Bus Safety Data Report

Bus Transit Safety Data 2008–2016

November 2018

U.S. Department of Transportation
Federal Transit Administration

This page intentionally left blank

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1. REPORT DATE	2. REPORT Type	3. DATES COVERED *(From - To)*
11-2018		2008 – 2016

4. TITLE AND SUBTITLE
Bus Safety Data Report: Bus Transit Safety Data 2008–2016

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
Federal Transit Administration

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)

11.SPONSORING/ MONITORING AGENCY REPORT NUMBER

12. DISTRIBUTION AVAILABILITY STATEMENT

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The Bus Safety Data Report (BSDR) is a data analysis prepared by the Federal Transit Administration (FTA). The goal of the BSDR is to present and summarize bus transit safety and security event data with a focus on patterns and trends in event, fatality, and injury data within the report's period of study. This BSDR presents data reported through the National Transit Database (NTD) program for the years 2008 through 2016. This report highlights totals and rates from 2016, the most recent year of data available for analysis, and provides trends across the nine-year study period.

15. SUBJECT TERMS
Bus Transit; National Transit Database; Industry Trends; Bus Collision Type; Safety Event Type; Bus Fatalities; Bus Injuries; Bus Safety Events

16. SECURITY CLASSIFICATION OF			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE		64	19b. TELEPHONE NUMBER (*Include area code)*

This page intentionally left blank

Table of Contents

Table of Figures

Table of Tables

Executive Summary

This Bus Safety Data Report (BSDR) is a data analysis prepared by the Federal Transit Administration (FTA) to illustrate bus transit safety outcomes and present trends and patterns in bus safety and security event data. This BSDR focuses on safety outcomes in 2016 and trends in the data between 2008 and 2016. The FTA plans to publish additional BSDRs as future annual transit safety data become available.

The data used in the BSDR come from the FTA's National Transit Database (NTD). The NTD program requires all recipients of the FTA's Urbanized Area Formula Grants (§5307) and all general rural transit and tribal transit recipients of the FTA's Formula Grants for Rural Areas (§5311) to report safety event data.

As of 2016, the FTA requires NTD reporters to submit data on all events resulting in a fatality, one or more injuries, $25,000 or more in property damage, fire suppression, a life safety evacuation, or a collision requiring towing for at least one vehicle. See Appendix A for precise definitions and thresholds. During the analyzed period, the FTA changed these thresholds, affecting the frequency with which agencies reported certain types of events. To ensure definitional and threshold consistency, we have limited certain analyses in this BSDR to specific timeframes within the analyzed period.

The following pages (vi–xi) present summary data from the BSDR. The report introduction and the presentation of detailed safety data begin on page 1, after the Executive Summary.

Events, Fatalities, and Injuries

In 2016, NTD bus transit operators reported

- **15,185 events** that resulted in
  - **117 fatalities** and
  - **17,492 injuries**.

All three of these annual totals increased between 2015 and 2016.

- Events increased 3.8% and averaged an increase of 5.0% per year after 2011.[a, b]
- Fatalities increased 1.7% and averaged an increase of 1.1% per year after 2008.
- Injuries increased 0.7% and averaged an increase of 0.7% per year after 2008.

Figure 1. Total Events, Fatalities, and Injuries and Rates per 100M VRM

However, when we adjust for the increasing levels of bus service provided over the period, we see slightly different trends.

- The 2016 event rate of 424.39 per 100 million Vehicle Revenue Miles (100M VRM) shows an increase of 2.2% from 2015, with an average annual increase of 3.0% per year after 2011.[a]
- In 2016 there were 3.27 fatalities per 100M VRM. Although this was a slight 0.2% increase from the 2015 rate, there was an average decrease of 0.4% per year from 2008 to 2016.
- The 2016 rate of 488.87 injuries per 100M VRM decreased a slight 0.9% from 2015, with an average annual decrease of 0.9% between 2008 and 2016.

[a] Starting in 2011, FTA stopped collecting occurrences of non-major security events, which affected reported events from that year on. Because of this, 2011 is the first year of comparable reporting for events.

[b] Starting in 2015, FTA required agencies to report all collisions resulting in towing. This new requirement led to more reportable events, accounting for about 57% of the increase seen between 2014 and 2015.

Reporter Type

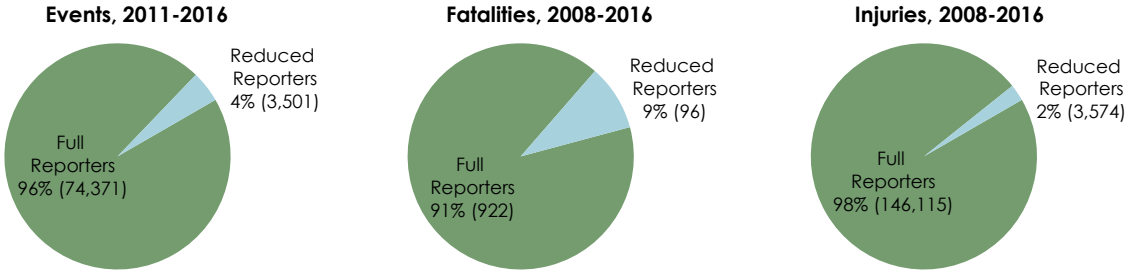


Figure 2. Comparison of Safety Data Volume from Full and Reduced Reporters

- The FTA requires more detailed event reporting from large §5307 agencies than smaller §5307 agencies and §5311 agencies in order to relieve some reporting burden for smaller operators (Reduced Reporters). Appendix B has more details on how event reporting requirements vary.

The following analyses include all events submitted by Full Reporters.

Fatalities and Injuries by Person Type

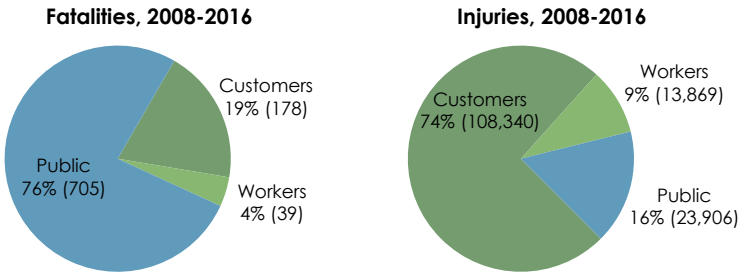


Figure 3. Full Reporter Fatalities and Injuries by Person Type

- 24% of transit fatalities in the analysis period were transit customers and workers. The public, which includes pedestrians, bicyclists, and occupants of other vehicles, accounted for 76% of fatalities.
- 84% of transit injuries in the analysis period were transit customers and workers. The public represented 16% of reportable injuries.

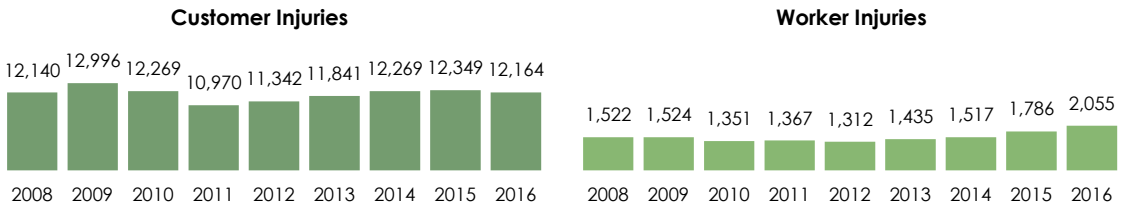


Figure 4. Trends in Full Reporter Customer and Worker Injuries

- Bus worker injury totals increased at a faster pace than customer injuries.

Modal Comparison

The following three charts compare data from fixed-route bus modes with data from demand-response modes. See Appendix A for precise definitions of these mode categories.

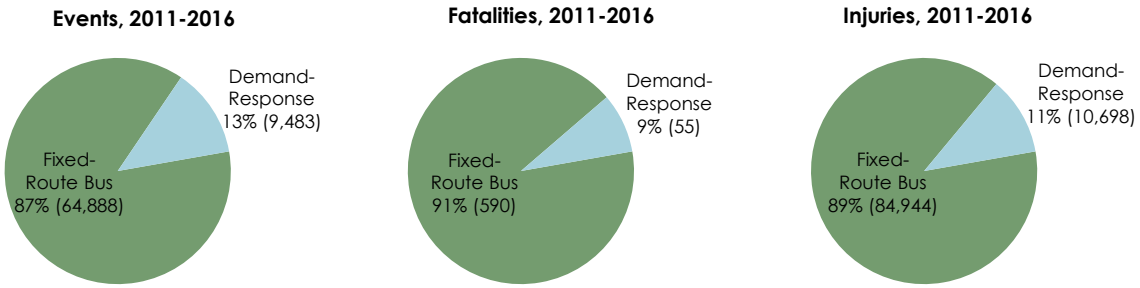


Figure 5. Comparison of Full Reporter Events, Fatalities, and Injuries by Mode

- From 2011 to 2016, most events (87.2%), fatalities (91.5%), and injuries (88.8%) occurred on fixed-route bus modes.

Event Types

The following charts compare data from different types of events — collisions, security events, fires, and all "other" events. See Appendix A for precise definitions of these event types.

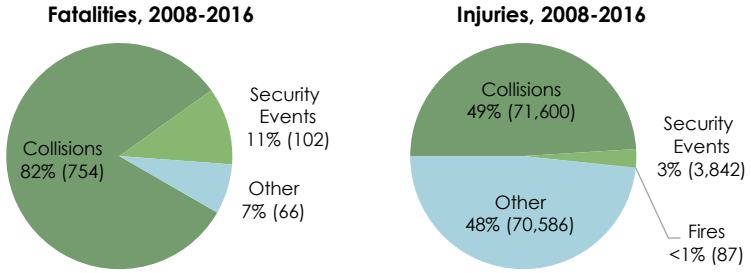


Figure 6. Full Reporter Fatalities and Injuries by Event Type

- Most fatalities resulted from collisions.
- A large portion of injuries also resulted from collisions (49%), but a comparable number resulted from "other" events, which include slips, trips, falls, electric shocks, and smoke events.

Collision Fatalities and Injuries

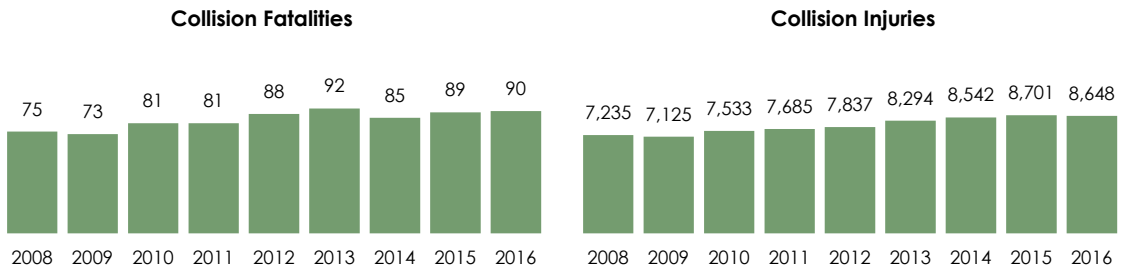


Figure 7. Trends in Full Reporter Collision Fatalities and Injuries

- Both fatalities and reported injuries resulting from collisions increased at an average rate of around 2.0% per year between 2008 and 2016.
- Adjusting for increased service levels, the collision fatality rate and collision injury rate increased by an annual average of 1.6% per year during this time.

Collision Types Resulting in Fatalities and Injuries

The following charts examine fatalities and injuries from different types of collisions. See Appendix A for precise collision type definitions.

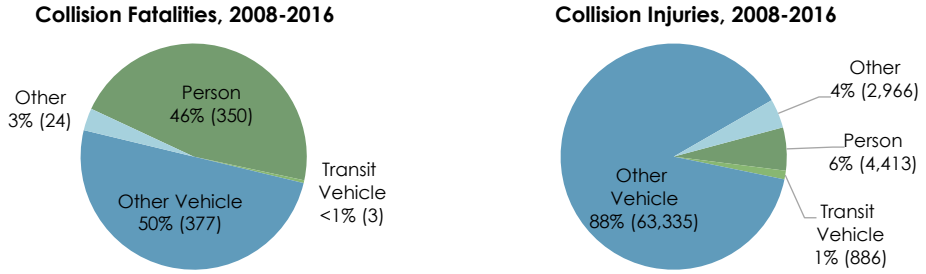


Figure 8. Full Reporter Collision Fatalities and Injuries by Collision Type

- 96% of collision fatalities resulted from collisions between transit vehicles and either persons or non-transit vehicles.
- A large majority (88%) of collision injuries resulted from collisions between transit vehicles and non-transit vehicles.

Trends in Collision Types Resulting in Fatalities and Injuries

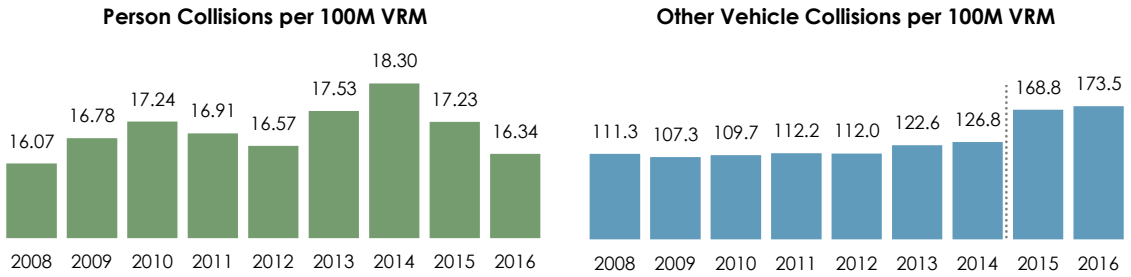


Figure 9. Trends in Full Reporter Person and Other Vehicle Collisions[a]

- The 2016 transit vehicle-to-person collision rate (per 100M VRM) decreased 5.2% from 2015, with an average annual increase of 0.2% per year since 2008.
- Collisions between transit vehicles and non-transit vehicles per 100M VRM increased by 2.7% between 2015 and 2016.
- In 2015, the FTA began requiring agencies to report all collisions involving transit vehicles when a vehicle needs to be towed. Previously, this fact alone did not require an event report. This new requirement increased the number of reportable collisions compared to previous years.

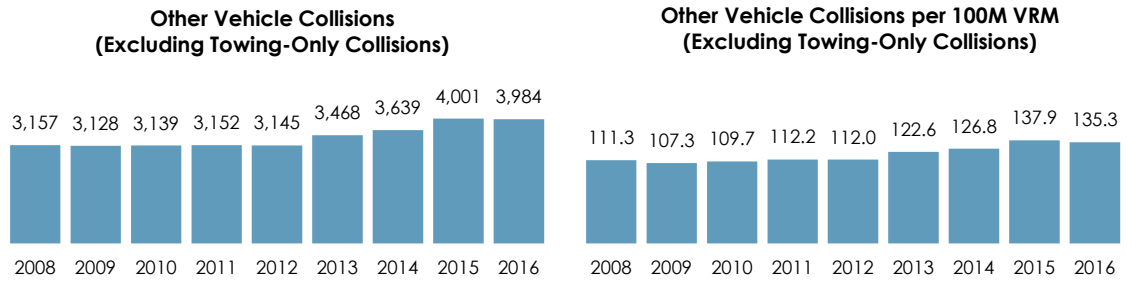


Figure 10. Trends in Other Vehicle Collisions and Rate per 100M VRM Excluding Collisions Reportable Solely from Towing

- Excluding collisions reported solely due to the towed-vehicle reporting policy change, collisions between transit vehicles and non-transit vehicles increased an average of 2.6% per year during the analyzed period.
- Agencies reported these collisions more frequently per 100M VRM during the analyzed period. The rate increased an average of 2.2% per year from 2008 to 2016.

[a] Starting in 2015, FTA required agencies to report all collisions resulting in towing. This new requirement led to more reportable events, accounting for about 57% of the increase seen between 2014 and 2015.

"Other" Event Occurrences and Injuries

The charts below show trends in slips, falls, and other events and their resulting injuries.

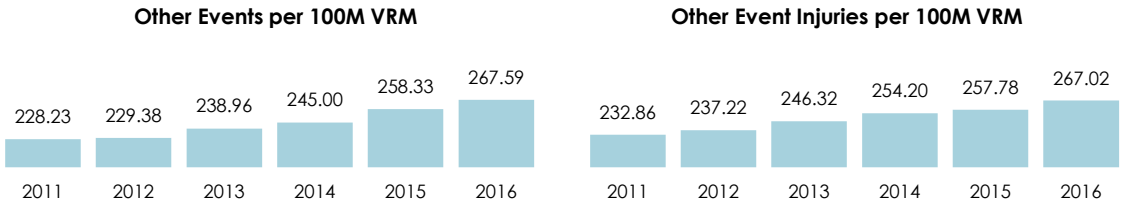


Figure 11. Trends in "Other" Event Occurrences and Resulting Injuries

- Both occurrences per 100M VRM (2.7%) and resulting injuries per 100M VRM (2.3%) increased between 2011 and 2016.[a]

Security Event Fatalities and Injuries

The following charts present the distribution and trends of fatalities and injuries by security event type. See Appendix A for precise definitions of security event types.

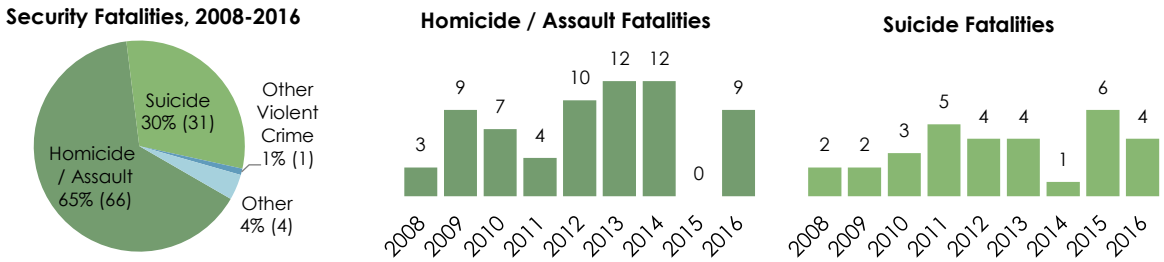


Figure 12. Full Reporter Security Fatalities by Security Event Type

- Most (95%) security event fatalities resulted from either homicides or suicides.
- There was an average of 7.3 homicide fatalities and 3.4 suicide fatalities per year.

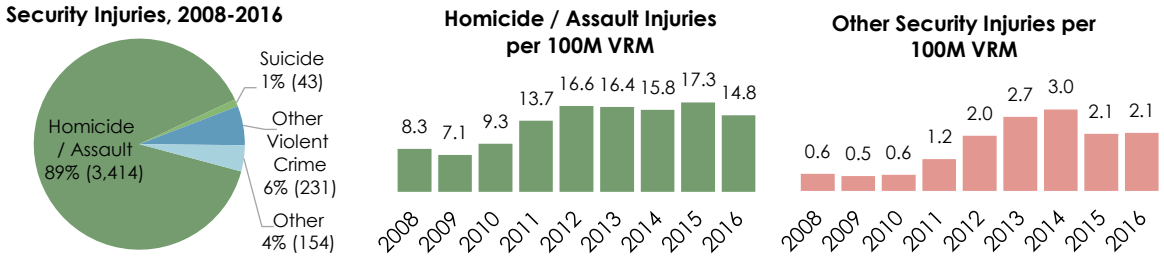


Figure 13. Full Reporter Security Event Injuries by Security Event Type

- Most (89%) security event injuries resulted from assaults. Assault injuries per 100M VRM increased at an average rate of 6.6% per year from 2008 to 2016.

[a] Starting in 2011, FTA stopped collecting occurrences of non-major security events, which affected reported events from that year on. Because of this, 2011 is the first year of comparable reporting for events.

Introduction

The Bus Safety Data Report (BSDR) is a data analysis prepared by the Federal Transit Administration (FTA). The goal of the BSDR is to present and summarize bus transit safety and security event data with a focus on patterns and trends in event, fatality, and injury data within the report's period of study. This BSDR presents data reported through the National Transit Database (NTD) program for the years 2008 through 2016. This report highlights totals and rates from 2016, the most recent year of data available for analysis, and provides trends across the nine-year study period.

Industry Overview

The BSDR includes data from all bus transit providers that report to the NTD. The bus transit NTD reporters include:

- Recipients or beneficiaries of the FTA's Urbanized Area Formula Grants (§5307), including local transit operators that provide service within Urbanized Areas (UZAs);
- Recipients or beneficiaries of the FTA's Formula Grants for Rural Areas (§5311), including States[1] reporting on behalf of rural transit agencies and Indian tribes; and
- Voluntary NTD reporters that do not receive the program funds listed above (voluntary reporters may be public or private and may operate in either urban or rural areas).

The BSDR does not include NTD data from rail transit modes or ferryboat systems. For the purposes of the BSDR, the data are limited to "bus modes" (rubber-tired motor vehicles operating on roadways). Please see Appendix A for a detailed breakdown of the NTD modes included in the BSDR.

The public can access summaries of NTD safety and security data through the NTD website (https://transit.dot.gov/ntd).

What Is NTD Safety and Security Data?

NTD reporters provide data on safety and security events related to their operations that surpass at least one of the following thresholds:

- A fatality resulting from the event occurs within 30 days,

[1] "States" include the 50 States of the United States, the District of Columbia, Puerto Rico, the Northern Mariana Islands, Guam, American Samoa, and the Virgin Islands.

- One or more persons are injured as a result of the event and require immediate transport for medical attention,
- The estimated property damage from the event is at least $25,000,
- At least one motor vehicle is towed away from the scene of a collision event,
- A fire requires suppression, or
- An evacuation is made due to potentially life-threatening conditions.

Please see Appendix A for a more detailed explanation of event reporting thresholds.

Limitations of This Analysis

This report presents analyses that reflect safety and service data as reported to the NTD program. Although the FTA considers 2016 data final at the time of this report's publication, NTD reporters may still request data revisions to correct an inaccurate report.

All analyses in this report provide descriptive statistics illustrating the distribution and trends in bus transit safety outcomes between 2008 and 2016. This report does not estimate or otherwise draw conclusions on safety outcomes beyond 2016.

2016 Bus Transit Industry Data and Annual Trends

Total Bus Transit VRM (Billions)

3.58
Billion VRM

2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
3.12	3.22	3.18	3.19	3.24	3.26	3.46	3.52	3.58	**3.31**	

Figure 14. Total VRM (Billions)

- Transit agencies provided 3.58 billion VRM of bus service in 2016. That figure reflects a 1.6% increase from 2015 and 1.5% average annual increase since 2008.

Total Events and Rates per 100M VRM

15,185
Events

2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
39,609	44,810	40,186	11,316	11,538	12,232	12,970	14,631	15,185	**22,497.4**	

424.39
Per 100M VRM

2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
1,267.83	1,391.63	1,264.17	355.21	356.57	374.69	374.56	415.32	424.39	**680.07**	

Figure 15. Total Events and Rates per 100M VRM[a, b]

- Bus transit agencies reported 15,185 events to the NTD for 2016. This reflects a 3.8% increase from 2015. On a per vehicle revenue mile basis, the 2016 event rate was 2.2% greater than 2015.
- Between 2011 and 2016,[a] events reported to the NTD increased at an average rate of 5.0% per year. When standardizing by vehicle miles, this is equivalent to an average increase of 3.0% per year.
- When we exclude events that are reported solely due to the towed-vehicle threshold change,[b] the average increase was 3.6% per year for events and 1.6% per year for events per 100M VRM during this time period.

[a] Starting in 2011, FTA stopped collecting occurrences of non-major security events, which affected reported events from that year on. Because of this, 2011 is the first year of comparable reporting for events.

[b] Starting in 2015, FTA required agencies to report all collisions resulting in towing. This new requirement led to more reportable events, accounting for about 57% of the increase seen between 2014 and 2015.

Total Fatalities and Rates per 100M VRM

117
Fatalities

2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
106	97	103	104	131	135	110	115	117	**113.1**	

3.27
Per 100M VRM

2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
3.39	3.01	3.24	3.26	4.05	4.14	3.18	3.26	3.27	**3.42**	

Figure 16. Total Fatalities and Rates per 100M VRM

- Bus transit agencies reported 117 fatalities resulting from reportable events in 2016, a 1.7% increase from the previous year and a 1.1% average annual increase since 2008.
- When measured per vehicle revenue mile, the fatality rate for 2016 was 0.2% higher than in 2015 but reflects a 0.4% average annual decrease since 2008.

Total Injuries and Rates per 100M VRM

17,492
Injuries

2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
16,495	17,868	16,976	14,953	15,435	16,218	16,873	17,379	17,492	**16,632.1**	

488.87
Per 100M VRM

2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
527.98	554.91	534.03	469.37	477.00	496.79	487.28	493.33	488.87	**502.77**	

Figure 17. Total Injuries and Rates per 100M VRM

- Bus transit agencies reported 17,492 injuries resulting from reportable events in 2016, 0.7% more than reported in 2015. However, the rate of 488.87 injuries per 100M VRM traveled was 0.9% lower than the comparable 2015 figure.
- Between 2008 and 2016, reportable injuries increased at an average pace of 0.7% per year. The injury rate per 100M revenue miles decreased at a pace of 0.9% per year during that same timeframe.

Full vs. Reduced Event Reporting

The level of detail required in NTD safety and security event reporting varies depending on transit agency characteristics.

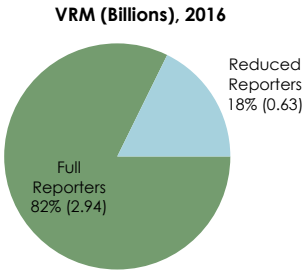
To reduce the burden on small operators, the NTD does not require the smallest transit agencies with to report at the same level of detail as larger agencies. These "Reduced Reporters" are generally small §5307 recipients (with fleets of fewer than 30 vehicles) and §5311 agencies. Reduced Reporters only provide annual totals of events, fatalities, and injuries. They do not submit additional information that would support more comprehensive analyses. The BSDR includes 2016 data from 1,681 Reduced Reporters.

The FTA requires more detailed event reporting from large §5307 agencies. The FTA calls the large §5307 group "Full Reporters." Currently, the FTA requires Full Reporters to provide the NTD with detailed reports of each event surpassing a major reporting threshold and monthly summaries of non-major events. Appendix B provides a detailed explanation of the criteria used to delineate major and non-major events. The BSDR includes 2016 data from 506 Full Reporters.

Voluntary reporters must meet the same reporting obligations as mandatory reporters (either full or reduced). Appendix B provides the criteria the NTD program uses to determine the required level of reporting detail.

The following section provides detail on the proportion of safety data that falls under either full or reduced reporting requirements and trends in data at each reporting level between 2008 and 2016. **Starting with the section "Full Reporter Agency Events," analyses are based on the data from detailed event reports and are therefore limited to Full Reporters.**

Total Bus Transit VRM (Billions) by Reporting Requirements

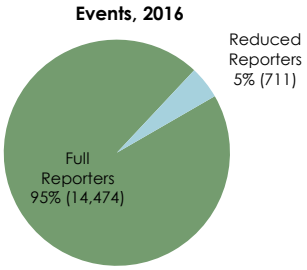


	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Full Reporters	2.84	2.91	2.86	2.81	2.81	2.83	2.87	2.90	2.94	**2.86**	
Reduced Reporters	0.29	0.31	0.32	0.38	0.43	0.44	0.59	0.62	0.63	**0.44**	

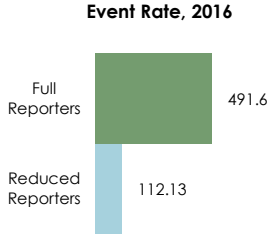
Figure 18. VRM (Billions) by Reporting Requirements

- Full Reporter bus transit agencies provided over 80% of VRM in 2016.
- The amount of bus service that falls under reduced reporting requirements has increased. Reduced Reporter bus VRM in 2016 was 300M higher than in 2008.[a]

Events and Rates per 100M VRM by Agency Reporting Requirements



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Full Reporters	38,681	44,406	39,889	11,006	11,034	11,739	12,211	13,907	14,474	**21,927.4**	
Reduced Reporters	928	404	297	310	504	493	759	724	711	**570.0**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Full Reporters	1,363.1	1,523.8	1,394.7	391.8	393.1	415.0	425.6	479.2	491.6	**765.7**	
Reduced Reporters	323.89	132.14	93.19	82.29	117.55	113.16	127.84	116.64	112.13	**128.23**	

Figure 19. Events by Agency Reporting Requirements and Rates per 100M VRM[b, c]

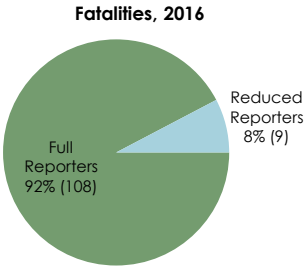
- Full Reporters accounted for over 97% of the events reported to NTD between 2008 and 2016.

[a] In 2011, §5307 recipients operating between 10 and 30 vehicles became eligible for reduced reporting, increasing the share of VRM reported by Reduced Reporters.

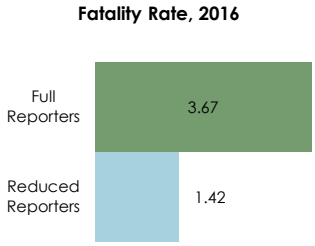
[b] Starting in 2011, FTA stopped collecting occurrences of non-major security events, which affected reported events from that year on. Because of this, 2011 is the first year of comparable reporting for events.

[c] Starting in 2015, FTA required agencies to report all collisions resulting in towing. This new requirement led to more reportable events, accounting for about 57% of the increase seen between 2014 and 2015.

Fatalities and Rates per 100M VRM by Agency Reporting Requirements



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Full Reporters	88	91	98	96	115	123	101	102	108	**102.4**	
Reduced Reporters	18	6	5	8	16	12	9	13	9	**10.7**	

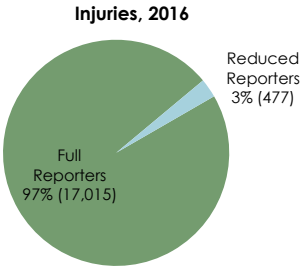


	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Full Reporters	3.10	3.12	3.43	3.42	4.10	4.35	3.52	3.51	3.67	**3.58**	
Reduced Reporters	6.28	1.96	1.57	2.12	3.73	2.75	1.52	2.09	1.42	**2.40**	

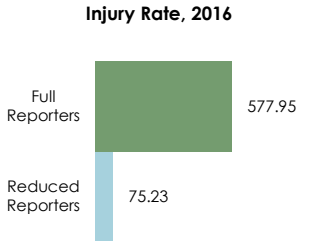
Figure 20. Fatalities by Agency Reporting Requirements and Rates per 100M VRM

- Full Reporters accounted for over 90% of bus fatalities in 2016. The 2016 Reduced Reporter fatality rate (1.42) was less than half the Full Reporter rate (3.67).

Injuries and Rates per 100M VRM by Agency Reporting Requirements



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Full Reporters	16,283	17,555	16,635	14,659	15,026	15,814	16,378	16,750	17,015	**16,235.0**	
Reduced Reporters	212	313	341	294	409	404	495	629	477	**397.1**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Full Reporters	573.82	602.39	581.61	521.85	535.28	559.02	570.86	577.17	577.95	**566.95**	
Reduced Reporters	73.99	102.38	106.99	78.04	95.39	92.73	83.38	101.34	75.23	**89.34**	

Figure 21. Injuries by Agency Reporting Requirements and Rates per 100M VRM

- Full Reporters accounted for over 90% of bus injuries in 2016. The Full Reporter injury rate was over six times higher than the Reduced Reporter rate that year.

Full Reporter Agency Events

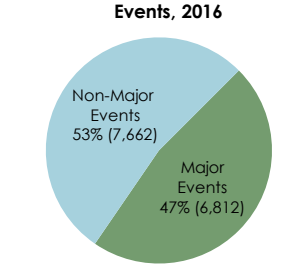
Full Reporter agencies report safety and security event details to the NTD in sufficient detail to allow a deeper analysis of events. This section of the BSDR presents events based on severity, and fatalities and injuries based on the type of individual that sustained the fatality or injury. The following sections also present Full Reporter safety and security event data by other criteria, including mode, event type, collision type, and security event type. **The following sections do not include data from Reduced Reporters since Reduced Reporter data are not collected in a way that supports these detailed analyses.**

NTD groups reportable events into these two categories:

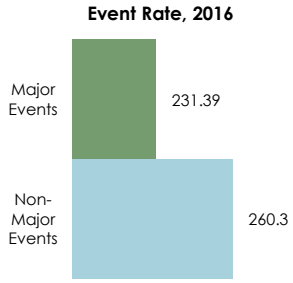
- **Major events:** The FTA requires agencies to provide detailed individual reports on each event.
- **Non-major events:** The FTA requires agencies to provide monthly event, injury, and fatality summaries.

Appendix B provides a full account of what criteria the NTD program uses to determine the required level of reporting detail.

Events and Rates per 100M VRM by Event Severity



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Major Events	4,341	4,143	4,229	4,421	4,493	4,905	5,114	6,614	6,812	**5,008.0**	
Non-Major Events	34,340	40,263	35,660	6,585	6,541	6,834	7,097	7,293	7,662	**16,919.4**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Major Events	152.98	142.16	147.86	157.38	160.06	173.39	178.25	227.90	231.39	**174.89**	
Non-Major Events	1,210.2	1,381.6	1,246.8	234.4	233.0	241.6	247.4	251.3	260.3	**590.9**	

Figure 22. Events by Event Severity and Rates per 100M VRM[a, b]

- Slightly less than half of the events reported to the NTD in 2016 were major events, which include all collisions, security events, and fires that involve a fatality, injury, $25,000 in property damage, an evacuation for life safety purposes, or a towaway.

- Excluding major events reported solely due to the vehicle-towing threshold change,[b] there were over 1,000 more major events in 2016 compared to 2008, with an increase at an average annual rate of 2.9%. The major event rate averaged an increase of 2.5% a year, from 152.98 per 100M VRM in 2008 to 191.41 in 2016.

- Agencies reported an increasing number of non-major events between 2011 and 2016;[a] these totals increased by an average of 2.6% each year during that time. When adjusted for changing service levels, the non-major event rate increased from 234.4 per 100M VRM to 260.3 in the same timeframe, an average annual increase of 1.8%.

[a] Starting in 2011, FTA stopped collecting occurrences of non-major security events, which affected reported events from that year on. Because of this, 2011 is the first year of comparable reporting for events.

[b] Starting in 2015, FTA required agencies to report all collisions resulting in towing. This new requirement led to more reportable major events, accounting for 63% of the increase seen between 2014 and 2015.

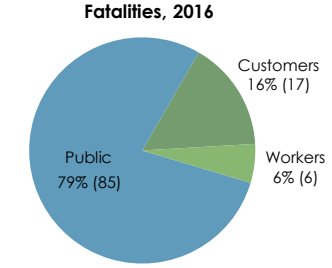
Fatality and Injury Person Types

In their event reports to the NTD program, agencies categorize fatalities and persons injured. These data can be analyzed to determine the frequency and trends of fatalities and injuries sustained by the following types of individuals:

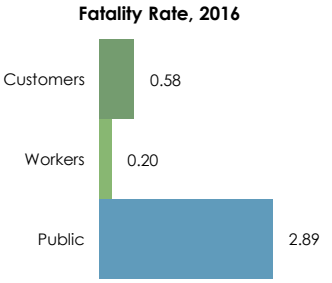
- **Customers**, including all passengers and patrons on transit property;
- **Workers**, including bus transit agency employees and contractors; and
- **Public**, including pedestrians, bicyclists, drivers or passengers of other motor vehicles, and individuals committing or attempting suicide.

Appendix A provides greater detail about how the FTA analysts created the above groups based on NTD safety and security event data.

Fatalities and Rates per 100M VRM by Person Type



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Customers	15	19	17	17	29	32	24	8	17	**19.8**	
Workers	3	7	3	3	4	7	5	1	6	**4.3**	
Public	70	65	78	76	82	84	72	93	85	**78.3**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Customers	0.53	0.65	0.59	0.61	1.03	1.13	0.84	0.28	0.58	**0.69**	
Workers	0.11	0.24	0.10	0.11	0.14	0.25	0.17	0.03	0.20	**0.15**	
Public	2.47	2.23	2.73	2.71	2.92	2.97	2.51	3.20	2.89	**2.74**	

Figure 23. Fatalities by Person Type and Rates per 100M VRM

- Taken together, customers and workers accounted for fewer than one out of every four fatalities reported to the NTD in 2016. Over 75% of fatalities were in the public type, including pedestrians and occupants of other vehicles.

- The number of customer fatalities fluctuated throughout the analyzed period and was relatively low throughout compared to the public category. There was less than one reported customer fatality per 100M VRM traveled in all analyzed years except 2012 and 2013.

- The number of worker fatalities was similarly low and fluctuates throughout the analyzed period. Between 2008 and 2016, agencies reported one or fewer fatalities per 400M VRM traveled each year.

- Reports of fatalities sustained by the public increased slightly, with 15 more fatalities reported in 2016 than 2008. The rate of these fatalities per 100M VRM traveled increased at an average rate of 1.8% per year during this timeframe.

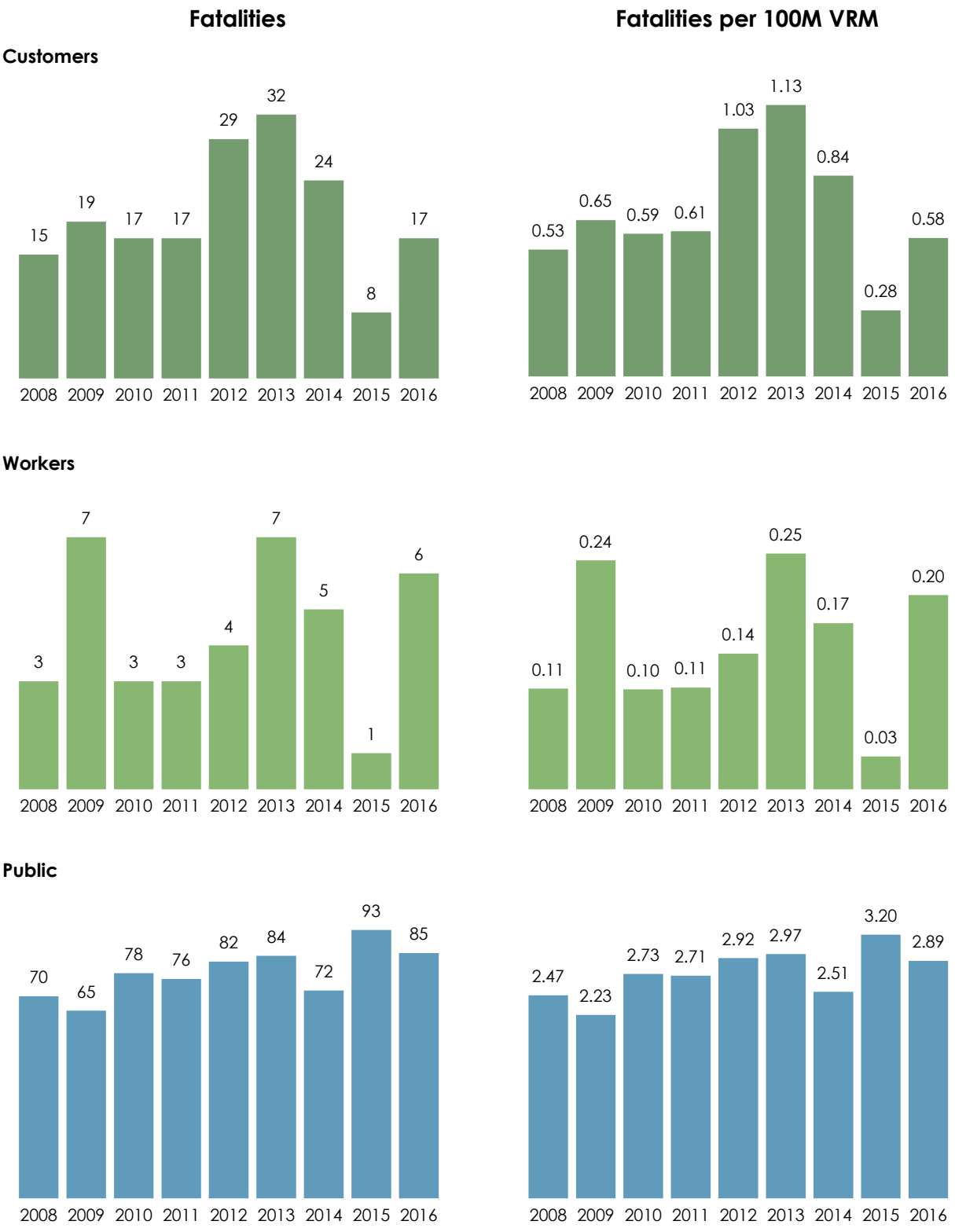
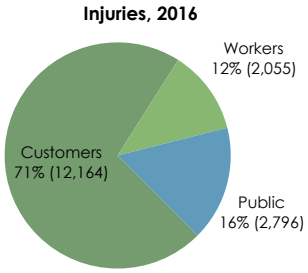
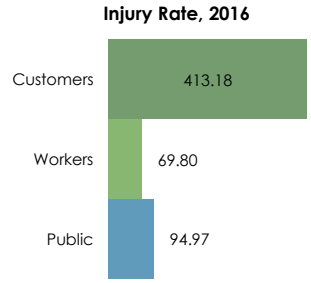


Figure 24. Fatality and Fatality Rate Trends by Person Type

Injuries and Rates per 100M VRM by Person Type



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Customers	12,140	12,996	12,269	10,970	11,342	11,841	12,269	12,349	12,164	**12,037.8**	
Workers	1,522	1,524	1,351	1,367	1,312	1,435	1,517	1,786	2,055	**1,541.0**	
Public	2,621	3,035	3,015	2,322	2,372	2,538	2,592	2,615	2,796	**2,656.2**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Customers	427.82	445.95	428.97	390.52	404.05	418.57	427.64	425.52	413.18	**420.38**	
Workers	53.64	52.29	47.24	48.66	46.74	50.73	52.88	61.54	69.80	**53.81**	
Public	92.37	104.14	105.41	82.66	84.50	89.72	90.34	90.11	94.97	**92.76**	

Figure 25. Injuries by Person Type and Rates per 100M VRM

- In 2016, 71% of reported injuries were injuries to customers. Workers sustained 12% of injuries the same year.
- Agencies reported a similar number of customer injuries in 2016 (12,164) as in 2008 (12,140).
- Bus transit reported 533 more worker injuries in 2016 than in 2008, reflecting a 3.4% average annual increase during that nine-year period. On a per vehicle revenue mile basis, the worker injury rate increased at a 3.0% average annual rate, from 53.64 injuries per 100M VRM in 2008 to 69.80 in 2016.
- Bus transit reported an increasing number of injuries sustained by the public (including pedestrians and occupants of other vehicles) between 2008 and 2016. This injury rate increased at an average annual rate of 0.3%, from 92.37 per 100M VRM in 2008 to 94.97 in 2016.

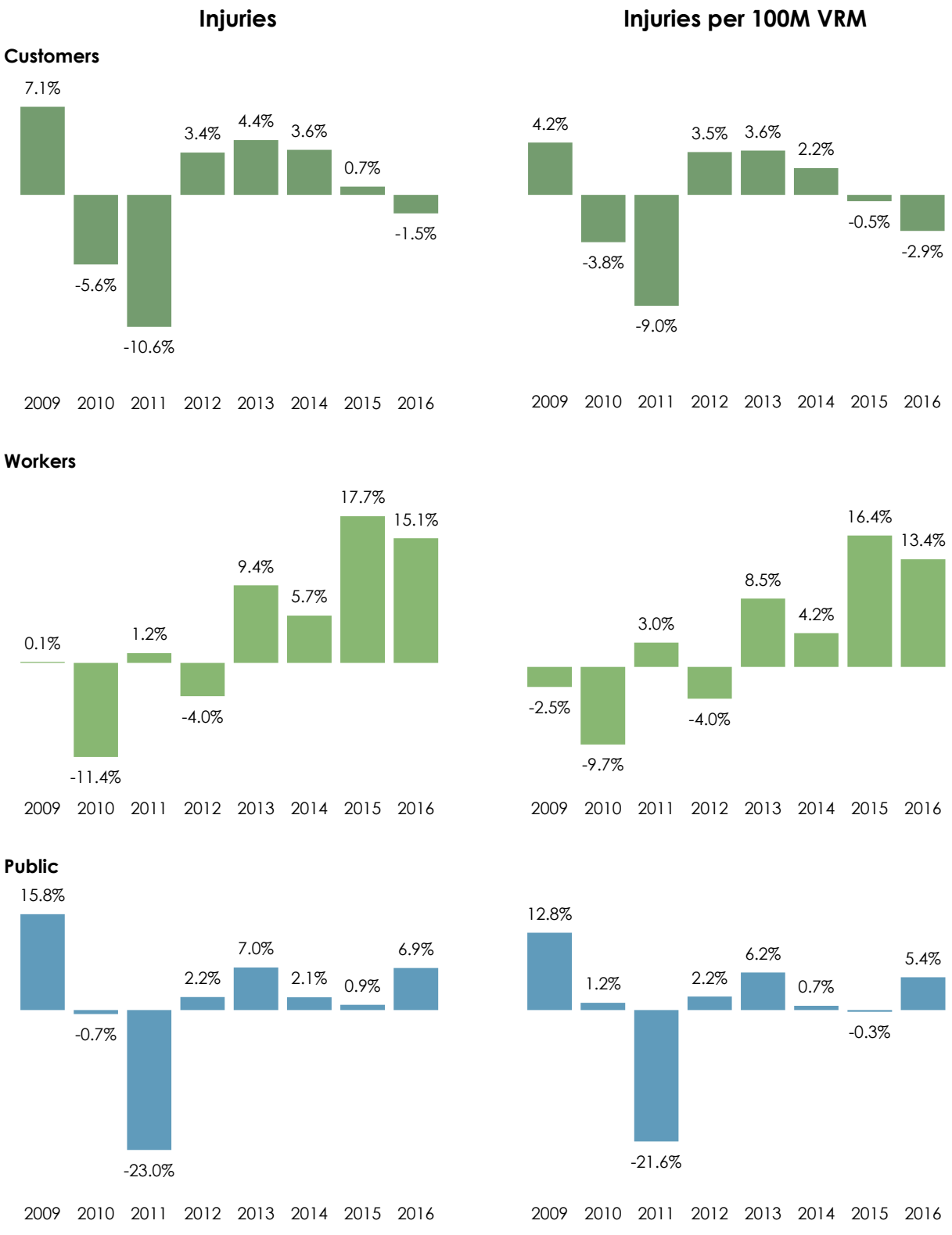


Figure 26. Annual Change in Injuries and Injury Rates by Person Type

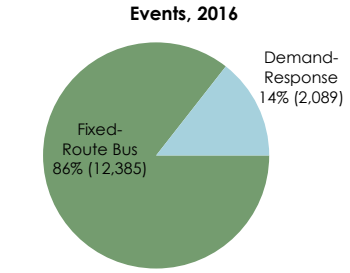
Full Reporter Agency Events by Mode

The FTA divides bus transit into nine different modes, as defined by the NTD. The BSDR organizes these into two modal categories for purposes of data presentation: fixed-route bus and demand-response. Please see Appendix A for a detailed summary of NTD modes and the BSDR groupings. The data presentations on the following pages show the trends and distribution of events, fatalities, and injuries involving each of these two modal categories.

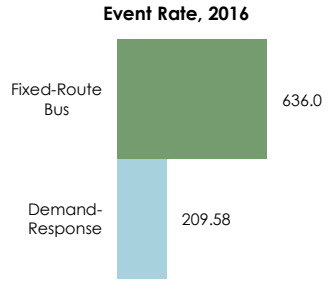
Modal Category	Description
Fixed-Route Bus	Local, express, and/or rapid bus service that follows a fixed route and typically also a fixed schedule. Passengers typically board and alight at fixed stops.
Demand-Response	Point-to-point transit service where service typically is provided upon request and/or reservation, when boarding and alighting locations are arranged.

Table 1. Modal Categories

Events and Rates per 100M VRM by Mode



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Fixed-Route Bus	36,762	42,399	38,248	9,659	9,753	10,331	10,684	12,076	12,385	**20,255.2**	
Demand-Response	1,919	2,007	1,641	1,347	1,281	1,408	1,527	1,831	2,089	**1,672.2**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Fixed-Route Bus	1,844.9	2,099.4	1,950.3	508.4	519.4	550.6	562.6	631.1	636.0	**1,048.5**	
Demand-Response	227.09	224.32	182.54	148.18	137.81	147.83	157.44	185.20	209.58	**179.49**	

Figure 27. Events by Mode and Rates per 100M VRM[a, b]

- Over four out of five bus transit events occurred on fixed-route bus modes in 2016. The fixed-route bus event rate per 100M VRM was over three times higher than the demand-response event rate for that same year.

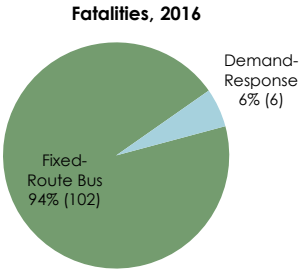
- Fixed-route bus modes reported 309 more events in 2016 than in 2015. (2015 is the first comparable year in the analyzed period due to changing event reporting thresholds.[a] [b]) Demand-response mode events increased by over 250 events during this same timeframe.

- The fixed-route bus event rate increased 0.78% between 2015 and 2016, from 631.1 per 100M VRM to 636.0. The demand-response event rate also increased over the same period, from 185.2 to 209.6 per 100M VRM.

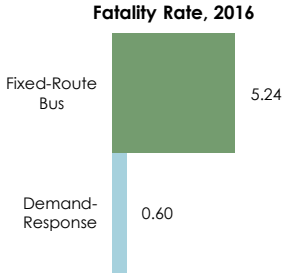
[a] Starting in 2011, FTA stopped collecting occurrences of non-major security events, which affected reported events from that year on. Because of this, 2011 is the first year of comparable reporting for events.

[b] Starting in 2015, FTA required agencies to report all collisions resulting in towing. This new requirement led to more reportable events for both fixed-route and demand-response bus modes from 2015 onward.

Fatalities and Rates per 100M VRM by Mode



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Fixed-Route Bus	81	80	87	92	99	111	90	96	102	**93.1**	
Demand-Response	7	11	11	4	16	12	11	6	6	**9.3**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Fixed-Route Bus	4.07	3.96	4.44	4.84	5.27	5.92	4.74	5.02	5.24	**4.82**	
Demand-Response	0.83	1.23	1.22	0.44	1.72	1.26	1.13	0.61	0.60	**1.00**	

Figure 28. Fatalities by Mode and Rates per 100M VRM

- Over 90% of bus transit fatalities occurred on fixed-route modes in 2016. That year the fixed-route bus fatality rate (per 100M VRM) was more than eight times the demand-response fatality rate.
- Fixed-route bus service reported 21 more fatalities in 2016 than in 2008. During this time period, the fixed-route bus fatality rate (per 100M VRM) increased an average of 2.9% per year, from 4.07 to 5.24.
- Demand-response fatalities fluctuated throughout the nine-year period, with the highest single year being 2012 (16 fatalities). Between 2008 and 2016 there were fewer than two demand-response fatalities per 100M VRM each year.

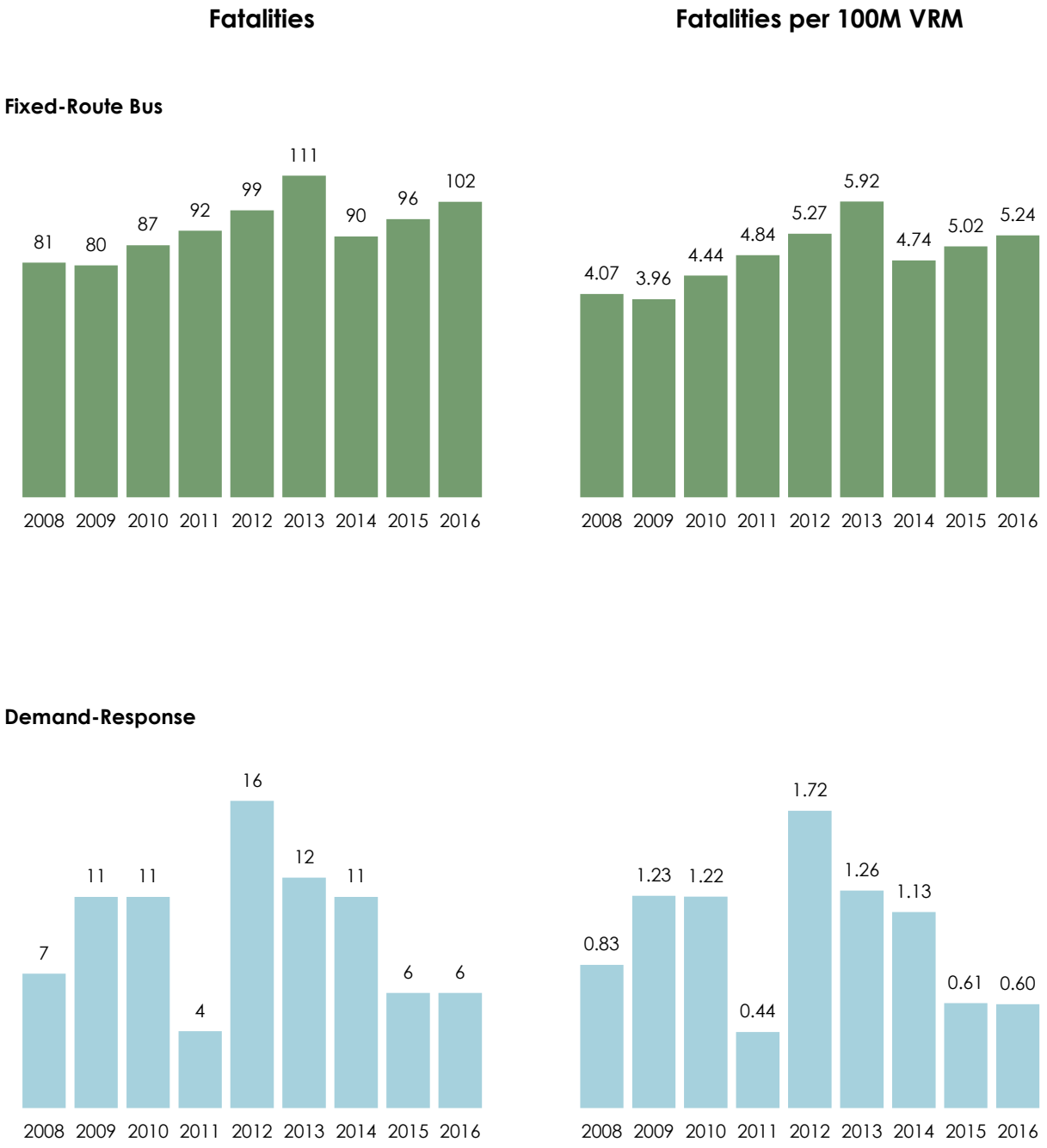
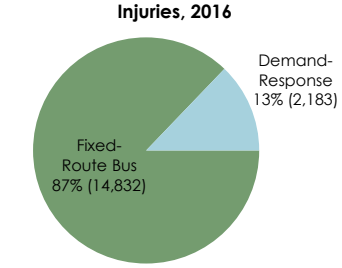
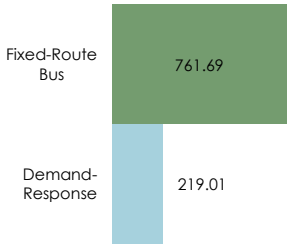


Figure 29. Fatality and Fatality Rate Trends by Bus Mode

Injuries and Rates per 100M VRM by Mode



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Fixed-Route Bus	14,281	15,590	14,947	13,094	13,479	14,113	14,539	14,887	14,832	**14,418.0**	
Demand-Response	2,002	1,965	1,688	1,565	1,547	1,701	1,839	1,863	2,183	**1,817.0**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Fixed-Route Bus	716.70	771.96	762.15	689.16	717.89	752.12	765.55	778.03	761.69	**746.31**	
Demand-Response	236.91	219.62	187.77	172.16	166.43	178.59	189.61	188.44	219.01	**195.03**	

Figure 30. Injuries by Mode and Rates per 100M VRM

- Over four in five injuries occurred in fixed-route bus modes in 2016. The injury rate per 100M VRM for fixed-route bus modes was over three times higher than for demand-response modes that same year.

- Agencies submitted over 500 more injuries resulting from fixed-route bus events in 2016 than in 2008. Reporters submitted over 100 more injuries resulting from demand-response events in 2016 than in 2008 as well.

- Injuries per 100M VRM for fixed-route bus service increased from 716.70 in 2008 to 761.69 in 2016 — an average increase of 0.7% per year.

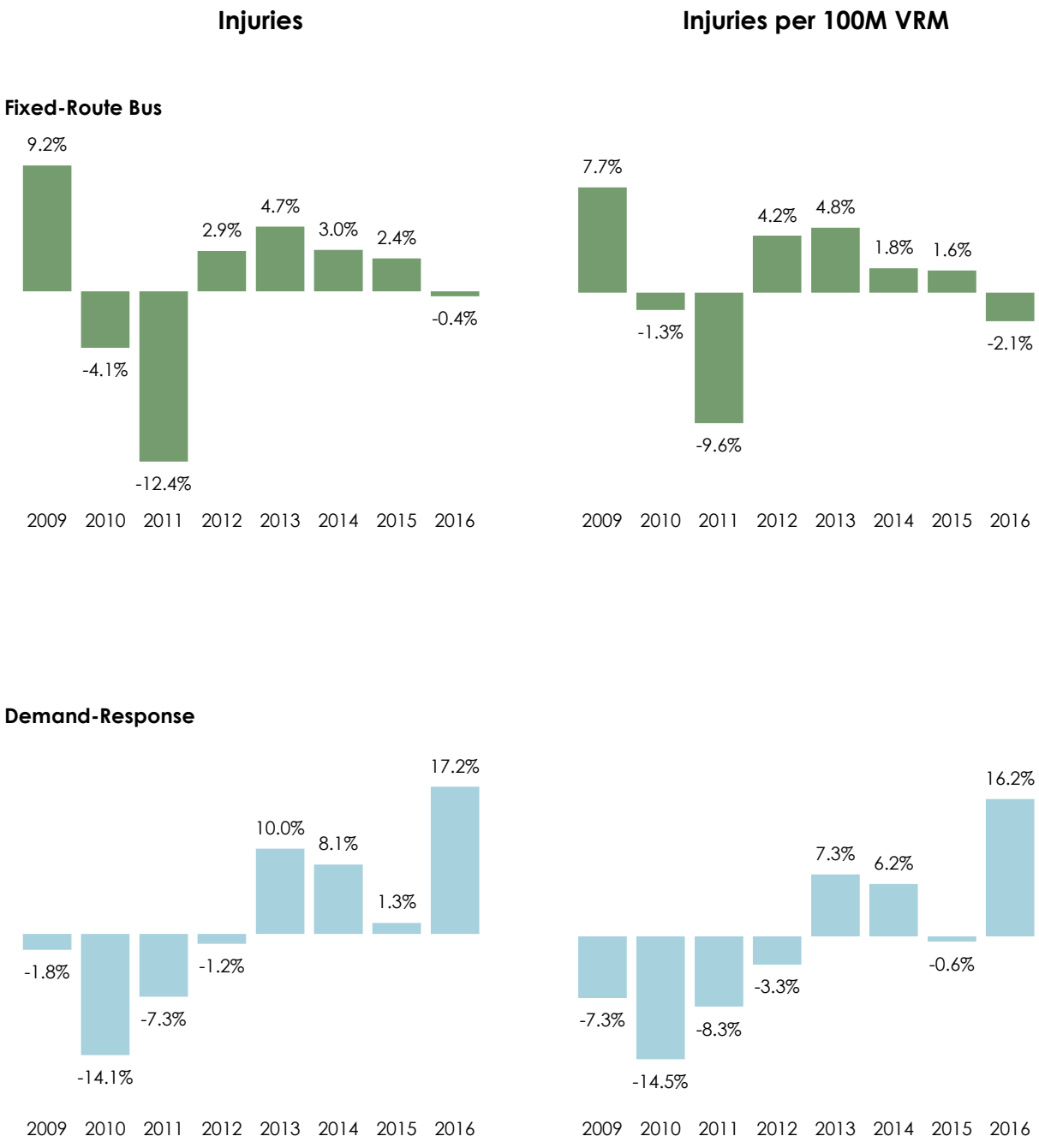


Figure 31. Annual Change in Injuries and Injury Rates by Bus Mode

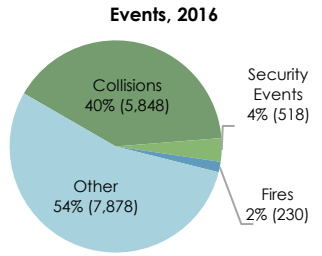
Full Reporter Agency Events by Event Type

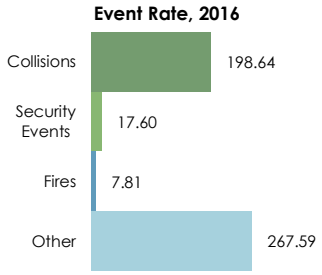
When bus transit agencies submit detailed event reports to the NTD, they include an event type. The BSDR uses these data to create the four event types shown in the table below. Appendix A includes additional details on how the BSDR groups events into these categories. The analyses on the following pages show the trend and distribution of events, fatalities, and injuries for these four event types.

Event Type	Description
Collision	Collision between a transit vehicle and anything else, including pedestrians, other vehicles, and stationary objects.
Security Event	Any event where a person causes harm to themselves or another person or damage to property, including suicides, assaults, and bomb threats.
Fire	Fire on transit agency property.
Other	Any other event surpassing a reporting threshold, including slips, falls, electric shocks, fare evasion citations, and events related to natural disasters.

Table 2. Event Types

Events and Rates per 100M VRM by Event Type





	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Collisions	3,827	3,739	3,792	3,826	3,805	4,194	4,425	5,618	5,848	**4,341.6**	
Security Events	15,934	21,125	16,110	420	521	545	542	550	518	**6,251.7**	
Fires	392	347	288	349	269	240	215	242	230	**285.8**	
Other	18,528	19,195	19,699	6,411	6,439	6,760	7,029	7,497	7,878	**11,048.4**	

	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Collisions	134.87	128.30	132.58	136.20	135.55	148.26	154.23	193.58	198.64	**151.61**	
Security Events	561.52	724.89	563.26	14.95	18.56	19.27	18.89	18.95	17.60	**218.32**	
Fires	13.81	11.91	10.07	12.42	9.58	8.48	7.49	8.34	7.81	**9.98**	
Other	652.94	658.66	688.74	228.23	229.38	238.96	245.00	258.33	267.59	**385.83**	

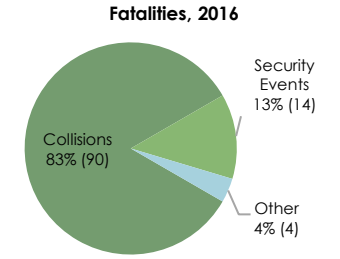
Figure 32. Events by Event Type and Rates per 100M VRM[a, b]

- Slightly more than one-half of events in 2016 were "other" events, which include slips, falls, electric shocks, and events related to natural disasters.
- Another 40% of events in 2016 were collisions.
- Security events and fires combined accounted for less than 10% of events in 2016.
- Excluding collisions reported solely due to the towed-vehicle threshold change,[b] bus agencies submitted over 800 more collisions in 2016 than they did in 2008, which reflects an annual average increase of 2.2% during that nine-year period.
    - The collision rate per 100M VRM increased an average 1.8% per year during the nine-year timeframe, from 134.87 in 2008 to 158.80 in 2016, after making the exclusions noted above.

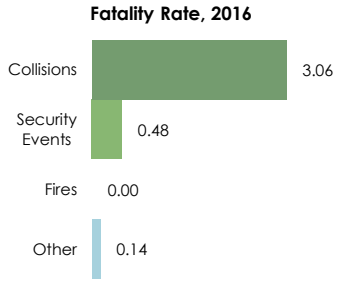
[a] Starting in 2011, FTA stopped collecting occurrences of non-major security events, which affected reported events from that year on. Because of this, 2011 is the first year of comparable reporting for events.

[b] Starting in 2015, FTA required agencies to report all collisions resulting in towing. This new requirement led to more reportable collisions, accounting for 79% of the increase seen between 2014 and 2015.

Fatalities and Rates per 100M VRM by Event Type



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Collisions	75	73	81	81	88	92	85	89	90	**83.8**	
Security Events	5	12	10	9	14	19	13	6	14	**11.3**	
Fires	0	0	0	0	0	0	0	0	0	**0.0**	
Other	8	6	7	6	13	12	3	7	4	**7.3**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Collisions	2.64	2.50	2.83	2.88	3.13	3.25	2.96	3.07	3.06	**2.93**	
Security Events	0.18	0.41	0.35	0.32	0.50	0.67	0.45	0.21	0.48	**0.40**	
Fires	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	
Other	0.28	0.21	0.24	0.21	0.46	0.42	0.10	0.24	0.14	**0.26**	

Figure 33. Fatalities by Event Type and Rates per 100M VRM

- Over four out of five fatalities in 2016 resulted from collisions. The majority of remaining fatalities in 2016 resulted from security events.
- Collisions resulted in 15 more fatalities in 2016 than in 2008. Adjusting for increased service levels, the collision fatality rate increased from 2.64 per 100M VRM to 3.06 over that nine-year period, an average increase of 1.6% per year.
- Agencies reported a small number of fatalities resulting from security events and "other" events like electric shocks and smoke events each year from 2008 to 2016.
- Security and "other" event fatalities fluctuated throughout the nine-year period and did not exceed one fatality per 100M VRM.

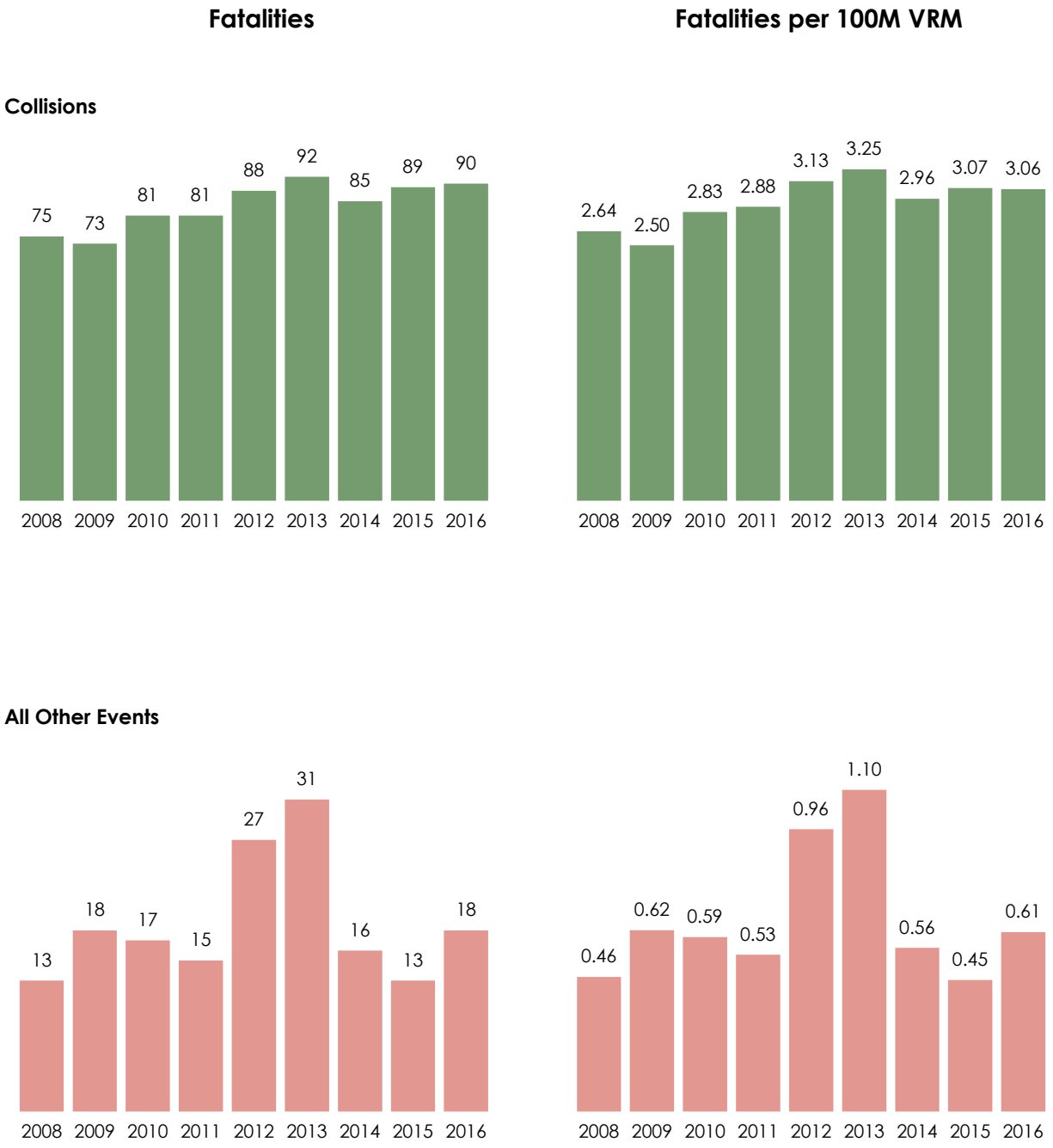
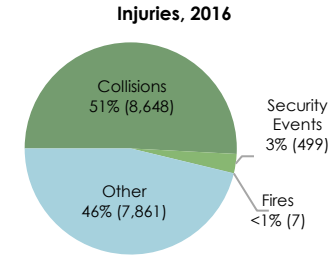
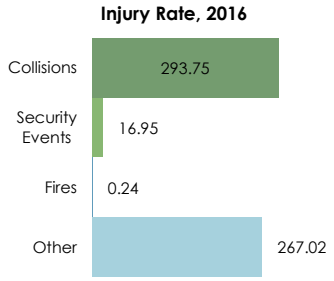


Figure 34. Fatality and Fatality Rate Trends by Event Type

Injuries and Rates per 100M VRM by Event Type



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Collisions	7,235	7,125	7,533	7,685	7,837	8,294	8,542	8,701	8,648	**7,955.6**	
Security Events	254	223	282	418	523	541	540	562	499	**426.9**	
Fires	21	11	6	15	7	11	3	6	7	**9.7**	
Other	8,773	10,196	8,814	6,541	6,659	6,968	7,293	7,481	7,861	**7,842.9**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Collisions	254.97	244.49	263.38	273.58	279.18	293.19	297.73	299.82	293.75	**277.82**	
Security Events	8.95	7.65	9.86	14.88	18.63	19.12	18.82	19.37	16.95	**14.91**	
Fires	0.74	0.38	0.21	0.53	0.25	0.39	0.10	0.21	0.24	**0.34**	
Other	309.17	349.87	308.17	232.86	237.22	246.32	254.20	257.78	267.02	**273.88**	

Figure 35. Injuries by Event Type and Rates per 100M VRM

- Just over half of the injuries in 2016 were the result of collisions. Nearly all the remaining injuries resulted from security events and "other" events like slips, trips, and electric shocks.
- Agencies reported over 1,000 more collision injuries in 2016 than in 2008, reflecting an average annual increase of 2.0% during that nine-year period. Accounting for increasing service levels, the collision rate per 100M VRM increased at an average of 1.6% per year, from 254.97 in 2008 to 293.75 in 2016.
- The security event injury rate also increased over the nine-year period, from 8.95 injuries per 100M VRM in 2008 to 16.95 in 2016.
- Agencies reported fewer injuries resulting from "other" events in 2016 (7,861) than in 2008 (8,773).

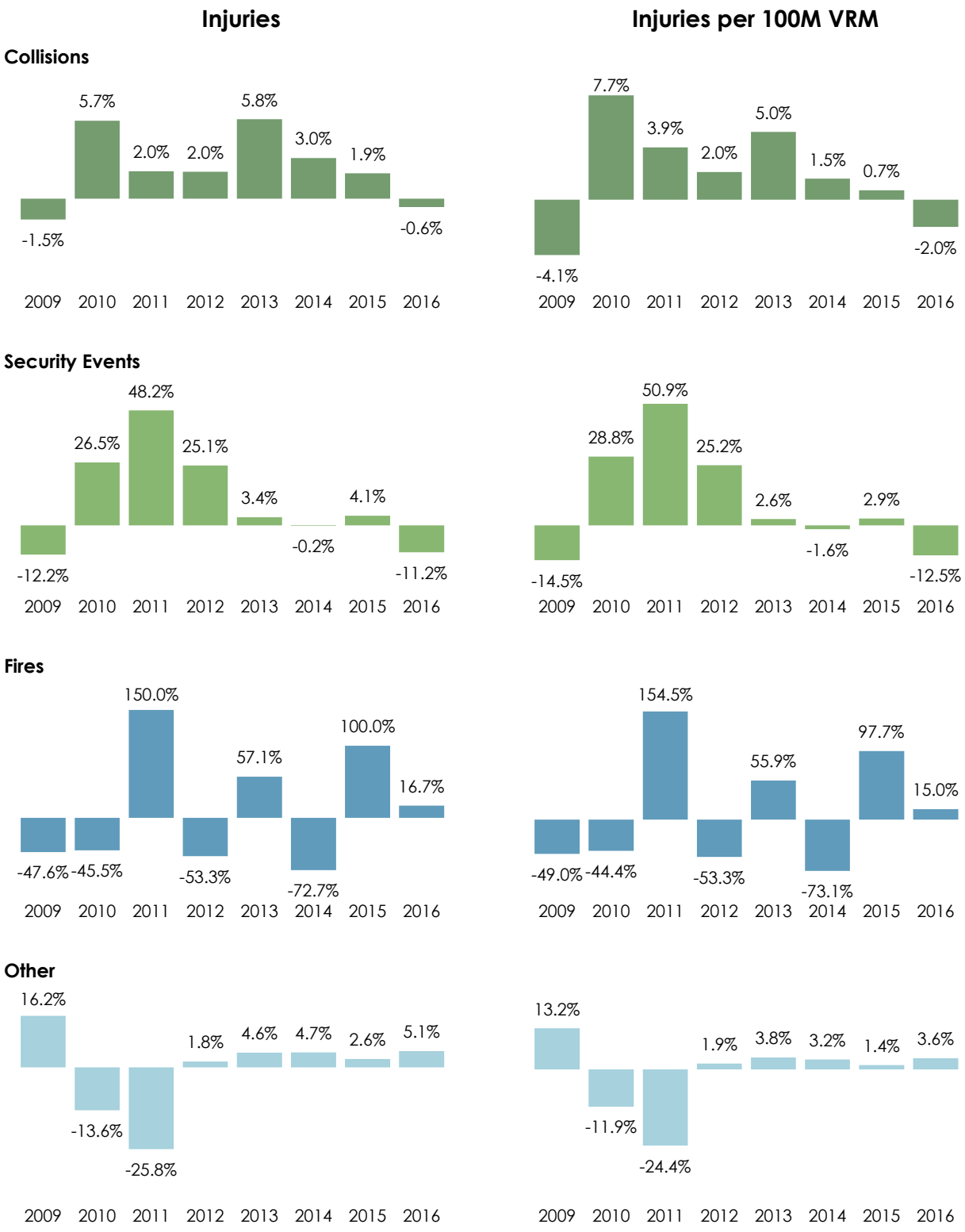


Figure 36. Annual Change in Injuries and Injury Rates by Event Type

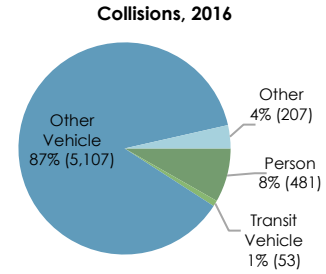
Full Reporter Agency Collisions by Collision Type

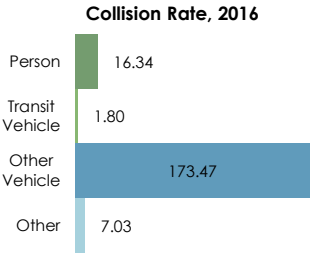
When bus transit agencies submit detailed event reports to the NTD, they include additional details when they report transit vehicle collisions. The BSDR uses these data to create the four collision type categories shown in the table below. Appendix A includes additional details on how the BSDR groups collisions into these categories. The following pages present the trends and distribution of events, fatalities, and injuries based on these four collision type categories.

Collision Type	Description
Person	Collision between a transit vehicle and an individual not in a motor vehicle, including pedestrians and bicyclists.
Transit Vehicle	Collision between two transit vehicles not involving a collision with a person.
Other Vehicle	Collision between a transit vehicle and non-transit motor vehicle (such as a car or motorcycle) that did not include collision with a person or another transit vehicle.
Other	All other transit vehicle collisions, including those with fixed objects and animals.

Table 3. Collision Types

Collisions and Rates per 100M VRM by Collision Type





	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Person	456	489	493	475	465	496	525	500	481	**486.7**	
Transit Vehicle	15	13	7	55	46	35	58	56	53	**37.6**	
Other Vehicle	3,157	3,128	3,139	3,152	3,145	3,468	3,639	4,900	5,107	**3,648.3**	
Other	199	109	153	144	149	195	203	162	207	**169.0**	

	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Person	16.07	16.78	17.24	16.91	16.57	17.53	18.30	17.23	16.34	**17.00**	
Transit Vehicle	0.53	0.45	0.24	1.96	1.64	1.24	2.02	1.93	1.80	**1.31**	
Other Vehicle	111.25	107.33	109.75	112.21	112.04	122.59	126.84	168.84	173.47	**127.40**	
Other	7.01	3.74	5.35	5.13	5.31	6.89	7.08	5.58	7.03	**5.90**	

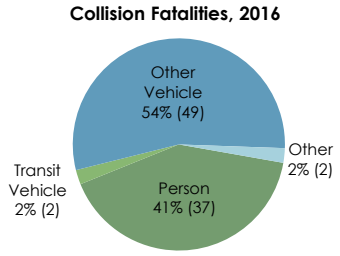
Figure 37. Collisions by Collision Type and Rates per 100M VRM[a, b]

- More than four out of five collisions reported to the NTD program in 2016 were collisions with a non-transit ("other") motor vehicle, such as a privately-owned car or motorcycle.
- Another 8% of collisions in 2016 were collisions with persons.
- Excluding collisions reportable solely due to the towed-vehicle policy change,[b] agencies reported over 800 more collisions with non-transit motor vehicles in 2016 than in 2008, reflecting an average annual increase of 2.6% during this nine-year period.
    - The rate of bus–to–non-transit vehicle collisions per 100M VRM increased by an average of 2.2% per year during this same timeframe.
- Collisions with persons fluctuated between 2008 and 2016. The rate of collisions with persons in 2016 is nearly identical to the rate in 2008: 16.34 and 16.07 per 100M VRM, respectively.

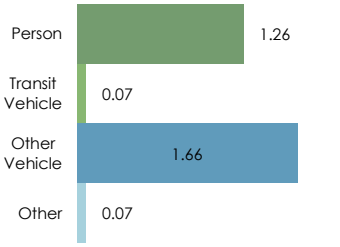
[a] The NTD began requiring agencies to report collisions between two transit motor vehicles under a distinct classification in 2011. Because of this, 2011 is the first year this type of comparison is possible.

[b] FTA began requiring agencies to report all collisions that resulted in towing in 2015. This new requirement led to more reportable collisions from 2015 onward.

Collision Fatalities and Rates per 100M VRM by Collision Type



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Person	31	36	43	36	42	41	42	42	37	**38.9**	
Transit Vehicle	0	0	0	0	0	0	0	1	2	**0.3**	
Other Vehicle	42	36	36	42	41	48	38	45	49	**41.9**	
Other	2	1	2	3	5	3	5	1	2	**2.7**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Person	1.09	1.24	1.50	1.28	1.50	1.45	1.46	1.45	1.26	**1.36**	
Transit Vehicle	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.07	**0.01**	
Other Vehicle	1.48	1.24	1.26	1.50	1.46	1.70	1.32	1.55	1.66	**1.46**	
Other	0.07	0.03	0.07	0.11	0.18	0.11	0.17	0.03	0.07	**0.09**	

Figure 38. Collision Fatalities by Collision Type and Rates per 100M VRM[a]

- Just over half of the collision fatalities in 2016 (49) resulted from collisions with a non-transit motor vehicle.
- In 2016, approximately 40% of these collision fatalities resulted from collisions with persons, even though collisions with persons were only 8% of all reported collisions. In each year of the analyzed period, roughly half of collision fatalities resulted from collisions with persons.
- Two fatalities in 2016 resulted from collisions between transit vehicles and collisions with other things, like fixed objects and animals. In each year of the analyzed period, fewer than two fatalities per billion VRM resulted from these types of collisions.

[a] The NTD began requiring agencies to report collisions between two transit motor vehicles under a distinct classification in 2011. Because of this, 2011 is the first year this type of comparison is possible.

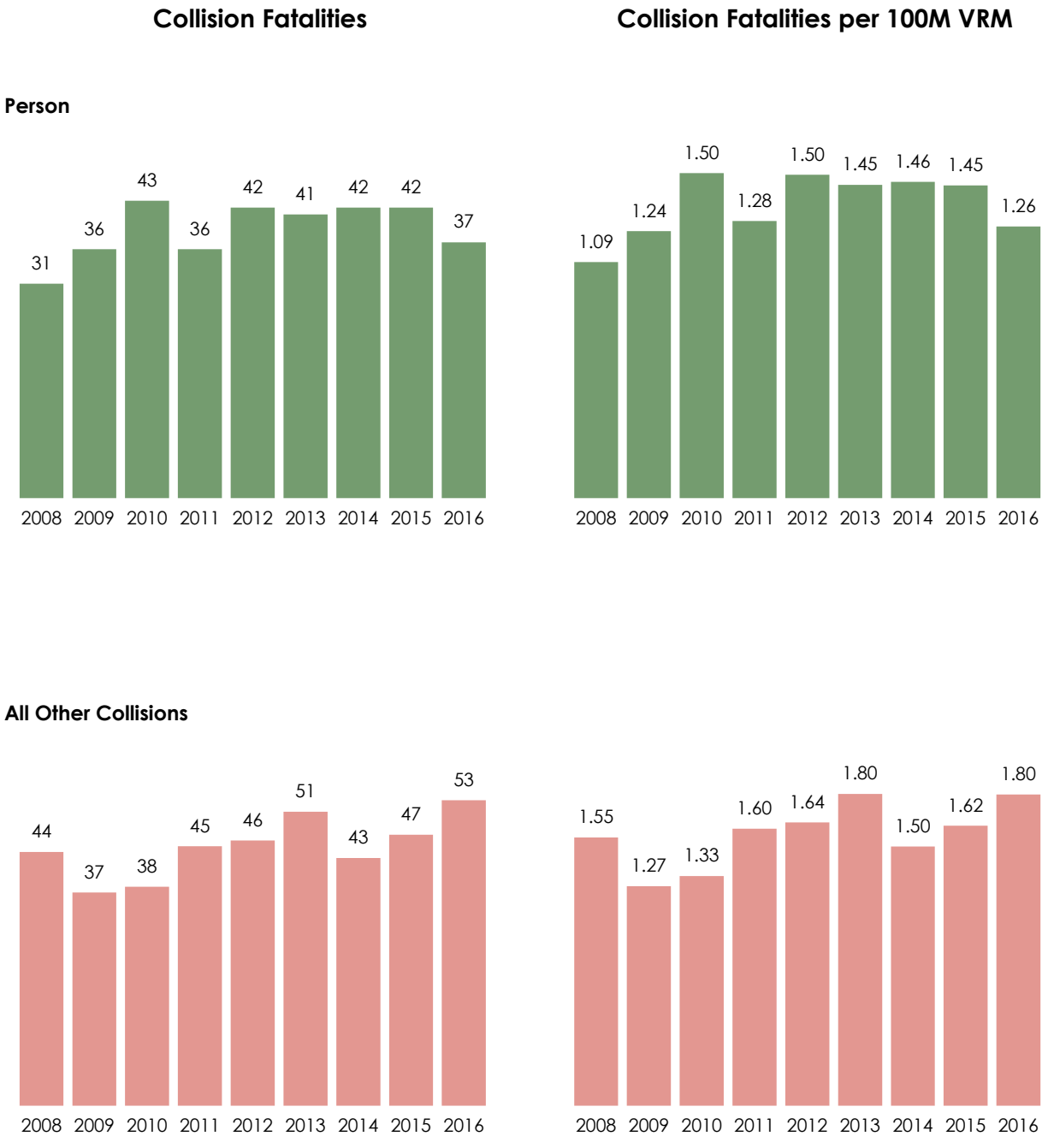
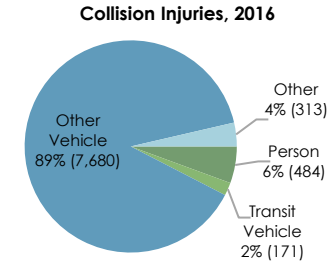
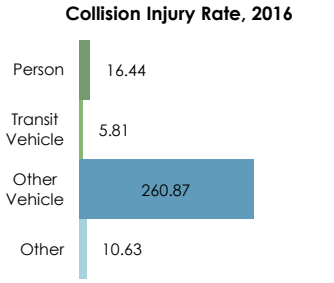


Figure 39. Collision Fatality and Fatality Rate Trends by Collision Type

Collision Injuries and Rates per 100M VRM by Collision Type





	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Person	474	482	499	461	461	507	546	499	484	**490.3**	
Transit Vehicle	27	45	11	206	95	67	131	133	171	**98.4**	
Other Vehicle	6,331	6,332	6,681	6,651	6,976	7,351	7,507	7,826	7,680	**7,037.2**	
Other	403	266	342	367	305	369	358	243	313	**329.6**	

	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Person	16.70	16.54	17.45	16.41	16.42	17.92	19.03	17.19	16.44	**17.12**	
Transit Vehicle	0.95	1.54	0.38	7.33	3.38	2.37	4.57	4.58	5.81	**3.44**	
Other Vehicle	223.11	217.28	233.59	236.77	248.51	259.85	261.66	269.67	260.87	**245.75**	
Other	14.20	9.13	11.96	13.06	10.87	13.04	12.48	8.37	10.63	**11.51**	

Figure 40. Collision Injuries by Collision Type and Rates per 100M VRM[a]

- More than four out of every five collision-related injuries in 2016 resulted from collisions with a non-transit motor vehicle.
- In 2016, agencies reported over 1,000 more injuries resulting from collisions with non-transit vehicles than in 2008, reflecting an average increase of 2.2% per year during that nine-year period.
- Adjusting for increased service levels, the non-transit vehicle collision injury rate has averaged a 1.8% increase per year during the nine-year timeframe, increasing from 223.11 injuries per 100M VRM in 2008 to 260.87 in 2016.
- From 2011 to 2016,[a] collisions between two transit vehicles constituted a very small proportion of all collisions (1.1%) and resulting fatalities and injuries (0.6% and 1.6%, respectively).

[a] The NTD began requiring agencies to report collisions between two transit motor vehicles under a distinct classification in 2011. Because of this, 2011 is the first year this type of comparison is possible.

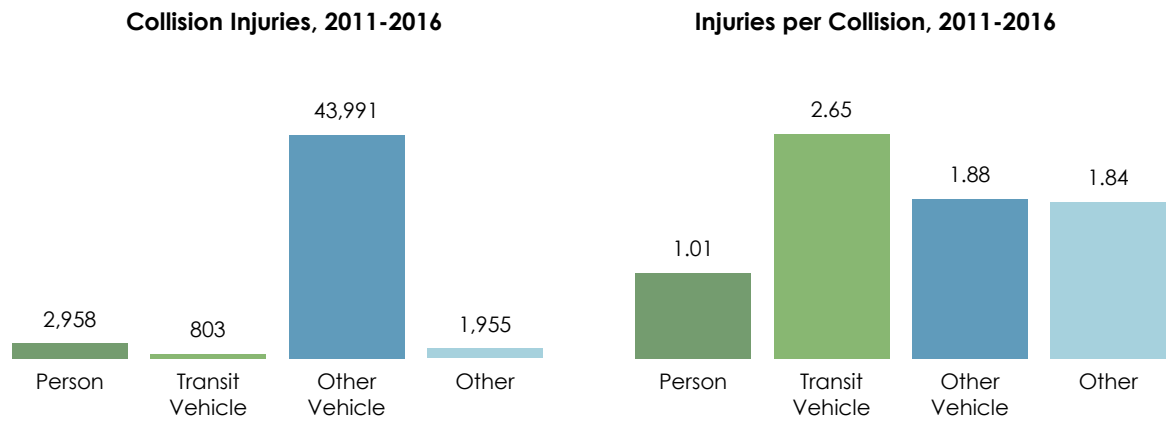


Figure 41. Collision Injury Totals and per Collision by Collision Type[a]

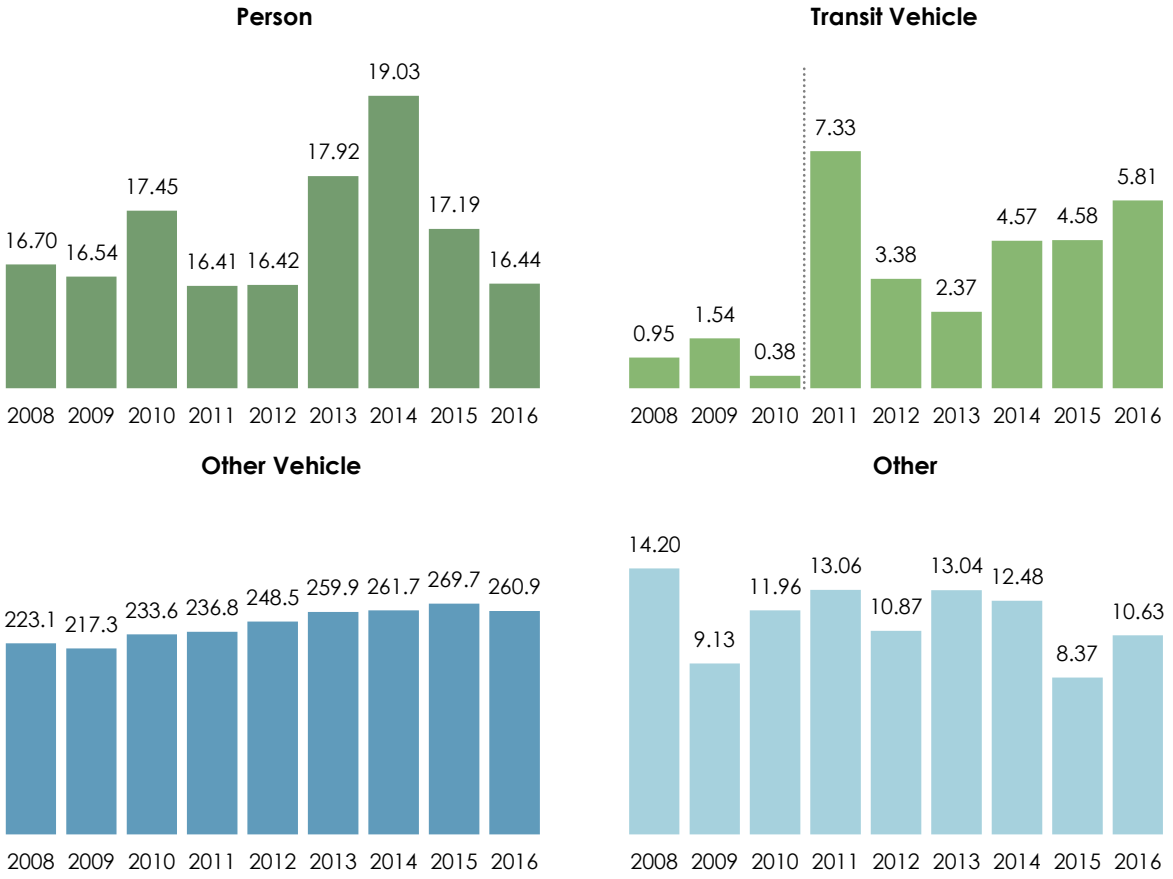


Figure 42. Collision Injuries per 100M VRM by Collision Type[a]

[a] The NTD began requiring agencies to report collisions between two transit motor vehicles under a distinct classification in 2011. Because of this, 2011 is the first year this type of comparison is possible.

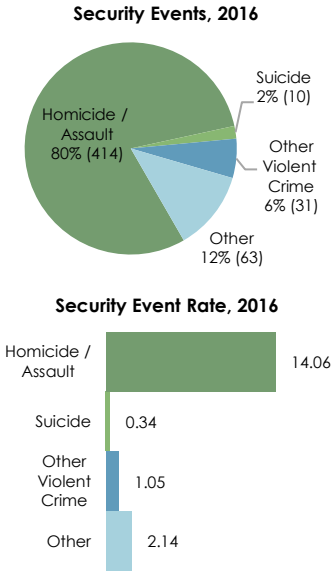
Full Reporter Agency Security Events by Type

When bus transit agencies report a major event to the NTD, they include a categorical description of the event in the reports. The BSDR uses these data to further categorize security events into the four groups shown in the table below. Appendix A includes a complete list of the event categories and how they are grouped into the BSDR analysis categories. The following pages present the trends and distribution of security events and resulting fatalities and injuries based on these four security event categories.

Security Event Type	Description
Homicide / Assault	An attack committed against a person on transit agency property, whether deadly or not.
Suicide	A successful or unsuccessful attempt by an individual on transit agency property to end their own life.
Other Violent Crime	Other violent crimes committed against an individual on transit agency property, including rapes and robberies.
Other	All other security events, including larcenies, burglaries, bomb threats, and vandalism.

Table 4. Security Event Types

Security Events and Rates per 100M VRM by Security Event Type



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Homicide / Assault	1,573	1,519	1,158	371	449	443	436	469	414	**759.1**	
Suicide	7	7	3	7	6	9	12	12	10	**8.1**	
Other Violent Crime	941	969	634	24	26	48	48	25	31	**305.1**	
Other	13,413	18,630	14,315	18	40	45	46	44	63	**5,179.3**	

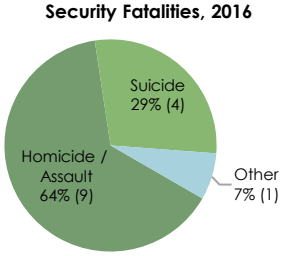
	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Homicide / Assault	55.43	52.12	40.49	13.21	16.00	15.66	15.20	16.16	14.06	**26.51**	
Suicide	0.25	0.24	0.10	0.25	0.21	0.32	0.42	0.41	0.34	**0.28**	
Other Violent Crime	33.16	33.25	22.17	0.85	0.93	1.70	1.67	0.86	1.05	**10.65**	
Other	472.68	639.27	500.50	0.64	1.42	1.59	1.60	1.52	2.14	**180.87**	

Figure 43. Security Events by Type and Rates per 100M VRM[a]

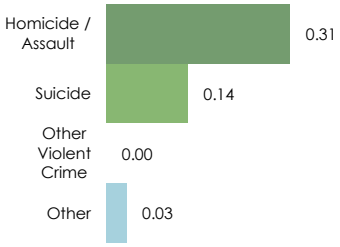
- More than three out of every four security events reported in 2016 were homicides and assaults.
- The 414 assaults and homicides reported in 2016 represent the second lowest annual total in this category for the six-year period between 2011[a] and 2016. The figure reflects an 11.7% decrease from 2015, which had the highest number of homicides and assaults in the six-year period.

[a] Starting in 2011, FTA stopped collecting occurrences of non-major security events, which affected reported events from that year on. Because of this, 2011 is the first year of comparable reporting for events.

Security Event Fatalities and Rates per 100M VRM by Security Event Type



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Homicide / Assault	3	9	7	4	10	12	12	0	9	**7.3**	
Suicide	2	2	3	5	4	4	1	6	4	**3.4**	
Other Violent Crime	0	0	0	0	0	1	0	0	0	**0.1**	
Other	0	1	0	0	0	2	0	0	1	**0.4**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Homicide / Assault	0.11	0.31	0.24	0.14	0.36	0.42	0.42	0.00	0.31	**0.26**	
Suicide	0.07	0.07	0.10	0.18	0.14	0.14	0.03	0.21	0.14	**0.12**	
Other Violent Crime	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	**0.00**	
Other	0.00	0.03	0.00	0.00	0.00	0.07	0.00	0.00	0.03	**0.02**	

Figure 44. Security Event Fatalities by Type and Rates per 100M VRM

- Homicides account for more than half of the security event fatalities reported in 2016. There were 9 homicide fatalities reported in 2016. Another 4 security event fatalities resulted from suicides.
- Homicides and suicides account for most (95.1%) security event fatalities reported between 2008 and 2016.
- During each year of the analyzed period, from 2008 to 2016, all security event types have resulted in less than a single fatality per 100M VRM.

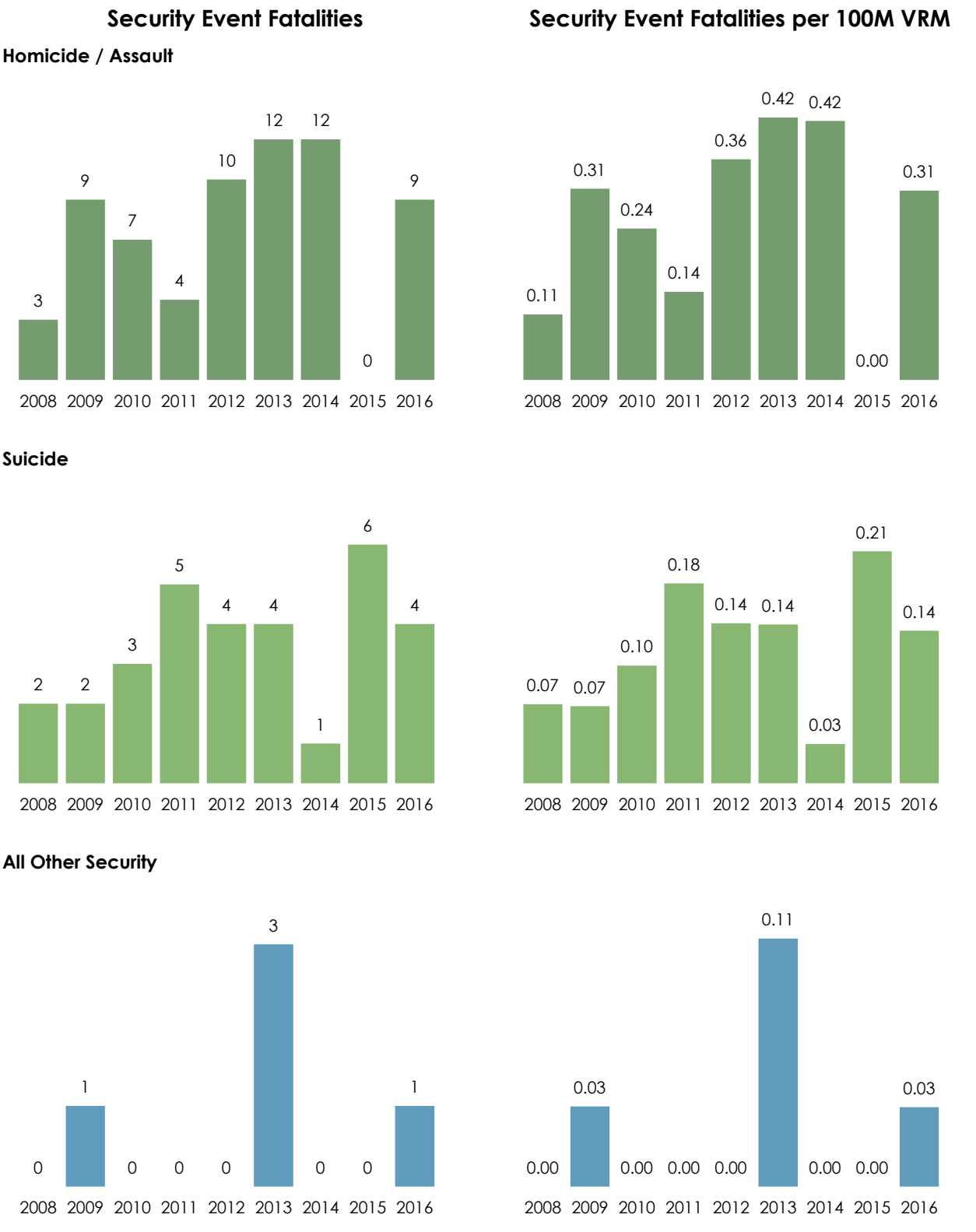
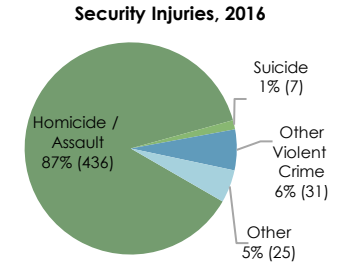
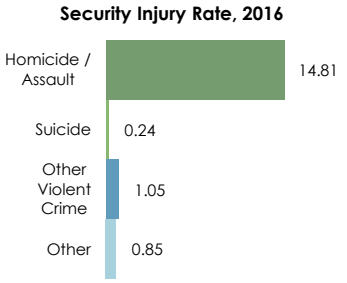


Figure 45. Security Event Fatality and Fatality Rate Trends by Security Event Type

Security Event Injuries and Rates per 100M VRM by Security Event Type



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Homicide / Assault	236	207	265	385	466	464	454	501	436	**379.3**	
Suicide	5	5	0	2	2	5	11	6	7	**4.8**	
Other Violent Crime	6	9	13	25	26	47	49	25	31	**25.7**	
Other	7	2	4	6	29	25	26	30	25	**17.1**	



	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg	Trend
Homicide / Assault	8.32	7.10	9.27	13.71	16.60	16.40	15.82	17.26	14.81	**13.25**	
Suicide	0.18	0.17	0.00	0.07	0.07	0.18	0.38	0.21	0.24	**0.17**	
Other Violent Crime	0.21	0.31	0.45	0.89	0.93	1.66	1.71	0.86	1.05	**0.90**	
Other	0.25	0.07	0.14	0.21	1.03	0.88	0.91	1.03	0.85	**0.60**	

Figure 46. Security Event Injuries by Type and Rates per 100M VRM

- Assaults and homicides account for over 80% of security event injuries reported in 2016. These events account for a large majority of all security event injuries in each year of the analyzed period.

- There were 200 more assault and homicide injuries reported in 2016 than in 2008. Between 2008 and 2016, the injury rate from these types of events increased from 8.32 injuries per 100M VRM to 14.81, a 6.6% average annual increase.

- However, the 436 assault and homicide injuries reported in 2016 is the lowest annual total since 2012. This figure represents a 13.0% decrease from 2015, the year with the most of these types of injuries in the analyzed period, and a 2.3% annual average decrease since 2012.

- Other violent crime injuries, which include those resulting from robberies and rapes, account for 6.0% of all security event injuries reported during the analyzed period. The 31 injuries reported in 2016 represent a 37% decrease from the peak year of 2014, but the rate of these injuries increased from 0.21 per 100M VRM in 2008 to 1.05 in 2016.

Figure 47. Security Event Injuries by Security Event Type

Appendix A. Definitions

Collision Type

For every reportable collision, NTD Full Reporters identify the person(s) and/or object(s) the transit vehicle collided with. The BSDR uses these data to group collisions into collision types as shown below. This process excludes collisions that are suicides and categorizes them as security events for the purposes of the BSDR.

BSDR Collision Type	NTD "Collision with" Data
Person	Incident report indicates that the transit vehicle collided with a person, individual, and/or a cyclist.
Transit Vehicle[1]	Incident report indicates that the transit vehicle collided with another transit vehicle (transit bus, van, train, non-revenue vehicle, etc.) and did not collide with a person as described above.
Other Vehicle	Incident report indicates that the transit vehicle collided with a motor vehicle (car, truck, van, motorcycle, etc.) and did not collide with a person or transit vehicle as described above.
Other	All other collisions involving a transit vehicle, including those where the incident report indicates the transit vehicle did not collide with a person, transit vehicle, or other motor vehicle as described above. This includes collisions with an animal or a fixed object.

Event

For the purposes of NTD reporting in 2016, a bus transit event is any event affecting persons engaged with the transit system where any of the following occur:

- A fatality, as defined below (one or more persons)
- An injury, as defined below, to one or more persons
- Estimated property damage of $25,000 or more
- A collision between motor vehicles after which at least one vehicle must be towed away from the scene
- A fire requiring suppression
- An evacuation for life safety reasons

[1] Prior to the 2011 reporting year, "Transit vehicle" was not an option NTD reporters could choose when reporting collisions.

See Appendix B for more information on criteria used to delineate major and non-major events and the differences in reporting requirements between different program participants.

Event Type

NTD Full Reporters categorize all individual event reports into one of several dozen event types on the Safety and Security (S&S)-40 form (for major events) and provide summaries of up to twelve distinct event types on the S&S-50 form (for non-major events). The BSDR uses four distinct event type categories, as shown in the table below.

BSDR Event Type	NTD S&S-40 Event Type(s)	NTD S&S-50 Event Type(s)
Collision	- Non-Rail Collision	- (n/a)
Security Event[2]	- Aggravated Assault - Arson - Assault - Attempted Suicide - Bomb Threat - Bombing - Burglary - Chemical / Biological / Nuclear / Radiological - Hijacking - Homicide - Larceny / Theft - Motor Vehicle Theft - Other Security Event - Rape - Robbery - Suicide - Suspicious Package - Vandalism	- Burglary - Larceny - Motor Vehicle Theft - Non-aggravated Assault - Other Arrests - Robbery - Trespassing - Vandalism
Fire	- Non-Rail Fire	- Fire

[2] For consistency across all years of data, this report categorizes S&S-40 events resulting in suicide fatalities or injuries as security events regardless of the event type provided by the NTD reporter.

BSDR Event Type	NTD S&S-40 Event Type(s)	NTD S&S-50 Event Type(s)
Other	- Earthquake - Flood - Hurricane - Non-Rail Hazardous Material Spill - Non-Transit Non-Rail Collision - Other High Winds - Other Safety Event - Snow Storm - Tornado	- Fare Evasion - Non-Violent Civil Disturbance - Not Otherwise Classified Safety Events

Fatality

Fatalities are losses of life resulting from an event that are confirmed within thirty days of the event and not the result of illness or other natural causes. Suicides are included in these figures.

Injury

Any damage or harm to persons as a result of an event that requires immediate medical attention away from the scene. Injury does not include illnesses not related to an event that require immediate medical attention.

Mode

A mode is a system for carrying passengers that is defined by its vehicle type, technologies, and operational characteristics. The FTA identifies nine distinct bus modes. NTD Full Reporters identify the mode on which each event occurs on the S&S-40 and S&S-50 forms. The BSDR uses two distinct mode categories, as shown in the table below.

BSDR Mode	NTD Mode(s)
Fixed-Route Bus	Bus (MB) Bus Rapid Transit (RB) Commuter Bus (CB) Jitney (JT) Público (PB) Trolleybus (TB)

BSDR Mode	NTD Mode(s)
Demand-Response	Demand-Response (DR) Demand-Response-Taxi (DT) Vanpool (VP)

Person Type

NTD Full Reporters categorize by person type who sustained fatalities and/or injuries for all reportable events. On the S&S-40 form, reporters select between fourteen categories to describe the relationship between each fatality or injury and the bus transit agency for each individual event. On the S&S-50 form, reporters select from three categories to summarize all similar "Other Safety Occurrences Not Otherwise Classified" (OSONOC) events occurring in the same month. The BSDR uses three distinct person type categories, as shown in the table below.

BSDR Person Type	S&S-40 Person Type(s)	S&S-50 Person Type(s)
Customer	- Person waiting for / leaving from transit - Transit vehicle rider	- Customers
Worker	- Other transit staff - Other worker - Transit vehicle operator	- Workers
Public[3]	- Occupant of other vehicle - Other - Pedestrian: bicyclist - Pedestrian: in crosswalk - Pedestrian: not in crosswalk - Pedestrian: person crossing tracks - Pedestrian: person walking along tracks - Suicides - Trespassers	- Other

[3] For consistency across all years of data, this report categorizes fatalities from suicides and injuries from suicide attempts as public, regardless of the person type provided on an S&S-40 form.

Security Event Type

NTD Full Reporters categorize all individual events into one of several dozen event types on the S&S-40 form and provide summaries of up to twelve distinct event types on S&S-50 form. For all events categorized as "security events" (see above), the BSDR categorizes the events into the four distinct event types shown below.

BSDR Security Event Type	NTD S&S-40 Event Type(s)	NTD S&S-50 Event Type(s)
Homicide / Assault	- Aggravated Assault - Assault - Homicide	- Non-aggravated assault
Suicide[4]	- Attempted Suicide - Suicide	- (n/a)
Other Violent Crime	- Rape - Robbery	- Robbery
Other	- Arson - Bomb Threat - Bombing - Burglary - Chemical / Biological / Nuclear / Radiological - Hijacking - Larceny / Theft - Motor Vehicle Theft - Other Security Event - Suspicious Package - Vandalism	- Burglary - Larceny - Motor Vehicle Theft - Other Arrests - Trespassing - Vandalism

[4] For consistency across all years of data, this report categorizes S&S-40 events resulting in suicide fatalities or injuries as suicides regardless of the event type provided by the NTD reporter.

Appendix B. NTD Reporting Requirements

Reporting Level

The level of detail required in NTD safety and security event reporting varies depending on the transit agency characteristics outlined below.

To reduce the burden on small operators, the NTD does not require the smallest transit agencies with the least complex operations to report at the same level of detail as larger agencies. These "Reduced Reporters" are generally small §5307 recipients (with fleets of fewer than 30 vehicles) and §5311 agencies. Reduced Reporters only provide annual totals of events, fatalities, and injuries and do not submit additional information that would support more comprehensive analyses.

The FTA requires more detailed event reporting from large §5307 agencies. The FTA calls the large §5307 group "Full Reporters." Currently, the FTA requires Full Reporters to provide the NTD with detailed reports of each event surpassing a major reporting threshold and monthly summaries of non-major events.

BSDR Reporting Level	Agency Characteristics	Reporting Requirements
Full Reporters	- Receives Urbanized Area Formula Grants (§5307) funding and operates more than 30[1] vehicles across all modes and types of service. - Receives §5307 funding and operates on fixed guideway and/or high intensity busways with any fleet size. - Reports voluntarily, operates transit service within Urbanized Areas (UZAs), and would otherwise qualify for full reporting based on the criteria above.	- For each major event (see below), Full Reporters must complete a detailed event report on an S&S-40 form (using the online NTD Reporting Tool) within 30 days of the event. - Full Reporters must tally non-major events (see below) on the S&S-50 form using the online NTD Reporting Tool by the end of the following month. The S&S-50 should include monthly counts of non-major events and resulting injuries grouped by event type and location type.
Reduced Reporters	- Receives §5307 funding but does not fit the full reporting criteria above. - Receives Formula Grants for Rural Areas (§5311) funding as a subrecipient of a state DOT[2] and qualifies as either a Rural General Public Transit or Urban/Tribal Recipient. - Receives §5311 directly as part of the Tribal Transit Grants program. - Reports voluntarily and does not fit the full reporting criteria above.	- Reduced Reporters must tally all events and resulting fatalities and injuries on the agency's Annual Report each year.

[1] Prior to the 2011 reporting year, FTA required full reporting from urban reporters operating fleets of 10 or more vehicles.

[2] State departments of transportation (DOTs) file their subrecipients' Annual Reports.

Major and Non-Major Event Reporting

Full Reporters provide considerably more detail than Reduced Reporters for events that qualify as major events. The table below outlines the criteria the FTA uses to distinguish between major events and non-major events.

BSDR Event Severity	Events Included
Major Events	- Any event that results in a confirmed fatality within 30 days of the event. - Any event that results in injuries requiring immediate transportation for medical attention for two or more people, $25,000 or more in estimated property damage, or an evacuation for life safety purposes. - Any collision, fire, hazardous material spill, security event, or act of God that results in injuries to a single individual requiring immediate transportation for medical attention. - Any collision that requires the towing away of one or more motor vehicles from the scene.
Non-Major Events[3]	- Any fire requiring suppression that does **not** result in a fatality within 30 days, injuries requiring immediate transportation for medical attention, $25,000 or more in estimated property damage, or an evacuation for life safety purposes. - Any event (such as a slip, fall, or electric shock) that is **not** a collision, fire, hazardous material spill, security event, or act of God that results in injuries to exactly one individual requiring immediate transportation for medical attention and does not result in a fatality within 30 days, $25,000 or more in estimated property damage, or an evacuation for life safety purposes.

[3] Prior to the 2011 reporting year, FTA required that agencies report certain categories of security events that did not result in a fatality, injuries requiring medical attention, $25,000 in property damage, or an evacuation for life safety purposes as non-major events.

Appendix C. Methodology

Data Collection

Program participants enter safety data through the online NTD Reporting Tool based on their reporting requirements. This system stores participants' data in a database that the FTA can query to extract the most up-to-date information possible. This BSDR presents analyses data from 2008 through 2016.

Data Processing

Analysts process safety data collected from the online NTD Reporting Tool in several ways to enable meaningful data analysis. Based on the agency information participants provide to the NTD, analysts examine program participant data based on whether an agency is a Full Reporter.

Full reporting agencies provide more detail on events, including

- Mode
- Event type
- Fatality person type(s)
- Injury person type(s)
- Object collided with (collisions only)
- Security event type (security events only)

All of the above details involve grouping categorical data provided by NTD reporters as outlined in Appendix A.

Data Analysis

Analysts conduct quantitative analyses of NTD data to identify trends in safety outcomes for the bus transit industry. This report presents analyses that focus on outcomes from 2016 and that track changes across the years covered within the report (2008 to 2016) when those years reflect consistent data collection practices.

All quantitative analyses conducted as a part of this report provide descriptive statistics of service and safety data (or portions of that data) submitted to the NTD. They are not designed to estimate or predict safety performance beyond 2016.

Unless otherwise noted, this report calculates annual average percentage change over multiple years as

$$r = \left(\frac{C_a}{C_b}\right)^{\frac{1}{y}} - 1,$$

which is a transformation of

$$C_a = C_b(1 + r)^y.$$

C_a is the count in the later year; C_b is the count in the earlier year; r is the annual average rate of change; y is the number of years between the two counts.

In the calculation, r reflects a uniform annual change rate across a y year period, with the first-year count C_a and the last-year count C_b. This calculation method results in a figure that is more comparable to a single year percentage change than the results of other calculation methods.

Data Considerations

The FTA first introduced NTD safety and security data collection as a pilot program in 2002. In the last 15 years, most transit agencies that report to the NTD have developed internal data collection and processing procedures to meet the reporting requirements. The FTA has also implemented a system of validation checks that has improved the accuracy of reported data in recent years. Although data quality and completeness have improved significantly over time, the analyses of NTD incident reports included here may still contain errors or omissions due to transit agency input errors.

Data Presentation

The FTA uses the following graphical structure to present trends in event, fatality, and injury data.