

TOWARDS AN EQUITABLE APPROACH TO TACKLING THE FARE EVASION PROBLEM:
A SCOPING LITERATURE REVIEW AND CASE STUDY ANALYSIS

By

Jessica Cho

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ABSTRACT

The widespread adoption of “proof-of-payment” ticketing systems by public transit corporations (PTCs) has renewed interest in the topic of fare evasion. Although this system has many benefits, it has also been associated with higher rates of actual or perceived fare evasion. As such, many PTCs including the TTC in Toronto have also simultaneously invested in heightened measures to curb fare evasion. These measures, however, have usually taken the form of increased fines and policing, which have the potential to further disadvantage marginalized populations. A scoping literature review and case study analysis have been employed to determine whether there is existing evidence that can make a case for the need for a more equitable solution to this problem, and to determine what alternative measures have been effective. Although there is much evidence to support the need for a more equitable approach, research into alternative measures is emerging and therefore somewhat inconclusive.

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1 INTRODUCTION

Fare evasion is the practice of using a transportation service, in this case public transit, without a fare altogether or without legitimate fare. It is also often thought to include the practice of using these services without the appropriate fare or without the appropriate fare media. Put simply, it can be the act of being in violation of any tariffs or by-laws that relate to paying for a transportation service. An international study has revealed that rates of fare evasion are typically between 0.7 and 8.6 percent (Multi-modal Transport Solutions, 2012 in Delbosc & Currie, 2016b). However, according to Delbosc and Currie (2019), between 20 and 42 percent of residents across nine cities (Boston, Brisbane, London, Melbourne, New York City, Perth, San Francisco, Sydney, and Toronto) indicated in an online survey that they have engaged in fare evasion before.

Fare evasion represents a major problem for public transit corporations (PTCs) as it is associated with significant losses in revenue, an increase in violence against staff and other passengers, and damage to their reputations (Reddy, Kuhls, & Lu, 2011; Barabino, Salis, & Useli, 2013; Isreal & Strathman, 2002 in Delbosc & Currie, 2019). According to Reddy et al. (2011), between 3 and 6 percent of revenue is commonly lost in this industry as a result of fare evasion, which is often equivalent to millions of dollars. In many instances, this loss of revenue has led to fare hikes for paying passengers, as revenues and government subsidization have not been enough to cover the operation and maintenance costs of public transit (Clarke, Contre, & Petrossian, 2010). In terms of the association between fare evasion and increased violence, it has been estimated by the Dutch railway transport company Nederlandse Spoorwegen (NS) that approximately 60 percent of all violent incidents on Dutch trains are related directly to fare evasion (NVA/Leemans, 2004 in Bijleveld, 2007). Furthermore, it has also been found in New York City by Reddy et al. (2011) that an increase in fare evasion can amplify people's negative perceptions about the transit environment, resulting in more individuals perceiving it as being unsafe.

The topic of fare evasion has managed to draw attention from various disciplines such as urban planning, criminology, and economics, among others (Barabino, Salis, & Useli, 2015). More recently, there has been renewed interest in the topic due to the widespread adoption of

“proof-of-payment” or “honour based” ticketing systems by PTCs (Currie & Reynolds, 2016; Delbosc & Currie, 2019). The switch to this type of ticketing system from the older, more traditional “pay on entry” system has allowed for all-door boarding to take place on buses and light rail transit (streetcars) (Currie & Reynolds, 2016; Delbosc & Currie, 2019). Direct benefits of this system include faster loading times and reduced dwelling times, and indirect benefits include improved reliability, increased ridership, and lower operational costs (Currie & Reynolds, 2016; Delbosc & Currie, 2019). However, it has also been associated with higher rates of actual or perceived fare evasion and additional costs due to staffing requirements (either fare inspectors or regular staff) (Lee, 2011). Therefore, whether the benefits of a proof-of-payment system exceed the costs has been highly contested. More recently, however, it has been found that the adoption of this system does not always result in higher rates of fare evasion (Lee & Papas, 2015). A review of the literature has also indicated that there are more benefits to adopting a proof-of-payment system than disadvantages (Delbosc & Currie, 2019). For this reason, it seems that many more PTCs are adopting this system. However, many of them are also simultaneously investing in heightened measures to curb fare evasion.

The Toronto Transit Commission (TTC) is one such PTC that has recently fully adopted this system, that has also simultaneously invested in heightened measures to curb fare evasion. In this context and elsewhere, however, these measures which have usually taken the form of steep fines and heavy policing, have been met with much public backlash. A key concern is that measures such as these can perpetuate inequities by further disadvantaging marginalized populations. To determine whether there are other ways of going about resolving this issue and whether these are necessary to look into, this paper will contend with the following research questions:

(1) What evidence exists to suggest that there is a need for a more equitable solution to the fare evasion problem?

(2) What measures or strategies have been shown to be effective in curbing fare evasion in a more equitable way?

It will do this through a scoping review of the literature on fare evasion and an examination of case studies from across the globe, North America, and Canada. Although two comprehensive literature reviews on the topic of fare evasion have been identified prior to the undertaking of this work, it was found that these were undertaken for different reasons (to organize the perspectives on fare evasion within the transportation literature and to characterize and organize the research on fare evasion across academic disciplines) and did not address these questions or the question of equity more specifically. This paper will make a contribution by synthesizing the existing knowledge to make a case for a more equitable approach to tackling the fare evasion problem.

As for the structure of this paper, chapters two and three will give a detailed account of the fare evasion problem in the context of Toronto and the TTC's existing fare enforcement strategy, which inspired this research. Chapter four will then elaborate on the current knowledge base and the findings of the two existing literature reviews on fare evasion, as well as the contribution that this paper will be making. This will be followed by chapter five, which will discuss the methodology, including the search strategy and inclusion/exclusion criteria employed for the scoping review, and the rationale behind the selection strategy informing the case study analysis. This will then be followed by chapters six and seven which will cover the scoping literature review and the case study analysis. Finally, chapter eight will consist of the conclusion, which will provide an evaluation of Toronto's fare enforcement strategy (based on the literature review), a discussion of the key learnings and lessons from the case studies, and a discussion of the limitations of this paper.

2 FARE EVASION IN THE CONTEXT OF TORONTO

2.1 Implementation of PRESTO & Proof-of-Payment

The Toronto Transit Commission (TTC) is a PTC that has recently fully adopted the proof-of-payment ticketing system. This system was adopted alongside PRESTO, an electronic fare collection system, which was first approved by the TTC Board in 2011 (TTC Deputy CEO - Operations, 2019). The rollout of PRESTO would improve efficiency by eliminating the need for tickets, tokens, passes, and cash (Metrolinx, 2016). It would also allow for all-door boarding to

take place, and this practice came into effect in 2015 when passengers could begin to board streetcars through the rear doors (TTC Deputy CEO - Operations, 2019; CBC, 2015). Former TTC CEO Andy Byford was quoted at the time saying that this would make streetcar trips 7 percent faster, as a result of reduced boarding times (CBC, 2015). Proof-of-payment is mandatory on streetcar routes and it can be requested by Fare Inspectors, Special Constables, Operators, Station Collectors, and Customer Service Agents alike (TTC, 2019a). This can take the form of a validated PRESTO card or a receipt from the Fares and Transfers Machine when cash, a ticket or a token is used (TTC, 2019a).

Contrary to popular belief, all-door boarding is currently not permitted on buses (TTC, 2019a). It is only permitted when a bus is operating as a shuttle bus or on a streetcar route (TTC, 2019a). For this reason, TTC buses do have PRESTO readers at every entrance, and it is possible that this has contributed to the confusion surrounding all-door boarding on buses. According to the TTC's Deputy CEO of Operations (2019), proof-of-payment is currently not required on buses or on the subway, however, it will continue to be implemented into the future. As of April 2019, the PRESTO adoption rate among passengers has been approximately 81 percent (TTC Deputy CEO - Operations, 2019). The TTC does note, however, that the full implementation of proof-of-payment will not necessarily result in the adoption of all-door boarding on buses (TTC Deputy CEO - Operations, 2019).

2.2 TTC Fare Evasion Statistics

The system wide fare evasion rate for the TTC was reported to be 5.7 percent in 2019 (TTC Head of Audit, Risk, & Compliance, 2020). However, it should be noted that this rate varied across the three public transit modes operated by the TTC. It was reported to be 2.4 percent on the subway, 6.3 percent on buses, and 15.9 percent on streetcars (TTC Head of Audit, Risk, & Compliance, 2020). While the subway and the bus rates are within the typical fare evasion range of 0.7 to 8.6 percent reported by PTCs (Multi-modal Transport Solutions, 2012 in Delbosc & Currie, 2016b), the streetcar rate certainly is not. Altogether, this is equivalent to \$70.3 million CAD in lost annual revenue, which is an increase from the previous year's estimate of \$61 million (TTC Head of Audit, Risk, & Compliance, 2020; TTC Auditor

General, February 2019). Broken down by mode, \$12.9 million was lost due to fare evasion on the subway, \$34.4 million was lost due to fare evasion on buses, and \$23 million was lost due to fare evasion on streetcars (TTC Head of Audit, Risk, & Compliance, 2020). Interestingly, although fare evasion rates are highest on streetcars, most of the revenue leakage stems from fare evasion on buses. In addition to this, it was reported that \$3.4 million was lost in 2018 due to malfunctioning equipment (i.e. PRESTO readers) (TTC Auditor General, October 2019).

It was found that while subway fare evasion rates remained relatively constant throughout the day, fare evasion rates on buses tended to spike at night (10:00 PM to 1:00 AM), and fare evasion rates on streetcars tended to spike in the afternoon at around 3:00 PM and then again at night (TTC, February 2020). Fare evasion rates also tended to be higher at the secondary entrance of subway stations (4.9 percent vs. 1.9 percent), and at the doors to the very rear of the streetcar (22 percent vs. 11 percent at the front doors) (TTC, February 2020).

In terms of the breakdown of methods of evasion, across the entire system, one third of fare evaders (33.7 percent) fraudulently used a child PRESTO card which allows children between the ages of 6 and 12 to ride for free, while another third (33.2 percent) of fare evaders simply had no valid proof-of-payment (TTC, February 2020; TTC CEO, 2016). Tailgating was another common method of evading fares (10.8 percent of evaders), followed by illegal entry through the collector fare gate (8.7 percent of evaders) (TTC, February 2020). After that, 5.2 percent of fare evaders misused a post-secondary fare card, and 4.6 percent of fare evaders misused a senior/youth fare card (TTC, February 2020). This could entail an individual ineligible for the discount fraudulently using one of the two discounted fare cards, or an individual who is eligible using one of these cards without the appropriate fare media (i.e. TTC issued post-secondary student card or valid photo ID) (TTC, 2019b). Finally, the remaining 3.8 percent of fare evaders have resorted to other methods such as illegally entering through bus bays, paying a fraction of the fare, tampering with fare gates, using expired legacy transfers, hopping over barriers, and abusing employee and pensioner cards (TTC, February 2020).

3 THE TTC'S EXISTING FARE ENFORCEMENT STRATEGY

The TTC currently has a variety of old and new measures in place to combat fare evasion and recover revenues. These measures include the deployment of fare inspectors and special constables, fines that are set out by by-law and provincial statute, increasing the presence of customer service staff, expanding CCTV coverage, and ad campaigns that raise awareness about the impacts and consequences of fare evasion. According to the TTC's new Revenue Protection Strategy, the goal of these measures is to improve revenue recovery by \$10.2 million CAD by the end of 2020 (TTC Deputy CEO - Operations, 2020).

3.1 Fare Inspectors

One way that they are hoping to achieve this goal is to increase the presence of fare inspectors throughout the system. By the third quarter of 2020, the TTC will have 111 fare inspectors and 72 transit enforcement special constables (TTC Deputy CEO - Operations, 2020). The focus in 2020 will be on hiring an additional 50 special constables, and this is set out in the budget under 'Revenue Protection Resources' (TTC Deputy CEO - Operations, 2020). In addition to this, more special constables will also be deployed in plainclothes (TTC Deputy CEO - Operations, 2020). While fare inspectors do not have police powers, special constables do in relation to sections 16 and 17 of the Mental Health Act (1990), sections 31(5), 36(1), 47(1) and (1.1), and 48 of the Liquor Licence Act (1990), and section 9 of the Trespass to Property Act (1990) (TTC, 2019c).

Over the past few years, however, following a number of high profile incidents, questions of whether these powers are appropriate or warranted have been raised.

For instance, in 2013, five TTC fare inspectors were found to be issuing fraudulent citations to homeless individuals in order to meet their quotas (Spurr, 2018). These individuals often had no idea that they even received citations and were convicted in absentia because they did not appear in court to challenge them (Spurr, 2018). All five fare inspectors involved were fired in 2013, but it was not until 2017 that three of them were found guilty and two were acquitted (Bykova, 2017; Spurr, 2018). The three who were found guilty were all special constables, and it was emphasized in court that this was especially concerning because they held police powers and positions of authority, and were found to be criminalizing the homeless population

(Bureau, 2018). The salaries of fare inspectors also became subject to public scrutiny at this point in time, as the three fare inspectors who were found guilty received salaries of \$142,000, \$108,000, and \$89,000 CAD in 2012 (their last full year of work) (Bureau, 2018).

Additionally, in February of 2018 there was an incident that involved three fare inspectors tackling and pinning Reece Maxwell-Crawford, a black teenager, to the ground on a streetcar platform near St. Clair West station before detaining him (CBC, 2019; Lapierre, 2019). Maxwell-Crawford was released from custody once the police found that he had not committed any offence (Lapierre, 2019). An initial investigation into the fare inspectors' actions found that there was insufficient evidence to support the claim that they had engaged in "unlawful or unnecessary exercise of authority," or "conduct amounting to discrimination and/or harassment." (TTC CEO (Acting) & CPO, 2018). However, this investigation was later criticized by Toronto's ombudsman, Susan Opler, who emphasized that racial profiling and anti-Black racism in relation to transit enforcement is a matter that should be taken much more seriously (TTC CPO, 2019). According to the TTC's Chief People Officer (CPO) (2020), as a response, a comprehensive Anti-Racism Strategy is currently in development, as per Opler's recommendation. In addition to this, they have also updated their recruitment and training practices to promote greater diversity and shift the focus to customer service (TTC CPO, 2020). According to the TTC's Deputy CEO - Operations (2020), "[Fare Inspectors] are provided extensive training on customer service, including mental health awareness, diversity and inclusion, human rights, and confronting anti-Black racism training aimed to prevent racial bias." (p. 4).

3.2 Fines

Fines are another measure to combat fare evasion through deterrence. TTC fines are set out under TTC By-law No. 1 and the Provincial Offences Act and range between CAD \$235 and \$425 (TTC, 2019d). For instance, travelling with invalid fare media will result in a fine of \$425, while failing to comply with the conditions of use of fare media will result in a fine of \$235 (TTC, 2019d). Although the set fines actually range between CAD \$195 and \$345, the payable amount becomes \$235 or \$425 because the Government of Ontario has imposed a

surcharge of 20 percent on all non-parking fines to be put towards a special fund to help victims of crime (TTC, 2019d). It is interesting that parking fines are exempt from this surcharge, as there has recently been much debate about the proportionality of these fines to the offence and to parking or driving fines (see Ranger, 2019; Boisvert, 2020). Councillor Shelley Carroll of Ward 17, Don Valley North, who also sits on the TTC board, has made the argument that it is unreasonable for a fare evasion fine to exceed \$400 when the fine for illegal parking is often just \$30 (Boisvert, 2020). To provide another comparison, in order to receive a fine upwards of \$400 while driving, an individual would have to be driving at least 40 kilometres per hour over the speed limit (Highway Traffic Act, 1990).

3.3 Increased Staff Presence & Monitoring

Finally, the TTC has also introduced a number of new measures to combat fare evasion. Customer Service Agents (CSA), for instance, were introduced in 2017 at Wilson station, Sheppard West station, and all the new Line 1 extension stations (Downsview Park to Vaughan Metropolitan Centre) to maintain a higher staff presence at entrances and exits (TTC, June 2019). Since then, CSAs have also been introduced to Yorkdale station and Lawrence West station, and they will be introduced to all remaining stations upon the successful and complete implementation of PRESTO (TTC, June 2019). According to the TTC (June 2019), the primary role of CSAs is to provide assistance to passengers who may face barriers (i.e. technological, linguistic, etc.) to using the system. In another effort to increase staff presence, the TTC is also continuing to implement a new station model, where the collector is positioned at the fare line instead of in the ticket booth (TTC, 2020a). This model has already been implemented between Lawrence West and Vaughan Metropolitan Centre stations, and as of January 5th, 2020, this model has been also implemented in another twenty stations (TTC, 2020a). CCTV infrastructure within stations is also continuing to be upgraded and expanded upon (TTC, June 2019). The TTC is hoping to achieve 90 percent CCTV coverage in all stations by 2024, through the replacement of existing cameras with 360 cameras and the installation of new cameras (TTC, June 2019).

3.4 Ad Campaigns

In addition to increased fare inspection efforts, the TTC has also recently launched an ad campaign to raise awareness about fare evasion and further combat it. The first iteration of this campaign was launched in May of 2019 (TTC, May 2019). It was called the “Smile! You’re on fare evader camera” campaign and it consisted of red and green posters that featured screencaps of CCTV footage of individuals either committing fare evasion or paying their fares (Canadian Audit & Accountability Foundation, 2019). The red posters featuring images of fare evaders had captions such as “Smile! You’re on fare evader camera” or “Fare evasion costs us all” and shamed the act. While the green posters featuring images of individuals tapping their PRESTO cards had captions such as “Thanks for paying your share” and provided positive reinforcement. In early 2020, another iteration of this campaign was launched. The new posters do not feature any images, and instead simply contain messages such as “No big deal? Actually it is. It’s stealing and it’s against the law.” They also state that there is no excuse not to pay a fare, and that individuals who do not comply may face a fine of up to \$425 CAD or a criminal charge. This campaign, however, has been very controversial. Many Torontonians have expressed their discontent with the aggressive tone of the campaign and have raised that such a campaign tends to overlook issues of equipment failure and service inconsistency (Yuen, 2020). Furthermore, many have also turned this around into a discussion about affordability (Yuen, 2020).

4 THE EXISTING KNOWLEDGE BASE

This chapter of the paper will elaborate on the current knowledge base through an examination of the two existing literature reviews on the topic of fare evasion that have been identified. It will also elaborate on what this paper will be contributing that will be novel.

The first literature review by Delbosc and Currie (2019) has sought to identify and organize the different perspectives on fare evasion that exist in the transportation literature, and has managed to put these into three different categories: the conventional transit system perspective, the customer profiling perspective, and the customer motivations perspective. They note that there is particular value in understanding the customer motivations perspective, which focuses on the psychology of fare evasion, because this might be able to provide further

insight into improving fare compliance. Although they also recognize that the issue of fare evasion should not be regarded as one that is simply black or white and suggest that it would be unwise to stigmatize and criminalize all passengers without a fare, they ultimately arrive at the conclusion that an integrated approach (some combination of increased fines and sanctions, increased inspections, campaigns, and infrastructure changes) is necessary to curb fare evasion and increase revenues. This research seems to approach this issue from the PTC perspective and does not give much consideration to the potential harmful effects of an increased combination of measures on marginalized populations.

The second literature review by Barabino, Lai, and Olivo (2020), on the other hand, was a systematic review that has sought to identify and organize the characteristics of the research on fare evasion across various academic disciplines. They have organized the literature into five categories, which are: fare evader-oriented studies, criminology, economics, technological innovations, and operational research. They have also identified research gaps specific to each of these five categories. According to Barabino et al. (2020), within the fare evader-oriented studies, there is still much that is unknown about different types of fare evaders, their motivations for engaging in fare evasion, and their travel behaviours. Within criminology, there is a need for a better understanding of individuals who do not respond to fines and other sanctions (Barabino et al., 2020). Within economics, there is a need for a better understanding of the relationships between rates of evasion, rates of inspection, and the cost of fines (Barabino et al., 2020). As well as further research into how fines should be set (Barabino et al., 2020). Within technological innovations, future research will need to look into the relationships between various payment methods, fare inspections, and passenger counts (Barabino et al., 2020). Lastly, within operational research, the development of models that look at the sociodemographic characteristics of passengers, their travel behaviour, and their attitudes toward fare evasion could be beneficial (Barabino et al., 2020). All in all, however, they conclude that the research on fare evasion remains quite fragmented due to the frequency of stand-alone studies being undertaken across academic disciplines, and suggest that efforts should be made to unify this research moving forward (Barabino et al., 2020). Like Delbosc and Currie (2019), they too approach this research from the PTC perspective, and discuss fare

evasion narrowly as a form of unethical behaviour, a criminal act, and something to be done for economic benefit. They do not draw any conclusions about the inequities that have been perpetuated as a result of this approach, whether there is a need for an equitable approach, or what such an approach might look like.

This paper will make a contribution by synthesizing knowledge. First and foremost, it will determine whether there is existing evidence that can make a case for the need for a more equitable solution to the fare evasion problem, and it will identify more equitable measures or strategies that have seen success in curbing fare evasion. It will then demonstrate the extent of study into alternative measures, and determine whether there is a need and potential for more work to be done. It will also examine the variations of these and other measures that have been implemented by PTCs across the globe that have not been studied academically. And lastly, it will evaluate the TTC's fare enforcement strategy and highlight the key lessons that may inform a more equitable solution to the fare evasion problem.

5 METHODOLOGY

The objective of this paper is to map the available evidence on fare evasion in order to determine whether there is any evidence to suggest that there is a need for a more equitable solution to the problem. It is also to develop a better understanding of what measures or strategies have been successful in curbing fare evasion, and whether any of these measures or strategies take a more equitable approach. In order to answer these questions, this paper has employed a rapid scoping review of the literature and a case study analysis. These will be elaborated on below.

5.1 Rapid Scoping Review

A scoping review method has been chosen to answer these research questions in part. According to Munn, Peters, Stern, Tufanaru, McArthur, and Aromataris (2018), this method is often employed by researchers to identify and map the available evidence on a given topic. These reviews are particularly useful for examining emerging evidence or fragmented evidence, as they can demonstrate the extent of the research that has been done, as well as their areas of focus (Peters, Godfrey, Khalil, McInerney, Parker, & Soares, 2015; Munn et al., 2018). In doing

this, they can also highlight the evidence that may be able to inform practice, as well as identify any gaps and opportunities for future research (Peters et al., 2015; Munn et al., 2018).

Due to time and resource constraints, this will also be a rapid review (Ganann, Ciliska, & Thomas, 2010; Harker & Kleijnen, 2012) as opposed to a traditional scoping review. Munn et al. (2018) have defined these as ‘systematic or scoping reviews with shortcuts’ where some steps are shortened or omitted due to constraints. Currently, there is no standardized or agreed upon methodology for rapid reviews (Ganann et al., 2010; Harker & Kleijnen, 2012). However, examinations of existing rapid reviews have revealed that researchers have gone about speeding up the review process in different ways. In many cases, researchers have shortened the search by only examining works undertaken in a certain time frame/after a certain year, only searching select databases, only examining works in a certain language, or only examining electronic sources (Ganann et al., 2010). In other cases, researchers have shortened the review process or the data extraction process (i.e. by examining abstracts over full texts) (Gannan et al., 2010). According to Ganann et al. (2010), streamlining a search strategy is relatively common, and this often does not significantly impact the conclusions and recommendations of a review. As such, rapid reviews can often make meaningful contributions despite their limitations (Gannan et al., 2010). The search shortcuts that have been taken in undertaking this research will be elaborated on below under ‘Search Strategy’.

5.1.1 Inclusion Criteria & Principal Focus

In order to draw any conclusions about the equity in curbing fare evasion and measures that could potentially curb it, there is a need to understand it as a phenomenon and to understand the previous work that has been done on it. As such, the inclusion criteria for the initial search was kept very broad. The goal was to be able to identify and examine all works specific to fare evasion on public transit. Once these works were gathered, they were examined to determine which of these (as in what types of studies) could answer the two specific research questions presented in this paper. It was eventually determined that the works that could answer these questions were focused on the sociodemographic characteristics of fare evaders, fare evader typologies, traditional strategies employed to curb fare evasion,

and alternative strategies employed to curb fare evasion. An understanding of the sociodemographic characteristics of fare evaders, fare evader typologies, and an examination of the traditional strategies employed to curb fare evasion and where they fall short could make a case for a more equitable solution to the fare evasion problem. Alternatively, an examination of alternative strategies employed to curb fare evasion could demonstrate what has worked and what has not. In addition to this, previous literature reviews and works focused on the relationship between fare evasion and proof-of-payment systems were included as well as they could inform the paper more broadly.

5.1.2 Search Strategy

The standard three-step search strategy recommended by the Joanna Briggs Institute (2019) was employed. However, as this is a rapid scoping review as opposed to a traditional one, certain shortcuts were taken with the search strategy. In this case, only the Ryerson University Library and Archives (RULA) database was searched, only electronic sources were examined, only journal articles were examined as the case study analysis could cover some of the grey literature on this topic, and only articles in English were examined.

Under step one, a limited search of the RULA database was conducted using three broad keywords: “Fare Evasion”, “Fare Enforcement”, and “Fare Inspection”. Altogether, this returned 78 results, of which 37 were duplicates. This was then followed up with an analysis and compilation of the keywords from the titles, abstracts, and index terms of all 41 unique articles. 86 additional keywords were derived, however, because a lot of these were too broad and unlikely to return results specific to fare evasion on public transit, only 11 keywords that were deemed to have the potential to return these results were selected.

Under step two, another round of searches was conducted using the 11 additional keywords that were identified towards the end of step one. These were “Fare Dodging”, “Fare Compliance”, “Proof-of-Payment”, “Fare Evader”, “Fraud in Public Transportation”, “Fraud in Public Transit”, “Fare Cheating”, “Transit Free Rider”, “Transport Free Rider”, “Free Public Transit”, and “Free Public Transport”. In many instances, keywords were changed to make reference to “Public Transit” and “Public Transport” as it was found that these were being used

interchangeably throughout the literature. Altogether, this returned 45 additional results, of which 27 were duplicates. At this stage, the 86 unique articles were examined and included or excluded upon a review of the abstract or full article, based on the exclusion criteria that will be discussed momentarily. Articles were excluded at this stage to streamline step three, which would involve searching the reference lists of identified articles for additional sources.

It was during step three that the inclusion criteria was further specified to only include articles focused on the relationship between fare evasion and proof-of-payment systems, the sociodemographic characteristics of fare evaders, fare evader typologies, traditional strategies employed to curb fare evasion, and alternative strategies employed to curb fare evasion. This resulted in the exclusion of 49 of the 86 articles that were identified earlier. At this stage, a search of the reference lists of the 37 identified articles was conducted. Again, only electronic sources that were published in English were included. This resulted in the identification of an additional three articles, all of which were focused on traditional strategies that have been employed to curb fare evasion. This brought the total number of studies included in this scoping review to 40. **Figure 1** outlines this entire process in a flow chart.

5.1.3 Exclusion Criteria

5.1.3.1 Abstract Review

The search of the RULA database returned a number of results from operations research and economics that focused on models or algorithms that could be employed to better understand fare evasion as a phenomenon or to better coordinate enforcement efforts. While some of these studies then applied these models or algorithms to a specific public transit system to derive conclusions about what could be done to resolve the fare evasion problem, other studies focused on the models and the algorithms themselves. It was these studies that focused more on a model or algorithm than the application of that model or algorithm that were excluded first. If this focus was clear based on an examination of the abstract alone, then the article was excluded at this stage.

5.1.3.2 Full Article Review

In some instances, it was unclear whether a study was more focused on a model or algorithm, or the application of that model or algorithm. As such, it sometimes took a full article review to determine this. Again, those articles that were more focused on the model or algorithm were excluded, but those that were more focused on application and conclusions that could inform practice were included. Additionally, articles that were focused on the psychology of fare evasion or motivations for fare evasion that did not consider the sociodemographic characteristics of evaders were excluded. These articles were excluded because they would not be able to answer the two research questions posed by this paper, or inform it more broadly. In addition to this, this area of the fare evasion literature is covered by Delbosc and Currie (2019) and Barabino et al. (2020) in their literature reviews. Barabino et al. (2020) even note that this area of research is lacking because it adopts a ‘one-size-fits-all’ view of fare evaders. Furthermore, articles that were focused on alternative measures or strategies to curb fare evasion that were more draconian, or which served to further stigmatize fare evaders were excluded as they also would not be able to answer the research questions posed.

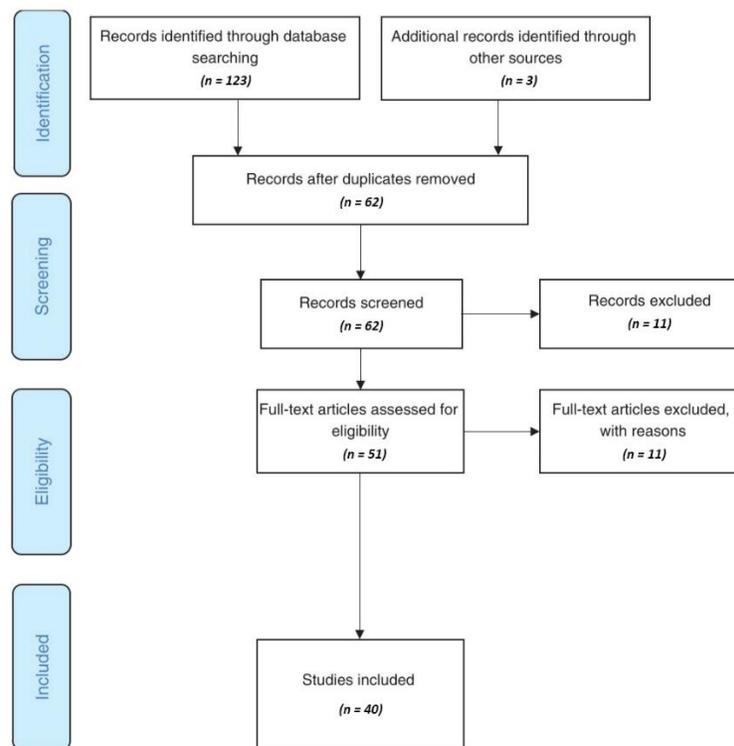


Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram outlining the process undertaken. Diagram template courtesy of Peters et al. (2015).

5.1.4 Charting the Results

All in all, 40 articles were included in this scoping review of the literature on fare evasion. These studies which cover previous literature reviews, the relationship between fare evasion and proof-of-payment systems, the sociodemographic characteristics of fare evaders, fare evader typologies, and traditional and alternative strategies to curb fare evasion will inform this paper more broadly and contend with the two research questions posed. They have been organized into 12 categories, which are outlined in **Table 1** below.

MAP OF THE RELEVANT EVIDENCE:	
Category	Articles
Literature Review (2 Articles)	<ul style="list-style-type: none"> • <i>Why do people fare evade? A global shift in fare evasion research</i> (Delbosc & Currie, 2019) • <i>Fare evasion in public transport systems: a review of the literature</i> (Barabino, Lai & Olivo, 2020)
Proof-of-Payment System (3 Articles)	<ul style="list-style-type: none"> • <i>Uncovering San Francisco, California, Muni's Proof-of-Payment Patterns to Help Reduce Fare Evasion</i> (Lee, 2011) • <i>All-Door Boarding in San Francisco, California</i> (Lee & Papas, 2015) • <i>Evaluating Pay-on-Entry Versus Proof-of-Payment Ticketing in Light Rail Transit</i> (Currie & Reynolds, 2016)
Sociodemographic Characteristics of Fare Evaders (9 Articles)	<ul style="list-style-type: none"> • <i>What is behind fare evasion in urban bus systems? An econometric approach</i> (Guarda, Galilea, Paget-Seekins, & Ortuzar, 2016) • <i>Fare evasion in public transport: A time series approach</i> (Troncoso & de Grange, 2017) • <i>Identification of the determinants of fare evasion</i> (Cools, Fabbro, & Bellemans, 2018) • <i>On evasion behaviour in public transport: Dissatisfaction or contagion?</i> (Allen, Munoz, & Ortuzar, 2019) • <i>*Segmenting Fare Evader Groups by Factor and Cluster Analysis</i> (Salis, Barabino, & Useli, 2017) • <i>What are the determinants in making people free riders in proof-of-payment transit systems? Evidence from Italy</i> (Barabino, Salis, & Useli, 2015) • <i>Unethical behavior in the field: Demographic characteristics and beliefs of the cheater</i> (Buccioli, Landini, & Piovesan, 2013) • <i>Cluster analysis of fare evasion behaviours in Melbourne, Australia</i> (Delbosc & Currie, 2016) • <i>Transit Fare Affordability: Findings from a Qualitative Study</i> (Perrotta, 2017)
Fare Evader Typologies (7 Articles)	<ul style="list-style-type: none"> • <i>Fare Evasion in Public Transport: Grouping Transantiago Users' Behavior</i> (Gonzalez, Busco, & Codocedo, 2019) • <i>Cluster analysis of fare evasion behaviours in Melbourne, Australia</i> (Delbosc & Currie, 2016) • <i>Four types of fare evasion: A qualitative study from Melbourne, Australia</i> (Delbosc & Currie, 2016) • <i>*Segmenting Fare Evader Groups by Factor and Cluster Analysis</i> (Salis, Barabino, & Useli, 2017) • <i>Drawing the line: how inspectors enact deviant behaviors</i> (Suquet, 2010) • <i>*Fare dodging and the strong arm of the law: An experimental evaluation of two different penalty schemes for fare evasion</i> (Bijleveld, 2007) • <i>*Deterrence and fare evasion: Results of a natural experiment</i> (Clarke, Contre, & Petrossian, 2010)
Traditional Strategy: Design Interventions	<ul style="list-style-type: none"> • <i>Measuring and Controlling Subway Fare Evasion: Improving Safety and Security at New York City Transit Authority</i> (Reddy, Kuhls, & Lu, 2011)

(4 Articles)	<ul style="list-style-type: none"> • <i>Fare Evasion and Automatic Ticket Collection on the London Underground</i> (Clarke, 1993) • <i>Target-Hardening at a New York City Subway Station: Decreased Fare Evasion – At What Price?</i> (Weidner, 1996) • <i>Subway Slugs: Tracking Displacement on the London Underground</i> (Clarke, Cody, & Natarajan, 1994)
Traditional Strategy: Optimized Inspections (8 Articles)	<ul style="list-style-type: none"> • <i>Fare evasion in proof-of-payment transit systems: Deriving the optimum inspection level</i> (Barabino, Salis, & Useli, 2014) • <i>Moving Towards a More Accurate Level of Inspection Against Fare Evasion in Proof-of-Payment Transit Systems</i> (Barabino & Salis, 2019) • <i>A modified model to curb fare evasion and enforce compliance: Empirical evidence and implications</i> (Barabino, Salis, & Useli, 2013) • <i>*Deterrence and fare evasion: Results of a natural experiment</i> (Clarke, Contre, & Petrossian, 2010) • <i>Optimization of Control Agents Shifts in Public Transportation: Tackling Fare Evasion with Machine Learning</i> (Delfau, Pertsekos, & Chouiten, 2018) • <i>The effects of a higher ticket inspection rate in a medium-size public transportation system</i> (Keuchel & Laurenz, 2018) • <i>*The Effects of Increasing the Certainty of Punishment: A Field Experiment on Public Transportation</i> (Killias, Scheidegger, & Nordenson, 2009) • <i>The efficiency of crackdowns: a lab-in-the-field experiment in public transportations</i> (Dai, Galeotti, & Villeval, 2017)
Traditional Strategy: Fines and Other Sanctions (2 Articles)	<ul style="list-style-type: none"> • <i>*Fare dodging and the strong arm of the law: An experimental evaluation of two different penalty schemes for fare evasion</i> (Bijleveld, 2007) • <i>*The Effects of Increasing the Certainty of Punishment: A Field Experiment on Public Transportation</i> (Killias, Scheidegger, & Nordenson, 2009)
Alternative Strategy: Positively Framed Ad Campaign (1 Article)	<ul style="list-style-type: none"> • <i>Crafting messages to fight dishonesty: A field investigation of the effects of social norms and watching eye cues on fare evasion</i> (Ayal, Celse, & Hochman, 2019)
Alternative Strategy: Incentivizing Compliance (1 Article)	<ul style="list-style-type: none"> • <i>Ride Your Luck! A Field Experiment on Lottery-Based Incentives for Compliance</i> (2019)
Alternative Strategy: Fare Inspection without Fines/Increased Staff Presence (2 Articles)	<ul style="list-style-type: none"> • <i>Decreasing fare evasion without fines? A microeconomic analysis</i> (Guarda, Galilea, Handy, Munoz, & Ortuzar, 2016) • <i>CRIME PREVENTION THAT WORKS: The care of public transport in the Netherlands</i> (van Andel, 1989)
Alternative Strategy: Fare Loan (Q2) (1 Article)	<ul style="list-style-type: none"> • <i>Impact of a Loan-Based Public Transport Fare System on Fare Evasion: Experience of Santiago, Chile</i> (Bucknell, Munoz, Schmidt, Navarro, & Simonetti, 2016)
Alternative Strategy: Fare-Free Public Transit (Q2) (5 Articles)	<ul style="list-style-type: none"> • <i>*Fare Evasion and Ticket Forgery in Public Transport: Insights from Germany, Austria and Switzerland</i> (Furst & Herold, 2018) • <i>Decrypting fare-free public transport in Tallinn, Estonia</i> (Hess, 2017) • <i>Applying a motivational stage-based approach in order to study a temporary free public transport intervention</i> (Friman, Maier, & Olsson, 2019) • <i>Free-Fare Public Transport in the Concept of Sustainable Urban Mobility</i> (Tomanek, 2017) • <i>The prospects of fare-free public transport: evidence from Tallinn</i> (Cats, Susilo, & Reimal, 2017)
* Select articles were put into two categories because they did not fit neatly into one.	

Table 1. Map of the relevant evidence gathered through the JBI three-step search strategy.

5.2 Case Study Analysis

In addition to the scoping review, a case study analysis has also been employed to answer the research questions. This will examine more equitable solutions to the fare evasion problem that have been implemented by PTCs in the real world. This is separate from the literature review because this analysis will be conducted primarily through an examination of PTC published reports, studies, and materials. Put simply, it will look more at the grey literature than academic sources. It should be noted that some strategies discussed in the literature will not be discussed in this chapter because they have either been covered in the literature review and have not been implemented elsewhere or have not been implemented in the real world (i.e. outside of a study or pilot project). The cases that would inform this chapter were selected on the basis that they were representative of the alternative strategy, were new and/or innovative, have been evaluated to some extent whenever possible, and were located in a context comparable to Toronto whenever possible.

6 LITERATURE REVIEW

This scoping review of the literature has revealed that the evidence that is relevant to these research questions has generally fallen into one of twelve categories, as summarized in **Table 1**. As the previous literature reviews on the topic and the relationship between fare evasion and proof-of-payment systems has already been covered in earlier chapters of this paper, this chapter will now focus on the findings from the studies focused on the sociodemographic characteristics of fare evaders, fare evader typologies, and traditional and alternative strategies to curb fare evasion. These will be discussed in relation to the research questions.

6.1 Sociodemographic Characteristics of Fare Evaders

Many of the studies focused on the sociodemographic characteristics of fare evaders have been conducted from the perspective of PTCs. As such, this research was undertaken not to understand the inequities that may exist, but instead to derive a profile of the typical fare evader to concentrate enforcement efforts. This is also mentioned in Delbosc and Currie's (2019) review of the literature, and it is noted in their review that this type of research was

short-lived because it was ethically questionable. More recent studies have departed from these attempts at deriving a profile of the typical fare evader and have sought to examine the sociodemographic characteristics of fare evaders for other reasons. These have been to better understand fare evasion as a phenomenon and to better understand fare evaders themselves and their circumstances. This section of the paper will review all of these studies, because no matter the perspective, taken together they have the potential to make a case for the need for a more equitable solution to the fare evasion problem.

6.1.1 Age

A review of the literature has revealed that fare evaders are typically young people in their teens and early 20s. In Reggio Emilia, Italy, Bucciol, Landini, and Piovesan (2013) have examined the sociodemographic characteristics of fare evaders based on a survey of 541 bus passengers. They found through a probit regression analysis that fare evaders were typically young people, with teenagers being 9.1 percent more likely to be fare evaders than adults (Bucciol et al., 2013). Barabino, Salis, and Useli (2015) have arrived at a similar conclusion in the context of Cagliari, Italy, where 2200 on-board interviews revealed that fare evaders were typically under the age of 26. Compared to those under the age of 26, those that were between the ages of 26 and 50 were three times less likely to be fare evaders (Barabino et al., 2015). Consistent with Barabino et al. (2015), Salis, Barabino, and Useli (2017), also working out of Cagliari, have found through a factor and cluster analysis of on-board intercept survey data that fare evaders were typically under the age of 26. Delbosc and Currie (2016a), in the context of Melbourne, Australia, have also found that fare evaders were typically younger individuals. However, according to their cluster analysis, these individuals were typically under the age of 35 (Delbosc & Currie, 2016a). More recently, Cools, Fabbro, and Bellements (2018) have examined fare evasion in the context of Flanders, in the north of Belgium, and they have also found through a stated preference survey that was administered online (646 responses) that those between the ages of 18 and 25 were more likely to be fare evaders, consistent with previous studies. Lastly, Allen, Munoz, and Ortuzar (2019), who have examined the characteristics of fare evaders in the context of Santiago, Chile, have also found that the typical

fare evader is between the ages of 18 and 24, further confirming the findings of previous studies.

6.1.2 Gender

The literature has also revealed that fare evaders are typically men. Buccioli et al. (2013) have found through the use of a probit regression analysis that men are 16.5 percent more likely to be fare evaders than women. Consistent with this, Barabino et al. (2015) have also found that fare evaders were more likely to be men than women, despite the fact that more women (60 percent vs. 40 percent) were users of public transit in the context of Cagliari. Cools et al. (2018) have also since found that fare evaders were typically men, further confirming this finding.

6.1.3 Level of Education

Many researchers have also attempted to get a better understanding of the socioeconomic status of fare evaders and by extension the relationship between socioeconomic status and fare evasion. One way that they have done this is through an examination of the level of education of fare evaders. Buccioli et al. (2013) in their examination of this variable, did not find it to have a significant effect. Barabino et al. (2015), however, have found that fare evaders did typically have a lower level of education. Those without a middle school diploma were more than twice as likely to be fare evaders than those with one, and those without a high school diploma were more than three times as likely to be fare evaders than those with one (Barabino et al., 2015). Consistent with this finding, Salis et al. (2017) have also found that fare evaders were more likely to have not completed high school. Counterintuitively, however, it was found by Delbosc & Currie (2016a) that the majority of deliberate fare evaders were highly educated individuals with post-secondary degrees. Additionally, level of education was also found to be insignificant in a more recent study by Cools et al. (2018). It should be noted, however, that Delbosc and Currie (2016a) and Cools et al. (2018) have both employed web-based survey methods to gather this data, which is unable to capture marginalized members of society such as newcomers and those who are unemployed or underemployed.

6.1.4 Income/Employment

Alternatively, researchers have also attempted to examine the relationship between socioeconomic status and fare evasion through an examination of income and other variables such as employment that may be indicative of income. According to Bucciol et al. (2013), fare evaders were typically 'poorly dressed', and poorly dressed individuals were 26.5 percent more likely to be fare evaders than those with 'regular dressing'. They have noted that this was intended to be their proxy for social status in this study, however, they do not elaborate on what poor dressing entailed and how it differed from regular dressing. Fare evaders were also typically non-European immigrants, and these individuals were 15.6 percent more likely to be fare evaders than Italians and European immigrants (Bucciol et al., 2013). In this study, this was also meant to be a proxy for income and socioeconomic status, as the non-European immigrant population in Italy tends to have higher rates of unemployment. Barabino et al. (2015), on the other hand, have examined employment as a proxy for income, and have found that those that were unemployed and/or students were more likely to be fare evaders, 1.485 and 1.415 times more likely to be more specific. Salis et al. (2017) have also examined employment as a proxy for income, and consistent with Barabino et al. (2015), have found that fare evaders were more likely to be students or unemployed. Counterintuitively, however, it was found by Delbosc and Currie (2016a) that fare evaders were typically employed full-time. Interestingly, it is also likely that these individuals were employed in white-collar jobs, considering Delbosc and Currie's (2016a) finding that the majority of them also held post-secondary degrees. Alternatively, Troncoso and de Grange (2017) have found in the context of Santiago, Chile that fare evasion had a tendency to decline whenever there was a rise in unemployment, suggesting that fare evaders were typically those in marginal or unstable jobs that are more prone to laying workers off.

Guarda, Galilea, Paget-Seekins, and Ortuzar (2016) have taken a slightly different approach but have also examined the patterns behind fare evasion in the context of Santiago, Chile. In order to derive information on the socioeconomic characteristics of passengers, an algorithm was created to take into consideration the location of the bus stop at which each passenger boarded (Guarda et al., 2016). To estimate income specifically, the average income of the neighbourhood where the bus stop was located was then considered (Guarda et al.,

2016). It was found that at each bus stop located in an upper middle-income area, the fare evasion rate decreased by 20.8 percent, and that at each bus stop located in a high-income area, the fare evasion rate decreased by 30.7 percent when compared to low-income or lower-middle income areas (Guarda et al., 2016). Allen et al. (2019), on the other hand, also working out of Santiago, have looked at the household income of individuals, and have found that fare evaders were typically from a low-income household. In addition to this, they have also found that these individuals were often unemployed or underemployed, further indicating low-income (Allen et al., 2019). Lastly, Perrotta (2017) has also examined the relationship between income and fare evasion in New York City. This study does not attempt to identify the characteristics of the typical fare evader, but instead uses narrative biographical interviews to examine the circumstances of a segment of the population known to engage in fare evasion more regularly. Here, it was found that low-income individuals regularly avoid paying fares, exploit free transfers, cut out other expenses, borrow the fare cards of friends and family, and/or use free fare cards provided to them by welfare agencies in order to travel by public transit (Perrotta, 2017).

6.1.5 Access to Alternative Modes of Transport

Additionally, researchers have also examined whether fare evaders were more or less likely to have access to alternative modes or means of transport. Here, it was found that they typically did not, suggesting that they are reliant on public transit. Salis et al. (2017) have found that fare evaders typically did not own cars and did not have any alternatives to the bus system in Cagliari. Those that did own cars but still took the bus on occasion were not typically fare evaders (Salis et al., 2017). In contrast to this, Cools et al. (2018) have found car ownership to be insignificant. A more recent study by Allen et al. (2019), however, has found that fare evaders typically did not have a driver's license, suggesting that they are less likely to have alternative means of travel, consistent with Salis et al. (2017). Additionally, it has been found by Perrotta (2017) that many low-income individuals are reliant on public transit as they often have no other reliable means of travel, but struggle to afford it.

6.1.6 Discussion

Taken together, the evidence derived from these studies supports the need for a more equitable solution to the fare evasion problem. After all, in most cases it was found that fare evaders were typically low-income (Buccioli et al., 2013; Guarda et al., 2016; Perrotta, 2017; Allen et al., 2019), students or unemployed (Barabino et al., 2015; Salis et al., 2017), those with lower levels of education (Barabino et al., 2015; Salis et al., 2017), and those with no alternative means of travel (Salis et al., 2017; Perrotta, 2017; Allen et al., 2019). In the few instances that fare evaders were found to be highly educated and employed full-time (Delbosc & Currie, 2016a), or that their level of education and access to alternative means of travel were found to be insignificant (Cools et al., 2018), the results were likely skewed by the strict use of an online method that could not capture more disadvantaged populations. This is also acknowledged in these studies. Altogether, these findings indicate that the issue of fare evasion has a significant socioeconomic component to it, and this has been elaborated on in some studies. Guarda et al. (2016), for instance, have stated that their finding that fare evasion tends to be more common in low-income and lower-middle income areas makes intuitive sense, as affordability is a legitimate and significant issue in Santiago where approximately 30 percent of public transit users belong to households that would have to spend upwards of 25 percent of their monthly budget on transit. In a similar vein, Perrotta (2017) notes that when low-income individuals do pay their fares when travelling by transit, they often end up having to cut down on or cut out other important expenses such as food, phone service, and rent, in order to be able to afford the fares. Increasing traditional methods of fare enforcement such as policing and fines will not help these individuals to afford transit fares. These methods do have the potential, however, to further disadvantage these individuals. All of which suggests that there is a need for a more equitable solution to the fare evasion problem.

6.2 Fare Evader Typologies

Another group of studies have focused on developing fare evader typologies based on their attitudes, motivations, justifications, and responses. These studies have begun to discuss what can and cannot be done to deter different types of fare evaders, and some of them make reference to chronic fare evaders, who have the highest rates of recidivism and the highest likelihood of being impervious to enforcement efforts. This group is of particular interest to this

research because their unique circumstances may be able to make the case for a more equitable solution to the fare evasion problem.

6.2.1 Different Types of Fare Evaders

An early ethnographic study by Suquet (2010) has identified six types of fare evaders based on how fare inspectors in France have categorized them. According to Suquet (2010), fare evaders are either 'people who have no choice', 'gamblers', 'ideological opponents', 'dissatisfied clients', 'cheats', or 'people who have no clue'. 'People who have no choice' are those who cannot afford the fare but have somewhere to be (Suquet, 2010). 'Gamblers' are those who believe that they can save more in the long run by not paying fares at all and paying the occasional fine (Suquet, 2010). 'Ideological opponents' are those who are anti-establishment and see fare inspectors as being representative of the establishment (Suquet, 2010). 'Dissatisfied clients' are those protesting the quality of service on the system, and 'cheats' are those who avoid the consequences by cheating the system with fake IDs and fake addresses (Suquet, 2010). Finally, 'people who have no clue' are those who accidentally evade fares as a result of being unable to successfully navigate the system (Suquet, 2010).

More recently, Delbosc and Currie (2016a), in their examination of different types of fare evasion behaviours in Melbourne, Australia, have employed a web-based survey (1561 responses) and a cluster analysis to derive three different categories of fare evaders: deliberate evaders, unintentional evaders, and never-evaders. Half of transit passengers fit into the 'never-evaders' category and do all that they can to avoid fare evasion (Delbosc & Currie, 2016a). Approximately 35 percent of transit users then have the propensity to be an 'unintentional evader,' where they will avoid paying a fare if circumstances make it difficult to do so (Delbosc & Currie, 2016a). It is the remaining fraction of transit passengers that comprise the 'deliberate evaders,' who have the greatest propensity to fare evade although they do not always (Delbosc & Currie, 2016a). According to Delbosc and Currie (2016a), deliberate evaders are more likely to be sensation seekers, tend to be unsatisfied with the level of service provided by the PTC, and see public transit as a money-making scheme as opposed to a public good.

Delbosc and Currie (2016b) have also undertaken similar research to determine people's attitudes toward and motivations behind fare evasion, but from a qualitative perspective, using face-to-face and online focus groups (67 participants). A key finding here was that there was a spectrum of circumstances under which individuals may travel without paying a fare, with what individuals believe to be "true" fare evasion representing one end of that spectrum (Delbosc & Currie, 2016b). Most study participants emphasized that it was intent that set fare evaders apart, however, participants also had different ideas about what constitutes intent to commit fare evasion (Delbosc & Currie, 2016b). A typology of fare evaders was also derived from this study, based on four different groups of attitudes. This typology consisted of the accidental evader, the 'it's not my fault' evader, the calculated risk-taker evader, and the career evader (Delbosc & Currie, 2016b). The accidental evader is equivalent to the never-evader from the previous typology, while the 'it's not my fault' evader is equivalent to the unintentional evader. However, under this typology, deliberate evaders are separated into calculated risk-taker evaders and career evaders (Delbosc & Currie, 2016b). Calculated risk-taker evaders are those who only evade fares when they believe they will not be caught, while career evaders who consistently evade fares and take pride in doing so (Delbosc & Currie, 2016b).

Salis, Barabino and Useli (2017) have also employed a factor and cluster analysis in Cagliari, Italy to derive three different categories of fare evaders: the accidental fare evader, the calculated-risk evader, and the chronic evader. In this case, the accidental fare evaders include those who only evade fares by accident, and those who do not set out to evade fares but end up doing so due to barriers to acquiring or validating tickets (Salis et al., 2017). Calculating fare evaders, on the other hand, are similar to the calculated risk-taker evaders in Delbosc and Currie's (2016b) typology who often evade fares when the opportunity to do so presents itself. Lastly, the chronic fare evaders are somewhat similar to Delbosc and Currie's (2016b) career evaders, however, Salis et al. (2017) go a step further and emphasize that these are individuals who never pay their fines either. According to Salis et al. (2017), while calculating fare evaders represent nearly half of all fare evaders, chronic fare evaders represent about a third of them.

Gonzalez, Busco and Codochedo (2019), on the other hand, have created a typology of not just fare evaders but all passengers on public transit in Santiago, Chile. This was done through an on-board survey that received 457 responses throughout July of 2018. According to this research, fare evaders may be radical evaders, strategic evaders, ambivalent evaders, or accidental evaders (Gonzalez et al., 2019). Radical evaders were those who did not actively carry a fare card or load it with funds despite anticipating the need to take transit (Gonzalez et al., 2019). In terms of their attitudes and beliefs, this group did not see fare evasion as an illicit and disrespectful act (Gonzalez et al., 2019). Strategic evaders, on the other hand, were slightly different in their behaviour and their attitudes. This group of evaders did actively carry a fare card and load it with funds but evaded fares when opportunities to do so presented themselves (Gonzalez et al., 2019). Additionally, this group did see fare evasion as an illicit and disrespectful act (Gonzalez et al., 2019). Ambivalent evaders were then defined by their contradictory attitudes and behaviours. This group also did not bother to carry their fare cards or load them, and saw fare evasion as an illicit or disrespectful act under certain circumstances but not under others (Gonzalez et al., 2019). Although this group tended to feel guilty when they did not pay, they also did not believe that they were being unfair to other passengers (Gonzalez et al., 2019). Finally, accidental evaders were those who did actively carry their fare cards and load them with funds, who also saw fare evasion as an illicit and disrespectful act, and never engaged in the act intentionally (Gonzalez et al., 2019). Another differentiating characteristic of this group is that they also recognized that engaging in fare evasion is unfair to other passengers (Gonzalez et al., 2019).

6.2.2 Targeted Fare Enforcement Strategies

According to Delbosc and Currie (2016a), PTCs should employ two different strategies to reduce fare evasion, with one strategy targeting unintentional evaders and the other targeting deliberate evaders. They suggest that 'scare campaigns' would be ineffective in changing the behaviour of unintentional evaders, as they do not set out to avoid paying their fares (Delbosc & Currie, 2016a). Instead, they recommend reducing any barriers to fare payment, such as complicated fare structures, long line-ups to purchase a ticket, purchasing tickets off the vehicle, no provision of change, or no opportunity to pay with alternative forms of tender

(Delbosc & Currie, 2016a). In addition to this, Salis et al. (2017) recommend resolving any PTC-dependent technical problems (i.e. ticket machine or fare reader issues) before vehicles are dispatched. Alternatively, to change the behaviour of deliberate evaders, recommendations include increasing physical barriers (i.e. ticket barriers), objective enforcement (i.e. more frequent inspections) or subjective enforcement (i.e. ad campaigns raising awareness about enforcement) (Delbosc & Currie, 2016a). However, it is also important to consider whether these deliberate evaders are calculated risk-taker evaders or career/chronic evaders. According to Salis et al. (2017), the latter group of fare evaders cannot be deterred by tougher sanctions as most of them already have criminal records. They are unaffected by increased enforcement in the form of more frequent inspections or steeper fines, and simply do not pay any fines they are given (Salis et al., 2017). As such, Salis et al. (2017) suggest effectively blocking these individuals from accessing the system in the first place as the only solution.

Gonzalez et al. (2019) have also suggested that it would be best to employ different solutions to target different types of fare evaders. Based on their typology of fare evaders and the stated preferences of individuals, they believe that turnstiles and increased fines could be effective in deterring accidental evaders, some ambivalent evaders, and some strategic evaders (Gonzalez et al., 2019). They also believe that introducing more opportunities to load or validate fare cards could be effective in deterring accidental evaders and some strategic evaders (Gonzalez et al., 2019). However, in regard to the radical/chronic fare evaders, they do not believe that any of these measures could be effective (Gonzalez et al., 2019). They have concluded that “[Radical evaders’] strong convictions on the issue make them immune to any mechanism in the system for discouraging evasion.” (Gonzalez et al., 2019, p. 6). This raises the question: Is it a lost cause to invest resources into deterring this group of fare evaders? After all, these individuals are often those who have criminal records and do not care for sanctions, have issues with drug or alcohol abuse, struggle with mental illness, and/or are homeless (Delbosc & Currie, 2019). As illustrated by the previous section, they are also often from low-income households that would have to spend a significant portion of their income on transit if they did pay (Allen et al., 2018). Furthermore, it is also often these individuals who do not pay

finer (Killias, Scheidegger, & Nordenson, 2009; Audit Office of New South Wales, 2006 in Clarke et al., 2010), are unable to pay fines, or would be hit particularly hard by steep fines.

6.2.3 Chronic Fare Evaders

It is important to recognize that many chronic fare evaders are not simply those who are dissatisfied with the service or protesting the high cost of fares. For instance, it was found in the Netherlands by the PTC Nederlandse Spoorwegen (NS) that the top 100 chronic fare evaders received between 107 and 356 citations in one year, and that of them 82 had a criminal record and issues with drug or alcohol abuse, mental illness, and/or homelessness (Bijleveld, 2007). Similarly, in Australia it was found that one chronic fare evader received 210 citations in one year, and that another 25 individuals had more than 2000 citations between them (Audit Office of New South Wales, 2006 in Clarke et al., 2010). In Edmonton, Canada, it is also believed that a small number of individuals are responsible for a large proportion of the fare evasion on the system (Clarke et al., 2010). In this context, 25 percent of fare evasion fines are not paid, and it is also believed that it is typically these individuals who do not pay their fines (Clarke et al., 2010).

6.2.4 Discussion

The contributions and findings of these studies are also able to support the need for a more equitable solution to the fare evasion problem. They have demonstrated that chronic fare evaders represent a significant part of the problem (Bijleveld, 2007; Audit Office of New South Wales, 2006 in Clarke et al., 2010; Clarke et al., 2010). The evidence suggests, however, that these chronic fare evaders are often individuals who are homeless, have issues with substance abuse, and/or struggle with mental illness (Salis et al., 2017; Delbosc & Currie, 2019). As such, their circumstances make the case for a more equitable solution to the fare evasion problem. The evidence also suggests that PTCs have nothing to gain by continuing to employ traditional methods of fare enforcement against these individuals, as they often do not pay their fines and do not respond to other sanctions either (Salis et al., 2017; Audit Office of New South Wales, 2006 in Clarke et al., 2010; Clarke et al., 2010; Gonzalez et al., 2019). These

methods of enforcement only serve to perpetuate these individuals' interactions with the criminal justice system.

6.3 Traditional Strategies Employed to Curb Fare Evasion

In order to gain insight into what has worked to curb fare evasion, a number of studies on traditional measures and strategies such as design interventions, inspections, and fines and other sanctions have been examined. The goal is to determine where these have succeeded and where they have fallen short. After all, in order to get an idea of how fare evasion might be curbed in a more equitable way, we must first understand how it has traditionally been curbed. Additionally, this section of the paper may be able to highlight the ways in which these approaches may be problematic, and it may contribute to the evaluation of current fare enforcement efforts in Toronto.

6.3.1 Design Interventions

An earlier study by Clarke (1993) has examined the impact that automatic ticket collection has had on fare evasion on the London Underground. This system was fully implemented in 1989 and included the installation of automatic ticket machines at all stations and automatic ticket gates (which would electronically validate tickets) at all stations located in the central zone (Clarke, 1993). It was found that these gates were effective at curbing fare evasion, with the rate of fare evasion declining from 6.2 percent in 1989 (prior to the implementation of this system) to 1.9 percent in 1990 (nine months after this system was implemented) (Clarke, 1993). However, Clarke (1993) has noted that the implementation of this system has required significant amounts of investment (£165 million from 1989 to 1990 with the initial return on that investment being £20 million in the form of recovered revenue) and that it is not entirely foolproof when it comes to fare evasion. For example, it was later found that fare evaders were underpaying by creating slugs that were 10p coins wrapped in foil, as the machines could not tell these apart from the acceptable 50p coins (Clarke, Cody, & Natarajan, 1994). In addition to this, it was also found that fare evaders could input a 10p slug and then receive a 50p coin by pushing on the coin reject button (Clarke et al., 1994). In order to tackle this issue, the machines were modified so that they could no longer accept 50p coins

(Clarke et al., 1994). However, this only displaced the issue, as this then resulted in the creation of a new £1 slug (Clarke et al., 1994).

Another earlier study by Weidner (1996) has examined the impact of a design intervention, the “high-wheel” turnstile, on fare evasion at a subway station in New York City. At the 110th Street Station, which was identified as a problem station, high-wheel (floor-to-ceiling) turnstiles were introduced, and these could only be entered through when the clerk manually unlocked them (Weidner, 1996). According to Weidner (1996), although this measure was an effective one in deterring fare evasion, which was demonstrated by the decline in fare evasion arrests and summonses at this station compared to others, it was found that passengers in general were not very receptive to it. A survey conducted in 1992 revealed that 44 percent of passengers actually disapproved of the intervention (Weidner, 1996). The main reason for this disapproval was the inconvenience of the system, followed by the uncomfortable feeling of being “caged in” (Weidner, 1996). Although these high-wheel turnstiles and gates could initially only be unlocked by booth buzzers or keys, this was re-evaluated following terrorist attacks on the London Underground in 2005 (Reddy et al., 2011). As such, panic bars now allow them to be opened from the inside, and passengers frequently exit through these despite the sound of an alarm (Reddy et al., 2011). It has been found that the most common method of fare evasion on NYCT is older children ducking under turnstiles, which made up 43 percent of observed illegal entries (Reddy et al., 2011). Second to this, has been entering through a gate as someone else exits, which made up 24 percent of observed illegal entries (Reddy et al., 2011). It is evident that these measures are no longer as secure as they once more (Reddy et al., 2011).

6.3.2 Optimized Inspections

Moving from an examination of the effectiveness of design interventions to an examination of the effectiveness of inspections and fines, it has been found by Killias, Scheidegger, and Nordenson (2009) in the context of Zurich, Switzerland that increased fines and other penalties have not been as effective in deterring fare evasion as increased inspections have been. The fine for fare evasion in Zurich used to be SFr 60 (equivalent to \$86

CAD), however, in December of 2003 it was raised to be SFr 80 (equivalent to \$115 CAD) (Killias et al., 2009). In the past, fare evaders also could not be compelled to verify their identity, however, this changed beginning in 2006 (Killias et al., 2009). Furthermore, if an individual was caught fare evading for the third time in two years, they would then be faced with a fine of SFr 120 (equivalent to \$172 CAD) and criminal prosecution (Killias et al., 2009). Prior to the implementation of these changes, the rate of fare evasion in Zurich was approximately 4 percent, and despite all these changes, this rate did not change (Killias et al., 2009). When the frequency of fare inspections was increased, however, the rate of fare evasion decreased to about 1 percent (Killias et al., 2009). This finding suggests that when attempting to curb fare evasion, a more effective strategy is to increase the certainty of being caught, as opposed to the consequences of being caught. Barabino et al. (2013) have also reflected on the finding that potential fare evaders are more likely to be deterred by the certainty of inspection than the severity of the punishment and note that strategies to increase risk perceptions can therefore be very effective (Barabino et al., 2013). Examples of such strategies include deploying fare inspectors more efficiently (i.e. focusing inspection efforts on routes that are most prone to fare evasion, during times where it is more common) and raising awareness about enforcement through information campaigns (Barabino et al., 2013).

Dai, Galeotti, and Villeval (2017) have furthered this discussion by determining what inspection strategies might be most effective in curbing fare evasion through an artefactual lab-in-the-field experiment conducted in Lyon, France, keeping the need for efficiency in mind. Here, it was found that concentrated inspections are not as effective nor efficient as random inspections, that prolonged inspections are only effective while they are ongoing and are also prone to inducing higher rates of fare evasion when they no longer take place, and that pre-announced inspections are also prone to inducing higher rates of fare evasion when inspections do not take place (Dai et al., 2017). Based on these findings, Dai et al. (2017) make the case for random inspections, as these are both effective and efficient. They argue that concentrated inspections, which they refer to as crackdowns, do not approach the level of effectiveness or efficiency of random inspections, unless they are also coupled with random inspections (Dai et al., 2017). However, it is noted that this coupling of crackdowns and random inspections does

not exceed the effectiveness of random inspections, and that it is therefore more efficient to simply conduct random inspections (Dai et al., 2017). They also suggest that conducting random inspections will be less costly in the long run (Dai et al., 2017).

A number of researchers have sought to determine an optimum level or rate of inspection that maximizes effectiveness and efficiency, and by extension, profits. Barabino et al. (2013) have built on Boyd, Martini, Rickard, and Russell's (1989) profit maximization model in order to determine the optimum level of inspection on proof-of-payment systems to effectively combat fare evasion, and have applied it to CTM, an Italian PTC in order to determine an optimum inspection rate. Here, the optimal system wide inspection rate was found to be 4.5 percent (Barabino et al., 2013). To determine this rate, the microeconomic theory of the producer was used for profit estimation, while the microeconomic theory of the consumer was used to determine the average person's likelihood of evading the fare (Barabino et al., 2013). Barabino et al. (2013) have suggested that this model can be used by any comparable mid-sized PTCs. Barabino, Salis, and Useli (2014) later built on this model again, this time accounting for the refined segmentation of passengers, varying perceptions of the inspection rate, and the inability of inspectors to fine every passenger caught evading. They applied it to CTM once again, this time using more extensive data (27,514 inspections and 10,586 interviews across a 3 year period) and determined that the optimum inspection level in order to maximize profits in this context is 3.8 percent (Barabino et al., 2014). They note that this is a positive finding, as it is a lower rate than the one derived from the previous model, suggesting that fewer fare inspectors (less investment) would be needed to maintain this level of inspection (Barabino et al., 2014). In 2019, this model was improved upon once again, with additional consideration being given to a refined characterization of passenger demand, new constraints, an alternative estimate of the evasion rate, and an alternative estimation of fines issued (Barabino & Salis, 2019). It was applied to CTM once more, this time using even more extensive data (57,256 inspections and 21,827 interviews across a 6 year period), and it was found that the optimum inspection rate was within the range of 3.4 to 4 percent (Barabino & Salis, 2019).

Delfau, Pertsekos, and Chouiten (2018), on the other hand, have created an algorithm that uses machine learning to generate optimal fare inspector deployment patterns. It strives to generate deployment patterns that are not repetitive, that will maximize the number of fines issued, allow for the inspection of at least 2 percent of passengers annually, and allow for every station to be visited on a regular basis (Delfau et al., 2018). This algorithm is meant to be usable by any PTC across the globe, however, its effectiveness is first being tested in Paris, France (Delfau et al., 2018). An initial finding has been that even with just a small team of fare inspectors, half of the transit system in Paris can be covered, and 6 percent of fare evaders can be caught and issued fines (Delfau et al., 2018). According to Delfau et al. (2018), this is a good rate, and one that can be maintained by focusing enforcement efforts on the stations with the highest fare evasion rates. Taking a somewhat different approach, in the context of Munster, Germany, Keuchel and Laurenz (2018) have examined various fare inspection levels and their corresponding fare evasion rates. Stadtwerke Munster, the local PTC, reorganized their fare inspection process in June of 2015 (increased inspection) and then again in October of 2016 (decreased inspection) (Keuchel & Laurenz, 2018). It was found that increased fare inspection had a more profound effect on some types of fare evasion than others (Keuchel & Laurenz, 2018). Interestingly, it was also found that the size of fare inspection deployment teams also had an impact on fare evasion rates. According to Keuchel and Laurenz (2018), teams of three inspectors were more effective than teams of two inspectors, although the total number of inspectors deployed across the system was the same.

It was also found by Keuchel and Laurenz (2018) that although fare enforcement declined again after it was increased, accidental fare evasion rates (which declined) stayed the same. They suggest that this could be reflective of a lasting educational effect. This makes intuitive sense, especially given a contrary finding by Clarke et al. (2010) in the context of Edmonton, Alberta. Clarke et al. (2010) found that increased inspections did not have an impact on rates of fare evasion in this context, but note that this was likely the case because this increase in inspections was not communicated to the public. These findings, taken together, suggest that an effective way of curbing fare evasion may be to optimize inspection

levels, and then to make it clear to the public that this has been done to increase the subjective or perceived certainty of being caught.

6.3.3 Fines and Other Sanctions

Alternatively, the discussion around fines and other sanctions suggests that although the presence of fines and sanctions themselves can deter fare evasion to a certain extent, increasing those fines or sanctions does not further deter fare evasion. As mentioned previously, it was found by Killias et al. (2009) that increased fines and other penalties have not been as effective in deterring fare evasion as increased inspections have been. When fines for fare evasion in Zurich were increased from SFr 60 (equivalent to \$86 CAD) to SFr 80 (equivalent to \$115 CAD), and to SFr 120 (equivalent to \$172 CAD) for repeat offenders, the rate of fare evasion remained the same at 4 percent (Killias et al., 2009). However, when the frequency of inspections was increased, the rate of fare evasion dropped down to 1 percent.

In addition to this, Bijleveld (2007) has examined two different models of fine collection in the Netherlands to determine which is more likely to recover lost revenue. The majority of fare inspectors employed by the PTC Nederlandse Spoorwegen (NS) are authorized to charge those without a fare an increased price for one or write them a fine for fare evasion, which is an offence in the Dutch criminal code (Bijleveld, 2007). 24 percent of fare evaders typically paid their fines right away, and another 6 percent then paid them after two reminders, bringing the total to 30 percent (Bijleveld, 2007). In 2003, this study was launched because NS felt that more could be done to improve revenue recovery (Bijleveld, 2007). For two years, an experimental penalty scheme was tested. Under this new penalty scheme, individuals received more time to pay their fines, but when they did not pay within that period, they were more likely to be prosecuted (Bijleveld, 2007). Under the old scheme, only those who had accumulated five or in reality nine fines were prosecuted, however, this time around anyone found to have given their accurate name and address was prosecuted and given a criminal record (Bijleveld, 2007). This not only increased the certainty of punishment after being caught, but also the severity of the penalty. However, counterintuitively, it was found that this new penalty scheme was significantly less effective than the standard one in terms of

recovering revenue (Bijleveld, 2007). As such, it was suggested that in this context, penalties imposed by the civil law approach represent a better measure of deterrence than those imposed by the criminal law approach (Bijleveld, 2007).

6.3.4 Successes, Shortcomings, and Inequities of Traditional Strategies

These studies, which have reviewed traditional measures to curb fare evasion such as design interventions, inspections, and fines and other sanctions have demonstrated where these have succeeded and where they have fallen short. Some of the inequities perpetuated by these strategies will also be discussed in this section.

Design interventions have often been shown to be effective in blocking out fare evaders when they are first implemented, such as in the case of London and New York City (Clarke, 1993; Weidner, 1996). However, the success of these interventions can often be short-lived, as people eventually find ways around them (Clarke et al., 1994; Weidner, 1996; Reddy et al., 2011). They have a tendency to displace fare evasion, rather than mitigate it. In London, for instance, when fare evaders created a counterfeit token to get past the gates, and the gates were modified to no longer accept that counterfeit token, they responded by simply creating a new counterfeit token (Clarke et al., 1994). Alternatively, in New York City, it is noted that the high-wheel turnstile intervention did not result in any significant changes in ridership, which suggests a displacement effect (Weidner, 1996). According to Weidner (1996), fare evasion did increase at two nearby stations, however, this relationship was not proven to be statistically significant (Weidner, 1996). Optimizing fare enforcement efforts, particularly fare inspections, has also seen much success. However, this has been done in various ways. It has been shown that it is not uncommon for enforcement efforts to be concentrated on certain stations or routes in certain neighbourhoods (Barabino et al., 2013; Delfau et al., 2018). This can be problematic, especially when these efforts are concentrated in low-income neighbourhoods, as it overlooks the issue of affordability discussed previously. Finally, and interestingly, the literature has also suggested that increased fines and other sanctions are unlikely to decrease rates of fare evasion past a certain point (Killias et al., 2009; Bijleveld, 2007). It is also implied here that these measures are therefore effective until a certain point, however, it is unclear as

to where the limits lie. This is also mentioned by Barabino et al. (2020), who have emphasized the need for further research into how fines should be set in their literature review. However, regardless of this, the existing evidence suggests that steep fines and draconian sanctions are counterproductive, and only serve to further disadvantage low-income individuals by trapping them in cycles of debt.

6.4 Alternative and Innovative Strategies Employed to Curb Fare Evasion

This next section of the paper will shift the focus from the traditional strategies that have been employed to curb fare evasion to alternative and innovative strategies that have been shown to be effective in curbing fare evasion in a more equitable manner. This discussion will provide an answer to the second research question posed by this paper. These findings will then be discussed further in relation to the case study analysis. This section of the paper will also demonstrate the extent of the research that has been done into alternative strategies, and what types of strategies have been examined.

6.4.1 Positively Framed Ad Campaign

In Occitanie, France, Ayal, Celse, and Hochman (2019) have examined the impact that ad campaigns featuring watching eye cues and social norm messages can have on fare evasion. These types of ad campaigns are meant to encourage ‘internal enforcement,’ where social norms cause individuals to police their own behaviours (Ayal et al., 2019). Ayal et al. (2019) have identified two ways of encouraging this: informing people of the desired social norms and what others are doing (Bicchieri, 2005 in Ayal et al., 2019), and making people feel as though they are being observed by others (Ernest-Jones, Nettle, & Bateson, 2011; Nettle, Nott, & Bateson, 2012 in Ayal et al., 2019). In this context, a poster with a picture of watching eyes, and another poster with a picture of watching eyes and a positive descriptive social norm were put up at two comparable railway stations (Ayal et al., 2019). The social norm message was “In this station, 90 percent of all individuals purchase and validate their ticket” because it was found that these messages tend to be more effective when they are attached to a geographical location, and that people respond better to social norm messages that are framed positively as opposed to those that are framed negatively (i.e. those that sanction undesired behaviour)

(Cialdini et al., 2006; Halpern, 2015; Sandburg, Schoenecker, Sebastian, & Soler, 2009 in Ayal et al., 2019). Prior to the first wave of the study, the rate of fare evasion was 9.97 percent at the first station and 6.27 percent at the second station (Ayal et al., 2019). The poster with the picture of watching eyes was introduced to the first station, and the poster with the picture of watching eyes and the social norm message was introduced to the second station (Ayal et al., 2019). After two weeks, it was found that fare evasion decreased to 9.24 percent at the first station and 3.25 percent at the second station (Ayal et al., 2019). In the second wave of the study, the rate of fare evasion was 9.1 percent at the first station and 9.8 percent at the second station (Ayal et al., 2019). After exposure to the two posters, fare evasion remained at 9.1 percent at the first station, and decreased to 7.04 percent at the second station (Ayal et al., 2019). In both waves of the study, it was found that the poster with the picture of watching eyes did not have a statistically significant impact (Ayal et al., 2019). However, it was found that the poster with both watching eyes and a social norm message had an impact that approached statistical significance ($p=0.056$) (Ayal et al., 2019).

Furthermore, Ayal et al. (2019) then took this a step further and conducted an artefactual field experiment at the station where passengers were exposed to the second poster. This took the form of a die-under-cup experiment where participants could earn €0, €3, or €5 depending on their roll of a die, which only they could see as it was inside a cup with only a peep-hole on the lid (Ayal et al., 2019). Prior to the launch of the ad campaign, although all outcomes should have been close to 33.33 percent, 22.33 percent of participants reported €0, 28.15 percent of participants reported €3, and 49.52 percent of participants reported €5 (Ayal et al. 2019). After exposure to the second poster, however, none of the reported outcomes differed significantly from 33.33 percent ($p>0.1$) (Ayal et al., 2019). Taken together, this suggests that fare evasion campaigns that use similar visuals and messages to encourage internal enforcement can be effective in curbing dishonesty and fare evasion (Ayal et al., 2019).

6.4.2 Incentivizing Compliance

In Rimini, Italy, Fabbri, Barbieri, and Bigoni (2019) have conducted a field experiment to determine whether a positive incentive scheme could effectively improve fare compliance and

curb evasion. This incentive scheme took the form of a lottery and sought to improve fare compliance by giving passengers a chance to be rewarded when they paid their fares (Fabbri et al., 2019). The experiment ran for one month in partnership with Start Romagna SpA and Agenzia Mobilita, the two PTCs operating in Rimini, and consisted of three lottery draws awarding a total of six prizes of €500 each (Fabbri et al., 2019). To ensure that self-selection of treated buses was not taking place, the lottery was promoted only by posters that had been put up inside of the treated buses (Fabbri et al., 2019). Here, it was found that significantly more tickets were sold on the treated buses than on the control buses during the month that the experiment was running (Fabbri et al., 2019). Although the effectiveness of this approach in improving fare compliance is clear, its cost-effectiveness, on the other hand, remains unclear (Fabbri et al., 2019). After all, according to Fabbri et al. (2019), this approach can only be considered truly successful when the increase in revenues is able to completely cover the cost of the prizes. In this case, the increased revenues were able to cover the cost of the prizes, but only because four of the six prizes went unclaimed (Fabbri et al., 2019).

6.4.3 Fare Inspections without Fines/Increased Staff Presence

An early study by van Anandel (1989) can make a case for fare inspections without fines. Fare evasion became more of a problem in the Netherlands after 1966 when automatic ticket machines were introduced, and the drivers of trams no longer had to check tickets (van Anandel, 1989). In 1984, two measures were introduced to address this problem, the VIC project, and a change in bus boarding procedures which required passengers to walk past the driver (van Anandel, 1989). The VIC project, which stood for 'Veiligheid, Informaliteit, Controle' or 'Safety, Information, and Control' employed 1,200 unemployed youth as fare inspectors and provided them with two to three months of training prior to dispatching them in three cities (Amsterdam, Rotterdam, and The Hague) (van Anandel, 1989). In Amsterdam and Rotterdam, they were given the authority to issue fines, however, in The Hague they went for a more 'customer friendly' approach and were not given the authority to issue fines (van Anandel, 1989). Instead, in The Hague, those caught without a fare were asked to either purchase one or exit the vehicle (van Anandel, 1989). The VIC project ran for three years, and upon evaluation it was found that the rate of fare evasion declined from 17.7 percent to 9 percent in Amsterdam, 5.8

percent to 3.7 percent in Rotterdam, and 13.7 percent to 9.5 percent in The Hague as a result of these inspections (van Anandel, 1989). Additionally, the change in bus boarding procedures which simply required passengers to walk past the driver resulted in a decline in the fare evasion rate from 14.1 percent to 2.4 percent (van Anandel, 1989). This suggests that inspections without fines, and staff presence in general, can be effective in curbing fare evasion (van Anandel, 1989).

A more recent study by Guarda et al. (2016) can also make a case for fare inspections without fines. In Santiago, Chile, besides the Ministry of Transport, Transantiago is also run by several private bus operators (Guarda et al., 2016). In terms of their approach to fare enforcement, they have fare inspectors employed by the Ministry of Transport who are authorized to fine fare evaders and write up citations, as well as fare inspectors employed by the private bus operators who are not authorized to fine passengers but help with monitoring fare payment (Guarda et al., 2016). To elaborate on the role of the latter group, these fare inspectors linger by the front door when passengers board the bus to monitor fare payment (Guarda et al., 2016). Guarda et al. (2016) have found through their study that these fare inspectors are still effective at reducing fare evasion at bus stops, despite the fact that they are not able to fine anyone that does evade paying a fare. This evidence suggests that fines may not be necessary to curb fare evasion.

6.4.4 Fare Loan

Bucknell, Munoz, Schmidt, Navarro, and Simonetti (2016), on the other hand, have examined the impact of the introduction of an innovative method of curbing accidental fare evasion, also in the context of Santiago. In their introduction, they note the importance of a solid load network when it comes to supporting a public transit system that uses smart cards, as an insufficient load network can often lead to higher rates of fare evasion (Bucknell et al., 2016). Transantiago's Bip! Card was introduced in 2007, and following this, loading stations were introduced to all subway stations and some retail stores (Bucknell et al., 2016). Although there were plans to introduce loading stations to all buses as well, this was not implemented due to high costs (Bucknell et al., 2016). According to Bucknell et al. (2016), approximately half

of bus stops in Santiago are located more than 250 metres away from a loading station. The assumption here was that many individuals with insufficient funds on their fare cards, usually those who had forgotten to load them, would end up resorting to fare evasion instead of making the trip to a loading station (Bucknell et al. 2016). As such, a cost-effective solution in the form of a fare loan called the 'emergency trip' was introduced. This would allow individuals with positive but insufficient funds to take one additional trip within a certain time frame, which was at first 9:00 pm to 9:00 am, and then extended to be 9:00 pm to 11:00 am (Bucknell et al., 2016). The emergency trip could only be taken on buses, as every subway station did have a loading station, and it was found that it was successful in decreasing the number of failed trip attempts on buses (Bucknell et al., 2016). This measure turned 6,000 would-be failed trip attempts into successful fare payments (Bucknell et al., 2016). Although whether these were truly successful fare payments depended entirely on whether individuals then loaded their fare cards after using the emergency trip. It was found that 58 percent of those who used the emergency trip loaded their cards that same day, and that another 30 percent loaded them after 3 or more days (Bucknell et al., 2016).

6.4.5 Fare-Free Public Transit (FFPT)

Another strategy that can be employed to curb fare evasion is to get rid of fares altogether. This is referred to as fare-free public transit (FFPT), where costs are fully subsidized by the service provider, whether that be the PTC or the government (Cats, Susilo, & Reimal, 2017). According to Cats et al. (2017), the key benefits derived from FFPT are improved access and equity. Besides presenting a solution to the fare evasion problem, proponents of FFPT also believe that FFPT can present solutions to various other problems. For instance, it is believed that FFPT may also be effective in getting more people out of their cars and onto public transit (Tomanek, 2017; Friman, Maier, & Olsson, 2019). However, Tomanek (2017) notes that FFPT can be incredibly costly to implement, especially in larger cities, and that it may ultimately take public funding away from upgrades to transit infrastructure and other expenses. Furst and Herold (2018) also contribute to this discussion, and raise that there is not much of a political appetite for it, that there would be issues with externalities, and that service quality may take a dive because there would be no incentive for maintenance or improvements. This is consistent

with the view of Hess (2017), who also shares this concern about service quality plummeting. She adds that in cases where FFPT does seem financially viable, it is important to consider that it may not always be, especially in the long run (Hess, 2017).

6.4.6 Summary and Discussion of the Research on Alternative Strategies

This section of the paper has reviewed a number of studies focused on alternative measures or strategies that have been employed to curb fare evasion in a more equitable manner. These have included positively framed ad campaigns (Ayal et al., 2019), incentivizing compliance (Fabbri et al., 2019), inspections without fines or increased staff presence (van Anandel, 1989; Guarda et al., 2016), fare loans (Bucknell et al., 2016), and fare-free public transit (FFPT) (Cats et al., 2017; Hess, 2017; Tomanek, 2017; Furst & Herold, 2018; Friman et al., 2019). Although all of these measures have managed to have some impact on rates of fare evasion, the findings of these studies have revealed that some of these have been more effective than others in curbing it. For instance, the ad campaign featuring the watching eyes *and* the social norm message was much more effective than the one featuring just the watching eyes (Ayal et al., 2019). According to Ayal et al. (2019), this ad was likely more effective because it managed to create more psychological tension, called 'ethical dissonance', in the minds of individuals (Ayal & Gino, 2011; Barkan, Ayal, & Ariely, 2015 in Ayal et al., 2019). This tension is created when individuals would like to maintain a positive image of themselves as moral actors, but are presented with an opportunity to benefit from immoral behaviour (Duval & Wicklund, 1972; Rosenberg, 1979 in Ayal et al., 2019). As such, these ads can be effective when they make it especially hard for individuals to dismiss this tension. However, it should be noted that in this case, even the impact of the more effective ad did not quite reach statistical significance (Ayal et al., 2019).

Fare inspections without fines and increased staff presence, on the other hand, have been shown to be more effective strategies. According to Guarda et al. (2016), there are also a number of additional benefits to having fare inspectors who do not issue fines or more of a staff presence. First and foremost, they can speed up boarding times, improve safety at bus stops, and support bus drivers (Guarda et al., 2016). When compared to traditional inspectors

who issue fines, they also tend to speed up operations as opposed to slow them down (Guarda et al., 2016). Secondly, they can also rid PTCs of the administrative costs associated with a fine collection system (Guarda et al., 2016). Another strategy that was found to be effective was the fare loan, however, it should be noted that it was effective against a certain type of fare evasion, accidental evasion. Although this also presents a valuable takeaway, this paper is more interested in measures that may be able to curb deliberate fare evasion. Alternatively, the positive incentive scheme was also effective in curbing fare evasion, but costly to implement (Fabbri et al., 2019). Fabbri et al. (2019) have noted, however, that measures such as these have the potential to be more effective, but require further adjustment and evaluation. An additional benefit of such a measure is that once again it can rid PTCs of the administrative costs associated with a fine collection system (Fabbri et al., 2019).

Lastly, in terms of FFPT, it remains unclear as to whether its collective benefits (besides just eliminating the fare evasion problem) can outweigh its objective and subjective costs in the long-term, and whether it is possible to implement in the context of a large city. For this reason, Furst and Herold (2018) have raised lowering the cost of fares in general, and in relation to the cost of driving in particular, as another alternative. The impact of subsidized fares on rates of fare evasion has not yet been examined in the academic literature. For this reason, this alternative will be discussed further in the case study analysis. All in all, it is also apparent that this is an emerging area of study. There are few studies that examine alternative measures or strategies to curb fare evasion, and the majority of these are very recent. As this area of study is emerging and therefore lacking, the case study analysis will be used to supplement these findings.

7 EQUITABLE SOLUTIONS TO THE FARE EVASION PROBLEM: A CASE STUDY ANALYSIS

The case study analysis will now examine more equitable solutions to the fare evasion problem that have been implemented by PTCs in the real world. The unique circumstances that gave rise to these alternative solutions will be closely examined, as they may be able to present additional evidence to demonstrate the need for a more equitable solution to the fare evasion problem. In addition to this, whether these equitable solutions are actually effective in curbing

fare evasion will be examined as well, as the goal remains to see if these can be appropriate solutions to the problem. As mentioned previously, this will be separate from the literature review because this analysis will be conducted primarily through an examination of PTC published reports, studies, and materials. Put simply, it will look more at the grey literature than academic sources. It should also be noted that some strategies discussed in the literature will not be discussed in this chapter because they have either been covered in the literature review and have not been implemented elsewhere or have not been implemented in the real world (i.e. outside of a study or pilot project). The cases informing this chapter were selected on the basis that they were representative of the alternative strategy, were new and/or innovative, have been evaluated to some extent whenever possible, and were located in a context comparable to Toronto whenever possible. This analysis will complement the scoping review by comparing strategies and findings, by compiling more evidence that may be able to inform practice, and by identifying gaps and opportunities for future research.

7.1 Innovative/Positive Fare Evasion Ad Campaigns

7.1.1 York Region Transit (YRT) (York Region, Ontario)

York Region Transit (YRT) has employed an innovative and light-hearted ad campaign called the 'Exposed' campaign to tackle fare evasion on its buses. This multimedia campaign was created in 2010 and featured animated cinema advertising, campus and mall posters, cost-per-click digital advertising on social media, and transit media that was targeted towards YRT's youth market (Acart Communications, 2020). Acart Communications, the advertising agency responsible for creating the campaign for YRT, decided not to be preachy or to take the "law and order" approach, as they did not think that this would be effective with youth (Megginson, 2010). Instead, they took a light-hearted "denormalizing" approach which positioned cheating as something that was "socially objectionable" and which positioned getting caught as being humiliating (Megginson, 2010). The ads featured comedic images of fare evading passengers (portrayed by actors) being caught in their underwear by fare inspectors and other passengers. This campaign also featured an innovative "Rider Reward" SMS contest that ran for 12 weeks where self-identified honest riders could text 'Exposed' to the short code to enter into a weekly

prize draw (Acart Communications, 2020). Although the campaign had the objective of reducing the rate of fare evasion on YRT buses to 2.15 percent, it managed to go beyond this and reduce it to 1.45 percent (Megginson, 2011). In 2011, it also won the Canadian Urban Transit Association's Corporate Innovation Award (Acart Communications, 2020).

7.1.2 Keolis (Bordeaux & Lyon, France)

Keolis has also employed various positively framed, light-hearted, and comedic ad campaigns to tackle fare evasion. A recent ad campaign that was run in Bordeaux, France includes a series of posters, two of which have the following captions:

- 1) "Did you know? The tram in which you travel costs €3 million. The TBM network has 100 trams. I travel, I validate!"
- 2) (A number of colourful stick figures) "+ You. Each traveler counts for a better network. I travel, I validate."

All of these posters are accompanied by one of three mottos: "It's your choice!", "Without you, there is no network!", and "I travel, I validate!" (Lynch, 2018). A fine of €122 euros is also highlighted at the bottom of each of these posters (Lynch, 2018). These have been criticized, however, for being "passive aggressive" and for appealing to the conscience rather than fear (Lynch, 2018).

Another campaign run in Bordeaux by Keolis in the past has used humour to encourage fare compliance. A circus llama was featured on the news in Bordeaux for taking a ride on a tram (Keolis, 2020). The campaign took advantage of this unusual story, and featured ads that depicted this llama validating his ticket (Keolis, 2020). Between 2014 and 2015, Keolis Bordeaux saw a 10 percent decline in fare evasion, despite a 3.9 percent increase in ridership, and this decline was seen as being owed to various fare evasion campaigns that they ran (Keolis, 2016). Keolis has also worked with PTCs to collect big data that has allowed them to identify stations with the highest rates of fare evasion and target their campaigns on those stations (Keolis, 2015). In order to boost their economic performance, Keolis have and will continue to (as of 2015/2016) run campaigns against fare evasion (Keolis, 2015).

In Lyon, campaigns have also played a large part in supplementing the efforts to combat fare evasion (Keolis, 2015). In this context, they have complemented plainclothes inspectors and fines. Audrey Hippert, Director of Bus Operations and the Department of Inspection and Intervention at Keolis Lyon has stated that: “Beyond ticket inspections alone, we feel there is real value in communication and raising passenger awareness in the fight against fare evasion.” (Keolis, 2015). In 2015, Keolis Lyon came out with a brochure campaign that was called the ‘Right Way to Travel’ campaign, which featured a true or false quiz about fare evasion and its impacts on the system and other passengers (Keolis, 2015). According to Keolis (2015), their goal was not to stigmatize fare evaders but to instead raise awareness about the real impacts of fare evasion.

7.1.3 Discussion

These ad campaigns can be considered equitable solutions to the fare evasion problem because they do not have the ability to further disadvantage marginalized populations. They do not trap them in cycles of poverty, nor do they increase their likelihood of interacting repeatedly with the criminal justice system. However, some of these ad campaigns take more of an equitable approach than others. A more equitable ad campaign would be one that seeks to raise awareness about the negative consequences of fare evasion for all passengers, while a less equitable ad campaign would be one that shames all passengers and/or potential fare evaders. For instance, it could be said that the Keolis campaigns take a more equitable approach, as they try to raise awareness about the impacts of fare evasion (Keolis, 2015). The YRT campaigns, on the other hand, try to shame or stigmatize potential fare evaders (Megginson, 2010). However, they can still be considered somewhat of an equitable approach because they do this in a manner that is comedic and light-hearted (Megginson, 2010). They do not shame all passengers, and fare evaders are depicted by actors, which is in contrast to more recent campaigns by the TTC, for example, which treat all passengers as fare evaders, and which publicly shame those that have been caught fare evading by publishing their image as part of the campaign.

These approaches from York Region, Bordeaux, and Lyon were not developed in response to a particular equity concern. As such, these cases do not present additional evidence that can make the case for the need for a more equitable solution to the fare evasion problem. However, as measures that have been evaluated and have been shown to be effective in curbing fare evasion, they do present an answer to the second research question posed by this paper. The effectiveness of these measures is also supported by the findings of the literature. The majority of the Keolis campaigns are positively framed and appeal to the conscience (Lynch, 2018). As demonstrated and discussed by Ayal et al. (2019), these campaigns are more effective than those that are negatively framed. The YRT campaign, on the other hand, was wise to specifically target the youth market, as the literature has shown that it is typically young people in their teens and early 20s that are fare evaders (Barabino et al., 2015; Salis et al., 2017). Additionally, the SMS contest that gave fare-abiding passengers a chance to win a prize employs the positive incentive scheme strategy discussed by Fabbri et al. (2019). It should be noted, however, that these measures were effective in conjunction with other measures. To better understand the effectiveness of these strategies, it may be valuable for future research to examine the impact of ad campaigns alone on rates of fare evasion.

7.2 Increased Staff Presence

7.2.1 Keolis (Lyon, France)

Keolis has also employed another type of campaign, which increases staff presence, to tackle fare evasion. Again, this has complemented other efforts such as other campaigns, inspections, and the issuance of fines (Keolis, 2015). This has been called the 'Fare evasion is everyone's business' campaign, which has recruited large numbers of volunteers to act as fare inspectors a couple times a year (Keolis, 2015). During these campaign events, these volunteers line up in several stations during rush hour to encourage fare compliance (Keolis, 2015). In 2015, three of these campaign events took place, and they involved a total of 250 volunteers (Keolis, 2015). In Lyon, the rate of fare evasion has declined from 18 percent in 2005 to 11 percent in 2013 and to 10 percent at the end of 2015 (Keolis, 2015). According to

Keolis (2015), these sorts of campaigns provide a cost-effective way of supplementing enforcement efforts.

7.2.2 Discussion

This strategy, which increases the presence of staff at transit stations on certain occasions, can be considered an equitable approach because it does not have the ability to further disadvantage marginalized populations. Instead, it is one that encourages fare compliance in a friendly manner. This particular strategy is also used in conjunction with other strategies and was not developed in response to an equity concern. As such, this case does not present additional evidence to make the case for a more equitable solution to the fare evasion problem. It does, however, contend with the second research question posed by this paper. It cannot be said that this specific approach to increasing staff presence is an effective way of going about curbing fare evasion in a more equitable manner. Firstly, because it complemented other measures, there is no way of knowing the direct impact that it has had on rates of fare evasion. Secondly, although the literature has demonstrated the effectiveness of fare inspections without fines and the increased presence of staff (van Andel, 1989; Guarda et al., 2016), it has also shown that concentrated enforcement efforts are ineffective because they have a tendency to induce higher rates of fare evasion during times when there is no enforcement (Dai et al., 2017). Increased staff presence is more likely to be effective when it is continuous.

7.3 Subsidized Fares and/or Compassionate Enforcement/Penalties

These next few case studies which cover subsidized fares and/or compassionate enforcement or penalties are particularly valuable because there was no mention of these in relation to fare evasion in the literature.

7.3.1 Calgary Transit (Calgary, Alberta) – Subsidized Fares

In Calgary, Alberta, a sliding scale fare structure for the Low Income Monthly Pass was introduced in April of 2017 (Standing Policy Committee (SPC) on Community and Protective Services, 2017). This was in response to a previous finding that the flat rate Low Income

Monthly Pass which cost \$44 CAD still represented a significant cost for many low income individuals (SPC on Community and Protective Services, 2017). At the time, a regular monthly pass would have cost \$101 CAD, and so this was a discount of approximately 55 percent for anyone eligible. Under the new structure, individuals are eligible for a discount that ranges between 50 percent and 95 percent off, depending on their income (SPC on Community and Protective Services, 2017). In 2017, upon the implementation of this structure, the Low Income Monthly Pass cost individuals between \$5.05 and \$50.50 depending on their income (SPC on Community and Protective Services, 2017). Today, as the cost of a regular pass has risen to \$109 CAD, this range has also changed to be between \$5.45 and \$54.50 (Calgary Transit, 2020a; Calgary Transit, 2020b). Calgary Transit currently recognizes three income bands (based on household size and income after taxes), with those in Band A being eligible to pay \$5.45, those in Band B being eligible to pay \$38.15 and those in Band C being eligible to pay \$54.50 (Calgary Transit, 2020b). For example, an individual falls into Band A if they earned less than \$13,213, Band B if they learned between \$13,214 and \$22,462, and Band C if they earned between \$22,463 and \$26,426 as of February 2020 (City of Calgary, 2020).

Although it was initially projected that this new fare structure would increase pass sales by 30 percent compared to the previous year, based on pass sales throughout 2017, it was then projected that by 2018 this would increase pass sales by more than 50 percent (SPC on Community and Protective Services, 2017). In the first three months following implementation, it was found that 96 percent of individuals eligible for a discounted pass purchased one, compared to 76 percent in the same period in the previous year (SPC on Community and Protective Services, 2017). In addition to this, it was found that 90 percent of pass sales were from those in income Bands A and B (SPC on Community and Protective Services, 2017). The reality is that more low income individuals are purchasing passes because they are able to under this new structure. The Standing Policy Committee on Community and Protective Services (2017) emphasizes that this represents a win for the City of Calgary as the data has shown that public transit becoming more accessible for those most in need. Although they do not discuss the impact of this initiative on fare evasion, it would make intuitive sense for an initiative such as this one to reduce the need to resort to fare evasion as a result of a lack of

affordability. The data also provides a case for this. Between 2009 and 2014, the average rate of fare evasion across five years was 3.6 percent (City of Calgary Newsroom, 2016), and this was prior to the introduction of the sliding scale fare structure. However, in 2018, the rate of fare evasion on Calgary Transit was approximately 2.3 percent, which would have been equivalent to about \$2.3 million CAD (Blanchard, 2019). This represents a significant decline, especially considering the fact that the overall ridership on Calgary Transit has increased by 3.4 percent in 2018 (Lobo, 2019a). In addition to this, throughout 2018, Low Income Transit Pass ridership represented the highest growing passenger segment (Lobo, 2019a).

Although this initiative has had many tangible benefits, it was possible to implement because the Government of Alberta has provided \$4.5 million CAD (plus a 5 percent contingency) to be used from 2017 to 2019 to the City of Calgary to support this initiative (Lobo, 2019). It has been recognized that it is not a sustainable funding model. In 2018, there was a lot of uncertainty surrounding this program, as the Government of Alberta had not confirmed whether they would continue to provide funding beyond 2019 (Lobo, 2019a). However, as of 2019, it has been confirmed that the Province will continue to provide funding to be put towards this program (Hudes, 2019). Despite this, there is still a \$6.5 million CAD shortfall, and how this will be made up is still up in the air (Lobo, 2019b). Three options were put forward to the Standing Policy Committee on Transportation and Transit (Lobo, 2019b). The first option would make up the \$6.5 million CAD shortfall through additional tax support, the second option would make up \$3.5 million CAD through additional tax support and then raise monthly pass costs so that the largest discount would be 88 percent instead of 95 percent off, and the third option would not require any additional tax support as it would simply raise monthly pass costs so that the largest discount would be 83 percent instead of 95 percent off and the smallest discount would be 45 percent instead of 50 percent off (Lobo, 2019b). The third option was the one that was ultimately recommended to Council. Although it was decided that property taxes would be increased by 1.5 percent, this revenue will not be put towards the Low Income Transit Pass (City of Calgary, 2019). Therefore, it is likely that the cost of a monthly pass will increase to \$18.55 CAD for those in income Band A, \$43.60 CAD for those in Band B, and \$59.95 CAD for those in Band C (Lobo, 2019b).

7.3.2 Public Transport Victoria (Victoria, Australia) – Compassionate Enforcement

In Victoria, Australia, researchers from Monash University found that in 2012, there were 67,000 repeat fare evaders who cost Public Transport Victoria (PTV) \$54 million AUD altogether and \$802 each (Parliament of Victoria, 2016). In contrast to this, there were 597,000 unintentional or one-off evaders in the same year who only cost the system \$4 million altogether (Parliament of Victoria, 2016). Previously, PTV had an on-the-spot fine of \$75 AUD for fare evasion (Parliament of Victoria, 2016). Fare evaders could pay this fine immediately by credit card or EFTPOS, or face a larger fine or other sanctions if they did not pay (Parliament of Victoria, 2016). In 2016, an investigation was launched by the Victorian ombudsman, who found this system to be one that further disadvantages “the vulnerable and the innocently ignorant” (Parliament of Victoria, 2016). As a result, in 2017 a fairer approach to fare compliance was introduced, which got rid of on-the-spot penalty fares (Victoria Department of Transport, 2018). In addition to this, Authorized Officers (fare inspectors) are also no longer able to issue fines, only the Department of Transport is able to issue them when they see fit (Victoria Department of Transport, 2018).

7.3.3 TransLink (Metro Vancouver, BC) – Subsidized Fares AND Compassionate Penalties

In the Metro Vancouver Area, there is currently a \$173 CAD fine for fare evasion enforced by TransLink. However, there are plans to change how fines work for children and low-income individuals. In 2018, 20,000 tickets were issued for fare evasion, and approximately 1,000 of these went to youth (Mayors’ Council on Regional Transportation, 2019). There have been calls to reduce or eliminate fares or fines for youth in particular, who have been negatively impacted by the accumulation of debt resulting from unpaid transit fines (Griffin, 2019; AllOnBoard, 2020). A survey administered by AllOnBoard, an advocacy group for fair fares, has found in 2018 that it was not uncommon for youth to have accumulated hundreds of dollars in debt for not paying off fare evasion fines (Griffin, 2019; AllOnBoard, 2020). A common consequence was the inability to acquire a driver’s license as a result of the unpaid debt (Griffin, 2019; AllOnBoard, 2020). However, it is noted that making transit free for youth would result in the loss of up to \$50 million CAD in revenue annually (Mayors’ Council on

Regional Transportation, 2019). It has been made clear that new funding would be required to do this, and it has been noted that low-income transit discounts in other Canadian cities are the result of government funding (Mayors' Council on Regional Transportation, 2019).

Interestingly, in the City of Victoria, transit has been made free for youth 18 and younger (Chan, 2019). This will cost approximately \$850,000 CAD annually, and it is expected to be covered by the municipal government's implementation of paid parking on Sundays, which is expected to generate \$1 million annually (Chan, 2019).

7.3.4. TriMet (Portland Metropolitan Area, Oregon) – Subsidized Fares AND Compassionate Penalties

In the Portland Metropolitan Area, TriMet's fare enforcement strategy and actions were evaluated in a study by the Portland State University's Criminal Justice Policy Research Institute (TriMet, 2016). This evaluation was a response to concerns about systemic racial bias in fare enforcement practices (TriMet, 2016). Although the study did not find there to be systemic racial bias, it called for certain changes to the enforcement approach to ensure that "[enforcement] is equitably applied and not overly punitive, but changes unwanted behaviour" (Renaucer, 2016; TriMet, 2016). Previously, anyone caught fare evading was issued a \$175 USD fine (TriMet, 2018). However, beginning in July of 2018, tiered fines and the option to do community service or enroll in the low-income/Honored Citizen program were introduced (TriMet, 2018). Fines for the first offense are now \$75 USD, but this becomes \$175 USD after the fourth offense (TriMet, 2018). Alternatively, the community service requirement starts at 4 hours (for the first offense) and goes up to 15 hours (for the fourth offense). Lastly, those that are eligible for but are not enrolled in the low income fare program (Honored Citizen program) can enroll to get their fine waived (TriMet, 2018).

7.3.5 King County Metro (King County, Washington) – Subsidized Fares AND Compassionate Enforcement and Penalties

In King County, Washington, a low-income fare program called ORCA LIFT was introduced in 2015, which has reduced fare costs for individuals with incomes at or below 200 percent of the federal poverty level (King County Metro, January 17, 2020). To be eligible, an

individual would have to have a monthly income of \$2,081 USD or lower, and a household of four people would have to have a monthly income of \$4,291 USD or lower (King County Metro, January 17, 2020). Although the standard adult fare on the King County Metro is \$2.75 USD, it would be \$1.50 USD for those enrolled in this program (King County Metro, February 2019). In addition to this, in the City of Seattle (located within King County), the ORCA Opportunity Program was introduced in 2018, which would provide select populations within Seattle with fully subsidized 12-month ORCA fare cards (City of Seattle, 2020a). The first iteration of this was the ORCA Opportunity Youth Program, which essentially made public transit free for all public high school students and income-qualified middle school students (City of Seattle, 2020c). The second iteration of this was its inclusion as a benefit for post-secondary students who are part of the Seattle Promise Scholars program, which all public high school students are eligible to apply to (City of Seattle, 2020d; Seattle Promise, 2020). Finally, the most recent iteration of this has been a pilot project that provides this benefit to select Seattle Housing Authority tenants who have an income of less than 30 percent of the Area Median Income (AMI) (City of Seattle, 2020b). Furthermore, later on this year, a new ORCA LIFT fare subsidy will be introduced which will completely subsidize fares for those with incomes at or below 80 percent of the federal poverty level (King County Metro, January 30, 2020). This would be an annual income of \$9,992 for an individual and \$20,600 for a household of four people (King County Metro, January 30, 2020). According to King County Metro (January 30, 2020), this would provide approximately 54,000 people with equitable access to transit. It is expected that it will cost \$40 million USD per year, and the matter of sustainable funding sources are currently being discussed. Of course, the majority of these initiatives have yet to be evaluated, however, King County Metro will be making a conscious effort to evaluate between now and 2022 (King County Metro, January 30, 2020).

In terms of fare evasion and enforcement, it was found by the King County Auditor's Office that between 2015 and 2017, 25 percent of citations on the Metro were given to individuals experiencing homelessness or housing instability (Deblieck, Garvey, & Thompson, 2018). These individuals also comprised 31 percent of those whose citations were then escalated to become misdemeanors. This represented a significant concern because this meant

that these individuals could be trapped in cycles of debt and be forced to interact with the criminal justice system (Deblieck et al., 2018). In addition to this, it was found that fare enforcement efforts were focused on lines A and E which were believed to have the highest rates of fare evasion (Deblieck et al., 2018). However, line E also serves an area with a large minority population, which has resulted in people of colour receiving a higher proportion of citations (Deblieck et al., 2018). Ultimately, it was recommended that Metro should re-evaluate its fare enforcement model in relation to King County's equity and social justice goals (Deblieck et al., 2018). In order to balance fare enforcement with equity and social justice, Metro convened a workgroup in 2018 to figure out a way to improve access to public transit while also tackling the issue of fare enforcement having a disproportionate negative impact on low-income individuals and people of colour (King County Metro, April 2019). This has resulted in the creation of a more compassionate approach to fare enforcement and penalties. Individuals who are caught without a fare are now given five options to choose from:

1. Pay the \$50 fine, which is reduced to \$25 if it is paid within the first 30 days.
2. Load \$25 onto an ORCA card or \$10 onto an ORCA LIFT card.
3. Perform two hours of community service.
4. Enroll in a discounted fare program (i.e. ORCA LIFT) and load \$5 onto the new card.
5. Appeal the violation. (King County Metro, April 2019)

The King County Code was amended in late 2018 to allow Metro to use an alternative resolution process and administer issued citations and appeals in-house, outside of the courts (King County Metro, April 2019). Under this new system, individuals are given 90 days to follow through with one of these options, and they are followed up with five times (King County Metro, April 2019). If individuals do not follow through within 90 days, they are put on a suspension list, where they are suspended for 30 days if they are caught once again without a fare (King County Metro, April 2019). Although evaluation is ongoing, it has been found that obtaining the accurate contact information of individuals represents a key challenge, as in the past fare enforcement officers had access to a law enforcement database that was used as a validation tool (King County Metro, April 2019). This has been part of switching to an administrative process from a civil infractions process. A solution has been to have officers

verify addresses through the internet, however, this has revealed once again that many individuals receiving citations do not have permanent addresses (King County Metro, April 2019). As such, King County Metro has made a conscious effort to continue to re-evaluate this system so that it will not disadvantage the most vulnerable fare evaders (i.e. those that are homeless and/or struggle with mental health challenges), and such thinking has also contributed to the inception of initiatives such as the new OCRA LIFT fare subsidy program that will be rolled out later this year (King County Metro, April 2019).

7.3.6 Discussion

Subsidized fares, compassionate enforcement, and compassionate penalties are all equitable solutions to the fare evasion problem because they recognize that affordability is a key component of it, and try to improve compliance by making fares more affordable, or recover revenues in a manner that does not trap low-income individuals in cycles of debt. Additionally, some compassionate penalties such as those employed by TriMet and King County Metro, offer those with no means of paying at all another option in the form of community service.

The majority of these solutions have been developed in response to the findings of studies and investigations that have examined fare evasion trends, or existing fare enforcement strategies in these contexts. In Victoria, Australia, for instance, a Monash University study found that the majority of fare evaders were chronic fare evaders who had \$54 million AUD in citations between them (Parliament of Victoria, 2016). Additionally, an investigation launched by the Victorian ombudsman in 2016 found the existing fare enforcement strategy which included an on-the-spot penalty to be one that further disadvantaged accidental fare evaders and vulnerable populations (Parliament of Victoria, 2016). In Metro Vancouver, BC, it was found that 1,000 of the 20,000 fare evasion citations issued in 2018 had gone to youth (Mayors' Council on Regional Transportation, 2019), and it was also found that these citations often resulted in the accumulation of debt for many individuals (Griffin, 2019; AllOnBoard, 2020). In the Portland Metropolitan Area in Oregon, on the other hand, a study by the Portland State University's Criminal Justice Policy Research Institute found that the existing enforcement

strategy was overly punitive (Renaucer, 2016; TriMet, 2016). Last but not least, in King County, Washington, it was found by the Auditor's Office that a quarter of fare evasion citations were being given to individuals experiencing homelessness, and that people of colour were receiving a higher proportion of citations because enforcement efforts targeted certain geographies (Deblieck et al., 2018). All of this taken together adds to the case for a more equitable solution to the fare evasion problem.

As far as the effectiveness of these solutions go, Calgary Transit has seen its rate of fare evasion decline in the year following the introduction of its subsidized fare program (Blanchard, 2019). However, it should be noted that it is unclear as to whether this decline is owed to this intervention, as the relationship between these has not yet been studied. In a similar vein, the impact of the new approaches of Public Transport Victoria, TransLink, TriMet, and King County Metro have yet to be evaluated. This represents an opportunity for future research.

7.4 Free Fare Public Transit (FFPT)

7.4.1 Tallinn, Estonia

In Tallinn, the capital city of Estonia, fare free public transit (FFPT) for all residents was introduced in January of 2013 (Cats et al., 2017). This has been the largest city to implement FFPT thus far, with a population of approximately 420,000 residents (Cats et al., 2017). Three goals inspired this initiative. First and foremost, there was a desire to encourage more residents to take public transit instead of the car (Cats et al., 2017). After all, although 40 percent of all trips in Tallinn are taken by public transit, the number of trips taken by car in the past two decades have doubled (Cats et al., 2017). Secondly, there was a desire to improve access to public transit for unemployed and low-income residents, as surveys conducted in 2010 and 2011 had revealed that the cost of fares had become the main barrier to increasing the public transit mode share, and that low-wage workers were not willing to travel longer distances to find work if public transit was costly (European Commission, 2013; Carey, 2020). Thirdly, there was a desire to encourage more inhabitants of Tallinn to formally register as residents so that the property tax base could be expanded (Cats et al., 2017). Interestingly, it was estimated that there were between 25,000 and 30,000 inhabitants of the city who were

not registered as residents (Cats et al., 2017). As such, in this particular context, encouraging just 12,000 of these individuals to register as residents would have covered revenues lost to completely subsidizing public transit (Cats et al., 2017).

Cats et al. (2017) have evaluated travel behaviour changes in Tallinn using survey data that was collected just before the implementation of FFPT and one year after the implementation of FFPT. They have found that this initiative has resulted in a 14 percent increase in the number of trips taken by public transit, and that this is the only part of Estonia where this modal share has increased (Cats et al., 2017). Everywhere else, it has declined slightly from 23.1 percent to 22.9 percent of all trips between 2012 and 2013 (Cats et al., 2017). Furthermore, they have also found that ridership increased most significantly among youth (between the ages of 15 and 19), seniors (between the ages of 60 and 74), low-income individuals (monthly income of or below €300), and unemployed individuals (Cats et al., 2017). According to Cats et al. (2017), this demonstrates that improved access and equity can be key benefits derived from FFPT.

7.4.2 Luxembourg

Luxembourg is a small country with a population of approximately 600,000 (Boffey, 2018). However, it has the highest ratio of personal cars to residents in the European Union (EU) and commuters spend much of their time stuck in traffic (Aryal, 2019). In this context, FFPT was not introduced as a solution to the fare evasion problem. Instead, it was introduced primarily to relieve congestion and improve air quality and the environment in general (Aryal, 2019). It has been raised, however, that this may not be enough to incentivize people to get out of their cars and onto public transit (Aryal, 2019). After all, public transit was previously already heavily subsidized, with it being free for young people under the age of 20 (Aryal, 2019). Regardless, transit in Luxembourg has been fare free since March 1st, 2020 (Mobilite Gratuite au Luxembourg, 2020). Although nothing can be said of the impact of this move to FFPT yet, there are plans for evaluation in the form of annual global monitoring beginning in March of 2021 (Mobilite Gratuite au Luxembourg, 2020).

7.4.3 Austin, Texas

Austin, Texas has remained the only large U.S. city to have experimented with system-wide FFPT until recently. The FFPT experiment in Austin ran for a full year from the end of 1989 to the end of 1990 (Perone, 2002). However, it was largely unsuccessful, and may explain why other large cities have stayed away from FFPT (Perone, 2002). It was also the case in this context that this was used as a way of incentivizing drivers to take public transit, however, it was found that although ridership did increase, it did not increase as a result of drivers making this switch (Perone, 2002). Ridership went up because more young people were taking transit (Perone, 2002). However, this resulted in higher rates of vandalism, graffiti, and conflict, and the deteriorating level of service further encouraged individuals to drive (Perone, 2002). Operating costs also increased, because more vehicles needed to be dispatched to meet demands (Perone, 2002).

7.4.4 Kansas City, Missouri

Kansas City, Missouri, with a population of 500,000 residents, will be the first large U.S. city to implement system-wide FFPT since Austin, Texas in 1989 (Bliss, 2019). Kansas City's streetcar system is already fare-free, and its buses will also be beginning in 2020 (Gibson, 2019). In this context, the goal has been to improve the mobility of marginalized populations (Bliss, 2019). However, it should be noted that Kansas City has unique circumstances in that only 1.2 percent of its residents commute to work on public transit (Gibson, 2019). As such, the cost of implementing FFPT in this context will only be \$9 million USD in lost fare revenues (Gibson, 2019). However, it is the hope of proponents of FFPT that the improved mobility of residents will also boost economic activity, covering this cost in the long-run (Gibson, 2019).

7.4.5 Discussion

FFPT, which completely subsidizes the costs of public transit, is an equitable solution to the fare evasion problem because it can maximize accessibility for all members of society. Although it was more so the carbon emissions problem that inspired experimentation with FFPT in Luxembourg (Aryal, 2019) and Austin, Texas (Perone, 2002), equity was a key concern that inspired the switch to FFPT in Tallinn, Estonia (European Commission, 2013; Carey, 2020) and Kansas City, Missouri (Bliss, 2019). However, even in these contexts where it was a response to

equity concerns, it was not a response to the issue of fare evasion. As such, these cases do not present additional evidence to make the case for a more equitable solution to the fare evasion problem. However, it should be noted that FFPT is the only solution guaranteed to completely rid PTCs of the fare evasion problem. This should be taken with a grain of salt, however, as the feasibility and cost-effectiveness of FFPT across different contexts remains unclear (Hess, 2017; Tomanek, 2017). The existing literature on the topic suggests that it is only feasible in smaller geographical contexts (Tomanek, 2017), and where the PTC is not largely dependent on fare revenues (Cats et al., 2016; Aryal, 2019; Gibson, 2019). As such, while it can be said that this is an effective way to solve the fare evasion problem, it cannot be said that this will be the case in every context.

8 CONCLUSION

A review of the literature on fare evasion and case studies from across the globe, North America, and Canada has revealed that there is much evidence to suggest that there is a need for a more equitable solution to the fare evasion problem, and that there are various ways that fare evasion can be curbed in a more equitable manner, although this research is currently emerging and being built upon. To conclude, this chapter will now evaluate the TTC's existing fare enforcement strategy based on these findings, highlight key lessons from the case studies, and review some of the limitations of this paper.

8.1 Evaluation of Fare Enforcement in Toronto

In Toronto, the TTC has introduced several measures to combat fare evasion. These measures have included the deployment of fare inspectors and special constables, the issuance of fines between \$235 and \$425 CAD, the introduction of Customer Service Agents (CSAs) to select subway stations, the introduction of a new station model where collectors are positioned at the fare line, increased CCTV coverage, and ad campaigns that raise awareness about the costs of fare evasion. These measures will now be evaluated based on the findings from the literature review.

The literature has indicated that fare inspectors are a necessary part of proof-of-payment systems (Lee, 2011; Lee & Papas, 2015; Currie & Reynolds, 2016) and that increased

inspections are an effective way of deterring fare evaders (Killias et al., 2009; Bijleveld, 2007). However, it has also indicated that fare inspectors without police powers or the authority to issue fines are also effective in deterring fare evasion (van Andel, 1989; Guarda et al., 2016). A greater staff presence may also have a similar effect. As such, the introduction of Customer Service Agents (CSAs) seems to be a step in the right direction. Given that the rate of fare evasion is quite low at subway stations, it might make sense to introduce more CSAs to streetcars and buses as well. The new station model which positions the collector at the fare line instead of in the ticket booth also seems to be a step in the right direction for this reason.

A common finding has been that a sizeable proportion of fare evaders tend to be chronic evaders (Bijleveld, 2007; Audit Office of New South Wales, 2006 in Clarke et al., 2010; Clarke et al., 2010), and this is likely the case in Toronto as well. According to Salis et al. (2017), chronic fare evaders are those who are not strategic about fare evasion because they are typically apathetic about being caught, and when they do get caught and issued a fine, they often do not pay their fines either. In addition to this, the literature has also indicated that steeper fines and other penalties (i.e. criminal sanctions) often do not have an effect on the rate of fare evasion (Bijleveld, 2007; Killias et al., 2009). For these reasons, it could be said that TTC fines are unnecessarily steep, especially when they do not go to the PTC but to the City (Spurr, 2019).

The literature does not say much about the effectiveness of CCTV coverage. However, it does speak to the effectiveness of ad campaigns. According to the literature, ad campaigns on fare evasion and enforcement can be effective in increasing internal enforcement at the individual level (Ayal et al., 2019). Thus far, the TTC has run two ad campaigns on fare evasion, the “Smile! You’re on fare evader camera” campaign and the “Fare evasion costs us all” campaign, which have both been controversial. According to Ayal et al. (2019), ad campaigns on fare evasion should inform people of the desired social norms and what others are doing to be most effective. In addition to this, it should also be noted that people respond better to social norm messages that are framed positively as opposed to those that are framed negatively (i.e. those that sanction undesired behaviour) (Ayal et al., 2019). The TTC’s fare evasion campaigns, however, have tended to frame these messages negatively, although one of

their ads (“Thank you for paying your fare share!”) does have a positive framing. As such, they might be able to benefit from taking a different approach in the next iteration of this campaign.

8.2 Lessons from Case Studies

It has been established that there is a significant socioeconomic component to fare evasion. After all, it was found that there were higher rates of fare evasion in low-income neighbourhoods across various contexts (Reddy et al., 2011; Guarda et al., 2016), and that fare evaders were typically low-income, unemployed or students with no alternatives to public transit (Barabino et al., 2015; Salis et al., 2017; Allen et al., 2019). Guarda et al. (2016) and Perrotta (2017) have emphasized that affordability is a real issue in many cases, with transportation costs making up a significant portion of the monthly budgets of low-income households. Given this socioeconomic component to fare evasion, there is only so much that deterrence in the form of inspections and fines can do (Allen et al., 2019). In addition to this, it has also been established that it is not uncommon for some chronic fare evaders to have either issues with drugs or alcohol, mental illness, and/or homelessness (Bijleveld, 2007; Audit Office of New South Wales, 2006 in Clarke et al., 2010).

For these reasons, Toronto and the TTC might benefit from the adoption of more compassionate penalties, such as in the cases of King County Metro in King County, Washington and TriMet in the Portland Metropolitan Area. Furthermore, Toronto could also benefit from recognizing that despite recent initiatives such as the launch of the Fair Pass Transit Discount Program, public transit remains unaffordable for many. To elaborate on this, the Fair Pass Transit Discount Program was rolled out in 2018, and provides those who are eligible (required to be receiving Ontario Works, Ontario Disability Support Program, or the Child Care Fee Subsidy) with a 33 percent discount off of a single-ride adult TTC fare and a 21 percent discount off of an adult monthly pass (City of Toronto, 2020). This brings the cost of the single-ride adult fare down to \$2.10 and the adult monthly pass down to \$123.25 (City of Toronto, 2020). In order to truly improve access and affordability, more deeply affordable fares for those in the lowest income strata may be beneficial. For this, the Calgary Transit model could be looked to.

8.3 Limitations and Opportunities for Future Research

This research paper has several limitations. First and foremost, a key limitation of the literature review is that it is a rapid review as opposed to a traditional scoping review. As such, certain shortcuts were taken with the search strategy. As mentioned previously, only the RULA database was searched, only electronic sources were examined, only journal articles were examined, and only articles in English were examined. In addition to this, the case study analysis is also lacking. This research has revealed that many PTCs across the globe are just now beginning to take a more equitable approach to combatting fare evasion. This has been in response to several studies and investigations that have revealed that:

- Steep fines can perpetuate cycles of poverty.
- The majority of revenue loss is connected to chronic fare evasion/fare evaders.
- Many chronic fare evaders struggle with homelessness, mental health issues, drug and alcohol dependence, etc.

While many of these new measures that have been or will be introduced are innovative and well-informed by these studies and investigations, they have yet to be evaluated or evaluated to the extent that they could be. This represents another limitation, but also an opportunity. It is recommended that these case studies be revisited in future research.

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