Metro Transit: Proactive Analysis and Training Could Further Improve Safety

ELISE GARVEY
PETER HEINECCIUS
BEN THOMPSON

Executive Summary

Since 2018, Metro Transit buses have traveled over 200 million miles and have been involved in 104 preventable incidents with a reported injury. While Metro Transit's Safety & Security Division reviews thousands of incidents each year, we found that Metro Transit could improve its review by collecting and analyzing data on additional indicators of risks, including less serious incidents, customer complaints, and operator traffic tickets. We also found that operators receive safety training after an incident, but more regular training for all operators could help prevent collisions, lowering the potential for injuries and costs.

Acknowledgment and Content Warning

We would like to acknowledge that the already demanding work performed by the Metro Transit Department became even more challenging during the COVID-19 pandemic. During this audit, Metro Transit was engaged with building back service and staffing challenges caused by the pandemic. Despite these challenges, Metro Transit staff were responsive and cooperative.

The nature of performance audits is to focus on areas for improvement—this does not mean the staff of Metro Transit are not also doing good work in collision and injury prevention under challenging circumstances. While driving any vehicle inherently presents the possibility of colliding with other vehicles or objects, causing injury to people or damage to property, buses still are one of the safest forms of travel. When incidents do happen, Metro Transit has processes in place for reporting and reviewing incidents and a division dedicated to safety and security that helps Metro Transit determine its response measures. This report identifies improvements Metro Transit can make to those processes. We also recognize the work of staff in the Safety & Security and Operations divisions, which developed and implemented Metro Transit's current safety management system.

Metro Transit responds to incidents through several measures, including an incident review process, operator re-training, a drug and alcohol program, bus maintenance, and bus design improvements. These measures are part of a safety management system and are intended to address issues that can help prevent collisions and injuries involving coaches, like operator behaviors and skills, keeping buses in good repair, and ensuring that buses are designed with safety in mind. Metro Transit leadership also told us that changes in service levels and traffic conditions during the COVID-19 pandemic provided more information about how agency-level policy decisions may affect safety by competing with operator focus on safe driving. For example, the general manager indicated that the department is investigating moving away from fixed-time service (e.g., the bus should arrive at exactly 1:32 p.m.) and toward more regular and frequent service (e.g., there will be another bus within the next 10 minutes). By removing fixed schedules, Metro Transit hopes that operators will feel less pressure to speed up if they are running behind, which will, in turn, reduce the risk of collisions and injuries.

> **This report contains references to injuries and fatalities that resulted from incidents with Metro Transit buses.**

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REPORT HIGHLIGHTS

What We Found

Metro Transit Department buses are involved in thousands of safety incidents each year, but few incidents result in serious injuries. Metro Transit has a response system in place that includes measures such as reviewing incidents to assess for any injuries or property damage. For more serious incidents, Metro Transit takes additional measures, like operator post-incident re-training and discipline. The Safety & Security Division also looks for patterns across incidents to find opportunities to prevent future collisions and injuries.

We found that while Metro Transit takes steps to respond to incidents, it could expand these measures to be more proactive in its prevention efforts. For example, Metro Transit has fewer formal response steps for incidents that did not result in injury or damage. Additionally, the Safety & Security Division does not have efficient access to data, such as traffic tickets and customer complaints, which could help identify risks for future incidents. Lastly, while staff work to find issues that contributed to incidents, they do not capture this information in the department's incident data system, making it more difficult to identify emerging patterns.

Metro Transit provides continuing education and post-incident training to operators but does not require regular training on basic skills and safety expectations—as suggested by the Transit Cooperative Research Program—to help prevent skill loss. This reactive model of training can also create a perception among some operators that training is a form of punishment. More regular re-training could reduce this stigma and prevent future collisions and injuries.

What We Recommend

We recommend Metro Transit expand its analysis and response measures to include less severe incidents and require regular re-training for all operators.

Why This Audit Is Important

While one of the safest forms of travel, Metro Transit buses still have the potential to cause grave injuries through serious collisions. For instance, over the past four years there have been four fatalities and four debilitating injuries involving buses, even though Metro Transit found that bus operators would not have been able to prevent any of these particular incidents. In addition to the human cost, King County also risks reputational damage and has paid over $15 million in claims in the past five years. The County's insurance costs are also rising in 2022, in part because of national trends regarding collisions and rising jury awards. This is why the Office of Risk Management Services consistently regards collisions and injuries to be among the top risks to the County. The total number of collisions fell during the pandemic, but it is likely to increase again as service and traffic return to pre-pandemic levels.

This audit looks at the steps Metro Transit takes as an agency to reduce the likelihood that collisions or injuries will occur.

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Improved Data and Training Could Help Prevent Collisions and Injuries

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SECTION SUMMARY	**Metro Transit Department focuses on reviewing preventable safety incidents, but more proactive analysis, as recommended by experts, could help prevent future collisions and injuries.** Metro Transit has dedicated staff who assess thousands of incident reports every year to decide the steps the agency should take in response. Metro Transit dedicates most of its analysis to incidents where there was damage or injuries reported and that the operator may have been able to prevent. Once an incident is determined to be non-preventable or less severe, Metro Transit does not take additional steps to analyze or respond to its context or causes. The Federal Transit Administration (FTA) encourages public transit agencies to move away from reactive approaches based on collisions that have already happened, to a more proactive approach that includes responding to indicators of future potential incidents, such as near misses and risky behavior.[1]
Riding a bus is one of the safest ways to travel	**Transit is one of the safest forms of travel for passengers, but collisions and serious injuries involving a bus remain one of the largest risks to King County.** Metro Transit has processes for reporting incidents and a division that reviews every reported incident. Metro Transit requires operators to submit reports whenever there is a safety incident. While there are thousands of safety incidents reported each year, a small percentage involve serious injuries.[2] Still, incidents involving buses have the potential to cause injuries and damage and the Office of Risk Management Services includes collisions among its most serious risks to the County.

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[1] Throughout this report, we use the term "incident" to describe any event involving a Metro Transit bus where there is a possibility for damage or injury. For example, this includes collisions where the bus contacts another vehicle, a pedestrian, or an object. Incidents also include events that do not involve a collision but could involve an injury such as if a passenger falls when stepping off the bus. Metro Transit and other government and industry agencies have specific terms they use for describing different types of events.

[2] King County does not know the exact number of serious injuries due to data limitations, such as if someone did not report an injury to Metro Transit, and because the department only evaluates the severity of an incident that led to an injury if the incident was preventable.

Metro Transit focuses on more serious incidents

Metro Transit has a system in place that reviews all incidents but reserves deeper analysis for more serious incidents. While the Safety & Security Division reviews all incidents, not every incident receives the same level of scrutiny. This is because each step of the division's process filters out incidents from further analysis (see exhibit A). First, the division determines whether there were injuries or property damage. Metro Transit categorizes incidents without reported injuries or property damage as "no judgment required" (NJR) and generally does not investigate further. Staff then determine whether the operator could have prevented each incident that resulted in injuries or damage. This is not to determine fault, but rather whether the operator could have reasonably taken any action that would have prevented the incident.[3] Staff only categorize injuries or damage as minor, major, or severe if they find the incident was preventable. Staff then use these categorizations to recommend operator re-training or discipline.

EXHIBIT A: Metro Transit assesses incidents for preventability and assesses those deemed preventable for severity.
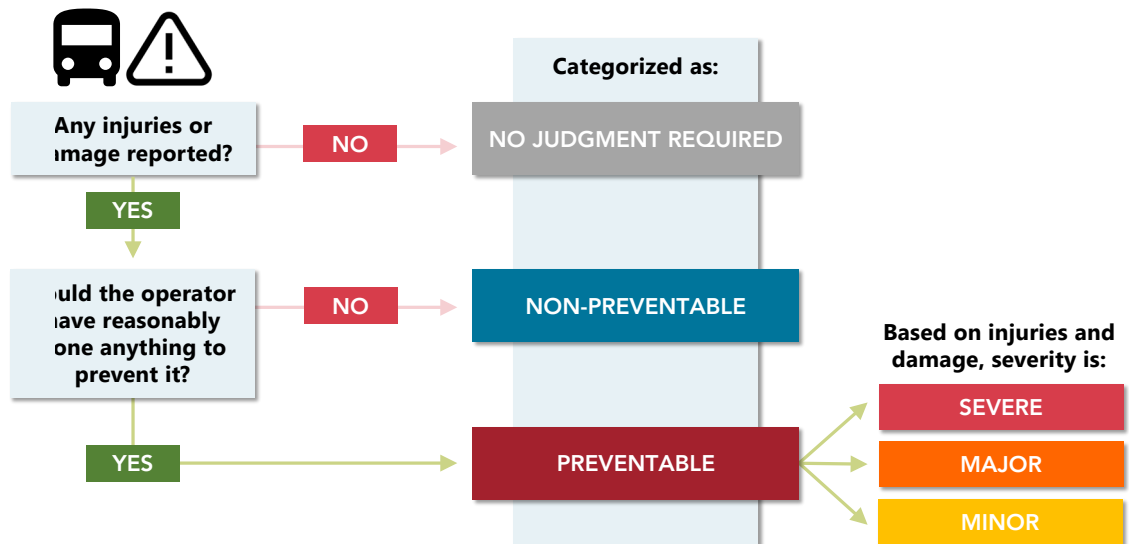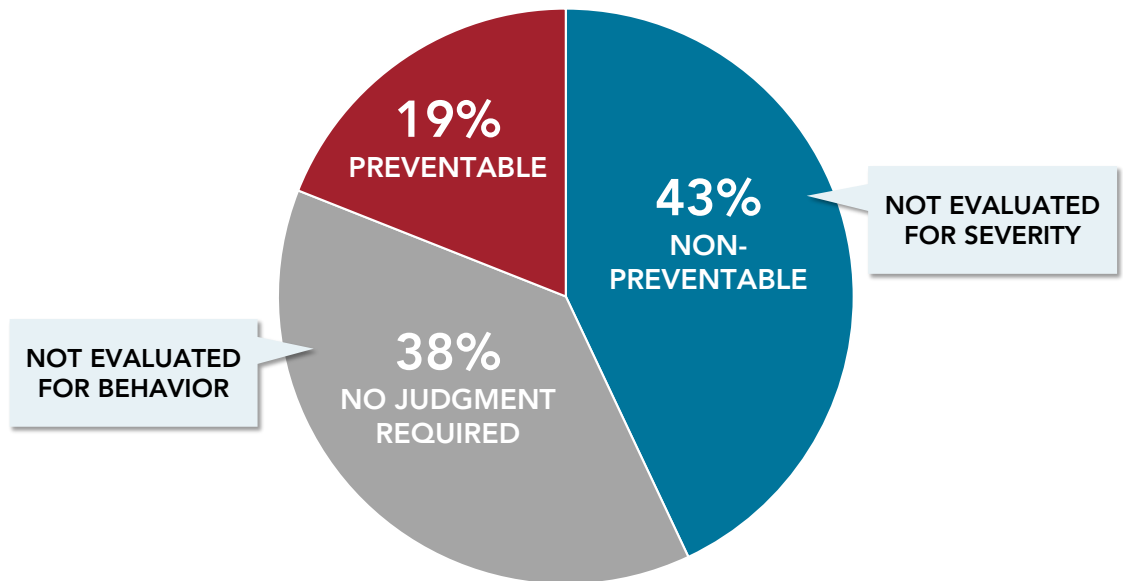

Source: King County Auditor's Office analysis of Metro Transit data

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[3] This determination is based on a national standard set by American National Standards Institute.

Broadening understanding of all incidents can help reduce future risks

By focusing on about 20 percent of all incidents, Metro Transit misses opportunities to better understand what it can do to prevent future collisions and injuries. From 2018 to 2021, Metro Transit categorized approximately 20 percent of incidents as preventable, 40 percent as non-preventable, and the remaining 40 percent as NJR. Metro Transit does not assess the severity of incidents that the operator could not prevent, and it does not assess operator behavior or other potential issues for NJR incidents (see exhibit B). Even though an individual operator might have been unable to prevent an incident, there may still be steps Metro Transit could take as an organization that might prevent future collisions and injuries. For example, some of the most serious injuries in recent years have involved pedestrians falling underneath the back end of buses. Since Metro Transit evaluated these as "non-preventable," it did not categorize incidents in which pedestrians fell under buses as "severe" the same way that they would a preventable incident. While staff did conduct initial review and investigation of these incidents, the exclusion of these types of incidents from further analysis makes it more difficult for Metro Transit to find patterns and design measures that could help prevent similar incidents in the future.

EXHIBIT B: Metro Transit evaluates a fifth of incidents for both operator behavior and injury severity.

Source: King County Auditor's Office analysis of Metro Transit data

Less severe incidents and near misses can expose risks

Metro Transit does not assess operator behavior in incidents that did not result in injuries or damages, which leaves out information that might help prevent future collisions or injuries. Staff at both Metro Transit and the Office of Risk Management Services stressed that whether an incident results in a serious injury or not can often be due to luck rather than a difference in the operator's actions. So not investigating incidents that did not result in injuries or damages may risk excluding important information about operator behavior. In practice, Safety & Security Division staff discuss patterns from these incidents informally, but these informal conversations are not part of the documented safety management system. Division staff indicated that they would prefer to fully review and gather data from all incidents, regardless of resulting injury or damage, but that they lacked the resources to do so. The FTA is encouraging transit agencies to move from reactive systems, highly focused on serious incidents, to more proactive safety management systems that analyze and respond to less serious events and near misses. Metro Transit's leadership indicated that the department would like to move toward this broader vision of safety.

Recommendation 1

The Metro Transit Department should identify and address risks for future incidents by formally analyzing and using data from all safety incidents, not just those that result in injuries or damages that the operator may have been able to prevent.

Metro Transit analyzes incident data and takes steps to reduce risks

While the Safety & Security Division analyzes data across incidents to find patterns and prevent future safety incidents, it could expand this effort to increase safety. The FTA recommends the identification, assessment, and mitigation of hazards as a key part of a modern safety management system. One way Metro Transit does this is by compiling and analyzing the locations of collisions to show frequently troublesome intersections or roadways. With this information, Metro Transit informs operators of potential hazards or works with the relevant jurisdiction to remove the hazard. Metro Transit could expand and strengthen these types of proactive efforts by incorporating more data on leading indicators, as discussed below. The Safety & Security Division currently has six staff positions that review the thousands of incidents that occur each year. The division stated that it would not have capacity to conduct deeper analysis without additional staffing, especially if it were reviewing additional incidents.

Metro Transit could improve analysis by expanding data available to the Safety & Security Division

Metro Transit does not provide efficient access to all the safety-related data it has to the Safety & Security Division, limiting its ability to identify potential hazards. The FTA recommends transit agencies broaden the scope of safety data collection and increase their focus on hazard identification across the organization. For example, the FTA lists customer complaints about unsafe operator behavior as a key source of information. However, the customer complaint system at Metro Transit is not easily accessible by Safety & Security Division staff; they have direct access to security-related complaints, but not safety-related complaints (see exhibit C). When Metro Transit receives a complaint, the complaint goes to the operator's base chief who determines, on a case-by-case basis, whether the operator needs re-training or counseling. Similarly, the Safety & Security Division does not have efficient access to information about operator traffic tickets. The Safety & Security Division would have to request the data to use it for identifying risks or trends. If the division had more efficient access to data like safety complaints and traffic violations, it would be better able to recognize potential hazards and recommend appropriate response measures to prevent future incidents.

EXHIBIT C: Metro Transit does not provide efficient access to all the safety-related data it has to the Safety & Security Division, which limits its ability to identify potential hazards.
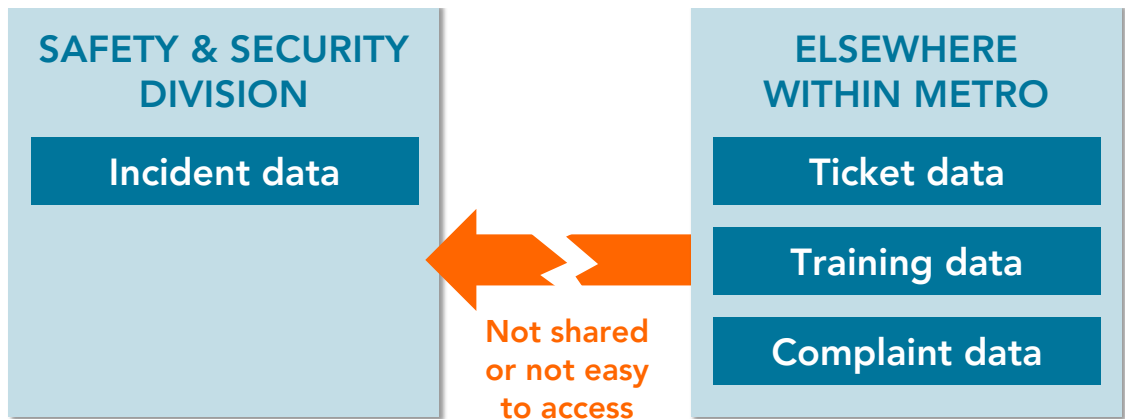
Source: King County Auditor's Office analysis

Recommendation 2

The Metro Transit Department should provide the Safety & Security Division with efficient access to safety-related data across the organization, including operator safety complaints and traffic offenses, so the division can use that data to identify potential risks.

Metro Transit does not record data on factors that cause or contribute to collisions or injuries, limiting its ability to find patterns and proactively prevent future incidents. Metro Transit collects data from both the operator's initial reports and subsequent investigations, and it keeps this data in a database. Although staff identify issues that might have caused or contributed to an incident, they do not record it in a way that would be easy to analyze. For example, Metro Transit staff identified operator fatigue as a potential cause of a collision, but fatigue is not a field in the database that Safety & Security Division staff can query. This means that while division staff can identify fatigue in individual cases, they cannot use data to show how often fatigue is a contributing factor to collisions across the agency.

Other factors that might help Metro Transit find causal patterns include:

- how long the operator had been on their shift when the incident occurred
- how recently the operator had a rest break before the incident, and how long the break was
- if the operator recently worked any overtime, and if so, how much
- if the operator was running behind schedule when the incident occurred.

These are just some examples of potential hazards or causal factors the Safety & Security Division could consider tracking, but the department does not collect data in a way that allows the division to easily analyze these factors across all incidents. Collecting and structuring this data would allow Metro Transit to better identify whether these are frequent hazards, design mitigation strategies to address them, and measure the impact of those mitigation strategies.

Recommendation 3

The Metro Transit Department's Safety & Security Division should determine and document what additional data fields would be helpful for identifying the causes of collisions and customer injuries.

Recommendation 4

The Metro Transit Department should collect the data identified in Recommendation 3 and analyze it as part of its safety management system.

Metro Transit does not require the annual refresher training recommended by the Transit Cooperative Research Program (TCRP). This may lead to operator complacency, which can increase the potential for incidents. According to the TCRP, complacency is a hazard for experienced operators since repetitive actions can lead to a loss of focus. Several of the Metro Transit base chiefs we interviewed raised the same concerns about complacency as a cause of collisions. Based on its research, the TCRP suggests that transit agencies should require annual refresher training for all

operators at a minimum to reduce complacency.[4] Over 70 percent of the transit agencies surveyed by TCRP in 2019 require refresher training for every operator at least once a year, with over a third requiring re-training multiple times per year.

While Metro Transit's Training Section provides thousands of trainings every year, including an initial training and continuing education opportunities, the department does not require any safety refresher training unless a bus operator is involved in a preventable safety incident or a chief determines it is necessary. This means some bus operators can go years without a safety refresher training. Furthermore, the connection between incidents and re-training means operators could perceive re-training as punishment, leading to disengagement with the content and less effective training outcomes. Several senior-level Metro Transit staff also expressed this concern and said that they are in the process of identifying ways to make training a standard and expected part of work at Metro Transit.

Recommendation 5

The Metro Transit Department should develop and implement annual safety refresher training on safe bus operations and require it for all operators.

Improved training data could help effectiveness

Metro Transit keeps data on trainings taken by operators, but this data is neither complete nor reliable, reducing its usefulness for analysis and decision-making. Metro Transit staff record information about training attendance for operators, but this data contains errors and lacks consistency in how staff enter training information. This means Metro Transit cannot reliably use the data to understand what information operators have been trained on and when it happened, reducing Metro Transit's ability to understand the effectiveness of its training. This is important as training can be costly to implement and it is a key tool Metro Transit uses to ensure its operators have the needed skills. Improving the reliability and consistency of its training data will allow Metro Transit to better understand the impact and cost of its trainings, so that it can make informed decisions about its requirements and offerings.

Recommendation 6

The Metro Transit Department should ensure its training data accurately captures the date and content of trainings for each operator, and it should use this data to assess the effectiveness of its trainings.

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[4] National Academies of Sciences, Engineering, and Medicine 2017. *Successful Practices and Training Initiatives to Reduce Accidents and Incidents at Transit Agencies.* Washington, DC: The National Academies Press.

Executive Response

King County

Office of Performance, Strategy and Budget
Chinook Building
401 Fifth Avenue, Suite 810
Seattle, WA 98104

April 4, 2022

Kymber Waltmunson
King County Auditor
Room 1033
C O U R T H O U S E

Dear Ms. Waltmunson:

Thank you for the opportunity to review and comment on the proposed final report *"Metro Transit: Proactive Analysis and Training Could Further Improve Safety"*. I appreciate the work your office has done on this subject as we continually seek to improve customer and operator safety in our transit system.

We concur with the audit recommendations and appreciate the thoughtful suggestions on how to improve our data collection and training to become more effective in providing effective training to employees to make our system safer. I also appreciate your acknowledgement that the recommended improvements do not mean that Metro staff are not already doing good work in collision and injury prevention, especially with the challenge that we've faced with the COVID-19 pandemic.

King County has one of the premier transit agencies in the nation and our long game includes continually improving our data analyses, decision-making and measuring performance. Implementation of your recommendations will help us continue our work to improve our operations. Our employees and our customers deserve safe and reliable transportation and these recommendations will help us make improvements in areas that make our system safer and more reliable.

Metro, along with other King County agencies, continues to improve our data systems and analyses to improve our operations. To implement the recommendations in this report, Metro will need to be thoughtful in how we determine and collect the data that is needed. This may require revisions to existing data systems or the creation of new data sources. While this will take some time for us time to implement, we will begin to act immediately on other recommendations.

Metro has almost 2,600 transit operators and the logistics of getting everyone through annual refresher training has had mixed success in the past. As we look at your recommendations, we are redoubling our efforts in this area and will be developing training while we get staff in place to do the training and operators in place to ensure that service will continue while operators receive training. Full implementation of this recommendation is not likely to occur until 2024 as we work through the processes and staffing needed to ensure success.

Thank you again for your important work on behalf of King County. If you have any questions regarding our audit response, please contact Dwight Dively, Chief Operating Officer and Director, Office of Performance, Strategy and Budget at 206-263-9687.

Sincerely,

Dwight Dively
Chief Operating Officer

Enclosure

Cc: King County Councilmembers
                ATTN: Janine Weihe, Acting Chief of Staff
                            Melani Pedroza, Clerk of the Council
        April Putney, Deputy Executive
        Shannon Braddock, Chief of Staff, Office of the Executive
        Karan Gill, Deputy Chief of Staff, Office of the Executive
        Terry White, Director, Metro Transit Department (MTD)
        Michelle Allison, Deputy Director, MTD
        DeAnna Martin, Chief of Staff, MTD

Recommendation 1

The Metro Transit Department should identify and address risks for future incidents by formally analyzing and using data from all safety incidents, not just those that result in injuries or damages that the operator may have been able to prevent.

Agency Response	
Concurrence	**CONCUR**
Implementation date	4th Quarter 2024
Responsible agency	Metro Transit
Comment	Metro will need to scope and develop data analysis tools to support this work and/or increase the workforce to perform required analysis which could require budget decisions that will be outside of the 2023-2024 biennium.

Recommendation 2

The Metro Transit Department should provide the Safety & Security Division with efficient access to safety-related data across the organization, including operator safety complaints and traffic offenses, so the division can use that data to identify potential risks.

Agency Response	
Concurrence	**CONCUR**
Implementation date	6/2024
Responsible agency	Metro Transit
Comment	To accomplish this, Metro will be conducting a data needs assessment and identifying whether and where data current exists in current systems. Once that analysis is completed, Metro will work to bring existing data in TBird or other reporting tools.

Recommendation 3

The Metro Transit Department's Safety & Security Division should determine and document what additional data fields would be helpful for identifying the causes of collisions and customer injuries.

Agency Response	
Concurrence	**CONCUR**
Implementation date	1/1/2023
Responsible agency	Metro Transit
Comment	Dedicated work effort from Operational Safety SMEs and Base Ops Management to identify required needed information will be part of the data needs assessment conducted as part of Recommendation #2.

Recommendation 4

The Metro Transit Department should collect the data identified in Recommendation 3 and analyze it as part of its safety management system.

Agency Response	
Concurrence	**CONCUR**
Implementation date	6/2024
Responsible agency	Metro Transit
Comment	Consistent with Recommendation #2, existing data sources will be interfaced to reporting systems and new/revised systems will be identified to collect data that may not already exist. Creation and implementation of new systems will likely extend this beyond 2024.

Recommendation 5

The Metro Transit Department should develop and implement annual refresher training on safe bus operations and require it for all operators.

Agency Response	
Concurrence	**CONCUR**
Implementation date	Starting in March 2023, Metro will start assigning all operators to the 8 hour Continuing Education Training with the objective that the training will be completed by the end of 2024.
Responsible agency	Metro Transit
Comment	With our current Operator and First-line supervisor shortage, we do not have the ability at this time to start these trainings. With additional First-line Supervisors graduating in late 2023 and early 2024 (as well as increased operator counts) Bus Operations will then be able to aggressively start completing these trainings.

Recommendation 6

The Metro Transit Department should ensure its training data accurately captures the date and content of trainings for each operator, and it should use this data to assess the effectiveness of its trainings.

Agency Response	
Concurrence	**CONCUR**
Implementation date	12/2024
Responsible agency	Metro Transit
Comment	A content management system may be necessary to accomplish the task of capturing content for each class an operator attends. At this time Bus Operations does not have such a database. In addition, Metro is working with HRD to include requirements in the new Learning Management System so that training attendance can be tracked and reported centrally.

Statement of Compliance, Scope, Objective & Methodology

Statement of Compliance with Government Auditing Standards

We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Scope of Work on Internal Controls

We assessed internal controls relative to the audit objectives. We assessed the extent to which the King County Metro Transit Department has controls in place to prevent and respond to safety incidents involving buses, including collisions and injuries.

Scope

This audit examined Metro Transit's safety program and efforts to reduce collisions and passenger injuries involving its coach operations. We examined collisions and passenger injuries between 2017 and 2021.

Objectives

1. What has been the incidence and severity of collisions and passenger injuries involving Metro Transit coaches since 2016, and what elements have contributed to those collisions and injuries?

2. What steps has Metro Transit taken to address the elements contributing to collisions and injuries involving coaches?

Methodology

We reviewed key department documents, including Metro Transit's policies, procedures, and agency goals related to safety and bus operations, including its Operator's Rules & Procedures, Preventable Accident Review System, Agency Safety Plan, and labor contract with operators. We interviewed knowledgeable staff from the Safety & Security Division, Bus Operations Division, and departmental leadership on relevant topics and internal controls, such as how Metro Transit:

- ensures it knows about safety incidents

- investigates, collects, and uses data on safety incidents

- trains operators on safe driving skills, policies, and procedures

- includes safety as a factor in its bus procurement process

- implements its drug and alcohol testing program

- conducts coaching and discipline procedures related to safety risks.

We collected and analyzed Metro Transit's incident data from 2017–2021. We looked at trends in incidents over time, including analyzing incidents by operator tenure and age, location of incident, time of day, timing around major route and schedule changes (shake-ups), among others. We normalized

incident data using Metro Transit's data on mileage and hours of bus operations. We also conducted qualitative analysis of descriptive information about incidents. We gathered and assessed Metro Transit's data on operator training.

We reviewed requirements, research, and guidance from federal agencies like the Transit Cooperative Research Program and Federal Transit Administration as well as industry organizations like the American Public Transportation Association. We also interviewed staff and reviewed data from relevant county agencies such as the Office of Risk Management Services and Safety & Claims.

List of Recommendations

Recommendation 1

The Metro Transit Department should identify and address risks for future incidents by formally analyzing and using data from all safety incidents, not just those that result in injuries or damages that the operator may have been able to prevent.

Recommendation 2

The Metro Transit Department should provide the Safety & Security Division with efficient access to safety-related data across the organization, including operator safety complaints and traffic offenses, so the division can use that data to identify potential risks.

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KYMBER WALTMUNSON, KING COUNTY AUDITOR

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AUDIT   This audit product conforms to the GAGAS for independence, objectivity, and quality.