/54/55	2016	1004	3020	4.2%
7	3726	2441	6167	8.0%
8	1075	956	2031	5.1%
9	265	270	535	6.6%
10/12	1186	878	2064	4.1%
11/125	818	605	1423	4.5%
14	989	565	1554	5.9%
15/18/21/22/56/57	3622	1321	4943	4.7%
16	402	223	624	2.2%
17/27	629	365	994	4.1%
23/28	872	675	1547	4.6%
24/131/132/134	944	986	1930	5.1%
25/37	85	50	135	1.1%
26/124	1874	1021	2896	7.9%
30	868	413	1280	8.2%
31/68	195	163	358	2.0%
33/39	206	158	364	2.4%
34	0	0	0	0.0%
38	0	0	0	0.0%
41	869	571	1439	2.5%
42	20	15	35	5.0%
43	1154	420	1575	4.2%
44	943	297	1241	3.2%
45	0	5	5	0.7%
46	15	10	25	1.6%
48	1006	546	1551	2.7%
49	506	159	665	1.5%
51	12	5	17	1.6%
53	0	5	5	1.4%

[9] The "runs" that the coach operates during a day often include routes that serve similar geographic areas and many that are through-routed (i.e., Route 1 becomes Route 36 – and vice versa – when in downtown Seattle), so exactly where the fare evasion occurs can't be measured precisely. The percentages are based on total boardings, including Ride Free Area trips and children under 6 because there is no measurement of those riders at the route level.

Route(s)	Weekly Evaders			% of Route's Boardings
	Full	Partial	Total	
60	637	316	953	4.4%
64	35	30	65	1.7%
65/67	458	176	634	2.5%
66	248	172	420	2.6%
68	10	10	20	0.2%
70	489	379	868	3.9%
71-74/76-79	1719	1051	2770	2.8%
75/330	514	344	859	2.7%
101/102	889	534	1423	4.3%
105	72	115	187	2.9%
106	1336	733	2069	7.1%
107/143	394	161	555	4.5%
110	0	5	5	0.7%
111	45	50	95	2.8%
113	0	25	25	1.6%
114	25	20	45	3.1%
116	10	50	60	3.7%
118/119	28	13	40	0.8%
120	1372	1196	2568	5.6%
121/123	80	55	135	2.0%
122	10	10	20	0.7%
128	644	1007	1651	7.8%
129	0	0	0	0.0%
133	15	15	30	2.6%
139	30	40	70	4.8%
140	464	367	831	5.2%
143/149	40	10	50	2.4%
150	1295	941	2236	5.3%
152	10	25	35	2.5%
154	15	15	30	7.1%
155/156	63	56	118	2.6%
157	10	0	10	1.3%
158	25	55	80	2.9%
159	50	95	145	6.2%
161	18	27	45	2.6%
162	0	15	15	2.2%
164/166/168	340	478	818	3.5%
167/342	10	0	10	0.3%
169	665	702	1367	6.3%
173	0	0	0	0.0%
174	1202	1064	2265	6.7%
175	20	40	60	5.3%
177	36	99	135	2.6%
179	80	75	155	7.0%

Route(s)	Weekly Evaders			% of Route's Boardings
	Full	Partial	Total	
180	530	440	970	3.8%
181	316	205	521	4.1%
182/187	196	119	315	6.4%
183/153	166	251	417	6.4%
190	25	40	65	4.1%
192	0	15	15	1.5%
196	15	35	50	3.6%
197	20	5	25	0.8%
201/203/204/213	40	0	40	3.4%
202/205	15	5	20	0.9%
209	77	6	83	4.9%
210	20	5	25	2.7%
211	15	5	20	2.2%
212	25	35	60	0.9%
214	35	0	35	1.1%
215	5	15	20	1.1%
216	5	15	20	1.1%
218	10	15	25	0.9%
219	5	0	5	0.4%
221	62	47	110	1.8%
222/233	95	100	195	2.8%
225	25	0	25	1.8%
229	15	0	15	1.1%
230	219	132	352	2.0%
232	5	0	5	0.3%
234	277	110	387	5.5%
236/238	128	74	201	2.8%
240	604	407	1010	7.6%
242	10	30	40	1.8%
243	0	5	5	0.5%
244	15	30	45	4.3%
245	405	201	607	4.2%
247	25	20	45	10.3%
248	124	42	166	3.4%
249/921	50	31	81	3.4%
250	0	5	5	0.5%
251	0	5	5	0.3%
252	11	39	50	2.0%
253	272	85	357	2.1%
255	461	307	768	3.8%
256	5	15	20	1.7%

Route(s)	Weekly Evaders			% of Route's Boardings
	Full	Partial	Total	
257	5	5	10	0.5%
260	5	0	5	0.6%
261	15	20	35	2.8%
265	30	5	35	2.8%
266	25	10	35	2.7%
268	5	30	35	2.7%
269	25	15	40	1.8%
271	517	222	739	3.4%
272	5	0	5	0.3%
277	15	0	15	1.3%
301	55	95	150	1.9%
303	60	30	90	1.9%
304	15	20	35	1.6%
306	20	30	50	2.3%
308	10	20	30	3.1%
311	18	42	60	2.3%
312	100	85	185	2.7%
316	5	20	25	0.8%
331/345/348	539	712	1251	5.6%
346/347	640	269	909	5.3%
355	10	10	20	0.4%
358	2444	1924	4368	7.2%
372	238	222	460	2.4%
373	7	13	20	0.5%
912	0	0	0	0.0%
915	163	82	245	12.8%
929	0	0	0	0.0%
941	5	0	5	0.2%

Appendix II – Fare Evasion on Sound Transit

The routes that Metro operates for Sound Transit were included in the study. The following is the estimated weekly fare evasion by route. The overall evasion rate is 4.1percent. (This rate is based on ridership excluding trips entirely in the Ride Free Area.) There are more partial payers than full evaders, possibly because of the different fare structures among Sound Transit and the local agencies.

Route	Full	Partial	Total	Ridership[10]	Rate
522	462	685	1,146	20,079	5.7%
540	53	27	80	6,248	1.3%
545	548	506	1,053	31,259	3.4%
550	734	1,133	1,867	37,010	5.0%
554	499	380	879	13,017	6.8%
555/6	15	35	50	5,516	0.9%
560	166	155	322	15,938	2.0%
566	194	131	325	9,514	3.4%
577	36	103	139	5,625	2.5%
Total	2,707	3,155	5,862	144,207	4.1%

[10] Weekly ridership is based on Q4 2009, except for the new Route 566 which uses preliminary data from February and March.

Appendix III - Detailed Methodology and Analysis

The fare evasion data were collected via farebox entries by all transit operators on one weekday and one weekend day between February 18 and March 14. The days rotated among the bases. Results from these days were projected into a measurement of fare evasion during a *composite week* – five weekdays, a Saturday, and a Sunday.[11]

A measure of fare evasion data from just one weekday and one weekend day for each base in a one-month period is not meant to be representative of the entire year. Given the time constraints in the budget proviso, the need to avoid certain weeks because of ORCA issues and shakeup, and the extensive labor demands of the data collection effort, the test was limited to just a few days. However, there appears to be very little variance in fare evasion from day to day during the course of a year. As measured by the 3 key (the usual method of recording fare evasion), the ratio of fare evaders to total boardings had a low *coefficient of variance* (0.10) on weekdays from January to November 2009. Therefore, the limited duration of the fare evasion measurement is still a reasonable *indicator* of systemwide fare evasion over a wider period.

The operators were asked to use the A, B, and C keys on the farebox instead of the usual 3 Key. The A key was for adults who paid no fare, the B key was for youths, seniors, and disabled passengers who paid no fare, and the C key was for partial payments from any customer.

The farebox data were analyzed at the linked-route level. On any given day, most coach assignments operate just one group of linked routes (e.g., a coach might be assigned to a "run" that operates routes 15, 18, 21, 22, and 56). These linked routes serve somewhat similar geographic areas and many are "through-routed" (e.g., Route 15 often becomes Route 22 as the coach passes through downtown). The farebox does not capture data at such fine detail to identify individual routes within a group of linked routes, requiring data analysis at the linked-route level.[12]

Custom routes were not included in the study because by definition they generate sufficient revenue to cover costs, and most of those revenues are from the sales of passes.

The farebox data were segmented into the linked-routes based on the operators' input value for the route and run. For those cases in which the route was not one normally assigned to the base, the coach assignments were examined to determine the correct linked group.[13]

---

[11] An average week during the year has slightly fewer than five weekdays because of holidays, but no holidays fell within the study period.

[12] Some runs operate a few trips outside of the predominant group of linked routes. In those cases, the data were included in the predominant linked routes. Some routes with light ridership are scattered among linked routes are thus not analyzed separately: Routes 35, 81, 82, 83, 84, 85, 217, 222 (weekends), 237, 280, and 600.

[13] Routes 49 and 44 are considered separate route groups in this analysis, but they appear in the Route 7 and Route 43 route/runs, respectively. Thus, further segmentation was done at the run level. The runs operate just one route either exclusively or predominantly.

The farebox data probably both overstate and understate actual fare evasion activity. Some reported fare evasion seemed unreasonably high. One instance of 153 adults paying no fare (A key) within a short time frame was removed. Other activity may have been overstated but was left in. However, the cases where more than 20 instances of A, B, or C keys within a short time frame account for just 0.3 percent of the entire 4.8 percent fare evasion rate.[14] The impact of this potential overstatement is more pronounced at the route level than at the systemwide level.

Offsetting this potential overstatement are the operator assignments that did not have any reported fare evasion. About one-quarter of the weekday operators had no recorded fare evasion. However, weekdays have many operator assignments with just a few trips and these tend to be on peak-service routes with low fare evasion. Many of these assignments truly had no fare evasion. Perhaps a better measure is to be found on weekends when operator assignments are longer than average. About 17 percent of operator assignments had no fare evasion and, excluding the Eastside bases where fare evasion is low, about 14 percent had no reported fare evasion. Again, some of these truly had no fare evasion, so it is reasonable to assume that only about 5-10 percent of operator assignments did not record fare evasion even though fare evasion may have occurred.

This potential underreporting was at least partly corrected. When an operator assignment had more 3 key activity, the usual way to measure fare evasion, than the sum of A, B, and C key activity, the excess 3 key activity was prorated among the A, B, and C keys in the proportions found in other assignments for the same linked route.[15] This accounts for 0.1 percent of the 4.8 percent total fare evasion rate. When combined with the 0.3 percent that comes from potentially overstated fare evasion, this is less than 10 percent of the total fare evasion reported and roughly offsets the 5-10 percent potential understatement.

Just one weekend day was surveyed: a Saturday at Atlantic, Central, North, and Ryerson Bases and a Sunday at Bellevue, East, and South Bases. For the purposes of constructing the composite week of five weekdays, a Saturday, and a Sunday, it is assumed that the rate of fare evasion per boarding is the same on Saturday and Sundays (which may or may not be true). Some routes at Bellevue, East, and South Bases operate on Saturdays but not Sundays, so they were not surveyed on a weekend. In those instances, the weekday fare evasion rate was applied to Saturday ridership.

The lost revenue was calculated as follows:

- All youth and senior fares are 75 cents. The adult weekend fares are $2.00.

[14] The farebox records a separate line of data when the operator changes a parameter of the trip, usually the trip number. However, this is not done all the time, so some of these high levels of recorded fare evasion may reflect a long period of time.

[15] Operators were asked to still use the A, B, and C keys if they mistakenly used the 3 key instead. So excess 3 key activity is considered fare evasion not recorded by the A, B, or C keys. In many of these cases, there was no A, B, or C key activity, but only 3 key activity during the operator assignment.

- On weekdays, the "fareset" value in the farebox associated with the adult fare evasion was used to classify the evaded fare as off-peak ($2.00), peak 1-zone ($2.25), and peak 2-zone ($2.75).
- It is likely that some fare evaders make a second trip within a two-hour window and the second trip would have no fare anyway. The systemwide estimate of 1.35 boardings per linked trip was used in calculating total revenue loss.
- Partial fare evaders are assumed to be distributed among adults, youths and seniors in the same proportion as the evaders who pay no fare.
- Partial fare evaders pay an average of two-thirds of the full fare, an estimate gathered from interviews with 20 randomly-selected operators. Their responses ranged from the payment being short by about 25 cents (especially on peak trips) to collecting about one-half of the full fare on average.
- If there were no fare evasion, it is assumed that 30 percent of current fare evaders would not ride, and 70 percent would pay full fare. A 2000 Pierce Transit study showed that when operators challenged passengers with invalid passes or transfers, about 70 percent ended up paying the fare and 30 percent chose not to ride. This factor is not applied to the partial payments where we are getting about the same percentage of full fares (67 percent) as in the assumption that 70 percent would pay full fare.

Given these assumptions, we estimate that in the composite week of the survey, Metro lost an estimated $41,000 from adults who evaded the fare entirely, $6,000 from youths and seniors who evaded the fare entirely, and $15,000 from partial payments. This sum of about $62,000 is roughly 2.5 percent of total fare revenue. This is lower than the 4.8 percent fare evasion rate for three reasons: the high proportion of fare evasion for which we receive partial payments (40 percent) the estimate that we already collect two-thirds of the fare in those partial payments; and the assumption that 30 percent of fare evaders would not ride and thus would not have provided revenue anyway.

Appendix IV - Fare Evasion Farebox Instruction Card (5.5" x 8.5")

FARE NON-PAYMENT STUDY

Today, we are asking for more details about non-payment of fares. **Instead of the "3 Key" or DDU "non-payment" button**, please use the following farebox keys:

A **Adult who paid NO fare**
(or had an invalid pass, expired paper transfer, "insufficient funds" on ORCA or blocked ORCA card)

B **Youth or Senior or Disabled who paid NO fare**
(or had an invalid pass, expired paper transfer, "insufficient funds" on ORCA or blocked ORCA card)

C **Any passenger who paid a PARTIAL fare**
(paid only some money, had a pass or ORCA with not enough fare value and didn't pay more, etc.)

Notes:

- Follow the usual procedures for collecting fares.
- Please remember to enter the usual info (fareset, trip, operator ID route, run,) at your farebox log-in and as needed at the start of trips.
- Please press the appropriate key at the time the non-payment occurs, not at the end of your trip.
- Use your judgment about who is an adult, youth, etc.
- Don't count passengers who avoid payment by using the back door. Those are being counted by Metro staff on a sample of trips.
- If you accidentally hit the 3 Key, please also hit the appropriate A, B, or C Key.
- If you know that the passenger has forgotten their pass or will pay double next time, please don't count them as a non-payer.
- **If you have any questions, please ask a Trainer.**

Thank you for your help!

Appendix V - Informational Poster

Fare Evasion Study

The King County Council has directed Metro to "*provide an estimate of the extent and cost of fare evasion … The report shall also include recommended strategies to address fare evasion.*" Local 587 supports this effort.

Coming Soon!

Between March 9th & 14th, each base will participate in the fare evasion study for two days. Operators will be asked to use a few spare keys on the fare-box to provide more details about fare evasion. On the dates your base is scheduled to do the study, you will be given instructions for counting three categories of non-payment using specially designated fare-box keys.

Please make every effort to track this information accurately during the days your base conducts the study!

A-Key
Adult who paid **NO** fare
(Or had an invalid pass, expired paper transfer, "insufficient funds" on ORCA or blocked ORCA card.)

B-Key
Youth or Senior or Disabled who paid **NO** fare
(Or had an invalid pass, expired paper transfer, "insufficient funds" on ORCA or blocked ORCA card.)

C-Key
Any passenger who paid a **PARTIAL** fare (paid only some money, had a pass with not enough face value and didn't pay more, etc.)

- Follow the usual procedures for collecting fares.
- Please remember to enter the usual information (fareset, trip, operator ID, route, run) at your farebox log-in and as needed at the start of trips.
- Please press the appropriate key at the time the non-payment occurs, not at the end of your trip.
- Use your judgment about who is an adult, youth, etc.
- Don't count passengers who avoid payment by using the back door. Those are being counted by Metro staff on a sample of trips.
- If you know that the passenger has forgotten their pass or will pay double next time, please don't count them as a non-payer.
- If you have any questions, please ask a Trainer.

Thank You for Your Help!

You will be given an instruction card for the days your base is performing the study.

Arriving at your base…

Atlantic Base
Saturday, March 13
East & Bellevue Base
Friday, March 12; Sunday, March 14
Central Base
Wednesday, March 10; Saturday, March 13
North Base
Thursday, March 11; Saturday, March 13
Ryerson Base
Thursday, March 11; Saturday, March 13
South Base
Tuesday, March 9; Sunday, March 14

Appendix VI - Operator Feedback Questionnaire (8.5" x 11")

Fare Evasion Survey

Please provide your opinions and suggestions concerning fare evasion by answering the questions below and returning this form to the window at the base. Thank you!

1. **As a transit operator, is dealing with fare evasion a problem for you or not?**
   - ☐₁ Not a problem at all
   - ☐₂ Not much of a problem
   - ☐₃ Somewhat of a problem
   - ☐₄ Significant problem

2. **If fare evasion is a problem, what do you see as the biggest issue that results from it?**
   - ☐₁ Fare disputes
   - ☐₂ Delays
   - ☐₃ Revenue loss
   - ☐₄ Carrying undesirable passengers
   - ☐₅ Other: _____

3. **Please rank your top three strategies to reduce fare evasion (indicate using 1, 2 and 3, where 1 is the most important):**

____ Eliminate the Ride Free Area (and thus eliminate pay-on-exit)

____ Reduce Ride Free Area hours of operation to the following hours: _____

____ Implement proof-of-payment for riders travelling beyond the Ride Free Area, with fare inspectors at the borders of the Ride Free Area

____ Make all of King County just one zone

____ Eliminate the peak surcharge

____ Eliminate the peak surcharge and have just one zone

____ Install back door ORCA card readers

____ Provide more Transit Police or fare checkers for fare enforcement

____ Eliminate paper transfers

____ Eliminate all special passes and accept ORCA cards only

____ Other:

_____

_____

_____

4. **What route(s) do you usually operate?** _____

Please return this to the window at the base.