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STEPHEN D. COAN
STATE FIRE MARSHAL

MEMORANDUM

TO: Heads of Fire Departments

FROM: Stephen D. Coan
State Fire Marshal

DATE: June 1, 2011

SUBJECT: MA Fire Department Response to EMS Calls & MVA's

On July 1, 2009, the Department of Fire Services was awarded a federal Section 408 grant to fund part of a Federal Fiscal Year 2008 application. The Massachusetts Traffic Records Coordinating Committee (TRCC) awarded \$40,284 in part to fund geographic information system (GIS) analysis of reported fire department responses to motor vehicle accidents (MVA's) and calls for emergency medical services (EMS).

The majority of local fire departments in the Commonwealth submit all of their run reports to the Massachusetts Fire Incident Reporting System (MFIRS). As part of the grant process DFS agreed to provide the TRCC with three studies. The first report is an analysis of local fire department response to EMS-type calls that have been reported to MFIRS from 2001 through 2009. The second report is an analysis of fire department response to motor vehicle fires caused by collisions that have been reported to MFIRS from 2001 through 2009. The last report is an analysis of fire department response to motor vehicle accidents (MVA's) that have been reported to MFIRS from 2001 through 2009.

As would be expected the larger communities or communities with major highways reported the most of these types of incidents. Boston, Framingham, Revere, Worcester and Malden reported the most EMS calls to MFIRS from 2001 through 2009. Boston, Worcester, Medford, Lawrence, and Weymouth reported responding to the most MVA's during the same time period. Boston, Springfield, Worcester, Milton, and Swansea reported responding to the most motor vehicle fires caused by collisions.

I hope you'll be able to use these reports to better demonstrate the services that your departments provide to your communities. If you have any questions, call Derryl Dion at 978-567-3382 or e-mail at Derryl.dion@state.ma.us.

Administrative Services • Division of Fire Safety
Hazardous Materials Response • Massachusetts Firefighting Academy

Fire Department Response to Emergency Medical Service Type Calls in Massachusetts 2001 – 2009



MFIRS
Massachusetts Fire Incident Reporting System

Fire Service Assists with EMS & Crash Data Analysis

On July 1, 2009, the Department of Fire Services was awarded a federal Section 408 grant to fund part of a Federal Fiscal Year 2008 application. The Massachusetts Traffic Records Coordinating Committee (TRCC) awarded \$40,284 in part to fund geographic information system (GIS) analysis of reported fire department responses to motor vehicle accidents (MVA's) and calls for emergency medical services (EMS). These funds were used to acquire two sets of software licenses, training for staff, a large scale printer and various related supplies to perform this analysis.

The majority of local fire departments in the Commonwealth provide EMS in their jurisdictions. These services may be as first responders, at the basic life support level or the advanced life support level. Many of these local departments submit all of their run reports to the Massachusetts Fire Incident Reporting System (MFIRS). This report is one of three studies that was agreed upon as part of the grant process. This report is an analysis of local fire department response to EMS-type calls that have been reported to MFIRS from 2001 through 2009.

Mandatory Reporting by MA Fire Departments

Under Massachusetts General Law Chapter 148 Section 2, local fire departments are only mandated to report fires or explosions that result in a dollar loss or human casualty and Section 2A, any fire that occurs at a school that has any grades between Kindergarten and grade 12. Fire departments submit these incidents either electronically or on paper to the MFIRS.

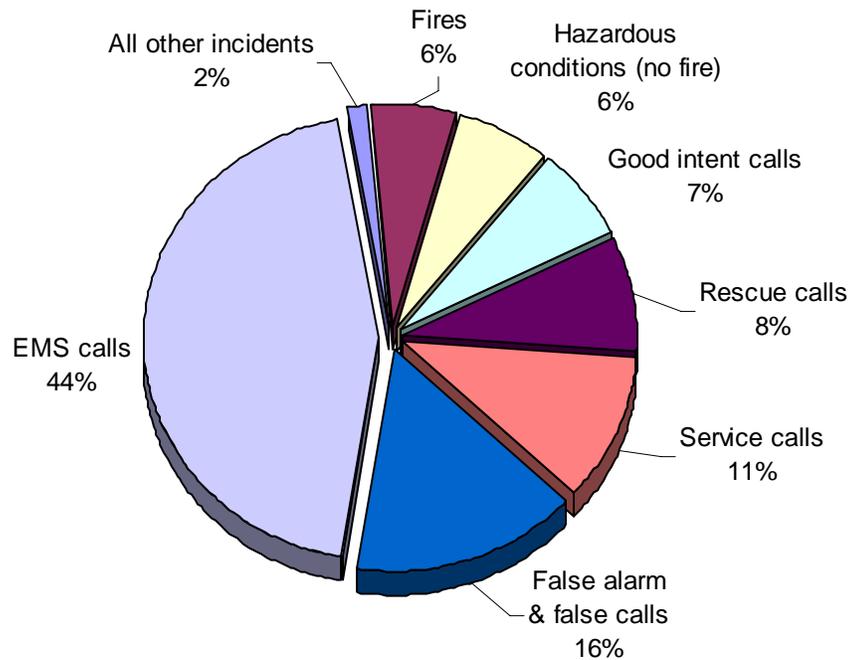
Fire Departments Do More Than Just Fight Fires

Massachusetts fire departments do much more than just fight fires. Over the past couple of decades they have branched out and taken on the added responsibilities for EMS responses, multiple types of specialized rescues, hazardous materials incidents, responding during and after natural disasters, as well as the typical service calls, good intent calls, false alarms and the special types of incidents that do not fit neatly into any of the other categories. These numbers have risen as more fire departments automate their reporting and have voluntarily reported all of their incidents MFIRS, not just those that they are mandated to report.

EMS Calls are 44% of All FD Responses

Emergency Medical Service (EMS) incidents represent the majority of reported incidents in MFIRS. From 2001 through 2009 there were 2,199,756 reported EMS calls to MFIRS. These 2,199,756 calls made up 44% of all the calls in MFIRS. This is over 2.5 times more than the second leading incident type of False Alarm and False Calls, which makes up 16% of total calls.

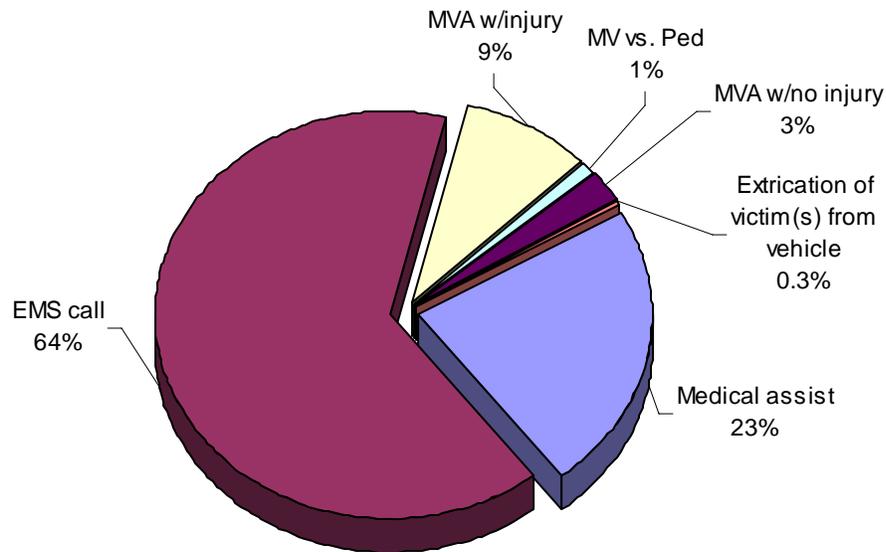
Fire Department Calls by Incident Type 2001 - 2009



EMS Calls are Almost 2/3 of All EMS Type Incidents

EMS calls (Incident Type – 321) are when a fire department ambulance responds to a call for a medical emergency, transport or refusal of treatment. From 2001 to 2009, 1,420,628 were voluntarily reported to MFIRS. These types of calls make up 64% of all the types of EMS calls and 29% of all calls of any type. There were 498,847 reported medical assists. Medical assists (Incident Type – 311) are when a fire department provides medical assistance to another group or agency that has the primary EMS responsibility in their jurisdiction. These calls make up 23% of all reported EMS calls and 10% of all calls. There were 196,976 reported motor vehicle accidents (MVAs) with reported injuries (Incident Type – 322). These calls represent 9% of all reported EMS type calls and 4% of all fire department incidents. Motor vehicle accidents with no injury (Incident Type – 324) accounted for 55,824 incidents, or 3% of all EMS type calls and 1% of all reported calls. There were 21,281 motor vehicle accidents involving pedestrians (Incident Type – 323). These calls accounted for 1% of all EMS type calls and less than 1% of all calls. Fire departments reported responding to 6,200 extrication of victims from a vehicle (Incident Type – 352). These calls were the cause of less than 1% of both EMS type calls and all types of calls.

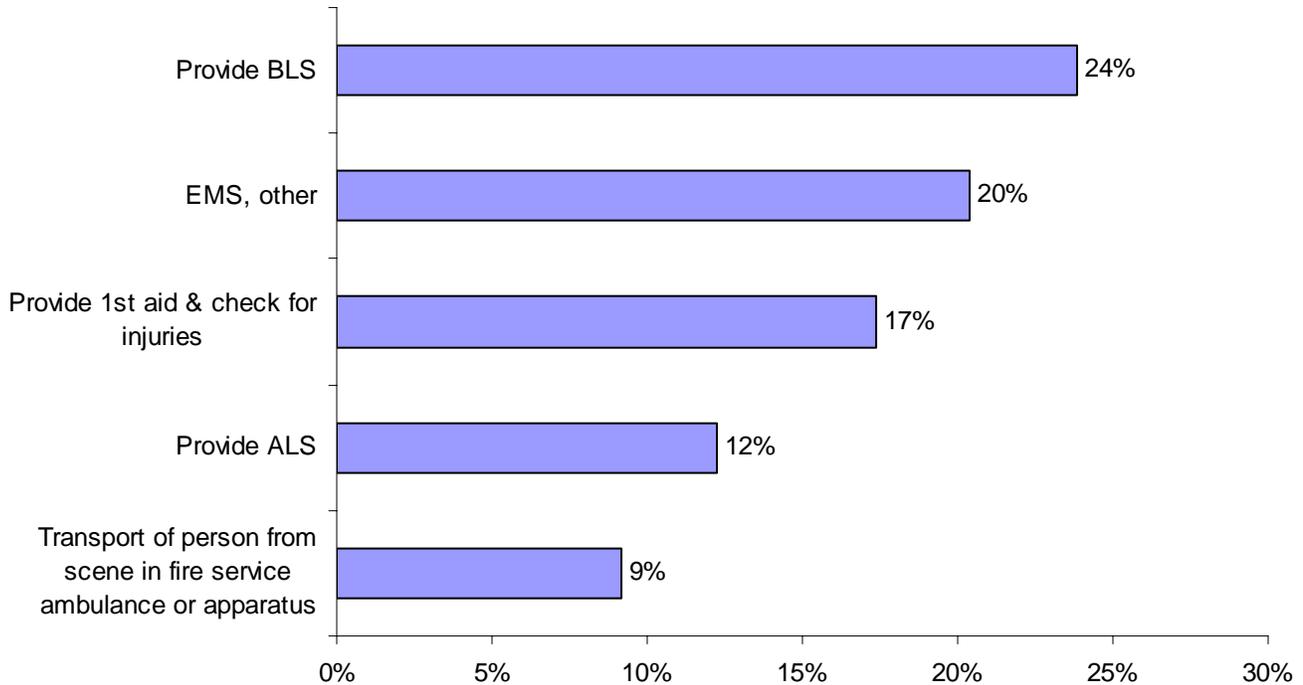
EMS Calls by Type 2001 - 2009



Providing Basic Life Support is Almost 1/4 of Actions Taken

Of all the reported EMS type calls 524,349, or 24%, reported that providing basic life support (BLS) was the principle action taken while on the call. Unclassified EMS activities (EMS, other) was the second leading action taken reported at 20%. Seventeen percent (17%) of the calls reported providing first aid and check for injuries as their primary action taken. Providing advanced life support (ALS) was the primary action taken for 12% of these calls. Transport of a person from the scene in a fire service ambulance or apparatus was reported as the primary action taken in 9% of all EMS type calls.

Leading Actions Taken During EMS Calls 2001 - 2009

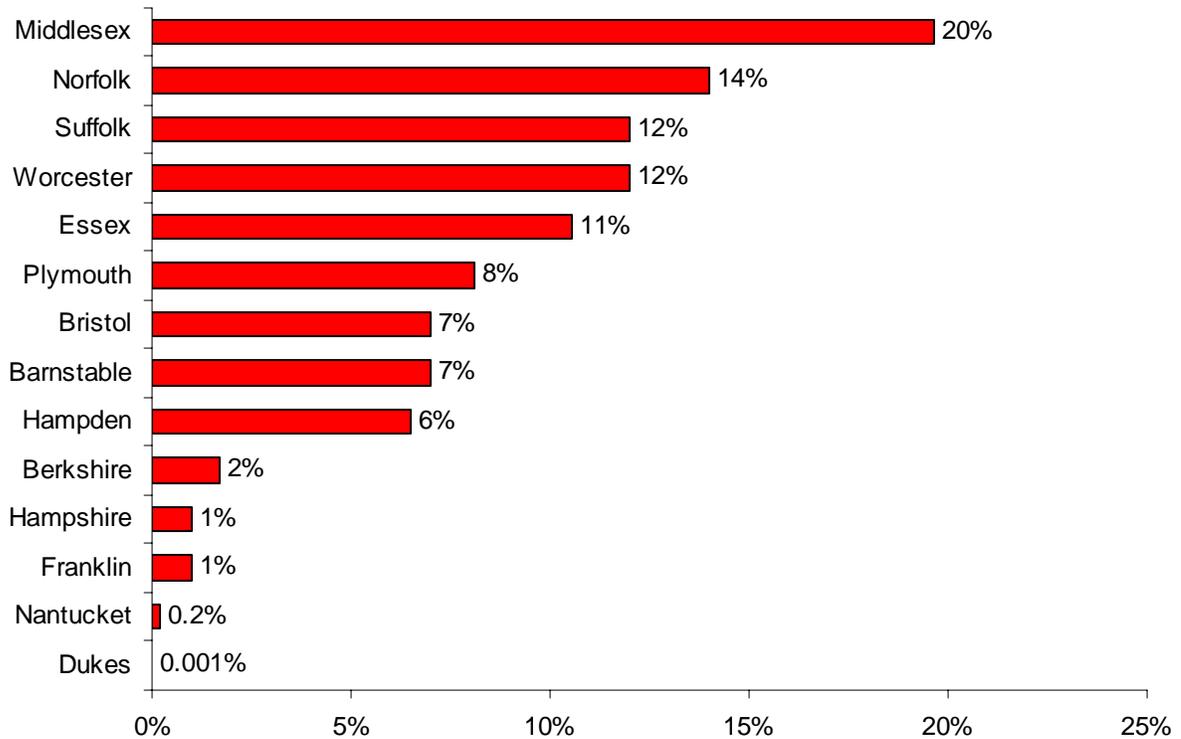


Middlesex County Reported the Most EMS Type Calls

From 2001 – 2009, fire departments in Middlesex County voluntarily reported the most EMS type calls in Massachusetts. Local fire departments in Middlesex County reported 432,079 calls, or 20%, of all EMS types in MFIRS. Norfolk County fire departments reported 14% and Suffolk and Worcester Counties fire departments each reported 12% of these calls. Essex County reported 11%; Plymouth County reported 8%; Bristol and Barnstable Counties each reported 7%; and Hampden County reported 6% of all EMS calls. Berkshire County reported 2%; Hampshire and Franklin Counties each reported 1%; and Nantucket and Dukes County each reported less than 1% of all EMS type calls in the Commonwealth.

The map on page 16 shows the five-year average (2005 - 2009) of EMS runs reported to MFIRS by county. Middlesex County had the highest average with 62,271 EMS runs reported per year. Norfolk County had the second highest average with 39,904 runs reported annually. Suffolk, Essex and Worcester Counties rounded out the top five counties that reported the most EMS runs to MFIRS from 2005 through 2009.

EMS Calls by County 2001 - 2009



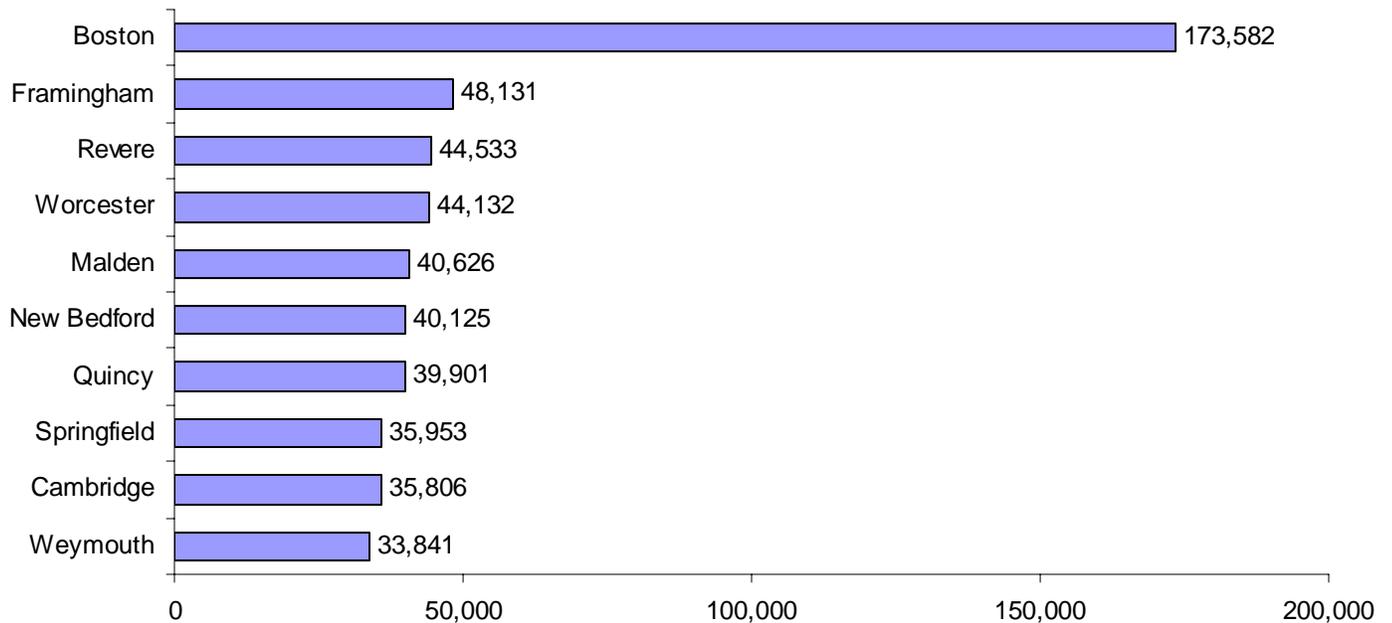
Boston Reported Most EMS Type Calls of Any Local Fire Department

From 2001 – 2009, the Boston Fire Department voluntarily reported 173,582¹ EMS type calls. This represents 8% of all EMS calls statewide and over 3.5 times more than the second leading department, Framingham. Framingham reported 48,131; Revere reported 44,533; Worcester reported 44,132 and Malden reported 40,626 EMS calls of all types. New Bedford (40,125), Quincy (39,901), Springfield (35,953), Cambridge (35,806), and Weymouth (33,841) round out the top 10 fire departments reporting these calls in Massachusetts.

The map on page 17 shows the five-year average (2005 - 2009) of EMS runs reported to MFIRS by city or town. Boston had the highest average with 27,818 EMS runs reported per year. New Bedford had the second highest average with 6,207 runs reported annually. Framingham, Revere and Malden round out the top five communities that reported the most EMS runs to MFIRS from 2005 through 2009.

¹ Boston didn't report these types of calls in 2001 or 2002; they started reporting all of their calls in 2003. Using the average for the seven years that they did report EMS type calls of 24,797 per year to complete 2001 & 2002, Boston would have 223,176 EMS type calls, reporting over 4.5 times more than Framingham.

Leading Fire Departments Reporting EMS Incidents 2001 - 2009

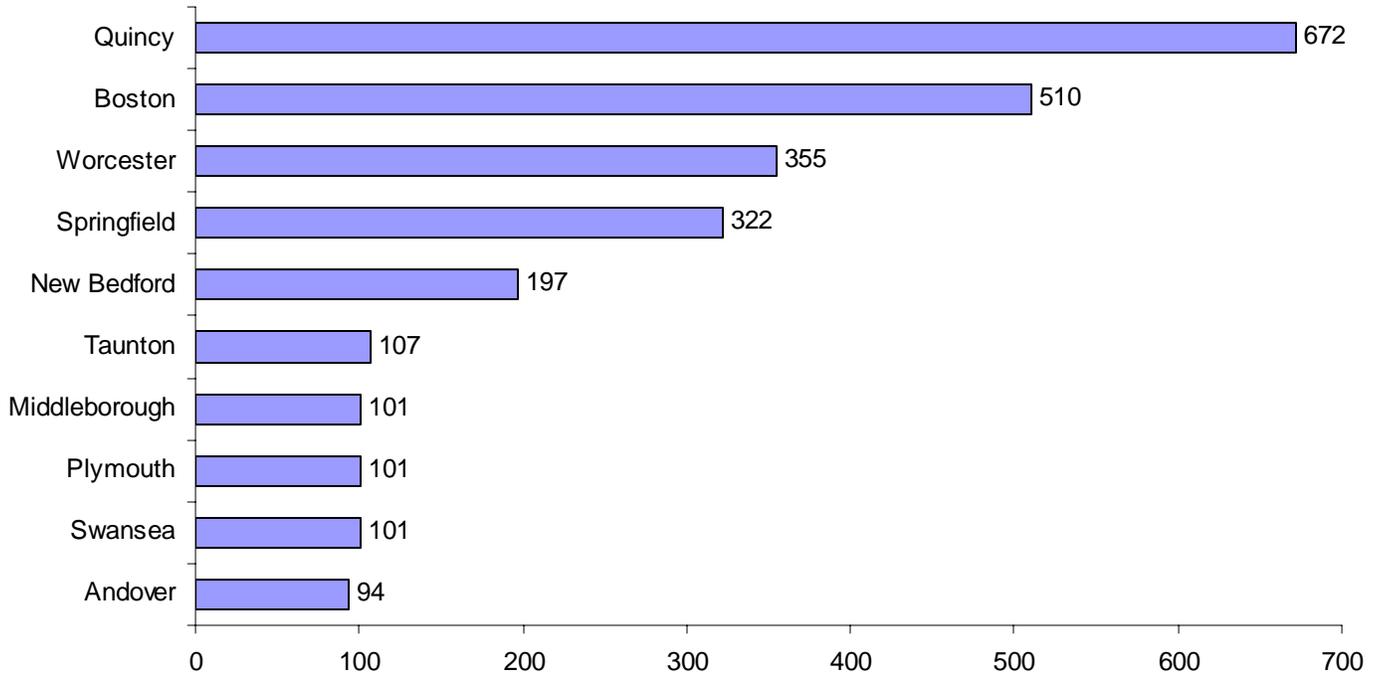


Quincy Reported the Most Vehicle Extractions

Massachusetts fire departments voluntarily reported 6,200 extractions of persons from vehicles to MFIRS from 2001 through 2009. The Quincy Fire Department reported the most auto extractions of victims. They reported 672 extractions, or 11% of the total number reported. Boston was the second leading reporter with 510 extractions. Worcester reported the third most with 355; Springfield reported 322; and New Bedford reported 197. Taunton reported 107 extractions; Middleborough, Plymouth and Swansea each reported 101 extractions; and Andover reported 94 vehicle extractions rounding out the top 10 departments in the state.

Most if not all of the communities that reported the most vehicle extractions have at least one interstate, U.S. or MA route or major roads going through them. Some have multiple highways traversing their boundaries.

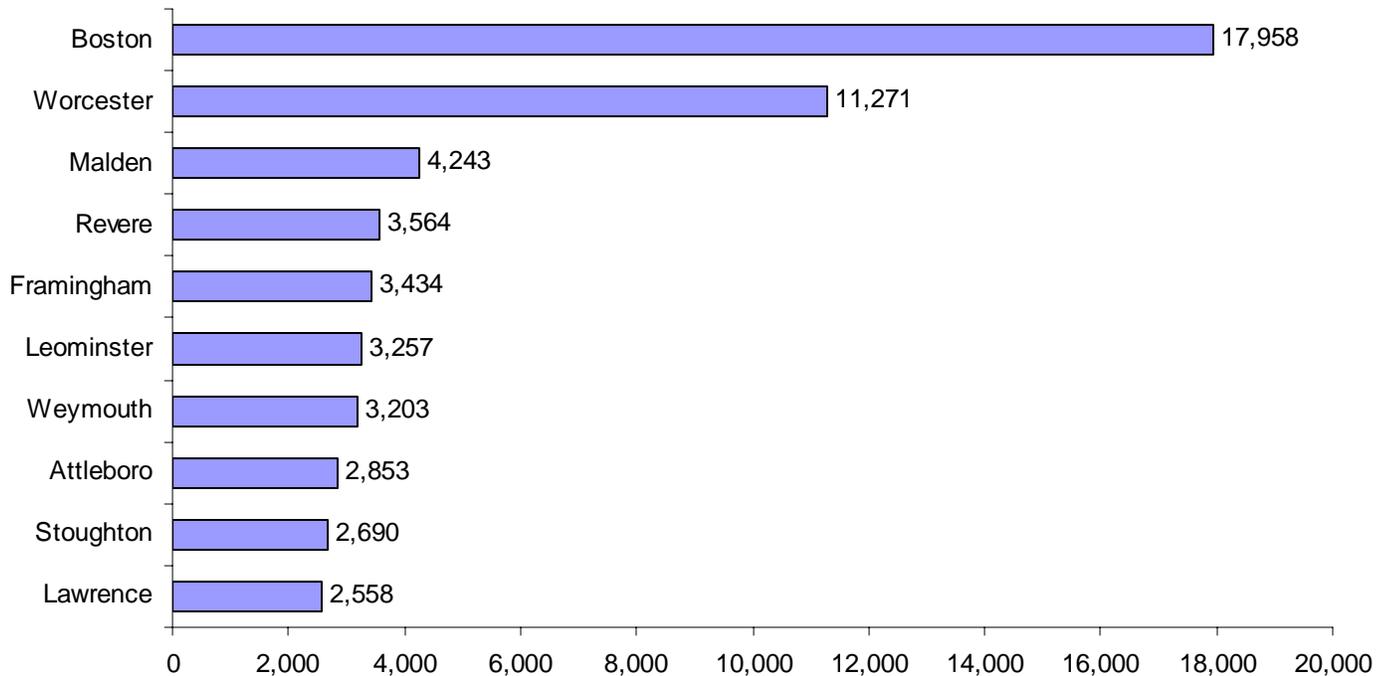
Auto Extrication of Victims 2001 - 2009



Boston Reported the Most Vehicle Accidents with Injuries

From 2001 through 2009 local Massachusetts fire departments reported that they responded to 196,976 motor vehicle accidents with injuries. Boston, reported the most of these calls with 17,958 even though they did not report these types of calls in 2001 and 2002. These 17,958 Boston calls represent 9% of the total 196,976 motor vehicle accidents with injuries. Worcester with 11,721 of these calls reported the second most accidents with injuries. Malden was third with 4,243; Revere was fourth with 3,564; and Framingham reported the fifth most accidents with injuries, 3,434. Leominster (3,257), Weymouth (3,203), Attleboro (2,853), Stoughton (2,690), and Lawrence (2,558) round out the top 10 or responding to motor vehicle accidents with injuries.

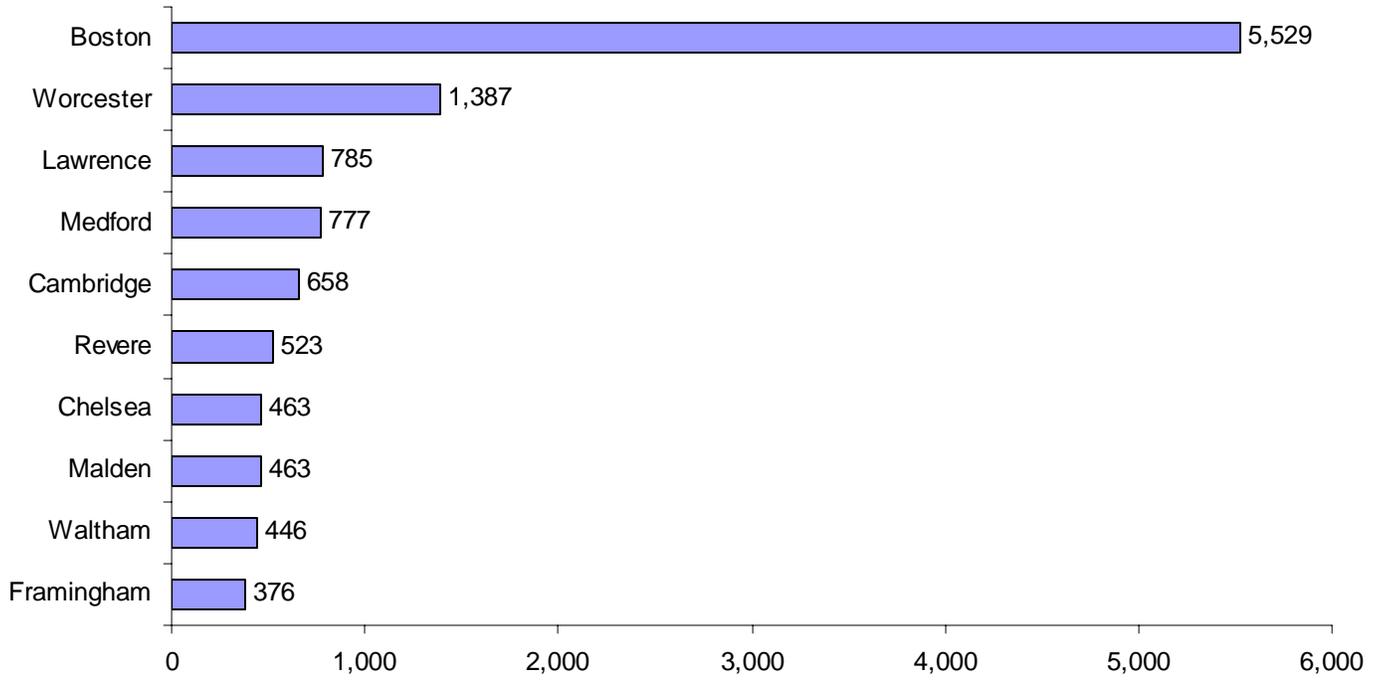
Motor Vehicle Accident with Injury 2001 - 2009



Boston had Over 1/4 of Motor Vehicle vs. Pedestrian Accidents

From 2001 to 2009 Massachusetts fire departments voluntarily reported that they responded 21,281 incidents involving a motor vehicle striking a pedestrian (MV vs. pedestrian). Boston reported the most of these types of accidents with 5,529, or 26%. This was four times more than the department with the second most motor vehicle vs. pedestrian incidents. Worcester reported the second most with 1,387. Lawrence reported 785 of these incidents ranking it third behind Boston and Worcester. Medford reported 777 and Cambridge went to 658 of these calls. Revere (523), Chelsea (463), Malden (463), Waltham (446), and Framingham (376) round out the top 10 for reported motor vehicle vs. pedestrian accidents in Massachusetts.

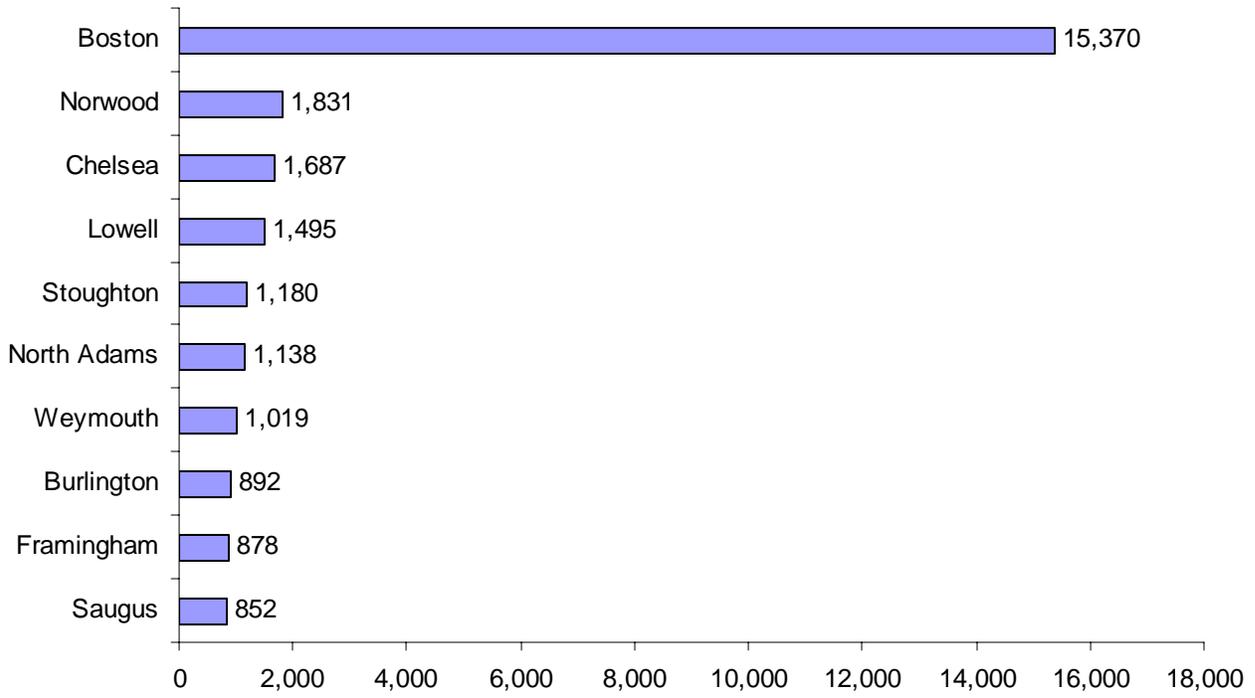
Motor Vehicle vs. Pedestrian Accidents 2001 - 2009



Boston had Over 1/4 of Motor Vehicle vs. Pedestrian Accidents

From 2001 to 2009 Massachusetts fire departments voluntarily reported that they responded 55,824 incidents involving a motor vehicle accidents without an injury (MVA w/out injury). Boston reported the most of these types of accidents with 15,370, or 28%. This was 8.4 times more than the department with the second most motor vehicle accidents without an injury. Norwood reported the second most with 1,831. Chelsea reported 1,687 of these incidents ranking it third behind Boston and Norwood. Lowell reported 1,495 and Stoughton reported going to 1,180 of these calls. North Adams (1,138), Weymouth (1,019), Burlington (892), Framingham (878), and Saugus (852) round out the top 10 for reported motor vehicle accidents without an injury in Massachusetts.

Motor Vehicle Accident without Injury 2001 - 2009



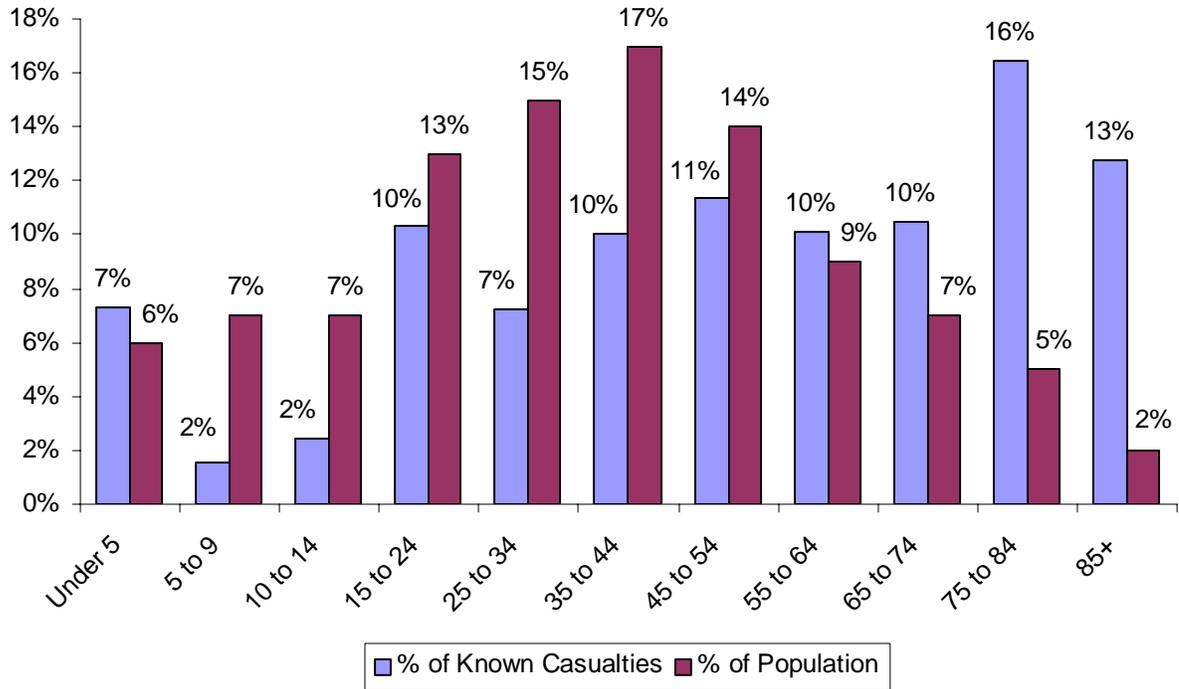
Over 1/2 of Patients Were Female

Over half 56,126, or 54%, of the 103,716 patients that were reported on EMS Modules where gender was known were women. Forty seven thousand five hundred and ninety (47,590), or 46% were men.

Older Adults & Young Children at Greater Risk for Injuries or Illness

Older adults, especially those over the age of 85 had the greatest risk of being transported for an injury or illness. Older adults over the age of 85, account for 2% of the population but 13% of these patients. The risk of an injury or illness for these adults is 6.4. This means that these adults were over six times as likely to need to be transported to a hospital. The following graph shows the percentage of age of patients versus population percentage by age groups for the time period from 2001 to 2009. Other older adults, between the ages of 75 and 84, accounted for 5% of the population but 16% of the fire deaths. Their risk of needing transport was at 3.3. Older adults in the age range of 65 to 74 also had a higher risk of needing transport at 1.5; and adults between the ages of 55 and 64 had a slightly elevated risk at 1.1. Children under five also had a slightly higher risk of needing to be transported to a hospital at 1.2.

Age of Known EMS Casualties



How to Read the Preceding Chart

If an age group represents 10% of the population, we expect it to account for 10% of the casualties. If it accounts for a higher percentage of casualties than it does for the overall population, that group is at a higher risk of becoming a casualty. If the age group accounts for a lower percentage of casualties than it does for the overall population, then that group is at a lower risk of becoming a casualty.

The percentages of the population in each age group were calculated using data from the 2000 Census from the U.S. Census Bureau.

EMT-Basic Was the Greatest Initial Level of Care

Over half, 53%, of the 124,474 patients where Initial Level of Care was reported were first aided by basic level emergency medical technicians (EMT-B). Twenty-four percent (24%) were first cared for by paramedics (EMT-P), and 18% were first aided by first responders. Intermediate level emergency medical technicians (EMT-I) accounted for only 2% of initial patient care, and 3% were reported as ‘Other’ or not reported.

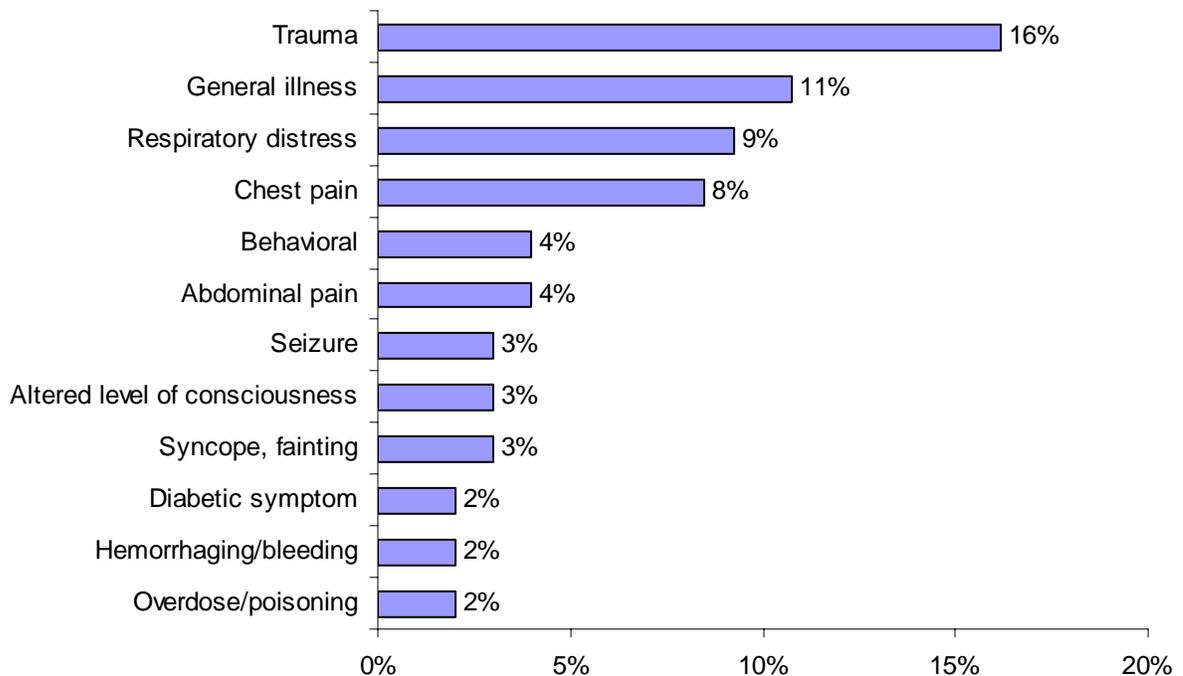
Paramedic Was the Highest Level of Care for Over 2/3 of All Patients

Sixty-nine percent (69%), over two-thirds were cared for by at least one paramedic. Fifteen percent (15%) had basic EMT’s for their highest level of pre-hospital care; and 2% were cared for by intermediate EMT’s. Fourteen percent (14%) were reported as ‘Other’ or not reported.

Trauma was the Leading Cause of Response

Of the 124,474 EMS Modules that were completed, the leading coded value for Provider Assessment was trauma, accounting for 16% of the patients. General illness was the second leading assessment at 11%. Respiratory distress at 9% and chest pains at 8% followed. Four percent (4%) of the assessments were each caused by behavioral problems and abdominal pain. Seizures, altered level of consciousness and syncope or fainting were each an assessment for 3% of these patients. Diabetic symptoms, hemorrhaging or bleeding and overdose or poisoning were each responsible for 2% of provider assessments.

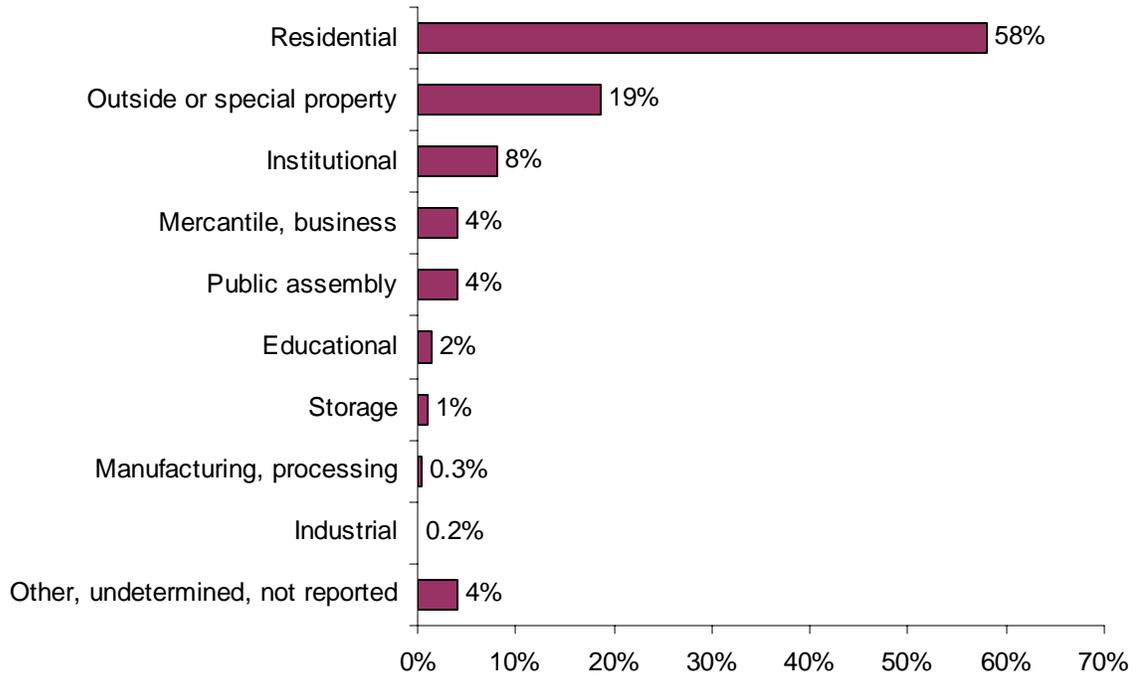
Leading Causes of Provider Assessment



Over 1/2 of All EMS Type Calls Occur in the Home

Of the 2,199,756 EMS type calls, 1,277,066, or 58%, occurred on or in a residential property. Outside or special properties were the second leading property use for these types of calls accounting for 19%. Mercantile or business properties and public assembly properties each accounted for 4%; 2% occurred at educational facilities and 1% happened at storage facilities. Manufacturing facilities and industrial facilities each had less than 1% occur there. There were 90,354 other, undetermined or not reported property uses, accounting for 4% of all the reported fire department responses to EMS type calls in Massachusetts from 2001 through 2009.

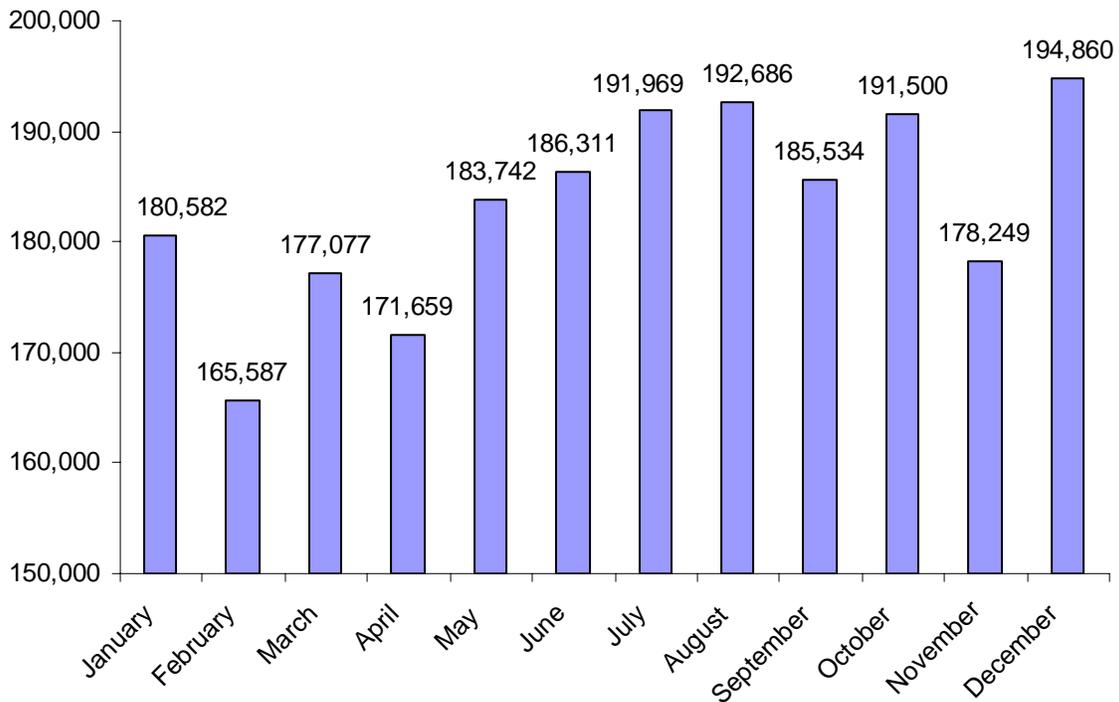
EMS Calls by Property Use 2001 - 2009



EMS Type Calls Most Common in December & Summer Months

December was the peak month for these incidents. August ranked second and July had the third largest number of EMT Type Calls. The late Winter and early Spring months

EMS Type Calls by Month 2001 - 2009

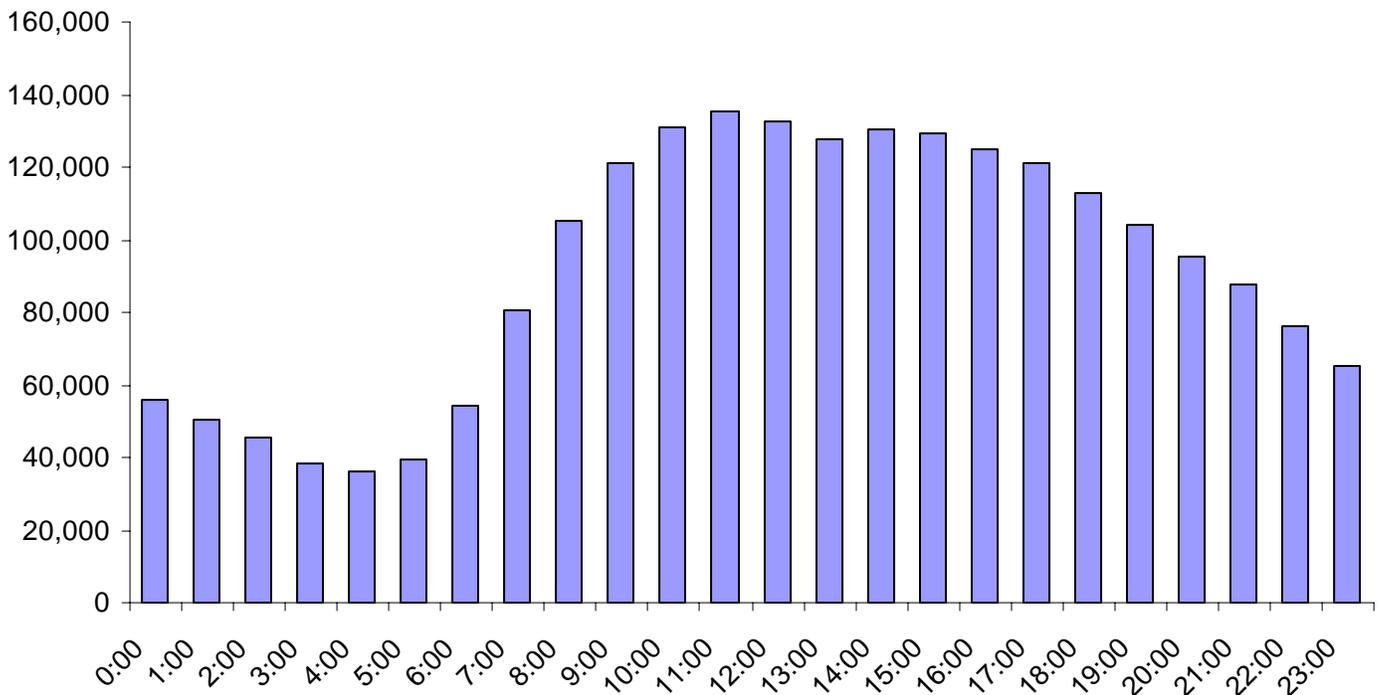


had significantly fewer calls of these types. The fewest EMS calls occurred in February. April had the second lowest frequency of these incidents, and March had the third lowest number of EMS type calls from 2001 - 2009.

EMS Type Call Most Common Around Lunch Time

EMS type calls occurred most often around lunchtime. They reached their lowest point between 12:00 a.m. and 6:00 a.m. and increased fairly steadily to a peak between 11:00 a.m. and 12:00 p.m. Thirty-six percent (36%) of all of these calls occurred during one-quarter of the day, between the hours of 10:00 a.m. and 3:00 p.m.

EMS Type Calls by Hour 2001 - 2009

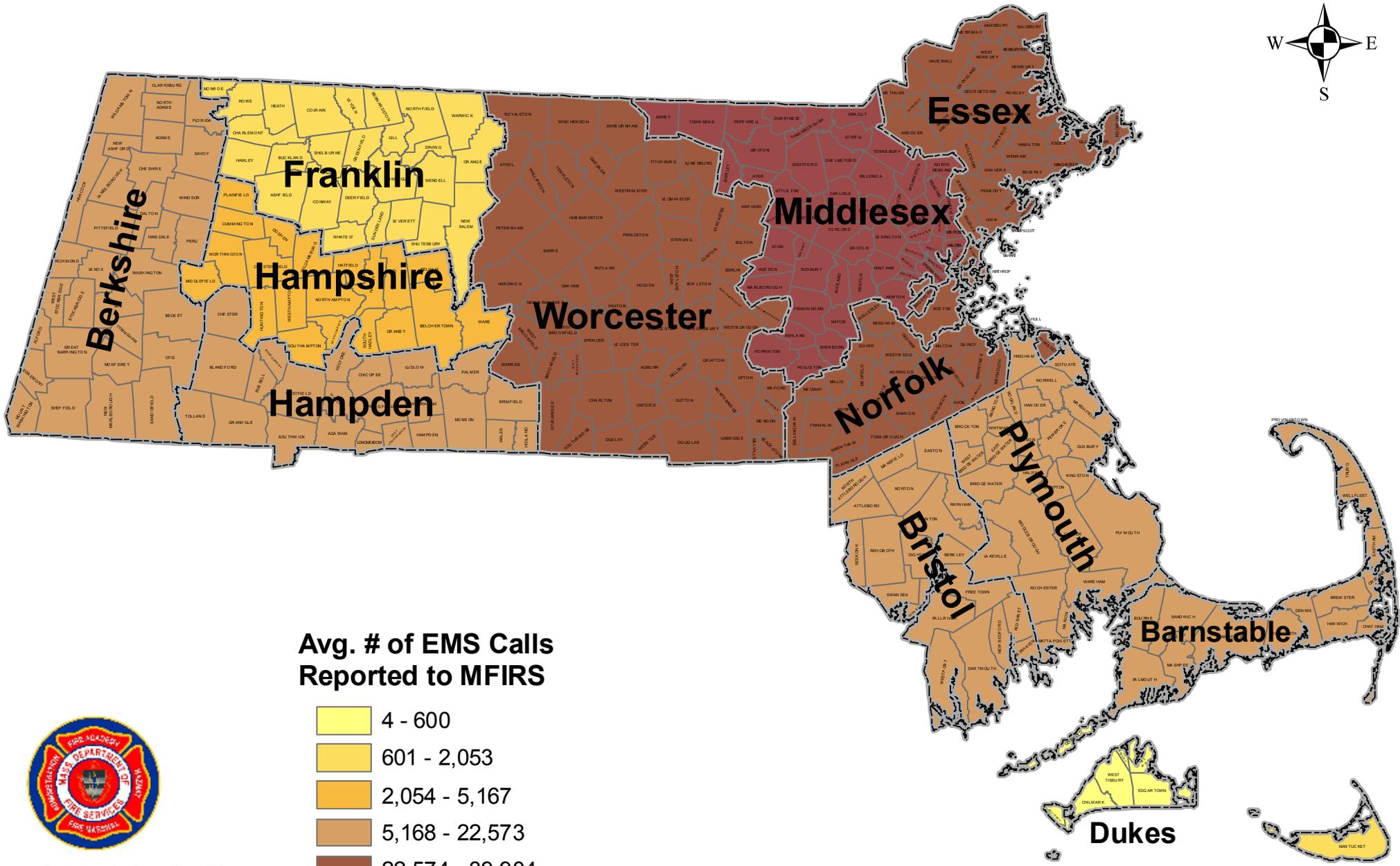


The previous graph shows fire frequency by time of day on the 24-hour clock for EMS calls. Midnight to 1:00 a.m. is represented by 0:00, 1:00 a.m. to 2:00 a.m. is represented by 1:00, etc.

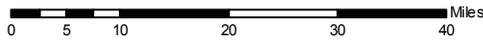
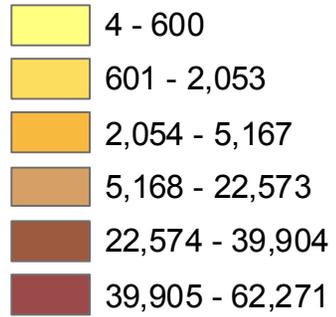
EMS Incidents = Most Fire Department Calls

EMS type incidents make up the majority of calls reported to MFIRS from 2001 through 2009. Forty-four percent (44%) of all reported incidents were calls for emergency medical services, including motor vehicle accidents. During these calls providing basic life support to the patient was leading action taken. The leading age group of patients were people between the ages of 75 and 84. Trauma was the leading assessment made by fire department EMS providers; general illness was the second leading assessment. Paramedics were by far the highest level of pre-hospital care reported. Most of these types of calls come in July, August and September; and occur during lunchtime.

Average Number of EMS Calls Reported to MFIRS by County 2005 - 2009



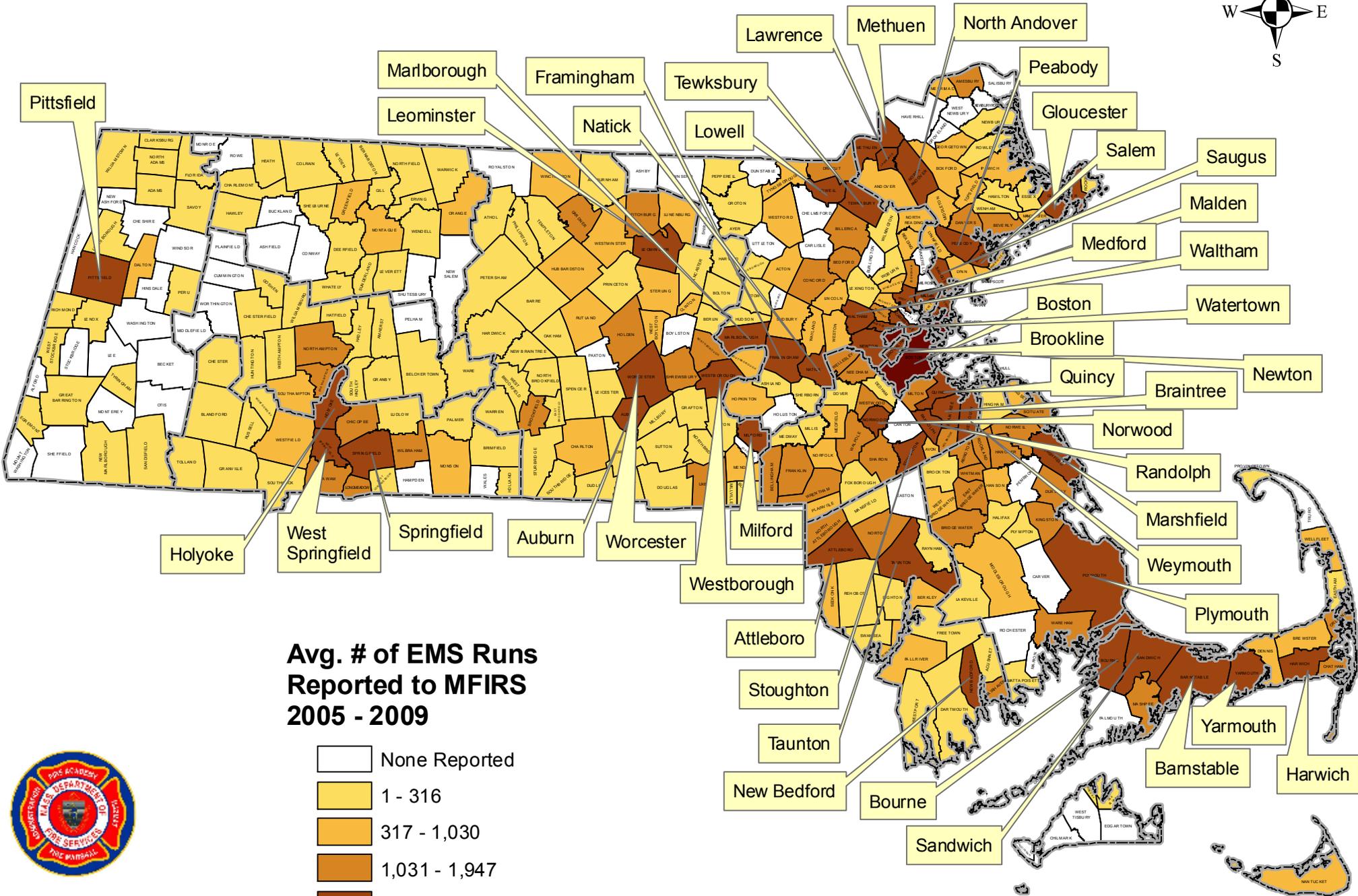
Avg. # of EMS Calls Reported to MFIRS



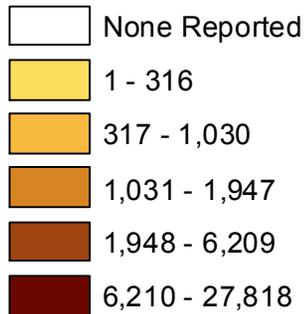
Dukes

Nantucket

Average Number of EMS Runs Reported to MFIRS 2005 - 2009



Avg. # of EMS Runs Reported to MFIRS 2005 - 2009



Motor Vehicle Fires Caused by Collisions in Massachusetts 2001 – 2009



MFIRS
Massachusetts Fire Incident Reporting System

Fire Service Assists with EMS & Crash Data Analysis

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No one in recent memory has looked at motor vehicle fires caused by collisions. Since the majority of these occur on public roads it may be of interest to the TRCC. Local fire departments respond to these fires in their jurisdiction and submit these reports to the Massachusetts Fire Incident Reporting System (MFIRS). This report is one of three studies that was agreed upon as part of the grant process.

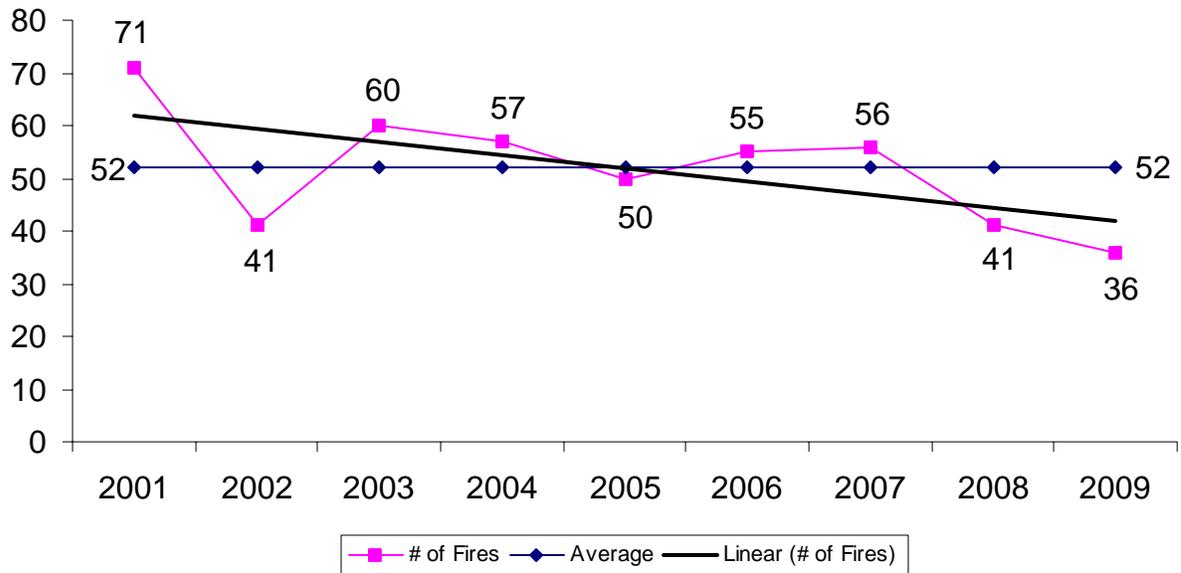
Mandatory Reporting by MA Fire Departments

Under Massachusetts General Law Chapter 148 Section 2, local fire departments are only mandated to report fires or explosions that result in a dollar loss or human casualty and Section 2A, any fire that occurs at a school that has any grades between kindergarten and grade 12. Fire departments submit these incidents either electronically or on paper to the MFIRS.

Averaged 1 MV Fire from Collision Per Week from 2001 – 2009

There were a reported 467 motor vehicle fires caused by collision in the Commonwealth from 2001 through 2009. This averages out to 52 of these fires per year, or one per week during that time period.

MV Fires from Collisions 2001 - 2009



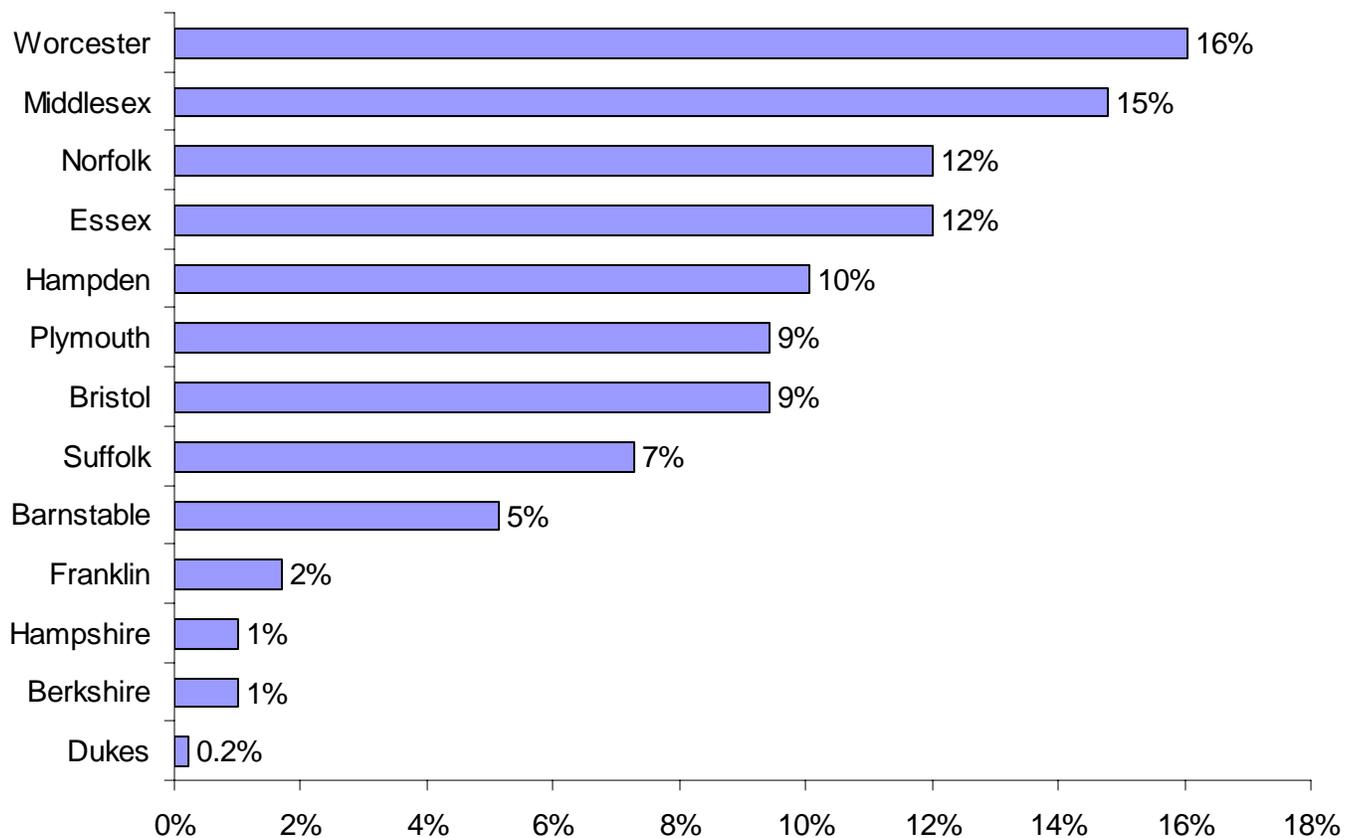
Over 3/4 Involve Passenger Vehicles

Of the 467 motor vehicle fires caused by collisions, 364 involved passenger vehicles. Over two-thirds, 78%, were passenger vehicle fires. Two percent (2%) of these incidents were road freight or transport vehicle fires; and 20% were unclassified motor vehicle fires.

Worcester County Reported the Most Fires

From 2001 through 2009, local Worcester County fire departments reported 75, or 16%, of the 467 motor vehicle fires caused by collision. Middlesex County reported 15% and Norfolk and Essex Counties each reported 12% of these fires. Hampden County reported 10%, Plymouth and Bristol Counties each reported 9%; and Suffolk County reported 7% of these incidents. Barnstable County reported 5%; Franklin County reported 2%; Hampshire and Berkshire Counties each reported 1%; and Dukes County reported less than 1% of these fires. Nantucket County did not report any motor vehicle fires from collisions during this time period.

MV Fires Caused by Collision by County 2001 - 2009



The map on page nine shows the total number of motor vehicle fires caused by collisions reported to MFIRS by county. Worcester County had the highest number reported at 75. Middlesex County had the second highest number of these incidents reported with 69. Norfolk County had 58 of these calls, Essex County reported 54 and Hampden County reported 47 motor vehicle fires caused by collision between 2001 and 2009.

Boston & Springfield Reported the Most Fires

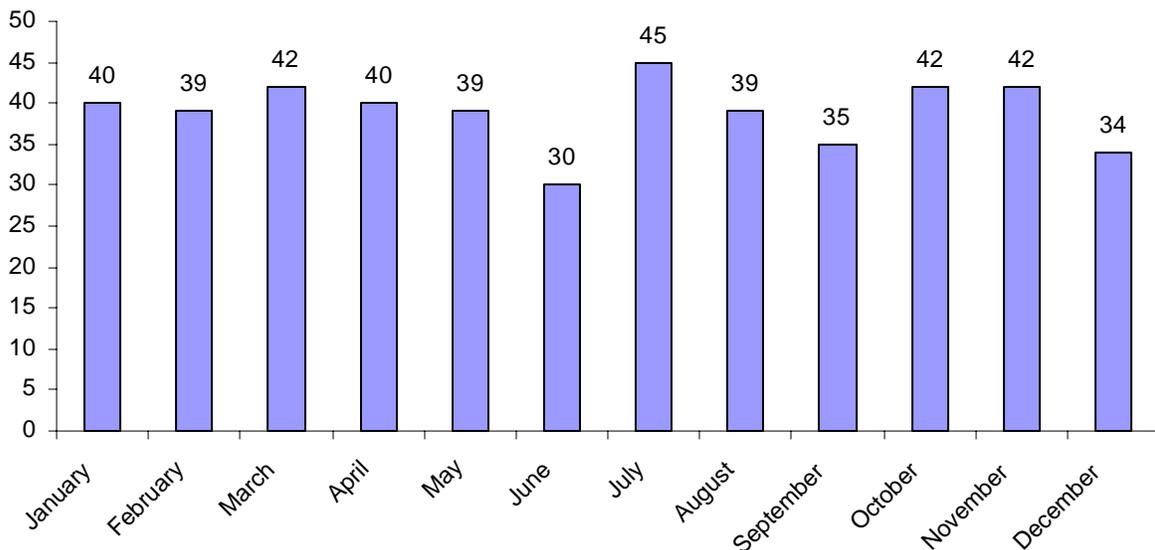
Boston reported the most motor vehicle fires caused by collisions of any local fire department. Boston reported 26 of these fires from 2001 through 2009. Springfield was second with 24 reported fires of this type and Worcester reported the third most with 12. Milton and Swansea each reported 10 of these fires; Plymouth reported nine; and Chicopee, Fall River and Quincy each reported eight motor vehicle fires caused by collisions. In total 155 local fire departments reported at least one of these types of fires.

The map on page 10 shows the total number of motor vehicle fires caused by collisions reported to MFIRS by city or town. Boston had the highest number reported at 26. Springfield had the second highest number of these incidents reported with 24. Worcester had 12 of these calls, and Barnstable, Milton and Swansea each reported 10 motor vehicle fires caused by collision between 2001 and 2009.

Most of These Fires Occur in July

The most prevalent month for motor vehicle fires caused by collision in the Commonwealth was July with a reported 45, or 10%, of these fires. March, October and November each had 42, or 9% of these fires. June was the month with the least amount of these fires. Only 30, or 6%, of these fires occurred in June.

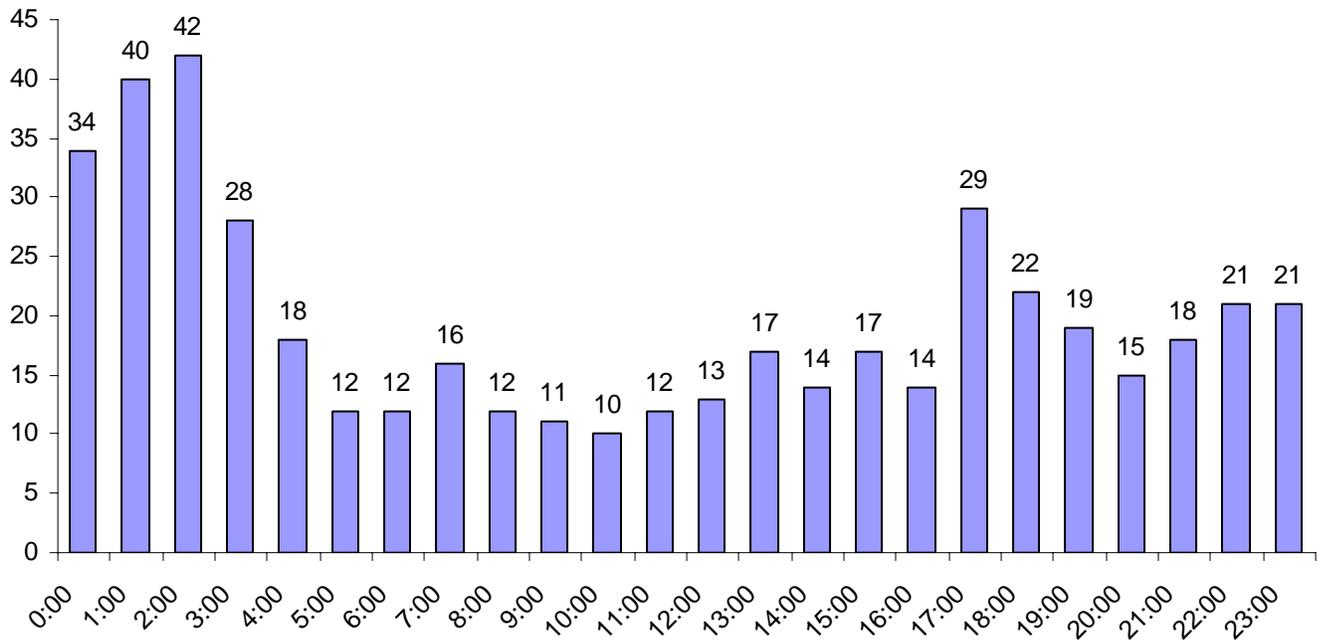
**Motor Vehicle Fires Caused by Collision by Month
2001 - 2009**



1/4 of These Fires Occur in the Early Morning Hours

One quarter, or 25%, of motor vehicle fires caused by collision occurred between the hours of midnight and 3:00 a.m. The next highest occurrence of these fires were during the evening commute between 5:00 p.m. and 7:00 p.m. The lowest occurrence of these fires were during the morning between 5:00 a.m. and noon with only a small spike at 7:00 a.m. during the morning commute.

**Motor Vehicle Fires Caused by Collision by Hour
2001 - 2009**



The previous graph shows fire frequency by time of day on the 24-hour clock for motor vehicle fires caused by collision. Midnight to 1:00 a.m. is represented by 0:00, 1:01 a.m. to 2:00 a.m. is represented by 01:00, etc.

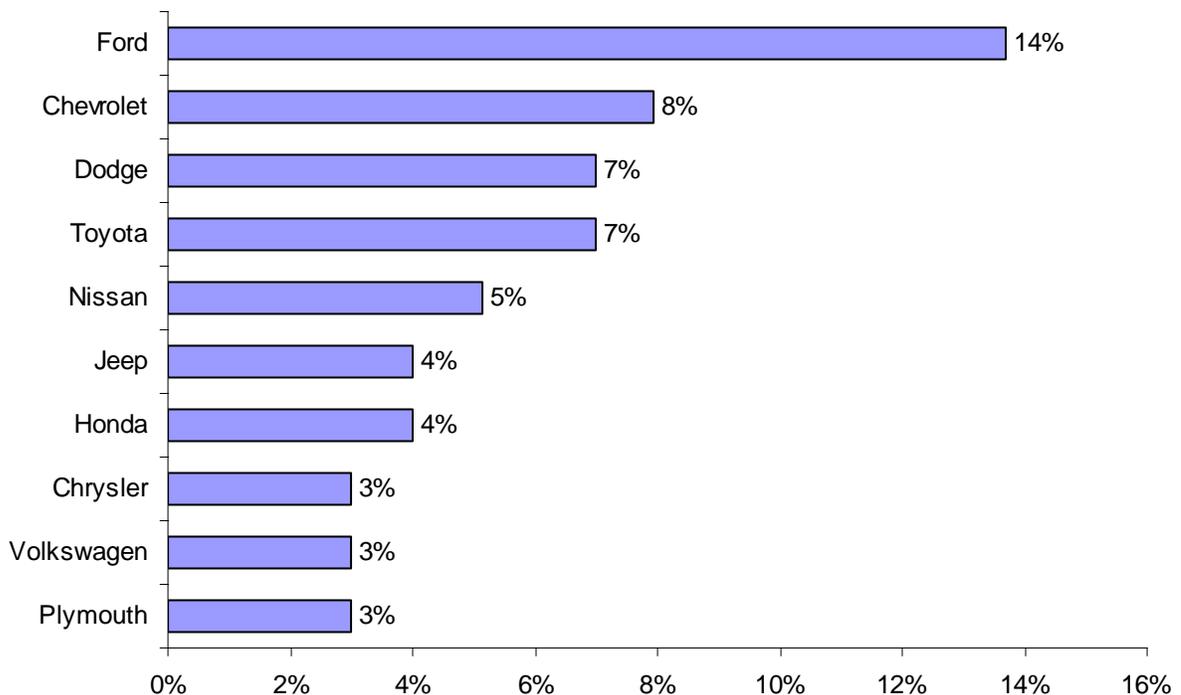
Passenger Cars Involved in 80% of Fires

Automobiles or passenger cars were the mobile property type involved in 372, or 80%, of these incidents. Unclassified passenger road vehicles were involved in 11%; semi-trailer freight trucks were involved in 2%; and motorcycles, tanker trucks carrying non-flammable cargo, pickup trucks, general use trucks were each involved in 1% of these fires. Buses, off-road recreational vehicles, unclassified freight road transport vehicles were each involved in less than 1% of these incidents. Unclassified or unreported motor vehicles were involved in 2% of the 467 motor vehicle fires caused by collision in the Commonwealth. While freight trucks hitting bridge abutments garner the big headlines, it is individual passenger cars that are most often involved in these fiery crashes.

Ford was the Leading Mobile Property Make

Of the 467 motor vehicle fires caused by collision, 64, or 14%, involved vehicles manufactured by Ford. Chevrolet was the next leading make at 8%. Dodge and Toyota each accounted for 7% of these vehicles. Nissans were 5%; Jeep and Hondas each accounted for 4%; and Chryslers, Volkswagens and Plymouths were each 3% of the vehicles involved in these incidents between 2001 and 2009.

**MV Fires Caused by Collision by Vehicle Make
2001 - 2009**



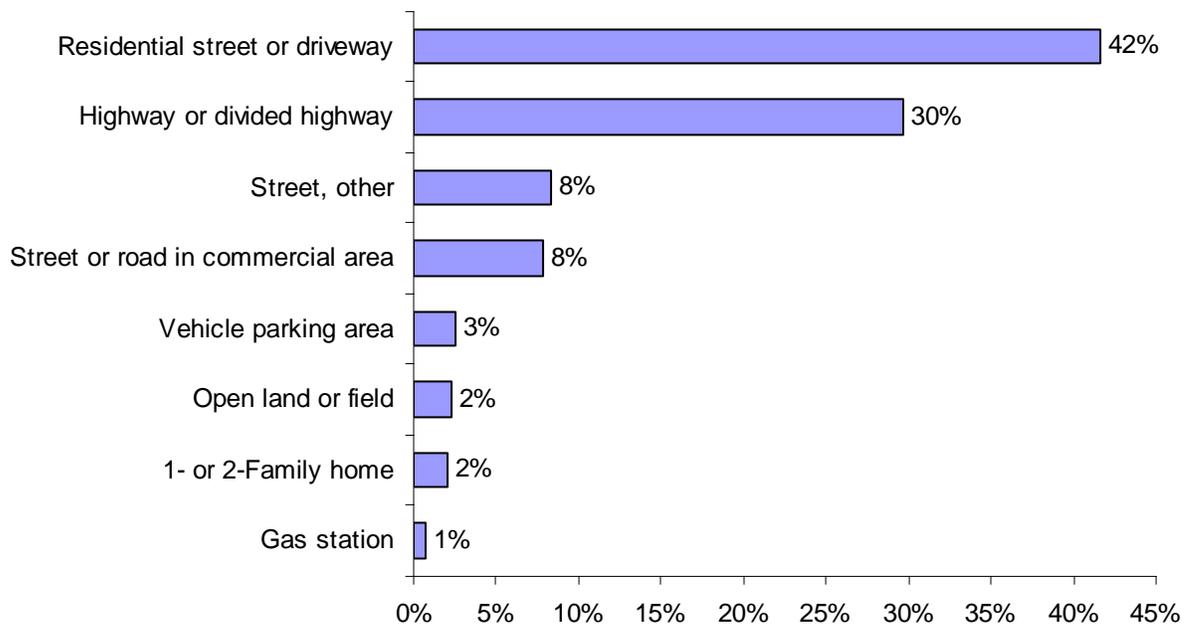
Just because a particular vehicle manufacturer has a higher instance of fires, it should not be assumed that their vehicles are more prone to fires. There could simply be more of that manufacturer’s vehicles in Massachusetts. One should not draw any specific conclusions about the above chart without having data on the most popular makes of vehicles in Massachusetts during the same time period.

42% Occurred on Residential Streets & Driveways

Not surprisingly residential streets and driveways were the leading place where most of the motor vehicle fires caused by collision occurred. One hundred and eighty-one, or 42%, of these 467 incidents happened on residential streets or driveways. The second leading property use for these types of incidents was highways where 129, or 30% occurred. Streets in commercial areas and unclassified streets each caused 8% of these

incidents. Three percent (3%) happened in parking lots; 2% occurred in open land or fields and 1-or 2-family homes and 1% happened at gas stations.

Leading Property Use for MV Fires Caused by Collision 2001 - 2009



Almost 3/4 of Fire Started in Engine Area

The leading 'area of origin' for these fires was the engine area of the vehicle. Seventy-one percent (71%) of the 467 reported motor vehicle fires caused by collision began in the engine area. The 'heat source' for almost half, 45%, of these fires was heat or electrical arcing from the vehicle itself. The leading 'item first ignited' was a flammable fuel escaping from the combustion engine, accounting for 22% of these fires. One quarter, or 25%, of all these fires had gasoline as the 'type of material first ignited'. Only 16 of these incidents reported a hazardous materials release. All 16 reported gasoline, diesel fuel or motor oil as the material being released.

Over 3/4 Reported No Human Factors Contributing to Ignition

Three hundred and sixty-seven (367), or 79%, of the 467 reported motor vehicle fires caused by collisions had 'none' reported or did not have any human factor contributing to ignition. Ten percent (10%) of these incident reported that at least one of the vehicle operators were possibly impaired by alcohol or drugs, and another 4% reported that an operator fell asleep while driving.

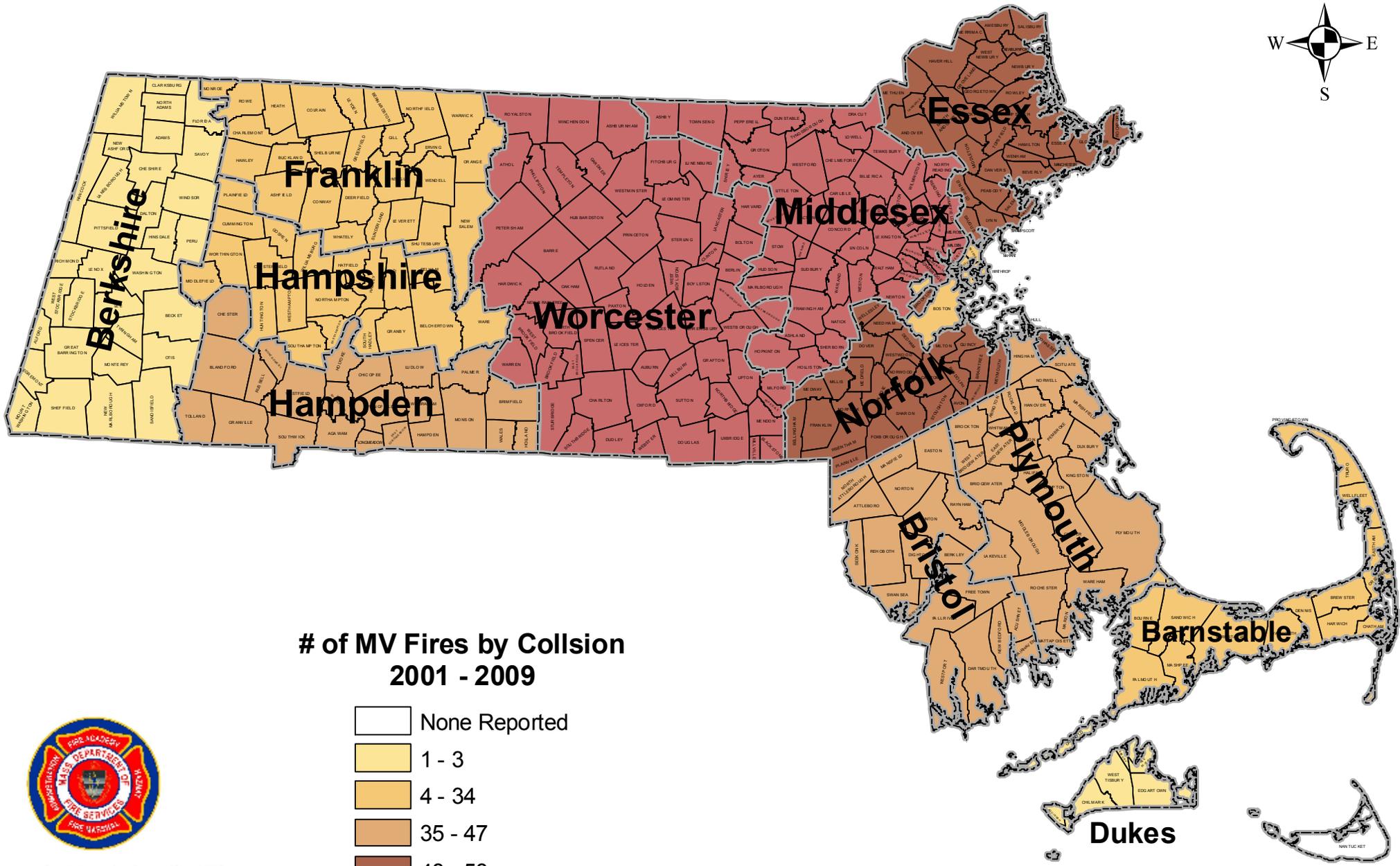
Conclusion

From 2001 to 2009 155 fire departments reported 467 motor vehicle fires caused by collision to MFIRS. These 467 fires caused 18 civilian deaths, 25 civilian injuries, 11 fire service injuries and \$2.8 million in estimated damages. Although not a common occurrence, on average one of these fires occurs weekly. Boston and Springfield were the leading communities where these fires occurred. The largest concentration of these incidents occurred between the hours of midnight and 3 a.m. with another spike at 5 p.m. that correlates with the leading human factors contributing to ignition of possibly impaired by alcohol or drugs and falling asleep. July, October and November were the leading months for these types of fires.

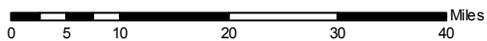
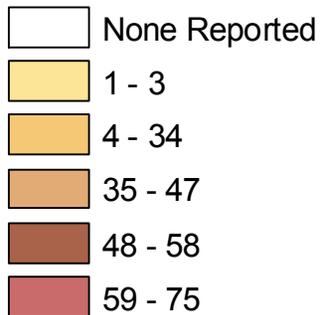
2007 Everett Tanker Accident Leads to Multiple Fires

On December 5, 2007, at 1:31 a.m., the Everett Fire Department responded to a motor vehicle accident and ensuing fire involving a gasoline tanker at the intersection of Sweetzer and Main streets. The tanker truck rolled onto its side discharging its cargo of gasoline into the street. The gasoline ignited and started 42 exposure fires; three building fires and 39 other motor vehicle fires. Fortunately there were no injuries. The total estimated dollar loss of the initial fire and accompanying exposure fires was \$2.1 million.

Motor Vehicle Fires from Collisions by County 2011 - 2009

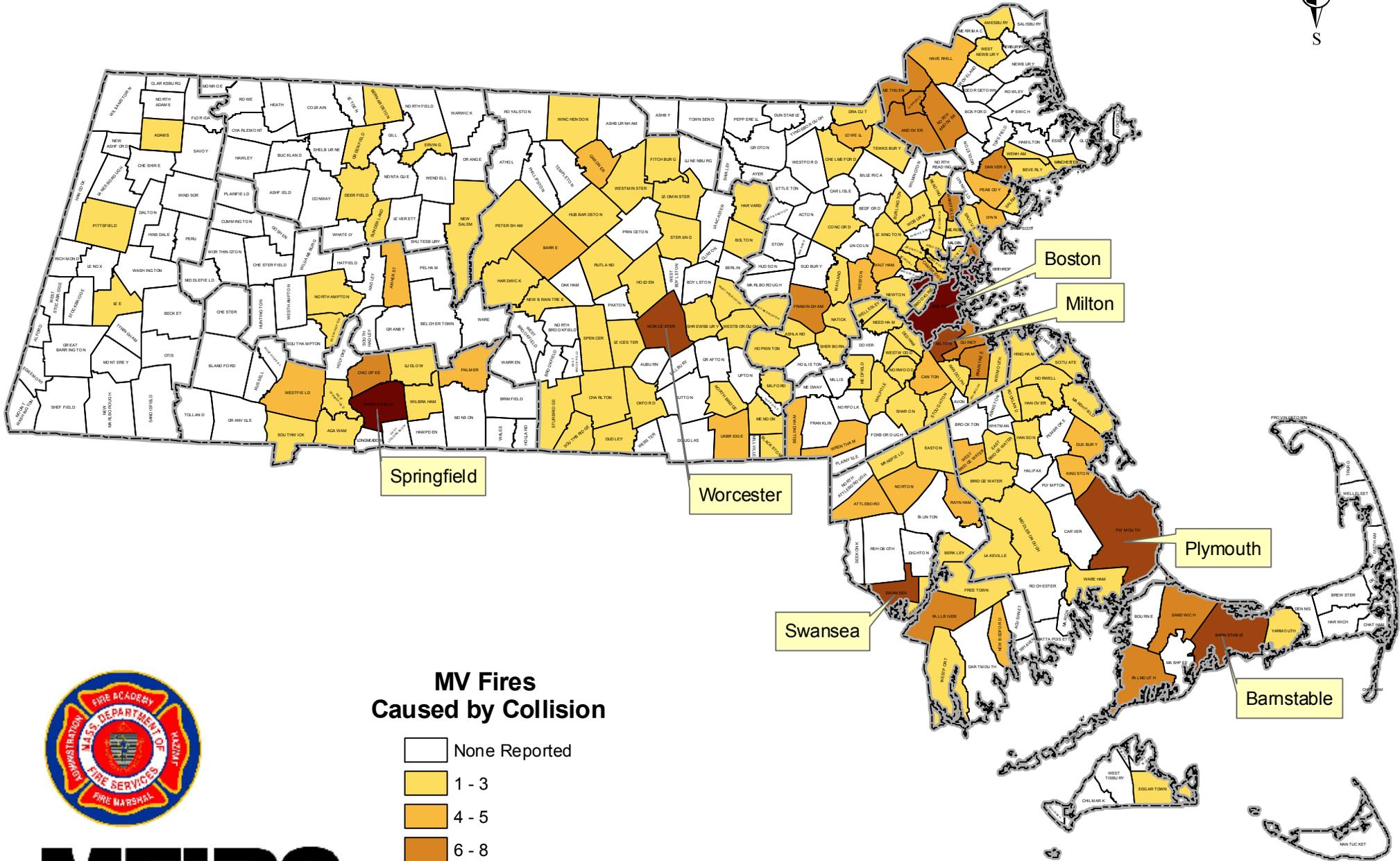


of MV Fires by Collision
2001 - 2009

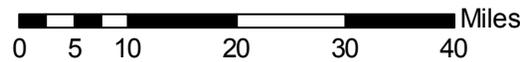
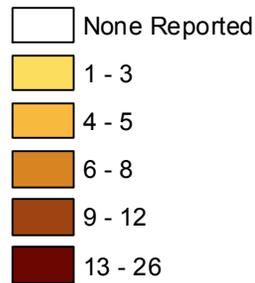


Nantucket

MV Fires Caused by Collision 2001 - 2009



MV Fires Caused by Collision



Fire Department Response to Motor Vehicle Accidents in Massachusetts 2001 – 2009



MFIRS
Massachusetts Fire Incident Reporting System

Fire Service Assists with MVA & Crash Data Analysis

On July 1, 2009, the Department of Fire Services was awarded a federal Section 408 grant to fund part of a Federal Fiscal Year 2008 application. The Massachusetts Traffic Records Coordinating Committee (TRCC) awarded \$40,284 in part to fund geographic information system (GIS) analysis of reported fire department responses to motor vehicle accidents (MVA's) and calls for emergency medical services (EMS). These funds were used to acquire two sets of software licenses, training for staff, a large scale printer and various related supplies to perform this analysis.

Historically some municipal police departments do not share their accident reports with the various members of the TRCC. The Department of Fire Services is in position to bridge the gap as many municipal fire departments do respond to most MVA's in their jurisdiction and voluntarily submit these reports to the Massachusetts Fire Incident Reporting System (MFIRS). This report is one of three studies that were agreed upon as part of the grant process.

Mandatory Reporting by MA Fire Departments

Under Massachusetts General Law Chapter 148 Section 2, local fire departments are only mandated to report fires or explosions that result in a dollar loss or human casualty and Section 2A, any fire that occurs at a school that has any grades between Kindergarten and grade 12. Fire departments submit these incidents either electronically or on paper to the MFIRS.

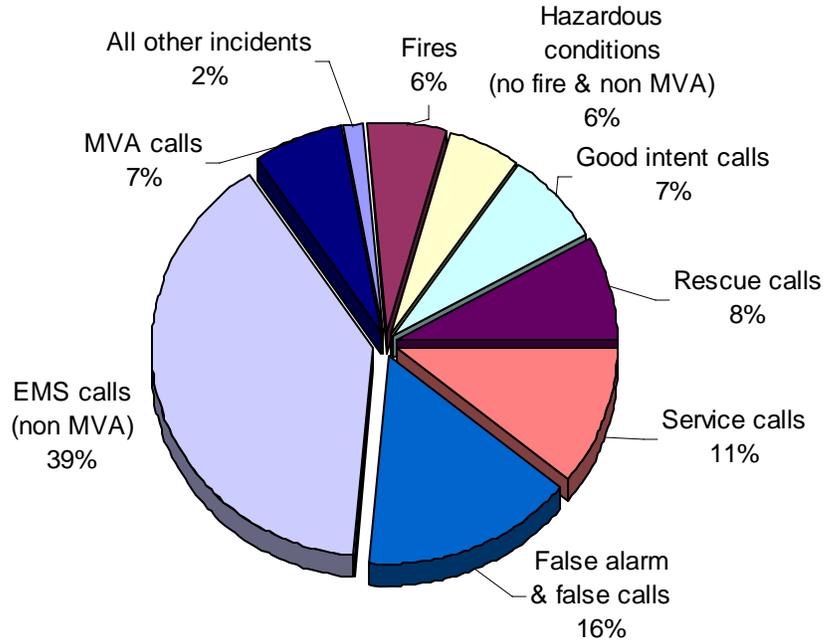
Fire Departments Do More Than Just Fight Fires

Massachusetts fire departments do much more than just fight fires. Over the past couple of decades they have branched out and taken on the added responsibilities for MVA responses, multiple types of specialized rescues, hazardous materials incidents, responding during and after natural disasters, as well as the typical service calls, good intent calls, false alarms and the special types of incidents that do not fit neatly into any of the other categories. These numbers have risen as more fire departments automate their reporting and have voluntarily reported all of their incidents MFIRS

MVA Calls are 44% of All FD Responses

Motor vehicle accident (MVA) incidents represent 7% of the reported incidents in MFIRS. From 2001 through 2009 there were 330,407 reported MVA calls to MFIRS. These 330,407 calls made up 7% of all the calls in MFIRS. This is 1% more than fire calls, which made up 6% of total calls.

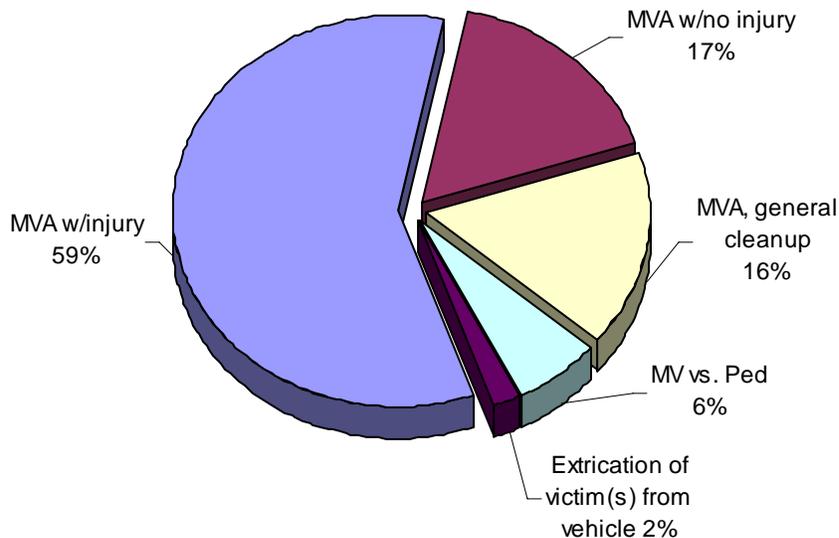
Fire Department Calls by Incident Type 2001 - 2009



MVA with Injury Calls are the Leading Type of MVA Incidents

MVA with injury calls (Incident Type – 322) are when a fire department responds to a call for a motor vehicle accident with reported injuries. From 2001 to 2009 194,254 were voluntarily reported to MFIRS. These types of calls make up 59% of all the types of MVA calls and 4% of all calls of any type. Motor vehicle accidents with no injury

MVA Calls by Type 2001 - 2009

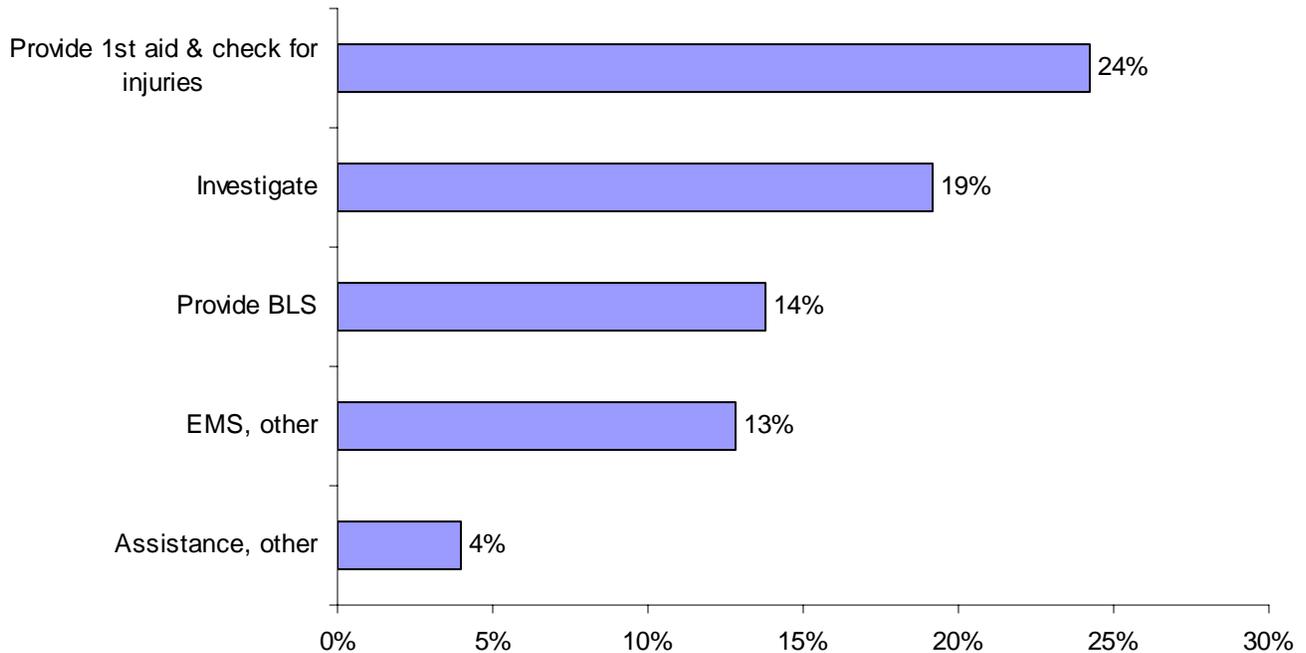


(Incident Type – 324) accounted for 55,797 incidents, or 17% of all MVA type calls and 1% of all reported calls. There were 52,952 motor vehicle accidents needing general cleanup (Incident Type – 463). These calls accounted for 16% of all MVA type calls and 1% of all calls. There were 21,254 motor vehicle accidents involving pedestrians (Incident Type – 323). These calls accounted for 6% of all MVA type calls and less than 1% of all calls. Fire departments reported responding to 6,150 extrication of victims from a vehicle (Incident Type – 352). These calls were the cause of less than 2% of MVA type calls and less than 1% of all types of calls.

Providing 1st Aid is Almost 1/4 of Actions Taken

Of all the reported MVA calls 80,157, or 24%, reported that providing first aid and checking for injuries was the principle action taken while on the call. Investigation was the second leading action taken reported at 19%. Fourteen percent (14%) of the calls reported providing basic life support (BLS) as their primary action taken. Unclassified EMS activities (EMS, other) was the primary action taken for 13% of these calls. Unclassified assistance was reported as the primary action taken in 4% of all MVA calls by Massachusetts fire departments between 2001 and 2009.

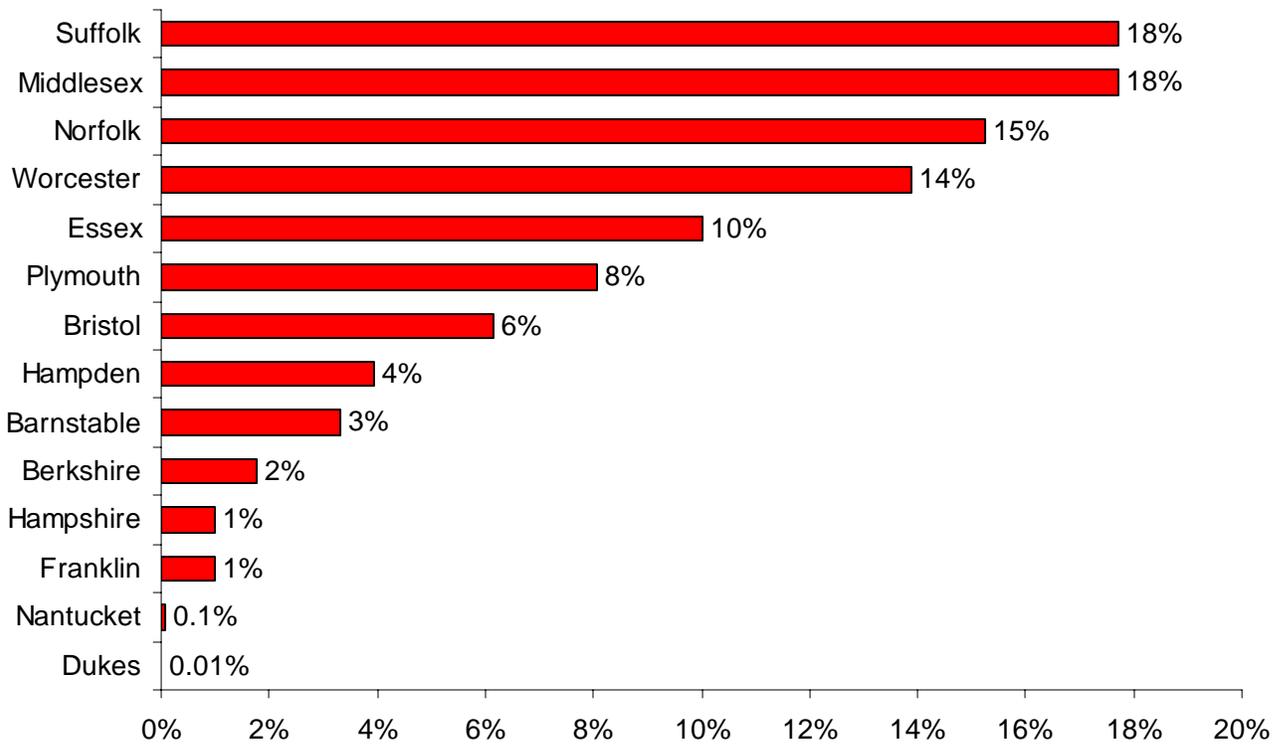
Leading Actions Taken During MVA Calls 2001 - 2009



Suffolk County Reported the Most MVA Type Calls

From 2001 – 2009 fire departments in Suffolk County voluntarily reported the most MVA type calls in Massachusetts. Local fire departments in Suffolk County reported 58,583 calls, or 18%, of all MVA types in MFIRS. Middlesex County fire departments reported 18%, Norfolk County fire departments reported 15% and Worcester County fire departments reported 14% of these calls. Essex County reported 10%; Plymouth County reported 8%; Bristol County reported 6% and Hampden County reported 4% of all MVA calls. Barnstable County reported 3%; Berkshire County reported 2%; Hampshire and Franklin Counties each reported 1%; and Nantucket and Dukes County each reported less than 1% of all MVA type calls in the Commonwealth.

MVA Calls by County 2001 - 2009

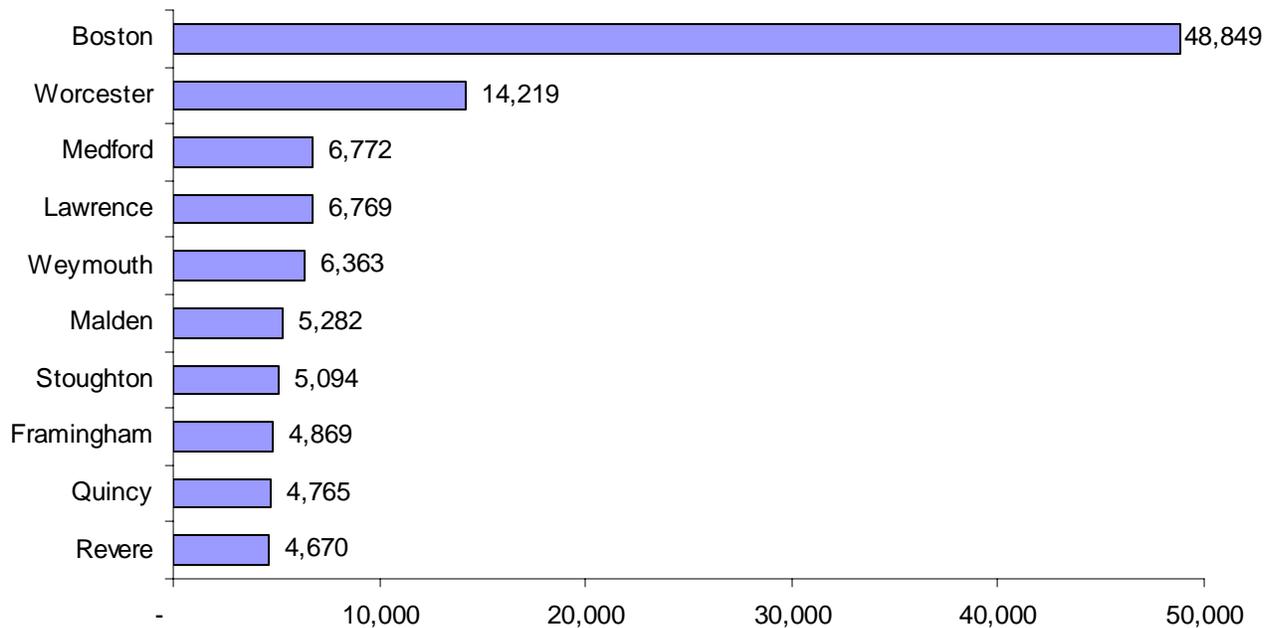


The map on page 15 shows the five-year average (2005 - 2009) of MVA calls reported to MFIRS by county. Middlesex County had the highest average with 8,311 EMS runs reported per year. Suffolk County had the second highest average with 7,833 runs reported annually. Norfolk, Worcester and Essex Counties rounded out the top five counties that reported the most MVA runs to MFIRS from 2005 through 2009.

Boston Reported Most MVA Type Calls of Any Local Fire Department

From 2001 – 2009 the Boston Fire Department voluntarily reported 48,849¹ MVA type calls. This represents 15% of all these calls statewide and over 3.4 times more than the second leading department, Worcester. Worcester reported 14,219; Medford reported 6,772; Lawrence reported 6,769 and Weymouth reported 6,363 MVA calls of all types. Malden (5,282), Stoughton (5,094), Framingham (4,869), Quincy (4,765), and Revere (4,670) round out the top 10 of fire departments reporting these calls in Massachusetts.

**Leading Fire Departments Reporting MVA Incidents
2001 - 2009**



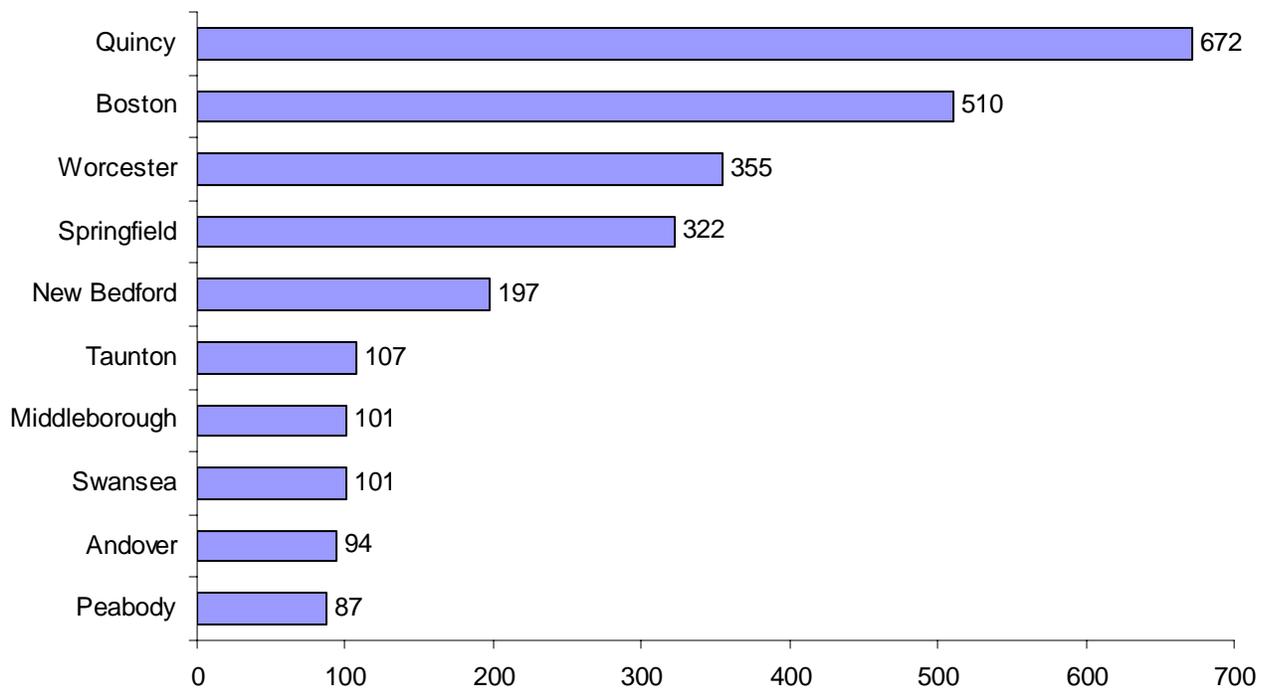
The map on page 16 shows the five-year average (2005 - 2009) of MVA runs reported to MFIRS by city or town. Boston had the highest average with 6,727 MVA runs reported per year. Worcester had the second highest average with 1,999 runs reported annually. Medford, Weymouth and Lawrence round out the top five communities that reported the most MVA runs to MFIRS from 2005 through 2009.

¹ Boston didn't report these types of calls in 2001 or 2002; they started reporting all of their calls in 2003. Using the average for the seven years that they did report MVA type calls of 6,978 per year to complete 2001 & 2002, Boston would have 62,806 MVA type calls, reporting over 4.4 times more than Worcester.

Quincy Reported the Most Vehicle Extractions

Massachusetts fire departments voluntarily reported 6,150 extractions of persons from vehicles to MFIRS from 2001 through 2009. The Quincy Fire Department reported the most auto extractions of victims. They reported 672 extractions, or 11% of the total number of extractions reported. Boston was the second leading reporter with 510 extractions. Worcester reported the third most with 355; Springfield reported 322; and New Bedford reported 197. Taunton reported 107 extractions; Middleborough and Swansea each reported 101 extractions; Andover reported 94 vehicle extractions; and Peabody reported 87 rounding out the top 10 departments in the state.

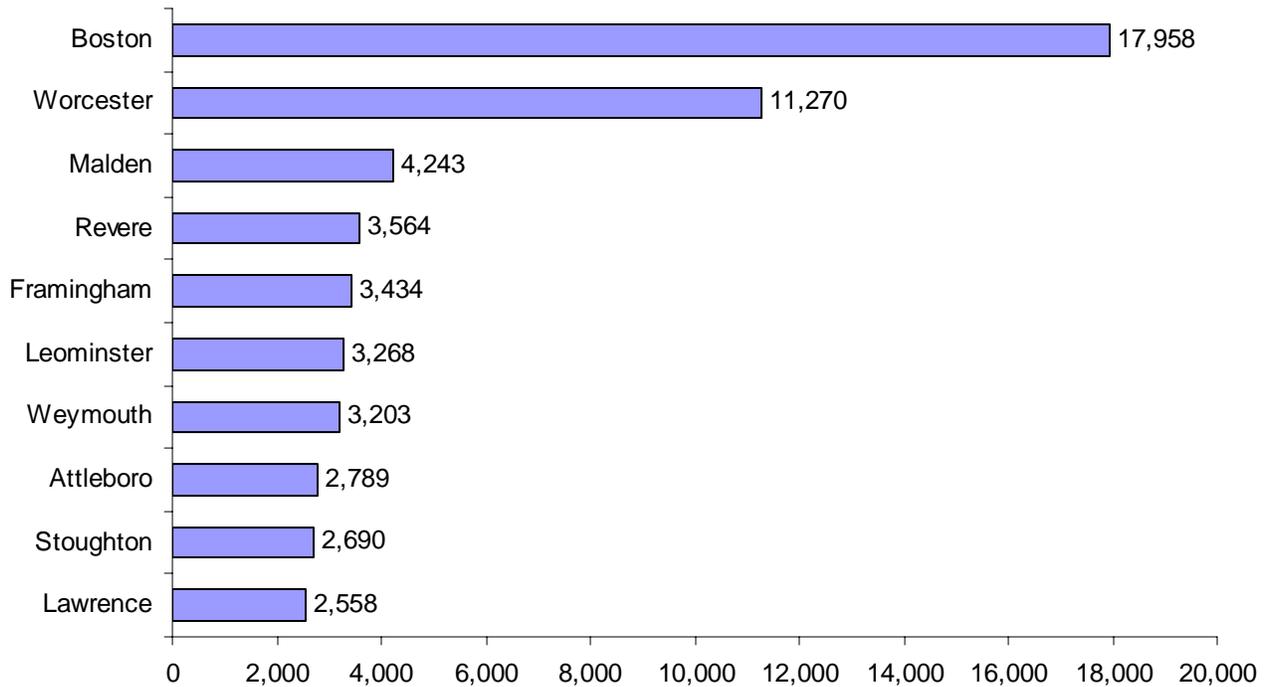
Auto Extrication of Victims 2001 - 2009



Boston Reported the Most Vehicle Accidents with Injuries

From 2001 through 2009 local Massachusetts fire departments reported that they responded to 194,254 motor vehicle accidents with injuries. Boston, reported the most of these calls with 17,958 even though they did not report these types of calls in 2001 and 2002. These 17,958 Boston calls represent 9% of the total 194,254 motor vehicle accidents with injuries. Worcester with 11,720 of these calls reported the second most accidents with injuries. Malden was third with 4,243; Revere was fourth with 3,564; and Framingham reported the fifth most accidents with injuries, 3,434. Leominster (3,268), Weymouth (3,203), Attleboro (2,789), Stoughton (2,690), and Lawrence (2,558) round out the top 10 or responding to motor vehicle accidents with injuries.

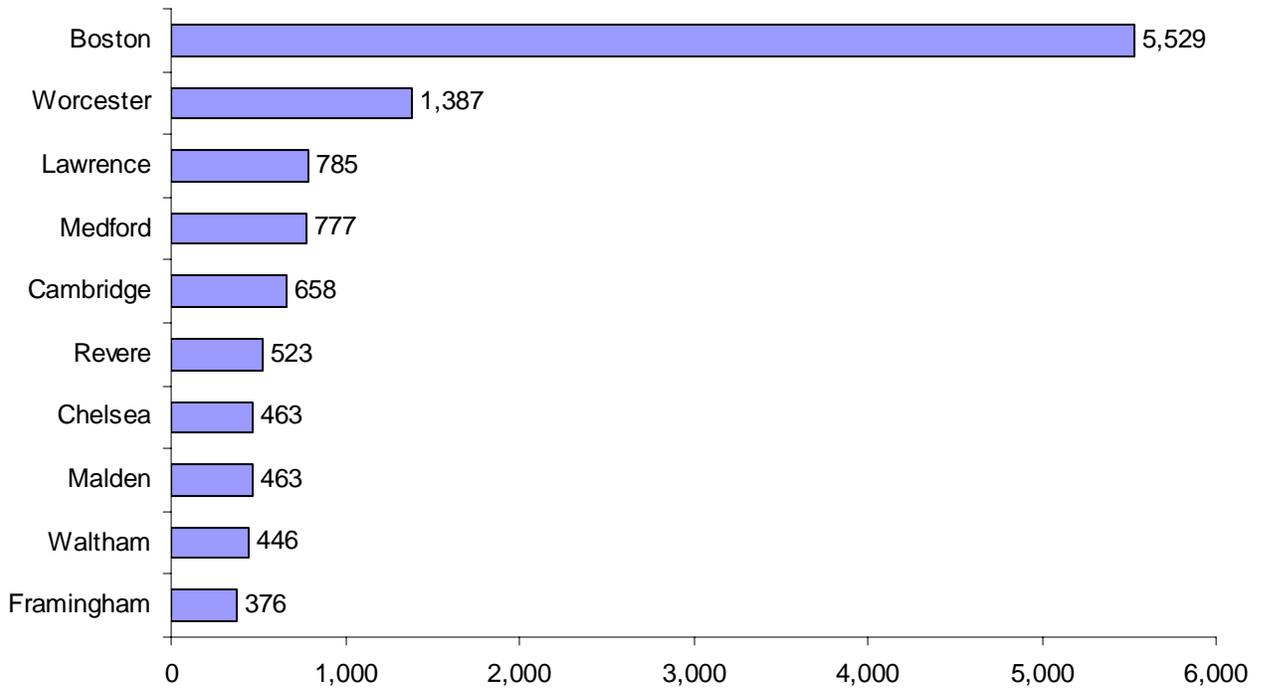
Motor Vehicle Accident with Injury 2001 - 2009



Boston Had Over 1/4 of Motor Vehicle vs. Pedestrian Accidents

From 2001 to 2009 Massachusetts fire departments voluntarily reported that they responded 21,254 incidents involving a motor vehicle striking a pedestrian (MV vs. pedestrian). Boston reported the most of these types of accidents with 5,529, or 26%. This was four times more than the department with the second most motor vehicle vs. pedestrian incidents. Worcester reported the second most with 1,387. Lawrence reported 785 of these incidents ranking it third behind Boston and Worcester. Medford reported 777 and Cambridge went to 658 of these calls. Revere (523), Chelsea (463), Malden (463), Waltham (446), and Framingham (376) round out the top 10 for reported motor vehicle vs. pedestrian accidents in Massachusetts.

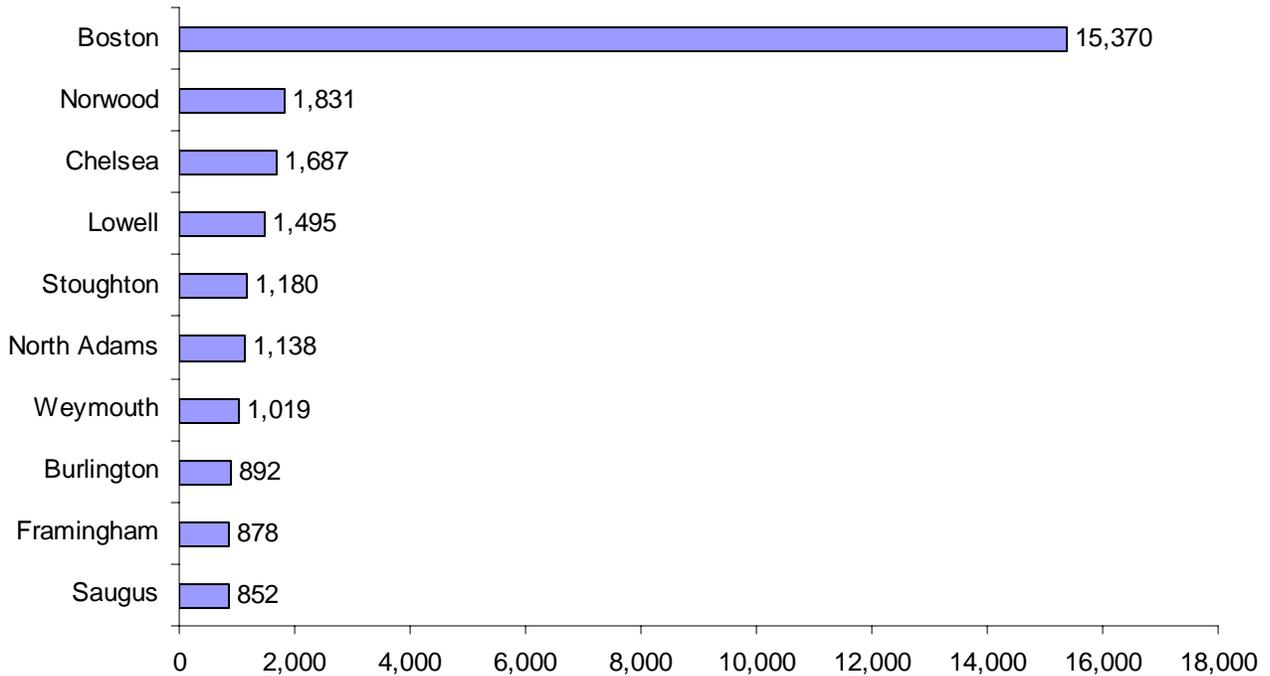
Motor Vehicle vs. Pedestrian Accidents 2001 - 2009



Boston Had Over 1/4 of Motor Vehicle Accidents with No Injuries

From 2001 to 2009 Massachusetts fire departments voluntarily reported that they responded 55,797 incidents involving a motor vehicle accidents without an injury (MVA w/out injury). Boston reported the most of these types of accidents with 15,370, or 28%. This was 8.4 times more than the department with the second most motor vehicle accidents without an injury. Norwood reported the second most with 1,831. Chelsea reported 1,687 of these incidents ranking it third behind Boston and Norwood. Lowell reported 1,495 and Stoughton reported going to 1,180 of these calls. North Adams (1,138), Weymouth (1,019), Burlington (892), Framingham (878), and Saugus (852) round out the top 10 for reported motor vehicle accidents without an injury in Massachusetts.

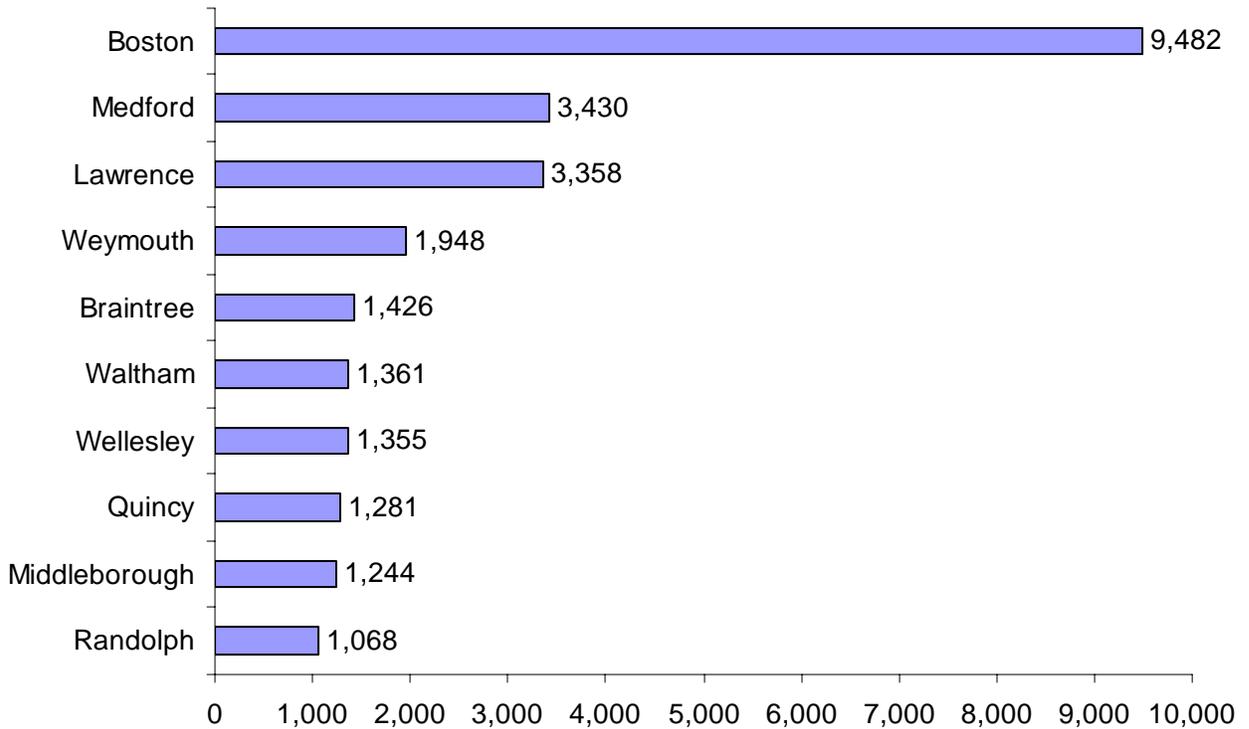
Motor Vehicle Accident Without Injury 2001 - 2009



Boston Had Most Motor Vehicle Accidents with General Cleanup

From 2001 to 2009 Massachusetts fire departments voluntarily reported that they responded 52,952 incidents involving a motor vehicle accidents without an injury (MVA general cleanup). Boston reported the most of these types of accidents with 9,482, or 88%. This was 2.8 times more than the department with the second most motor vehicle accidents without an injury. Medford reported the second most with 3,430. Lawrence reported 3,358 of these incidents ranking it third behind Boston and Norwood. Weymouth reported 1,948 and Braintree reported going to 1,426 of these calls. Waltham (1,361), Wellesley (1,355), Quincy (1,281), Middleborough (1,244), and Randolph (1,068) round out the top 10 for reported motor vehicle accidents without an injury in Massachusetts.

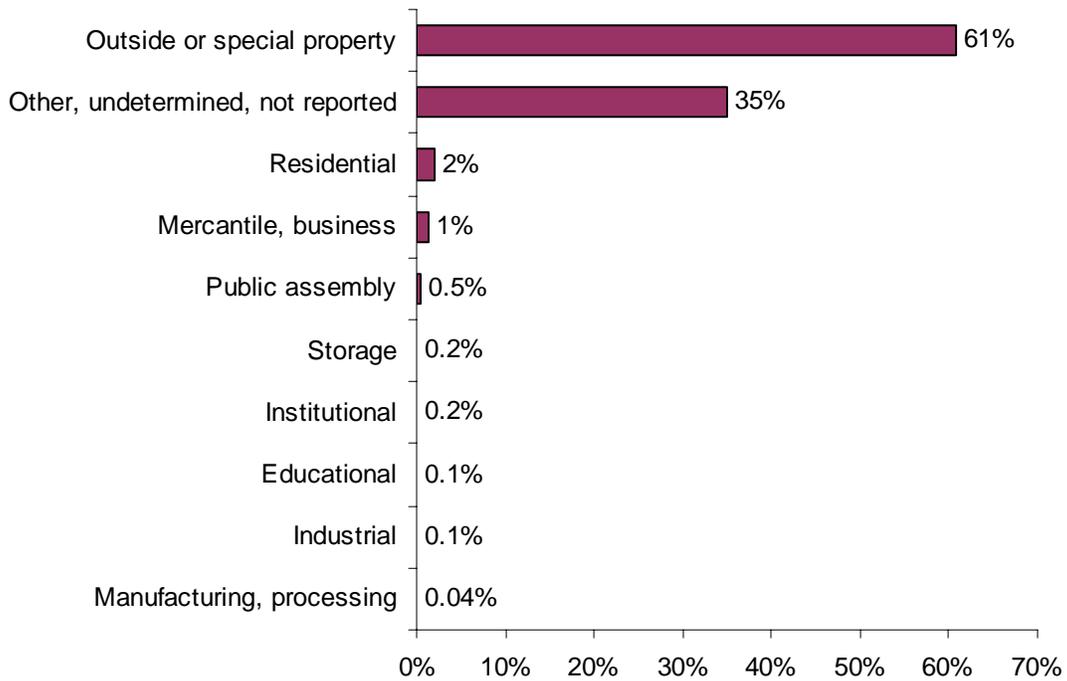
**Motor Vehicle Accident General Cleanup
2001 - 2009**



61% of All MVA Type Calls Occur Outside

Of the 330,407 MVA type calls, 290,194, or 61%, occurred on or in an outside or special property. This is not surprising as most motor vehicle accidents occur outside on streets or highways. Undetermined, not reported or *Other* type properties were the second leading property use for these types of calls accounting for 35%. Two percent (2%) occurred at residential properties. Mercantile or business properties accounted for 1% and less than 1% occurred at public assembly occupancies, storage facilities, educational properties, industrial facilities and manufacturing or processing facilities.

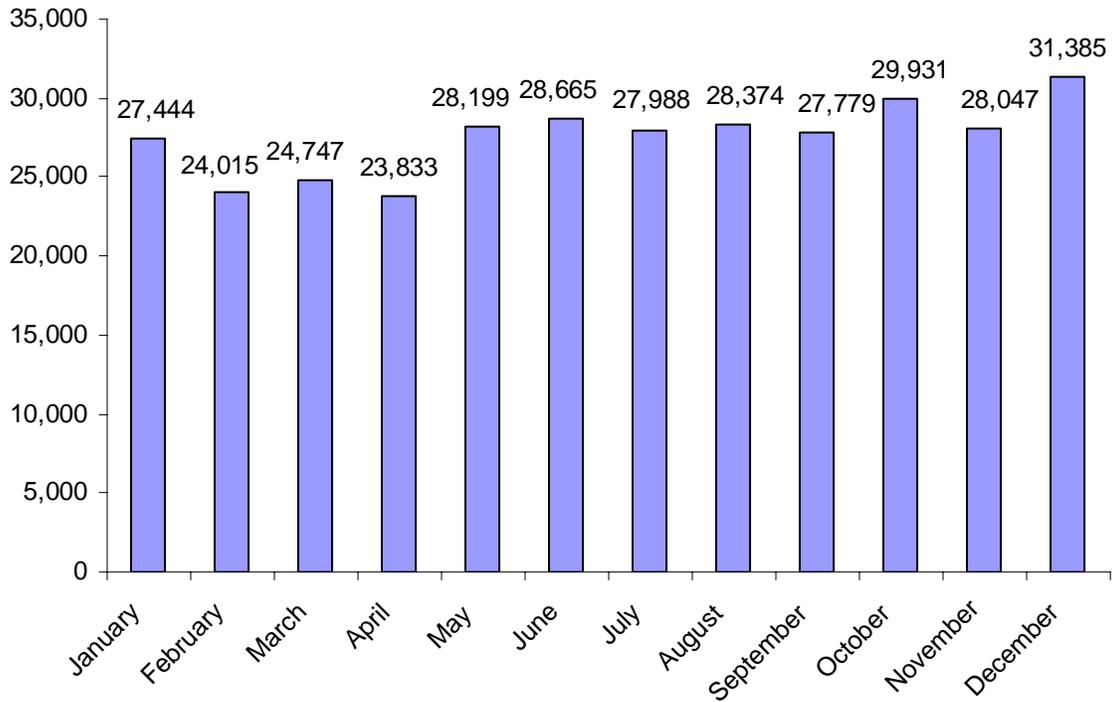
MVA Calls by Property Use 2001 - 2009



MVA Type Calls Most Common in December & October

December was the peak month for these incidents. October ranked second and June had the third largest number of MVA calls. The late winter and early Spring months had significantly fewer calls of these types. The fewest MVA calls occurred in April. February had the second lowest frequency of these incidents, and March had the third lowest number of MVA type calls from 2001 - 2009.

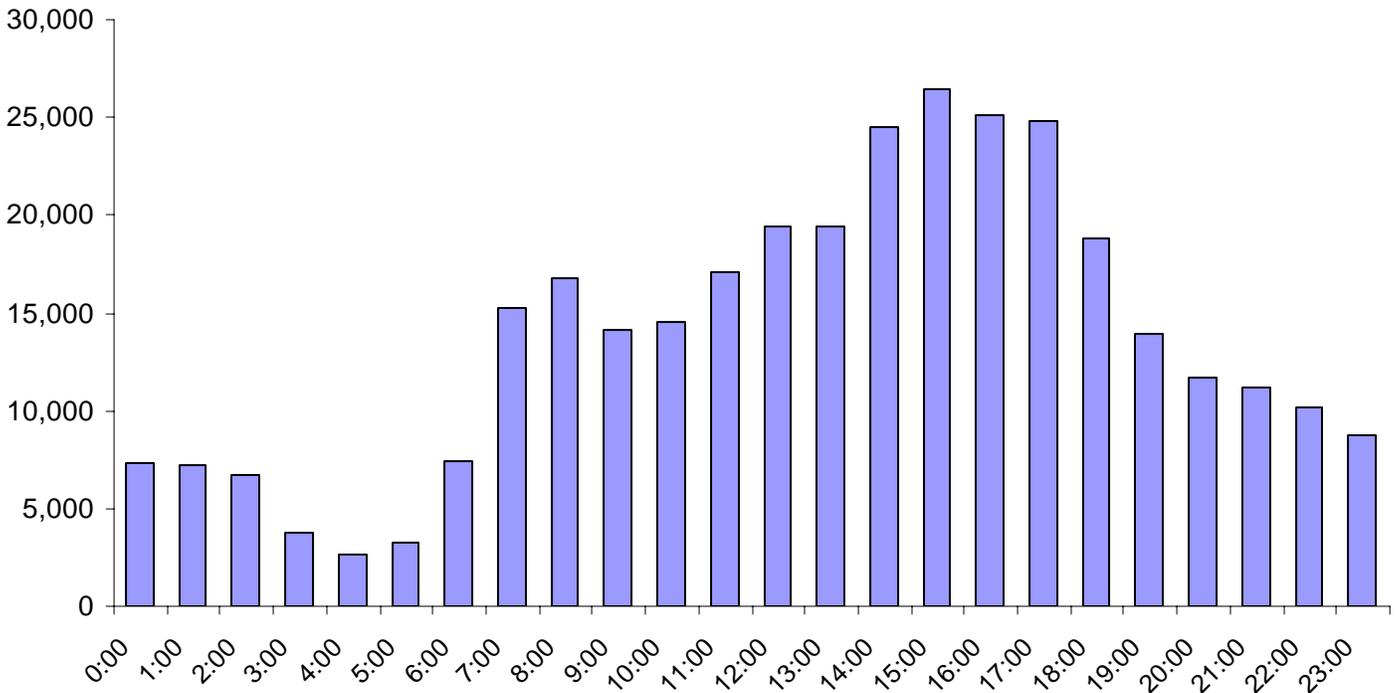
MVA Calls by Month 2001 - 2009



MVA Type Call Most Common After Lunch Time

MVA type calls occurred most often after lunchtime. They reached their lowest point between 1:00 a.m. and 7:00 a.m. and increased fairly steadily to a peak between 2:00 p.m. and 5:00 p.m. Thirty-six percent (36%) of all of these calls occurred during one-fifth of the day, between the hours of 2:00 p.m. and 6:00 p.m.

MVA Calls by Hour 2001 - 2009

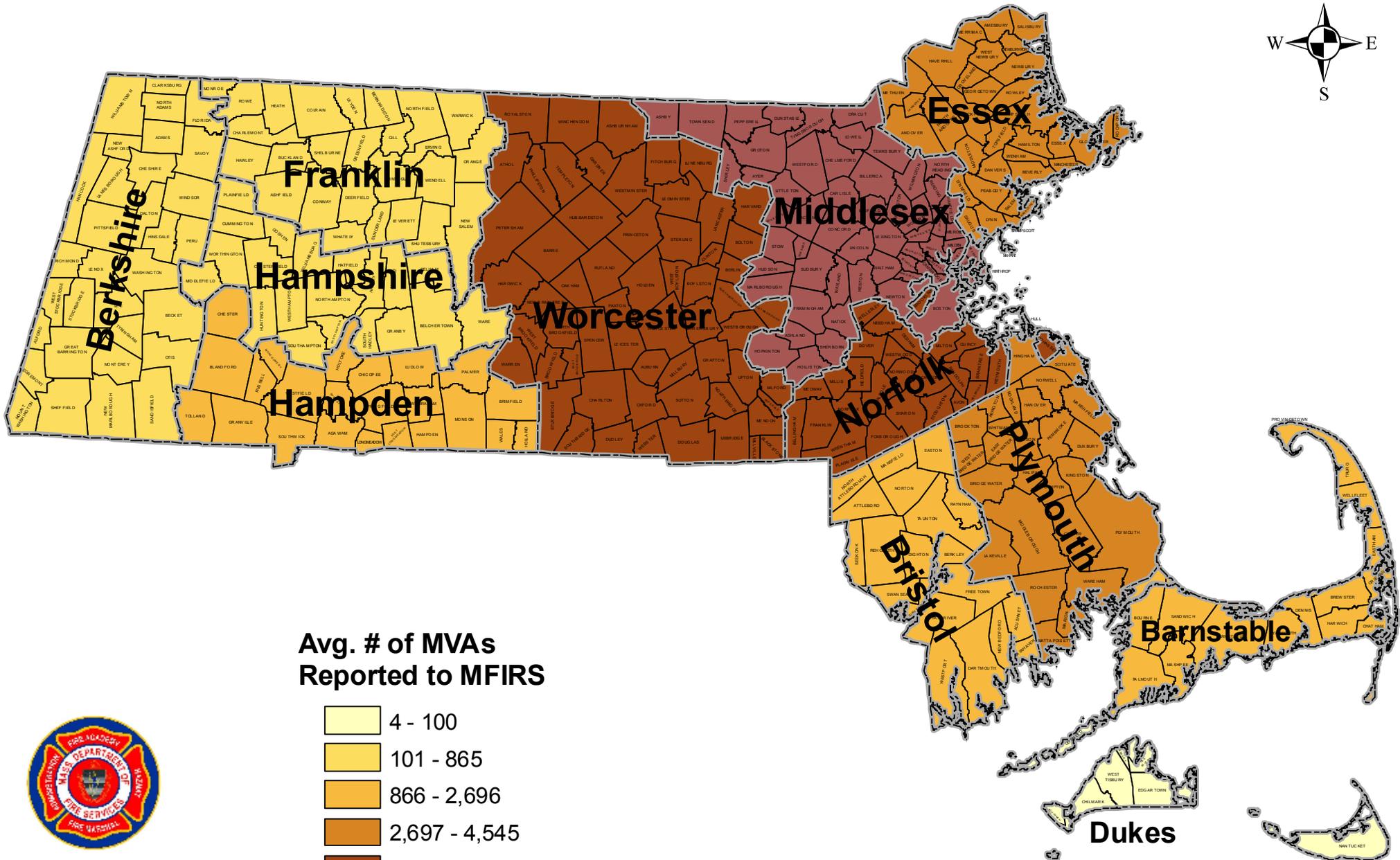
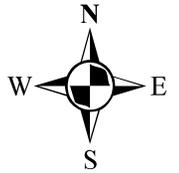


The previous graph shows fire frequency by time of day on the 24-hour clock for motor vehicle accidents. Midnight to 1:00 a.m. is represented by 0:00, 1:00 a.m. to 2:00 a.m. is represented by 1:00, etc.

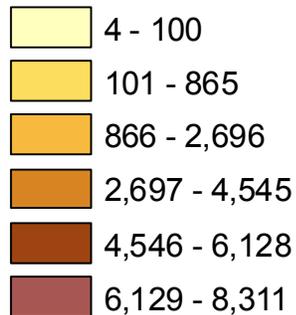
Conclusion – MVA Incidents = 7% of Fire Department Calls

MVA incidents make up 7% of all calls in MFIRS from 2001 through 2009, that is 1% more than fire responses during the same period. During these calls providing first aid, checking for injuries, investigating and providing basic life support to a patient were the leading actions taken. Most of these types of calls happen in December, October and June; and occur between lunch and dinnertime. Most of these accidents occurred in Suffolk and Middlesex Counties; but Boston and Worcester, the two largest communities in the state reported responding to the most motor vehicle accidents.

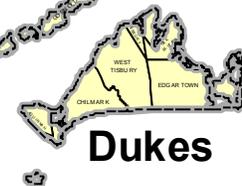
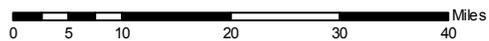
Average Number of Motor Vehicle Accidents by County 2005 - 2009



**Avg. # of MVAs
Reported to MFIRS**



MFIRS
Massachusetts Fire Incident Reporting System



Dukes



Nantucket

Average Number of Motor Vehicle Accidents Reported to MFIRS 2005 - 2009

