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Office of Emergency Medical Services
Data Report

2015

Emergency Medical Services Data Report

2015

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++NHTSA (National Highway Transportation Safety Administration), FHWA (Federal Highway Administration)

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Introduction

The Office of Emergency Medical Services (OEMS) has statutory authority for data collection and reporting of statewide EMS information. In 2000, Public Act 00-151[1] required the development of a data collection system to document the pre-hospital experience of patients from their initial contact with emergency medical services to their arrival at the emergency room. An annual report to the Connecticut General Assembly was required, starting in 2002. Annual reports listing selected summary figures and estimates followed.

The 2015 Office of Emergency Medical Services Data Report is a second step in the evolution of data collection and reporting. It is based on based on year 2015 data submitted through July 25, 2016. Data reports from 2014, 2015 and 2016 will be the last report based on the National EMS Information System (NEMSIS) version 2.2.1 before we upgrade the data collector to the version 3.4 data structures and upgrade the Trauma Registry.

OEMS Mission and Personnel

OEMS is part of the Healthcare Quality and Safety Branch. OEMS staff includes the Director, Medical Director, support staff, licensing, special investigators, program planners, regional coordinators and an epidemiologist.

OEMS functions relate to strategic planning, education, licensing, regulatory and statutory oversight of EMS provider training, and identification and follow-up on medical issues that affect patient care. Investigation of complaints about EMS organizations, patient care concerns, provider activities and EMS agency site and vehicle inspections are also included. Responsibility for the information chain covers data collection oversight, quality assurance and reporting of EMS and Trauma data (pre-hospital and hospital). EMS staff members participate in numerous advisory, steering, legislative and other committees to optimize services for Connecticut's 169 towns and borders with New York, Massachusetts and Rhode Island.

OEMS interacts within a large network of stakeholders that includes people in the communities, local EMS practitioners, municipal governments, software vendors, Connecticut hospitals and trauma centers, medical associations, clinicians, members of the state legislature, the Department of Emergency Services and Public Protection (DESPP), Division of Emergency Management and Homeland Security, the Connecticut Department of Transportation (DOT), the National Highway Traffic Safety Administration (NHTSA), the Connecticut Hospital Association (CHA) and other state and federal partners. Connecticut shares data with the National EMS information system (NEMSIS) and continues to work with its partners to standardize the submission of high quality data. The program is also strengthening its connections with the Department of Public Health (DPH) Office of Injury Prevention and the Office of Public Health Preparedness and Response.

[1] Public Act 00-151 *AN ACT CONCERNING EMERGENCY MEDICAL SERVICES DATA COLLECTION AND EMERGENCY MEDICAL DISPATCH*, provided both statutory requirement, as codified in Connecticut General Statute §19a-177, and funding, as codified in Connecticut General Statute §28-24

History

In 2000, the State of Connecticut supported the start of electronic data submissions for emergency medical services. Agreements with Digital Innovation, Inc., Information Technology at DPH and Business Enterprise Systems Technology (BEST) were made to establish a database and applications for collecting pre-hospital (EMS) and hospital trauma data. The EMS collector and the Trauma Registry were housed on BEST servers in Groton.

More than six-hundred and fifty laptop computers were purchased for use by local EMS agencies. EMS agencies were allowed to choose different software vendors for creation of electronic patient care records (ePCRs) as long as the software was compliant with NEMSI) requirements at the time (NEMSIS 2.2.1). Over the past few years, NEMSIS has helped develop a pathway for better data collection. This will require data collection with new EMS data structures (NEMSIS 3.4) and meet the requirement to replace the International Classification of Disease ninth edition (ICD-9) with the tenth edition (ICD-10) of diagnosis and procedure codes for both EMS and Trauma.

Challenges and Opportunities

The original laptops distributed for EMS data collection have over the years been replaced by local EMS agencies. No further state funding has been available to support local EMS computer hardware or data collection software.

Professional services required to maintain and upgrade DPH computer infrastructure, data collection applications and to analyze data and follow-up inconsistencies have been flat-funded since the statute to collect EMS and Trauma data was promulgated. The costs to collect and report trauma data were not delineated for hospitals and not specifically funded.

DPH database and hardware upgrades are long overdue for both EMS and the Trauma Registry. The EMS data collector in use since 2008 provided no messages about data submission and data processed record counts. Persistent differences between the number of records submitted and the number that could be processed were not apparent. Systematic monitoring of EMS data submissions and follow-up with local agencies was not routinely done by OEMS. The EMS application requested by OEMS from Digital Innovation did not include a Report Writer or other query tool. Hospitals which previously submitted trauma data have been unable to access a portal to submit data to OEMS since 2012. Individually, they have been able to send trauma data to the National Trauma Data Bank, but have not received any reports on aggregate trauma data from OEMS since 2011. The department was without an epidemiologist for three years.

The transition in 2017 to data collection following the NEMSIS version 3.4 data dictionary requires local EMS software to support new and renamed data fields. It establishes validation criteria to be met before patient care data can be successfully uploaded to OEMS. This first step should provide a foundation that can be added to over time through the work of OEMS and the data quality committee.

With guidance from a federally-funded team of experts from NHTSA , OEMS and its partners in EMS and Trauma expect to move forward with remedial actions in the coming year. The biggest challenge will be funding for the systems and people needed to make change.

Current Practice

OEMS is working with Digital Innovation, Inc., DPH Information and Technology and BEST to coordinate the upgrades of hardware, database application and communications processes necessary to transition to upgraded EMS and Trauma data collectors.

Ten software vendors provided the interfaces for data collection and submission for the local EMS agencies which serve the 169 Connecticut towns in year 2015. *Please see Appendix D.*

The OEMS epidemiologist is working with the Quality Improvement Data Committee (QIDC, a subset of the EMS Advisory Board). The group is reviewing the available data dictionary from NEMSIS, as well as the NEMSIS version 3.4 field validation criteria which are to be implemented for data collection in 2017. All of this information, along with the process for becoming NEMSIS 3.4 compliant, has been available to the local software vendors at http://www.nemsis.org.

Global changes in policy may require re-training in field documentation. An example is Naloxone administration. Basic Life Support (BLS) personnel may administer certain drugs (e.g., aspirin, epinephrine[2]). The BLS repertoire has been further extended to Naloxone. [3] Fields to capture medications given exist in the electronic patient care reports (ePCRs) but were not routinely made visible to BLS practitioners. This discrepancy appeared when the ePCRs of an EMS agency that frequently gives Naloxone had no notation of Naloxone in "medications given" fields. Only when the local EMS software administrator activated those fields were they visible to BLS logins.

The public perception is that a "911" call activates a network of communications and response equally available across the state. In reality, some area responders are volunteers who are not answering the calls from strategically placed locations. Geographic barriers, building types, busy highways, local construction projects, traffic patterns and individual living conditions affect response logistics. The responsibility to collect consistently valid data under challenging circumstances requires a cooperative network of guidance, support and feedback.

Major challenges to data collection for EMS and for the Trauma Registry include updated infrastructure at the state level data collectors and applications designed to support analyses and reporting. The local level costs of data collection hardware and software also needs to be acknowledged. End-users need guidance from OEMS and continuous education by software vendors in using the electronic Patient Care Record (ePCR) in a standard way.

Systems which are maintained and consistently used to collect and validate information can be used for process review as well as to link pre-hospital information with hospital and other data sources. This is important to both local concerns and to multi-area collaborations such as highway safety, injury surveillance, health care usage and other university-based research.[4]

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[2] In 2000, The Connecticut General Assembly enacted legislation, Public Act 00-135, that required all emergency medical technicians to receive training in the administration of epinephrine and required all ambulances to be equipped with epinephrine auto-injectors. This is the first medication, excepting oxygen, that EMTs were mandated to carry and administer. Effective January 1, 2001

[3] Expanded Scope of Practice, Administration of Naloxone, Connecticut, 2014. Accessed August 29, 2016 http://www.ct.gov/dph/lib/dph/ems/pdf/communication_statements/2014_06_change_to_emr_emt_aemt_scope_of_practice_-_administration_of_naloxone.pdf

[4] CT TRCC strategic plan. (Traffic Records Coordinating Committee), Accessed August 28, 2016 http://www.ct.gov/dot/lib/dot/documents/dtransportation_safety/traffic_records/trcc_traffic_records_strategic_plan.pdf

Short Term Objectives

- Address documentation of medications administered in medications fields provided. This requires ongoing collaboration by EMS providers and local software vendors.
- EMS Data collector and software vendor compliance with NEMSIS version 3.4 data structures and validation criteria as described at http://www.nemsis.org/v3/compliantSoftware.html
- Setup of production servers for EMS and trauma on new hardware in production. (In progress)
- Hardware testing has begun and will be followed by tests of data submissions. This involves Digital Innovation, Inc., OEMS, Information Technology at DPH and BEST, and EMS and hospital trauma testers.
- Create a business plan with input from end users, Information Technology and data system experts.
- Increase funding for data collection as prescribed in statute.

Intermediate Objectives

- Complete testing of version 3.4 EMS data collector and trauma data collection.
- Obtain a Report Writer tool in addition to an updated EMS data collector.
- Bring past trauma data into the new state central site from the individual hospitals.
- Identify any additional EMS and Trauma data collection requirements in data dictionaries.
- Get documentation of data collector and user processes and procedures for 2017 data and systems
- Submit 2016 data to NEMSIS according to quarterly deadlines.
- Address data submission issues and promote end-user education by ePCR software vendors.
- Become a member of C.A.R.E.S. (Cardiac Registry to Enhance Survival).

Longer Range Objectives

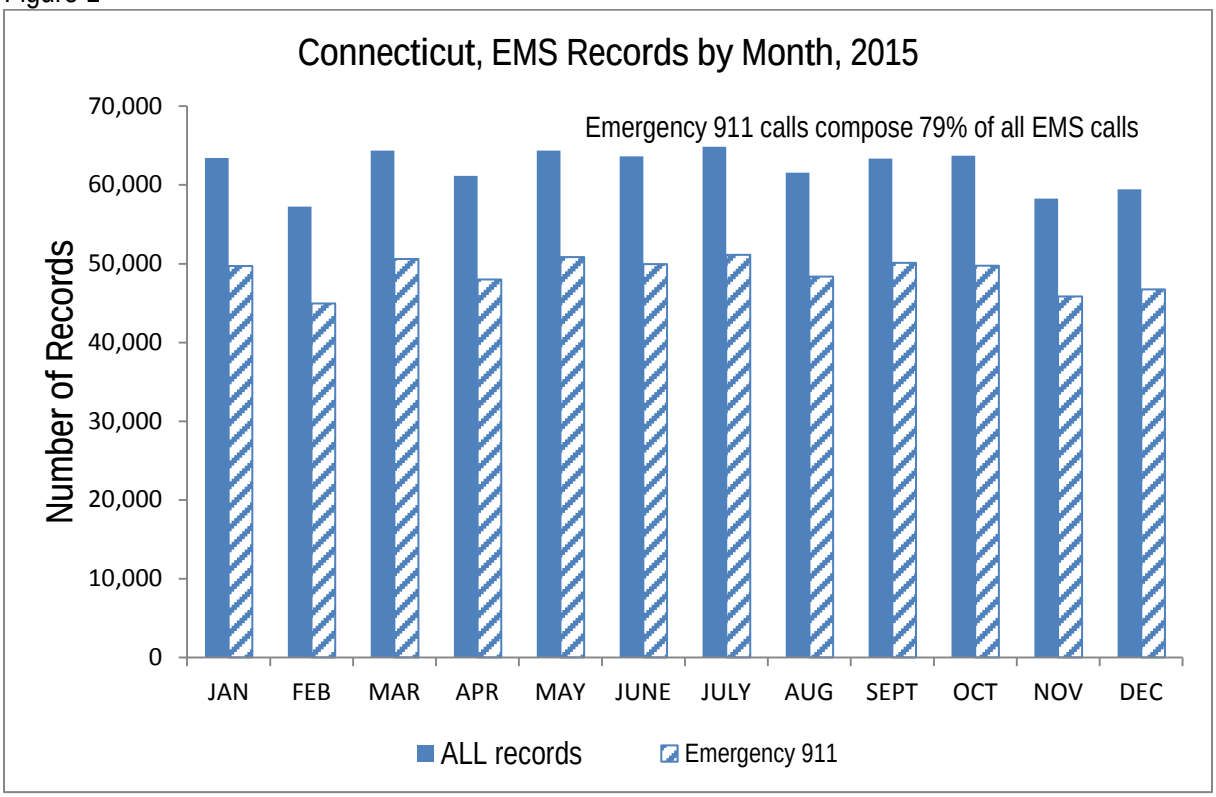
- Collect cleaner EMS data that is validated at the point of data entry.
- Use system development for linkage of EMS and hospital trauma data.
- Data sharing and linkage projects that collaborate with stakeholders in and outside of DPH.
- Complete the 2017 national assessment by NHTSA.
- Develop outside funding sources for system development and maintenance.
- Examine costs, advantages and barriers for alternative data collection systems.

EMS Data: Summary Figures

DPH reports and NEMSIS tabulations use counts of call records. A unique PersonID is not assigned and one person may be the subject of multiple EMS responses. Race and ethnicity information are not recorded for approximately forty-four percent of all calls.

Total 2015 records processed through collection deadline	745,449	
Total Emergency 911 records	585,890	
medical problem	516,833	88%
trauma	45,735	8%
911 mutual aid	2,903	<1%
911 paramedic on scene	363,464	62%
cancelled calls &	81,144	11%
911 calls by gender	511,337	
females		52%
males		48%
13% of records had no gender documented		
911 calls by age	514,117	
age under 18 years		7%
age 18 years and older		93%
12% of all records were missing age or age units or both		
911 calls by response mode	585,890	
Lights and Sirens	345,910	59%
no Lights or Sirens	196,908	34%
initial Lights and Sirens, Downgraded to No Lights or Sirens	31,829	5%
initial No Lights or Sirens, Upgraded to Lights and Sirens	4,811	<1%
invalid NULL value entered	6,432	1%
911 calls for cardiac arrests	3,791	
records with arrest timing data	3,783	
arrest prior to EMS arrival		84%
arrest after EMS arrival		16%
# records with no timing information	8	
cardiac arrest records with at least one defibrillation attempt	778	20%
defibrillation attempts that were successful (of 778 records)	255	33%
records with no defibrillation outcome (of 778 records)	56	7%

Figure 1



Incident Location Type

Calls for emergency medical assistance can present unique response issues for Emergency Medical Services providers. Residences are the most common place ambulances respond to (40%), for all calls and for emergency 911 (e911) calls. The next most frequent location shifts to street or highway for e911 calls. Approximately eleven percent of records processed are missing location information.

Table 1

Incident Location Type	% of All Records	% of E911 Records
Home/Residence	40%	48%
Health Care Facility	19%	7%
Missing data	11%	11%
Street or Highway	10%	12%
Residential Institution	9%	8%
Public Building	5%	6%
Trade / service place	4%	5%
Other Location	2%	2%
Recreation/Sport place	<1%	1%
Industrial Place	<1%	<1%
Farm	<1%	<1%
Lake, River, Ocean	<1%	<1%
Mine / Quarry	<1%	<1%

Figure 2

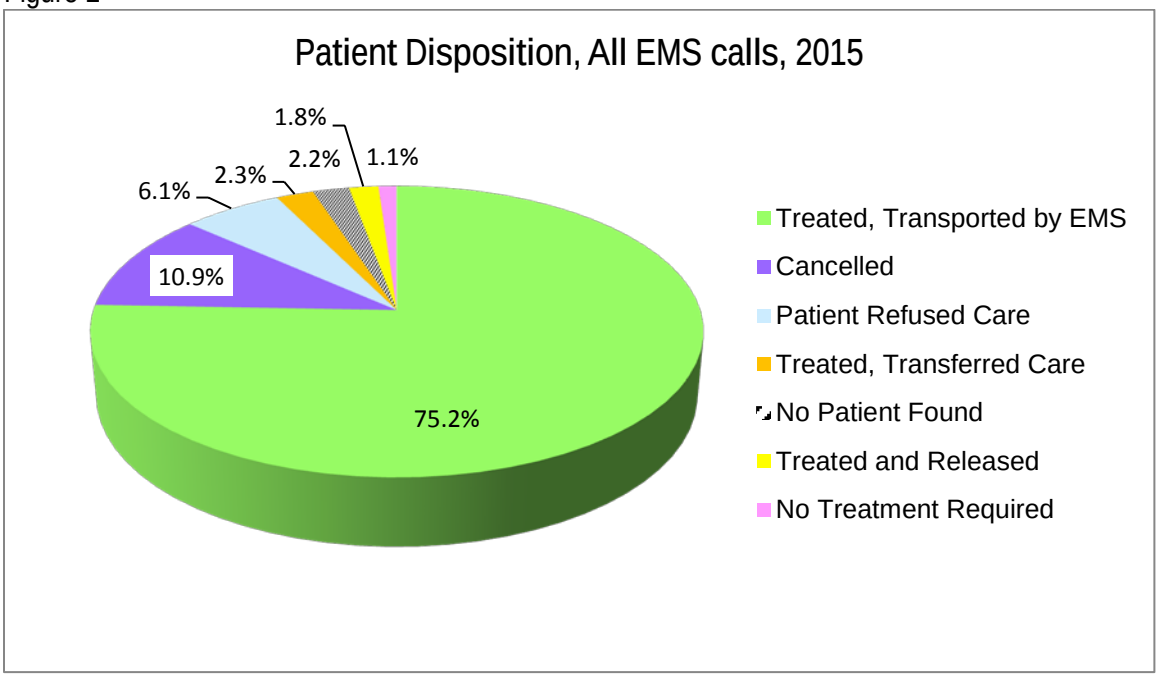


Table 2

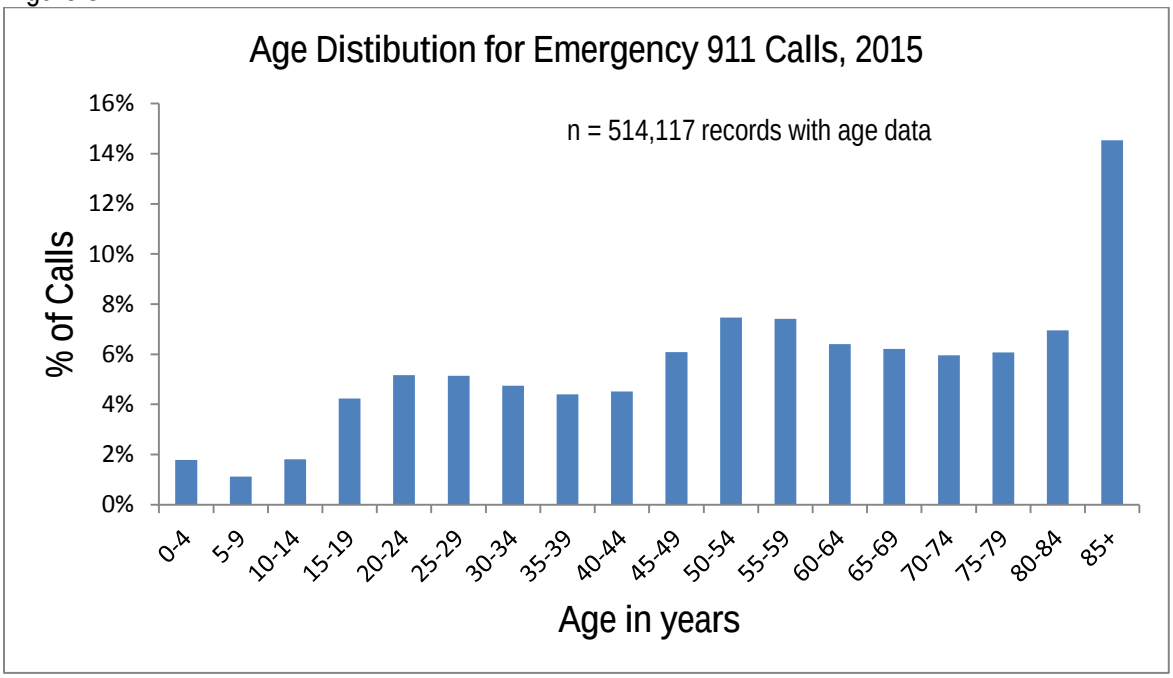
Incident Patient Disposition E911 Calls Only	Frequency	Percent
Treated, Transported by EMS	427,373	72.9%
Cancelled	62,350	10.6%
Patient Refused Care	43,926	7.5%
Treated, Transferred Care	15,896	2.7%
No Patient Found	13,346	2.3%
Treated and Released	12,481	2.1%
No Treatment Required	6,856	1.2%
Dead at Scene	3,468	<1%
Treated, Transported by Private Vehicle	130	<1%
Treated, Transported by Law Enforcement	62	<1%
	585,888	

* 2 records had missing or invalid codes. In addition, one large data submitter sent records with a disposition of "Cancelled" or "No Patient Found", when in fact, medications were given. This observation highlights the requirement for local EMS software coding to be the same as or to be mapped to the appropriate NEMSIS codes in the final data submitted to DPH.

Emergency 911 Calls

More than 146,000 emergency 911 calls are received each quarter. They are defined by the type of service requested, including “911 response to scene”, “intercept” and “mutual aid” calls. Eighty-eight percent of emergency 911 records contained age and age unit (years, months, days, hours) data so that reported age could be output.

Figure 3



Leading Causes of Injury

Trauma accounted for 7.8% of all reported emergency 911 calls in 2015. The clear majority of adult trauma calls were for falls, while pediatric calls were split between falls and motor vehicle traffic accidents. Children account for five percent of the falls records reported by the Emergency 911 providers in 2015. The graphs for adult and pediatric calls are based on the cause of injury listed in the call records.

Figure 4

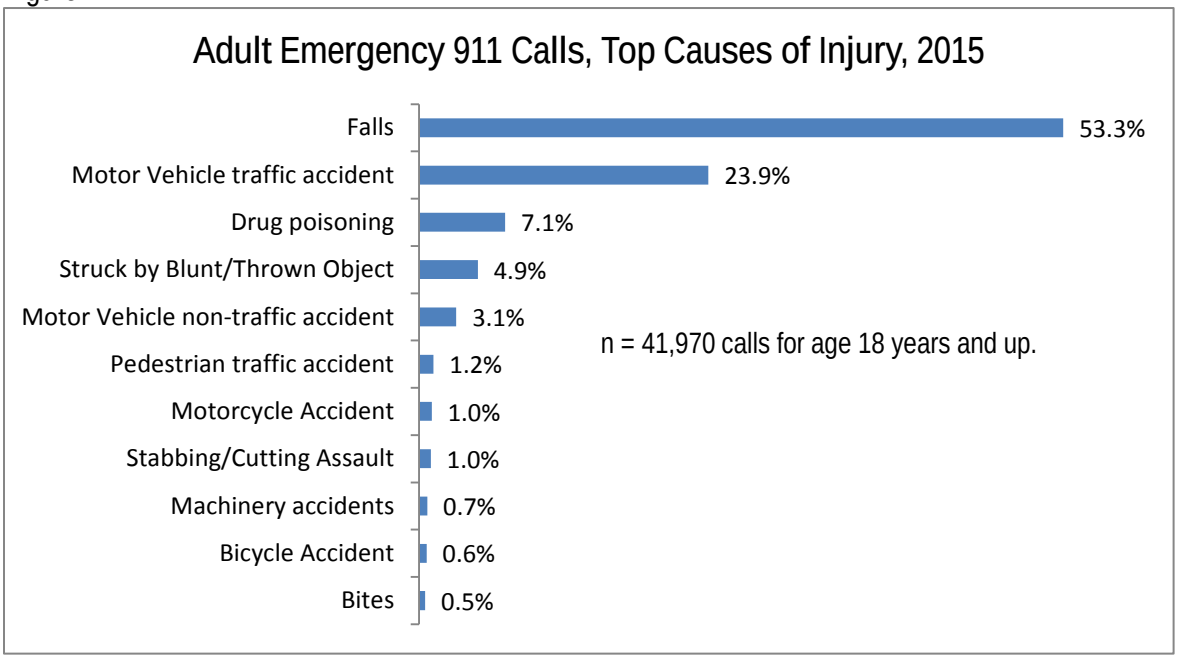
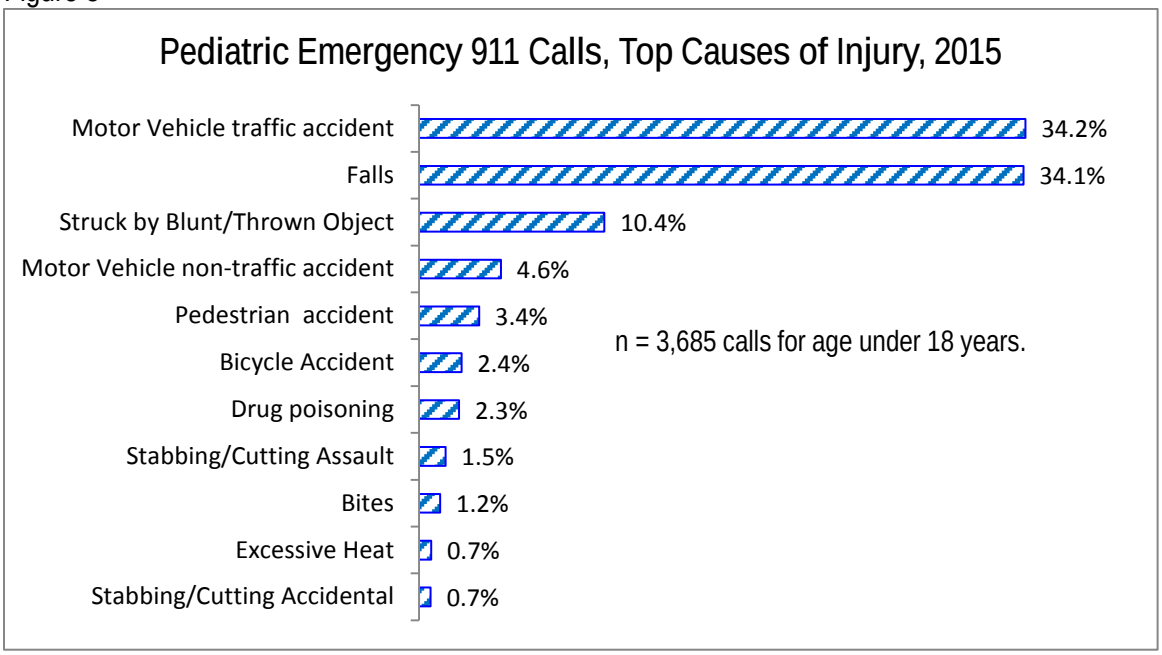


Figure 5

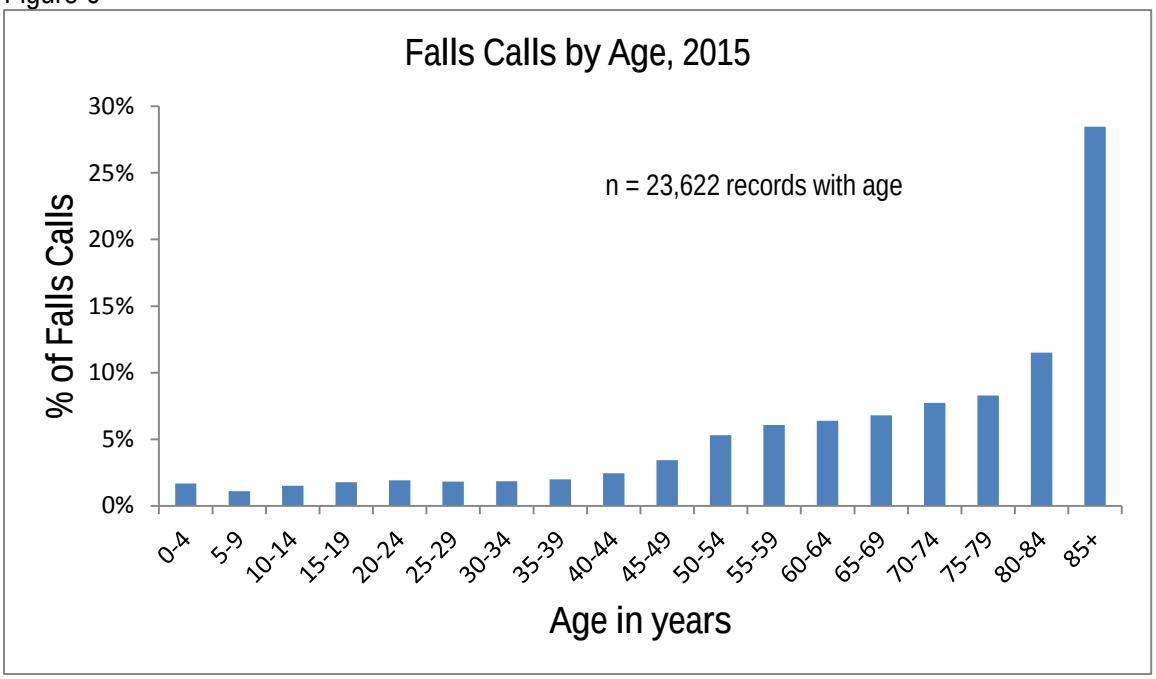


Falls

The Centers for Disease Control reported that falls are "the leading cause of non-fatal injury in children".[5] Falls are the leading cause of both fatal and non-fatal injuries in adults age 65 and older.[6] The distribution of emergency calls by age may reflect the mode of transport more than the actual falls experience by age group. The National Hospital Ambulatory Medical Care Survey[7] suggests that people age 65 years and older are more likely than younger people to arrive at an emergency department via ambulance.

The majority (73%) of emergency calls for adult falls took place at home or in a residential institution (Table 3). Almost two-thirds (63%) of all falls calls were for adults age 65 years and older. Falls are among the most costly and life-changing events for people as they age.[8] Assessment of personal risk factors and ongoing management of fall risks is crucial for prevention, especially in the elderly.[9]

Figure 6



[5] http://www.cdc.gov/safechild/Falls/ Protect the Ones You Love: Childhood Injuries are Preventable. Centers for Disease Control, accessed 8/5/2015.

[6] http://www.cdc.gov/homeandrecreationalsafety/falls/adultfalls.html Older Adult Falls: Get the Facts. Centers for Disease Control, accessed 8/5/2015.

[7] http://www.cdc.gov/nchs/data/ahcd/nhamcs_emergency/2011_ed_web_tables.pdf
National Hospital Ambulatory Medical Care Survey: 2011 Emergency Department Summary Table 5, accessed 8/5/2015.

[8] Falls Prevention Facts, National Council on Aging, accessed 9/15/2016
https://www.ncoa.org/news/resources-for-reporters/get-the-facts/falls-prevention-facts/

[9] Tinetti, ME and Kumar, C, The Patient Who Falls, JAMA. 2010 Jan 20; 303(3): 258–266., accessed 9/15/2016.

We also examined the distribution of falls by age group, location and time of day, using call records for ages 20 years and older. The time that the EMS unit was notified by dispatch served as the estimated time of each fall.

Figure 7

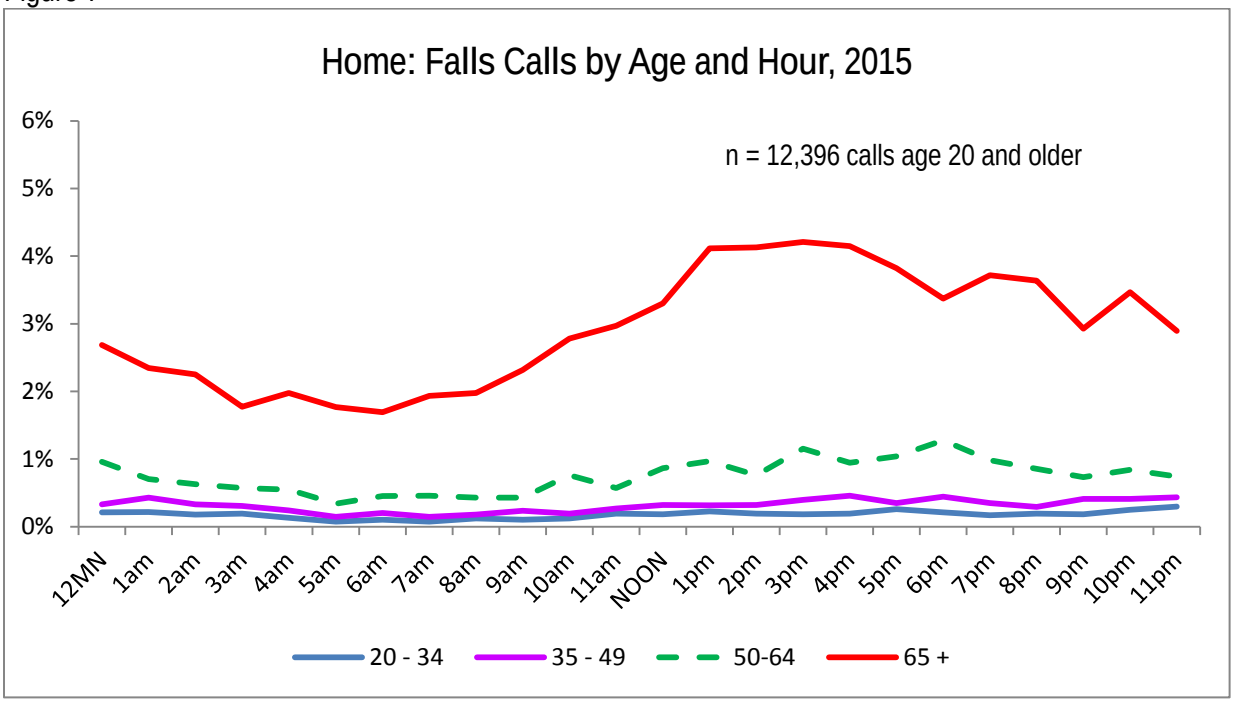


Figure 8

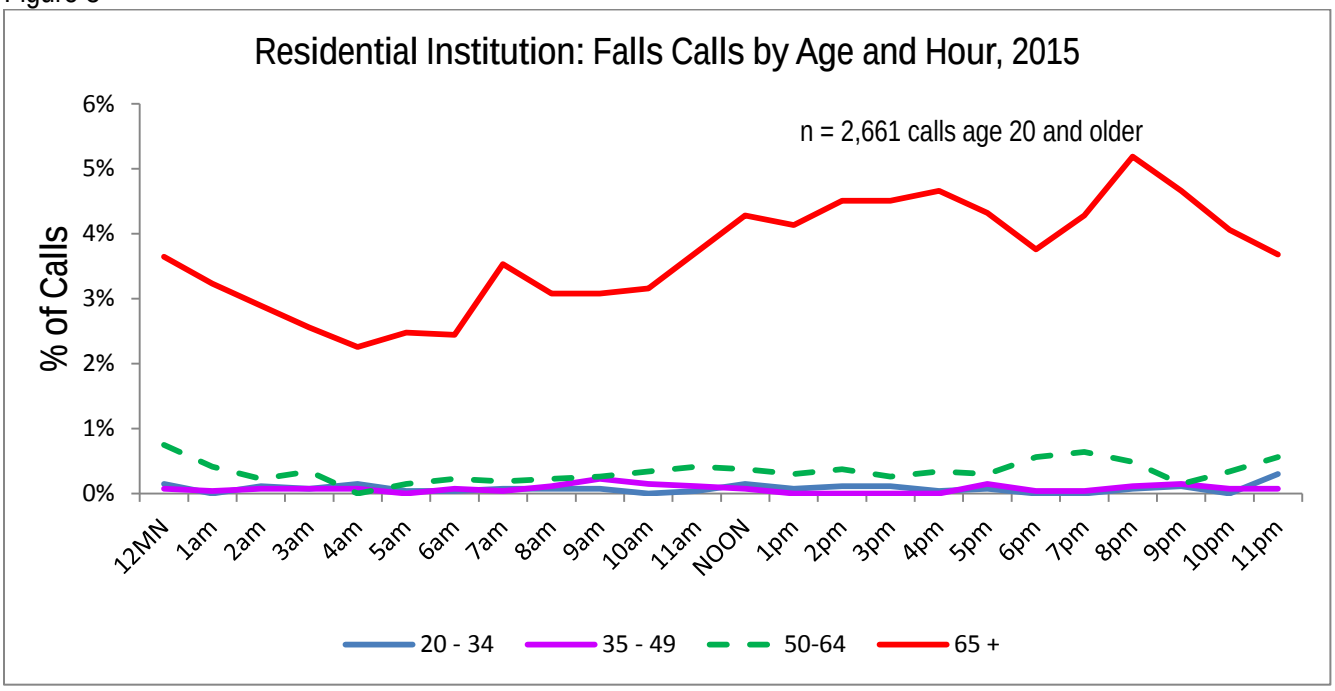
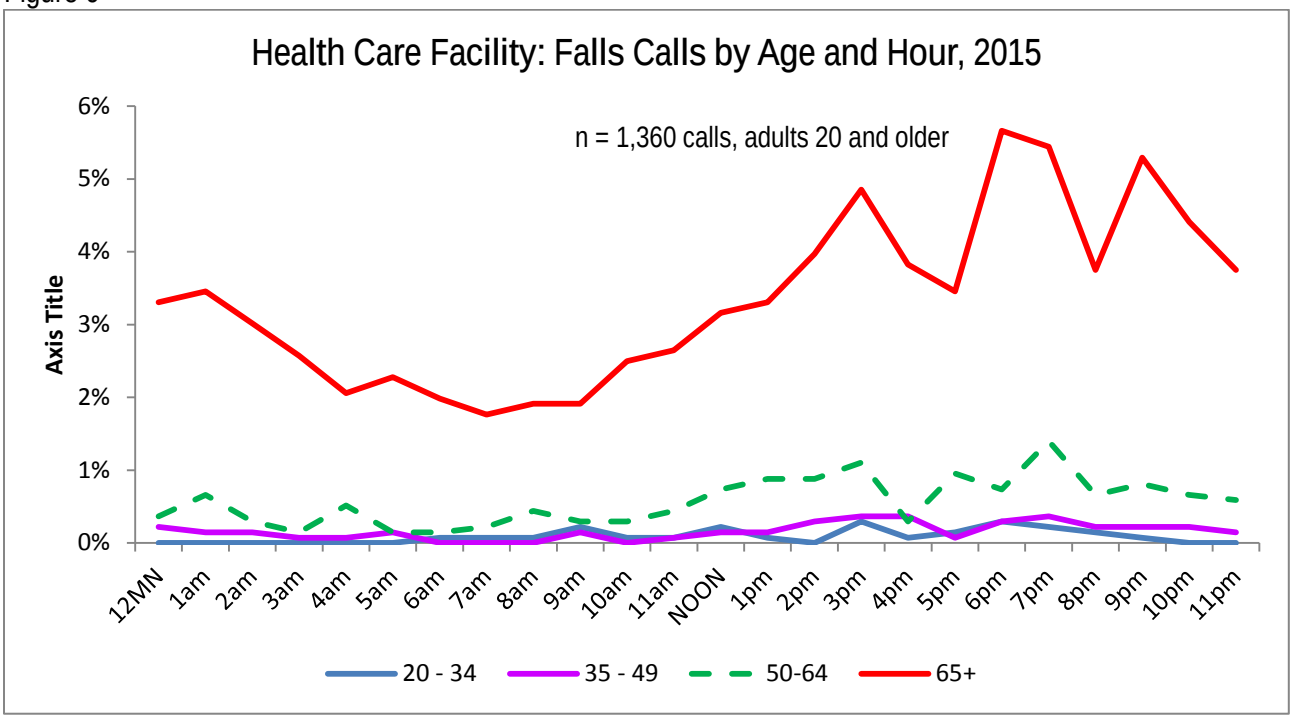


Figure 9



The location type of all adult falls (age 18 years and older) are listed below. Limitations of the current data collection are that nursing homes are classified in two different categories (residential institution and health care facility) and they are in the same category as jails and prisons. In the NEMSIS version 3.4 data collection that should begin in 2017, the classification is based on more exact ICD-10 codes for place of occurrence.

Table 3

ADULT Falls (age 18 and older) by Incident Location Type	Frequency	Percent
Home/Residence	12,449	60%
Residential Institution (nursing home, jail/prison)	2,669	13%
Trade / service place	1,535	7%
Health Care Facility (clinic, hospital, nursing home)	1,367	7%
Street or Highway	1,012	5%
Public Building	950	5%
Other Location	463	2%
Recreation/Sport place	242	1%
Industrial Place	72	<1%
Farm	27	total
Lake, River, Ocean	23	
Mine / Quarry	2	
Missing location = 1,559	20,811	

Vehicle Crashes and Accidents *(The national highway safety preferred term is now "crash" instead of "accident"; we use both)*

The National Center for Injury Prevention and Control ranks motor vehicle accidents as a Top 10 cause of death among people age one to fifty-four years.[10] Nationwide, crash deaths cost at least $44 billion when medical care from crash to death and the loss of work were counted. The estimated cost of traffic deaths in Connecticut for 2013 was $407 million.[11] Roughly half the total costs (49%) were related to fatal injuries of young adults 20 to 34 years old. One third of costs related to the deaths of adults age 35 to 64 years. These measures cannot describe the totality of loss experienced by families and by our society for events that are often preventable.

The Centers for Disease Control and Prevention (CDC) illustrates that crash fatalities are an important part of a much larger picture. In 2014 it was estimated that "Americans spend more than 1 million days in the hospital each year from crash injuries." Lifetime medical costs and loss of work days from crashes amount to billions of dollars.[12] Sources such as the National Safety Council are now reporting a rise in motor vehicle deaths. Data from 2015 reverses a previous downward trend, with a 7.2% increase nationwide for all types of roadway fatalities compared to 2014.[13] NEMSIS version 2.2.1 codes entered by EMS personnel are supposed to correspond to ICD-9 E codes.

Motor Vehicle Accident Calls in Connecticut

Table 4 (NEMSIS v. 2.2.1 gave ICD-9 equivalents for EMS codes.)

Cause of Injury	Frequency	Percent
Motor Vehicle traffic accident (E81X.0)	11,403	79.3%
Motor Vehicle non-traffic accident (E82X.0)	1,486	10.3%
Pedestrian traffic accident (E814.0)	627	4.4%
Motorcycle accident (E81X.1)	473	3.3%
Bicycle accident (E826.0)	353	2.5%
Non-Motorized Vehicle accident (E848.0)	46	<1%
	14,388	

The motor vehicle crash records include both drivers and passengers. Seating position data is required to differentiate driver-specific injuries from injuries of other vehicle occupants. With respect to safety equipment such as shoulder and lap belts and child restraints, sixty-three percent of motor vehicle crash records had information in at least one of five available fields available to document their use. However, more than one-quarter of safety equipment notations were "Other". Fields to collect occupant safety equipment data are part of the current NEMSIS version 2.2.1 data collection, but are not required as national elements in NEMSIS version 3.4.

[10] Motor Vehicle crash death fact sheet for Connecticut, 2013, accessed 9/15/2016. http://www.cdc.gov/motorvehiclesafety/pdf/statecosts/ct-2015costofcrashdeaths-a.pdf

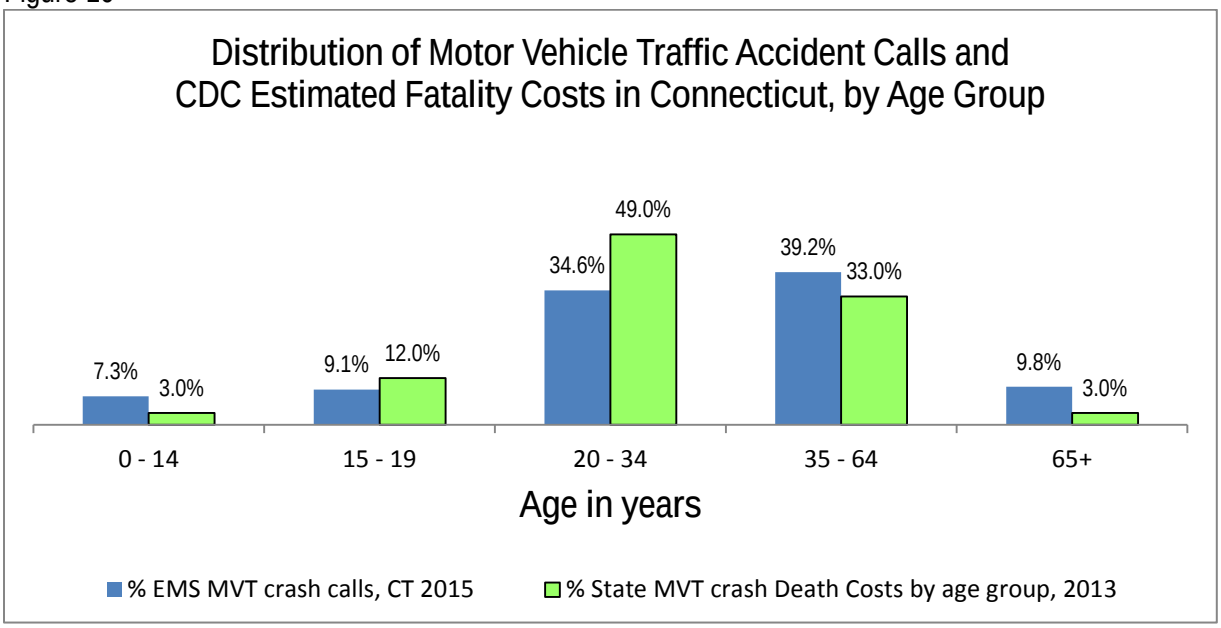
[11] Ibid. $5 million in medical costs for fatal injuries and $402 million for work loss costs for fatal crashes, Connecticut

[12] CDC Vital Signs, October 2014. Accessed 9/15/2016 https://www.cdc.gov/vitalsigns/crash-injuries/index.html

[13] National Highway Traffic Safety Administration, Traffic Safety Facts, August 2016 , accessed 10/25/16 https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812318

In Figure 10, Connecticut EMS motor vehicle traffic accident (MVTA) calls were distributed by the same age groupings as death cost data from the Centers for Disease Control for comparison. In Connecticut, roughly one third of the motor vehicle traffic records (passengers and drivers) involve the 20 to 34 year old age interval. According to the Centers for Disease Control, the same age interval accounts for almost half of the traffic fatality costs.[14]

Figure 10

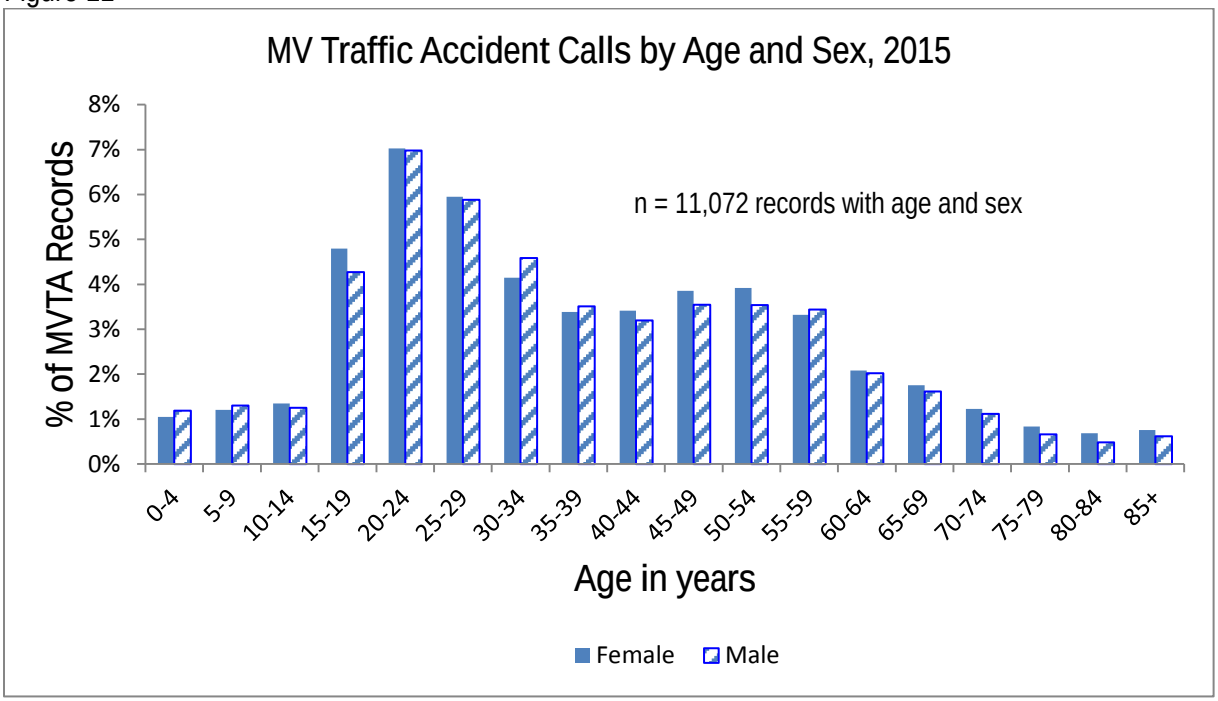


An important area of consideration by Connecticut is the collection of state-specific EMS data that can be linked to records from a variety of other sources.[15]

[14] Motor Vehicle crash death fact sheet for Connecticut, 2013, accessed 9/15/2016. http://www.cdc.gov/motorvehiclesafety/pdf/statecosts/ct-2015costofcrashdeaths-a.pdf

[15] Connecticut's Traffic Records Coordinating Committee (TRCC) Strategic Plan has a long term goal of linking data from six areas important to public health and roadway safety (Crash, Driver, Vehicle, Roadway, Citation/Adjudication and Health/Injury) in order to identify risk factors, prevention strategies and various outcome measures. Website accessed 9/14/2016. http://www.ct.gov/dot/lib/dot/documents/dtransportation_safety/traffic_records/trcc_traffic_records_strategic_plan.pdf

Figure 11



Analysis of 2015 MVTA calls included inspection of condition codes, protocol codes and codes for indicators of alcohol or drug use. The three types of fields are available for use when EMS personnel are evaluating patients. However, the information may sometimes be better documented with other data sources. This highlights the advantage of linking data, such as law enforcement records, EMS and hospital records to get a more accurate picture.[16]

The current EMS data collection does not supply fields to document other important crash factors such as distracted driving. The National Highway Traffic Safety Administration (NHTSA) data illustrates that a significant portion (18%) of motor vehicle traffic crashes reported to police involved distracted driving. To define the problems and find out whether prevention and enforcement policies are effective, we have to collect and link useful data.[17]

[16] Sobering Facts: Drunk Driving in Connecticut. Centers for Disease Control, 2014. Accessed 9/29/2016. http://www.cdc.gov/motorvehiclesafety/pdf/impaired_driving/drunk_driving_in_ct.pdf

[17] NHTSA Traffic Safety Facts, Summary of Statistical Findings, April 2015, accessed 9/28/2016. http://www.distraction.gov/downloads/pdfs/Distracted_Driving_2013_Research_note.pdf

Occupant Use of Safety Equipment

Multiple fields are available to document safety equipment used. Choices include codes for eye protection, lap belts, shoulder belts, child restraints, helmets, and other protective gear, "Other" or "None". More than one code could be entered. The percentage of records with any code in at least one of the fields is shown in Table 5. None of the records contained codes such as "not reported" or "not available" or "not applicable".

Table 5

Cause of Injury	# records	Safety equipment data in at least 1 field: Yes	No
Motor Vehicle traffic accident	11,403	63%	37%
Motor Vehicle non-traffic accident	1,486	73%	27%
Pedestrian traffic accident	627	26%	74%
Motorcycle accident	473	69%	31%
Bicycle accident	353	27%	73%
Non-Motorized Vehicle accident	46	28%	72%
	14,388		

Location of Motor Vehicle Traffic Accidents

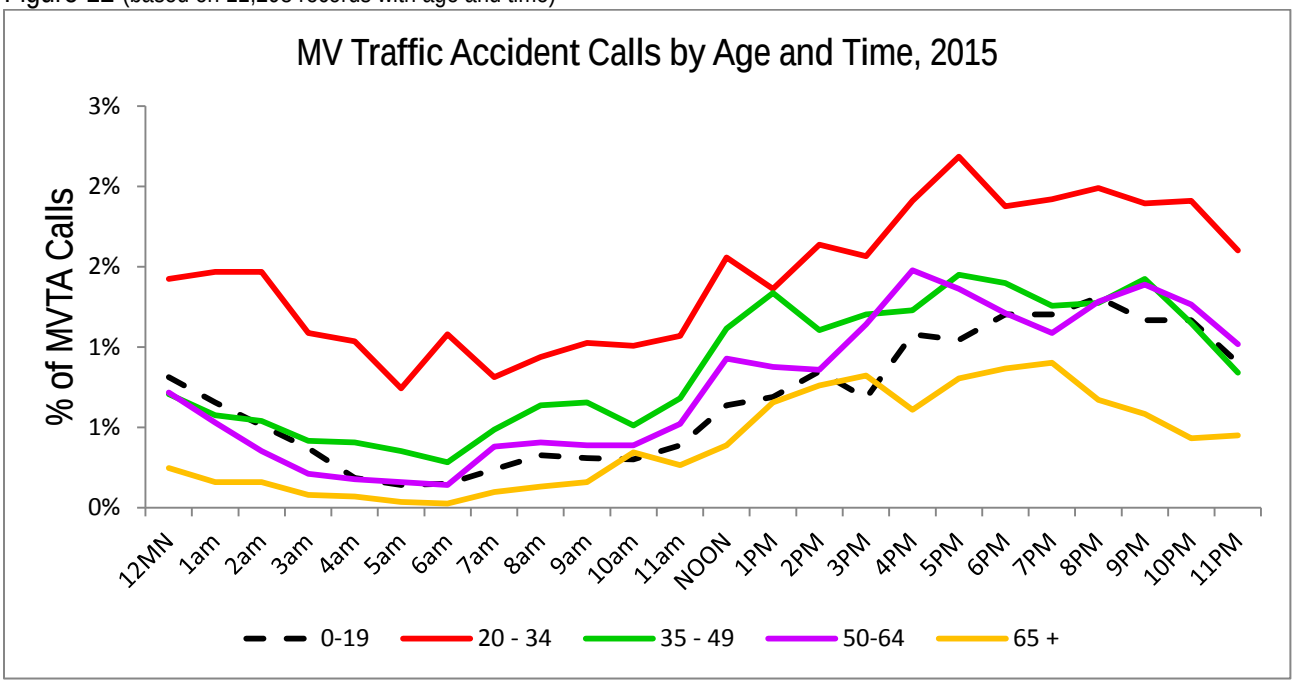
The exact location of motor vehicle crashes is important to highway safety efforts. The current EMS data collection software products allow entry of some crash location details. In practice, free text for street address, need for validation of zip codes, latitude and longitude entries make analysis of this data laborious. The query tool from UCONN's Crash Data Repository uses data from the state and local police. It provides a reliable way to research the actual location of crashes with validated information that is frequently updated.[18] Linkage of EMS and other data to the Repository information is an attainable goal.

Timing of Motor Vehicle Traffic Accidents

In Figure 12, the motor vehicle traffic accidents were divided into six age group intervals to examine the approximate timing of events for each age group. The time that the EMS unit was notified by dispatch was used as the best available estimate of the time of events.

[18] Demonstration of the Crash Data Repository query tool at the September 20, 2016 meeting of the Traffic Records Coordinating Committee selected Waterbury and in seconds, with much better precision, pointed to the same areas identified by our test of year 2015 DPH data. The Crash Repository query tool is clearly a linchpin in the linkage of information useful for public health and roadway safety research and policy. To read more about the crash data collection initiative and the collaboration involved, please see the Crash Data Initiatives and Programs at http://www/dot/cwp/view.asp?a=2094&Q=452380 and the Crash Data Repository at http://www.ctcrash.uconn.edu/ Accessed 9/29/2016.

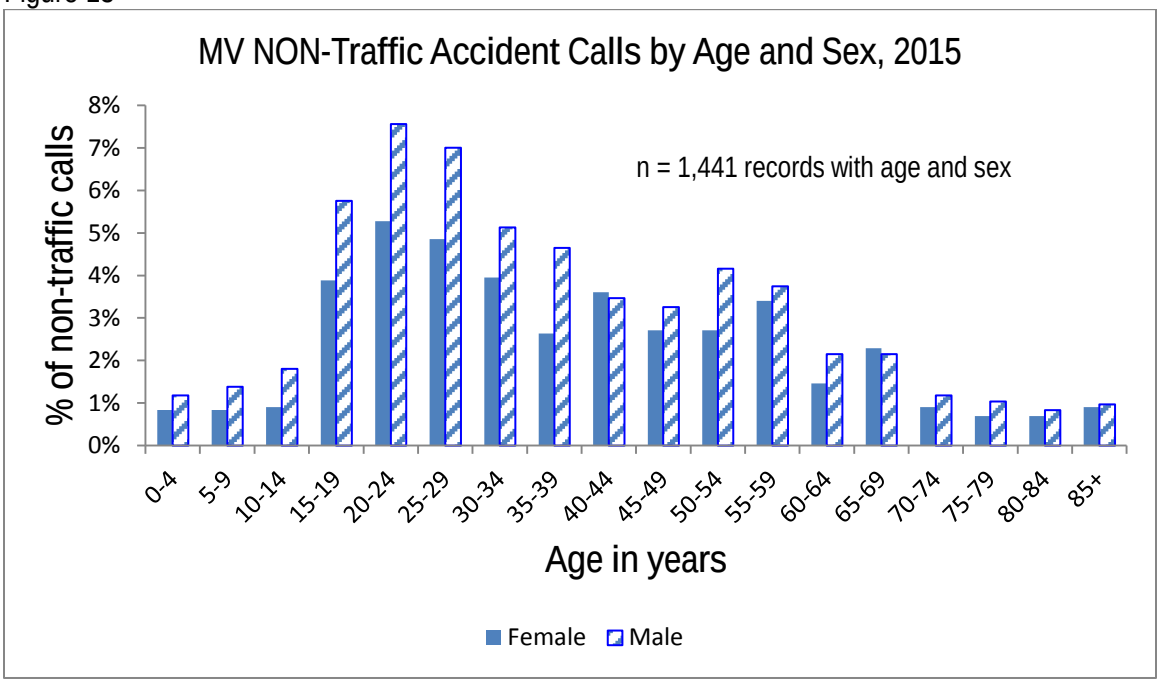
Figure 12 (based on 11,298 records with age and time)



Motor Vehicle NON-Traffic Accidents

Motor vehicle non-traffic crashes involve motor vehicles in recreation/sporting activities off the highway or motor vehicle collisions or crashes that take place entirely off the highway.

Figure 13



Motorcycle Accidents

There is information in at least one of five safety equipment fields for 69% of motorcycle crash calls. This includes the documentation of "None".

Figure 14

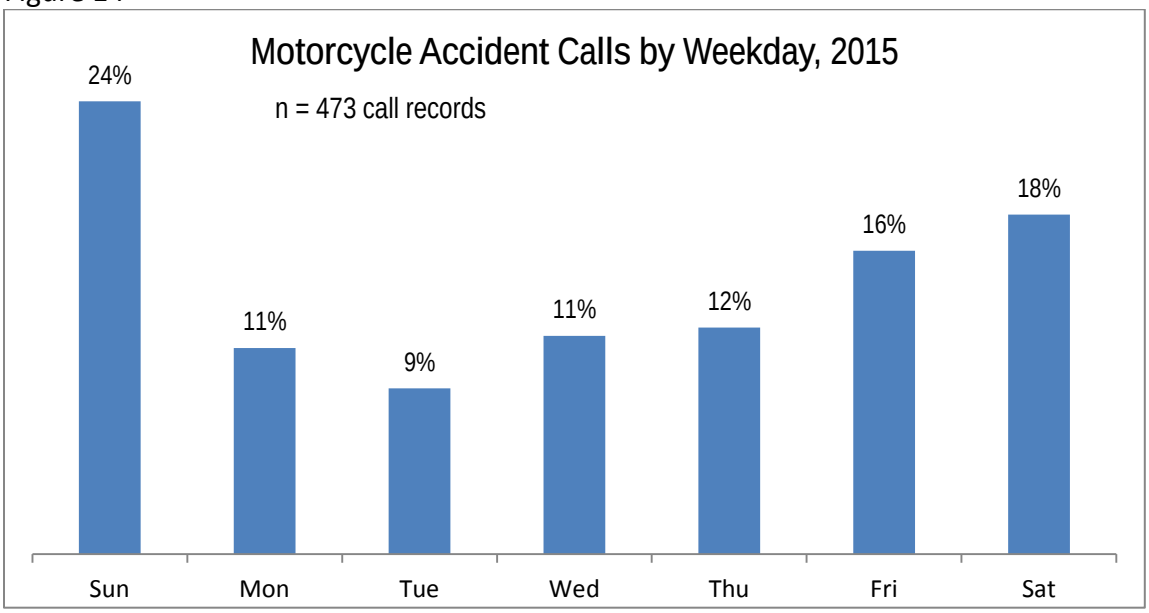
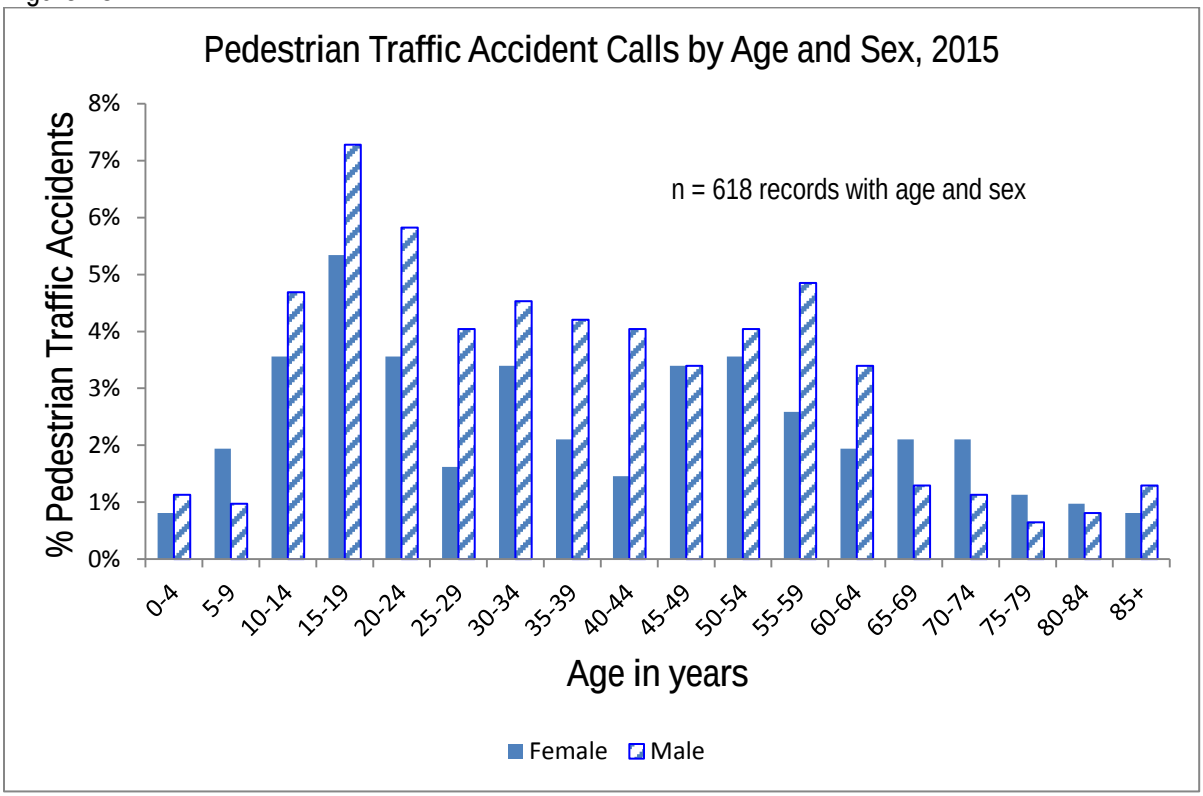


Figure 15



*n = 618 records with age and sex

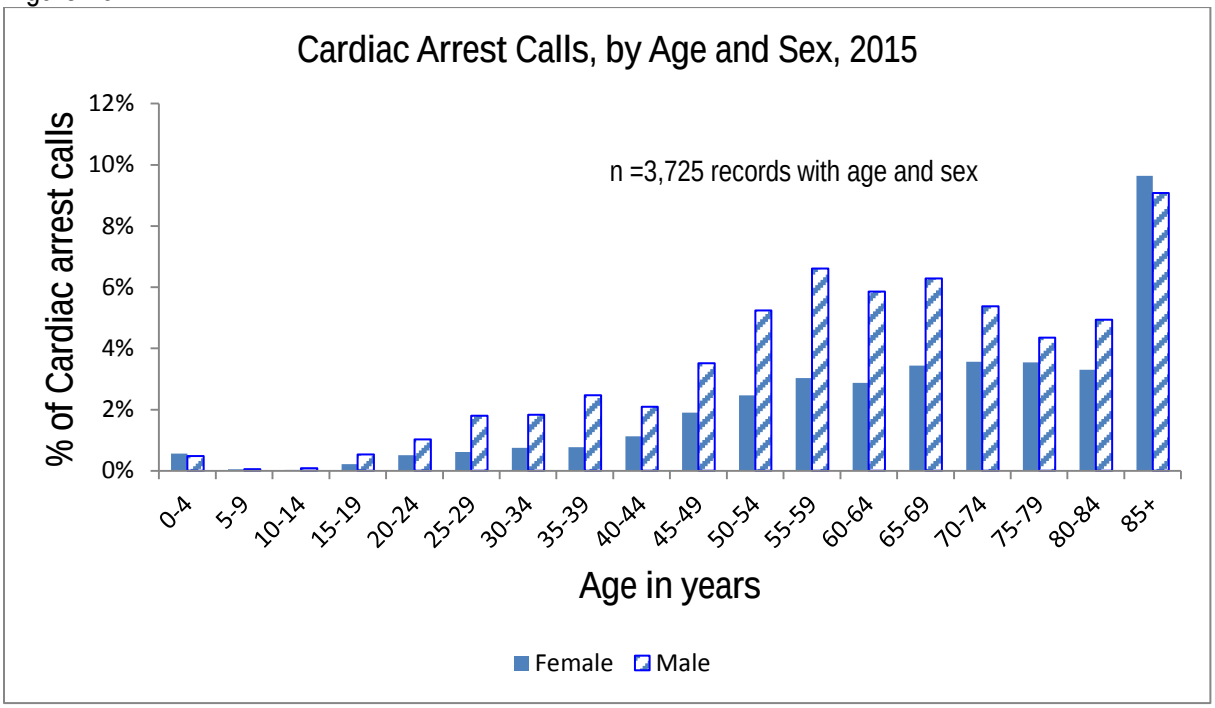
Cardiac Arrests

Out of hospital cardiac arrests (OHCAs) have a low survival rate. The CARES project (Cardiac Registry to Enhance Survival), studied outcomes for people who had received cardiopulmonary resuscitation (CPR) or automated external defibrillator (AED) assistance after cardiac arrest from probable cardiac causes.[19] This highlighted a subset of cardiac arrests where intervention by lay persons may improve outcomes. It supports using data linkage (emergency 911 calls, EMS and hospital outcome) to analyze and perhaps improve intervention and education.

More widespread training in CPR and use of AED may increase the chance of survival for some people who experience a sudden cardiac arrest.[20] The majority (80%) of cardiac arrest call records were for people age 50 years or older. Prevention may be the largest area of influence for individuals to change their risk profile for heart disease and cardiac arrest. This begins with recognition of risk factors and changeable living habits and also access to medical care.[21]

The majority of cardiac arrest (84%) records documented that the arrest occurred prior to EMS arrival. Current EMS data collection can capture whether the cardiac arrest was witnessed by a lay person, by a medical provider or not witnessed. Half (54%) of the 3,791 cardiac arrest call records documented unwitnessed events, twenty-eight percent were witnessed by a lay person and fourteen percent were witnessed by a healthcare professional. Seven percent of records were missing witness data. Defibrillation was attempted by EMS in twenty percent of cardiac arrest calls and was documented as successful in about one third of those records.

Figure 16



[19] Out-of-Hospital Cardiac Arrest Surveillance --- Cardiac Arrest Registry to Enhance Survival (CARES), United States, October 1, 2005--December 31, 2010 *Surveillance Summaries, Morbidity and Mortality Reports:* July 29, 2011 / 60(SS08);1-19 https://www.cdc.gov/mmwr/preview/mmwrhtml/ss6008a1.htm Accessed 10/3/2016

[20] Sudden Cardiac Arrest Foundation, "You Can Save a Life Anywhere" http://www.sca-aware.org/about-sca Accessed October 3, 2016.

[21] Centers for Disease Control: "Preventing Heart Disease: What You Can Do", http://www.cdc.gov/heartdisease/prevention.htm. Accessed October 3, 2016.

Documentation of Emergency Calls Involving Drugs, Alcohol and Medications

The enhanced scope of practice for EMS providers needs to be reflected in data documentation. The medications actually given by EMS at the basic life support (BLS) level are likely under-reported. We discovered this in regard to administration of naloxone (Narcan). The upsurge in acquisition and use of naloxone by EMS personnel follows the expansion in scope of practice which formally allowed administration of epinephrine (2000) and naloxone (2014) by BLS as well as advanced life support (ALS) providers.

In the records from 2015, it appeared that the ten fields available to each record for documenting Medications Given by EMS were filled in by ALS practitioners but rarely by BLS practitioners. Some of the difference is that BLS scope of practice limits medication administration. However, even as the scope of practice has been widened for BLS providers, the method of documentation has not caught up. For example, a local EMS agency (BLS) which used naloxone regularly in 2015 looked at their available data entry screens and found that in order to "see" the medications data entry fields, an administrator had to turn "on" that page in the ePCR. The fields for data entry existed but were not visible to data entry for BLS responders.

In the case of naloxone, different data entry of medications by BLS and ALS results in underestimates of its actual use by emergency medical professionals in the pre-hospital setting. Likewise, the disparity in documentation would make it difficult to assess practices such as the administration of aspirin for presumed cardiac chest pain.

Naloxone Administration

Out of 585,890 emergency 911 call records, 3,272 recorded at least one naloxone administration. Just over 4,000 total doses were documented. A single dose was given according to the majority of records (81%). Initiatives to combat opioid overdoses have also expanded dispensing of naloxone[22]. The documented administration of naloxone by EMS personnel is neither complete nor indicative of the scope of the naloxone dispensing in our communities.

Looking at Toxicity [23]

We looked at four types of fields from all emergency 911 records that might be used to identify alcohol, drug or other toxicity: Alcohol/Drug Use Indicators, Condition Codes, Protocols Used and Medications Given. The top causes of trauma identified from the Cause of Injury field were inspected for documentation of possible toxicity. The estimated percent of records for each cause of injury that contained at least one possible toxicity indicator were: Falls records 5.7%, Motor Vehicle Traffic Accident records 4.7% and Drug poisoning records 95%.
The distribution for falls that had any possible toxicity indicators clusters around middle age. Linkage to other data sources would be needed to clarify what type of toxicity, if any, was involved.

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[22] The Opioid Overdose Prevention Initiative, Connecticut Department of Mental Health and Addiction Services http://www.ct.gov/dmhas/cwp/view.asp?a=2902&q=509650 Accessed 10/12/2016

[23] Any record with at least one dose of naloxone in Medications Given fields was scored 1 for GOTNARCAN. Multiple alcohol/drug usage indicator fields may be coded for "Patient Admits to Drug Use", "Patient Admits to Alcohol Use", "Alcohol of Drug Paraphernalia at Scene", or "Smell of alcohol on Breath". If a record had any of these codes, ALCDRUGUSE was scored 1. Any record that had a Condition Code of "Poisons (all routes)", "Alcohol Intoxication or Drug Overdose" or "Severe Alcohol Intoxication" received a score of 1 for TOXICITY. If a Protocol Used field was coded for "Overdose/Toxic Ingestion", then it received a score of 1 for TPROTOCOL. A summary field was coded 1 if a record had at least one score of 1 for any of the indicator fields. This percent of trauma records with possible toxicity is only an estimate based on documentation of Cause of Injury and the component indicator fields. Records that documented toxicity in a patient care narrative or combination of other fields could not be searched. Consistent documentation is crucial to utility of the data.

Figure 17

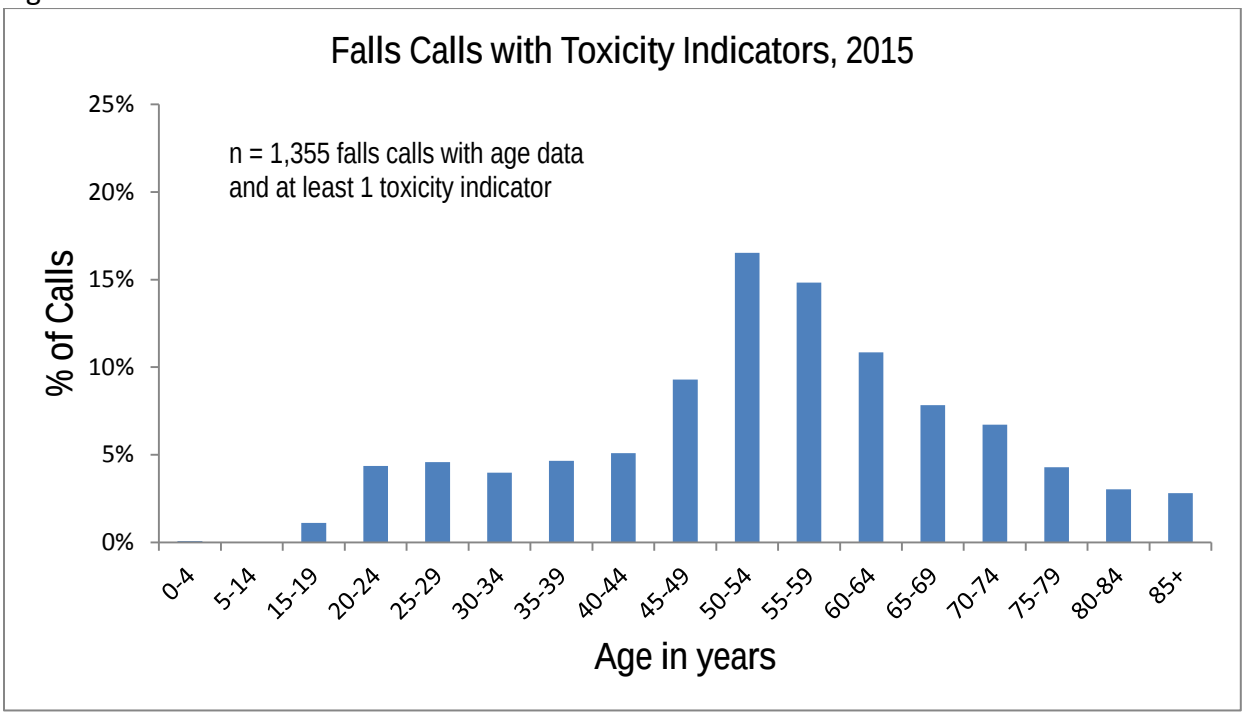
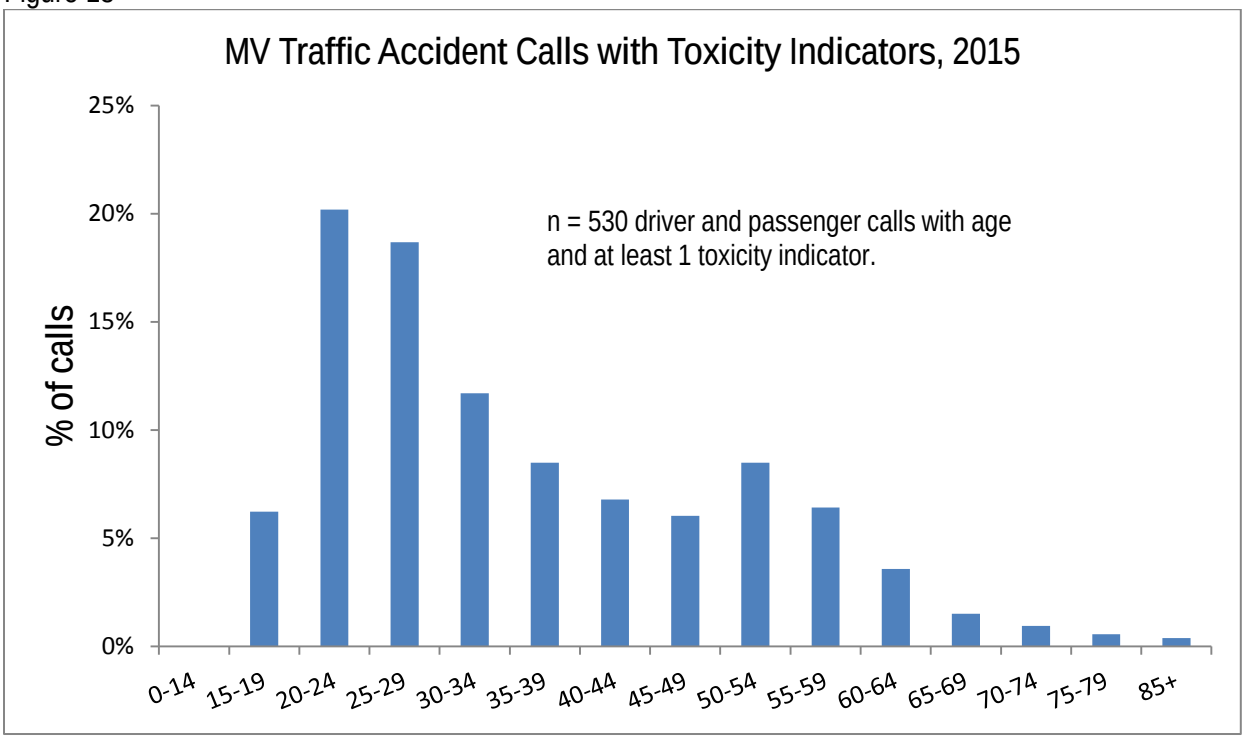


Figure 18



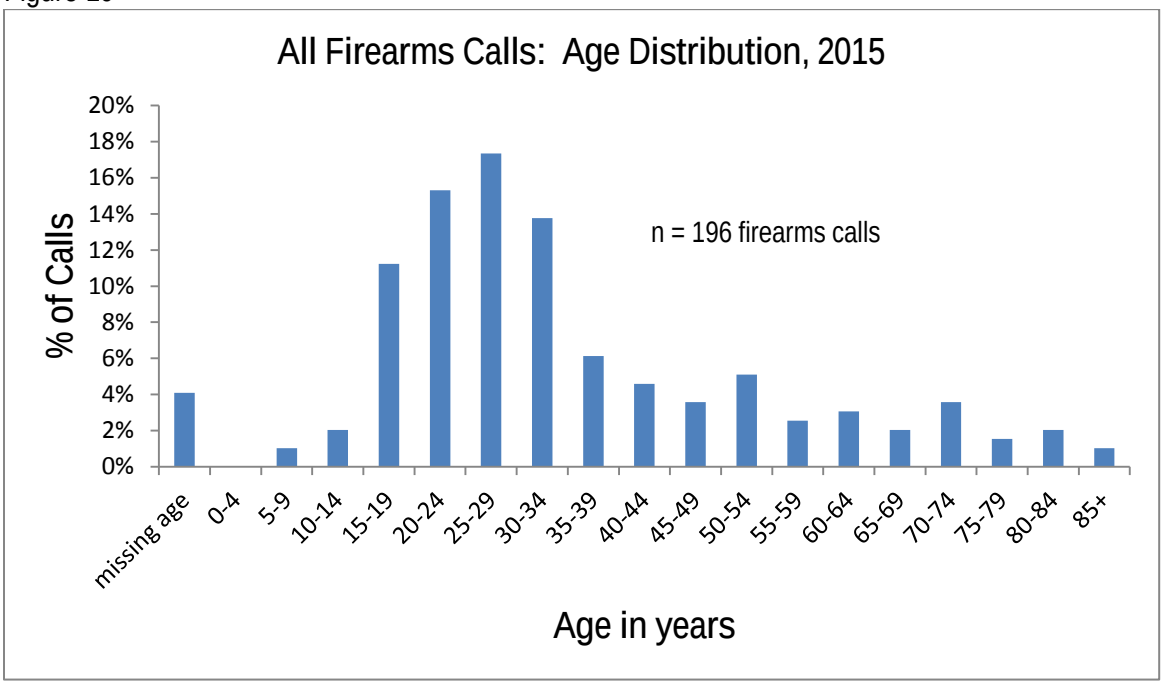
Calls Related to Firearms

The records (n=196) documenting cause of injury related to firearms were coded as follows: “Firearm assault”, “Firearm self-inflicted” and “Firearm injury (accidental)”. Eighty-five percent of the calls recorded intentional firearm injuries. Thirty of the calls documented death at the scene. Over half (55%) of the records came from incidents in New Haven, Hartford, Norwalk, Bridgeport, Waterbury and New Britain. Nine records were missing documentation of gender. The majority (82%) of all firearm calls were for males.

Table 6

Type of Event	Percent
Firearm assault	62.2%
Firearm self-inflicted	22.4%
Firearm injury (accidental)	15.3%

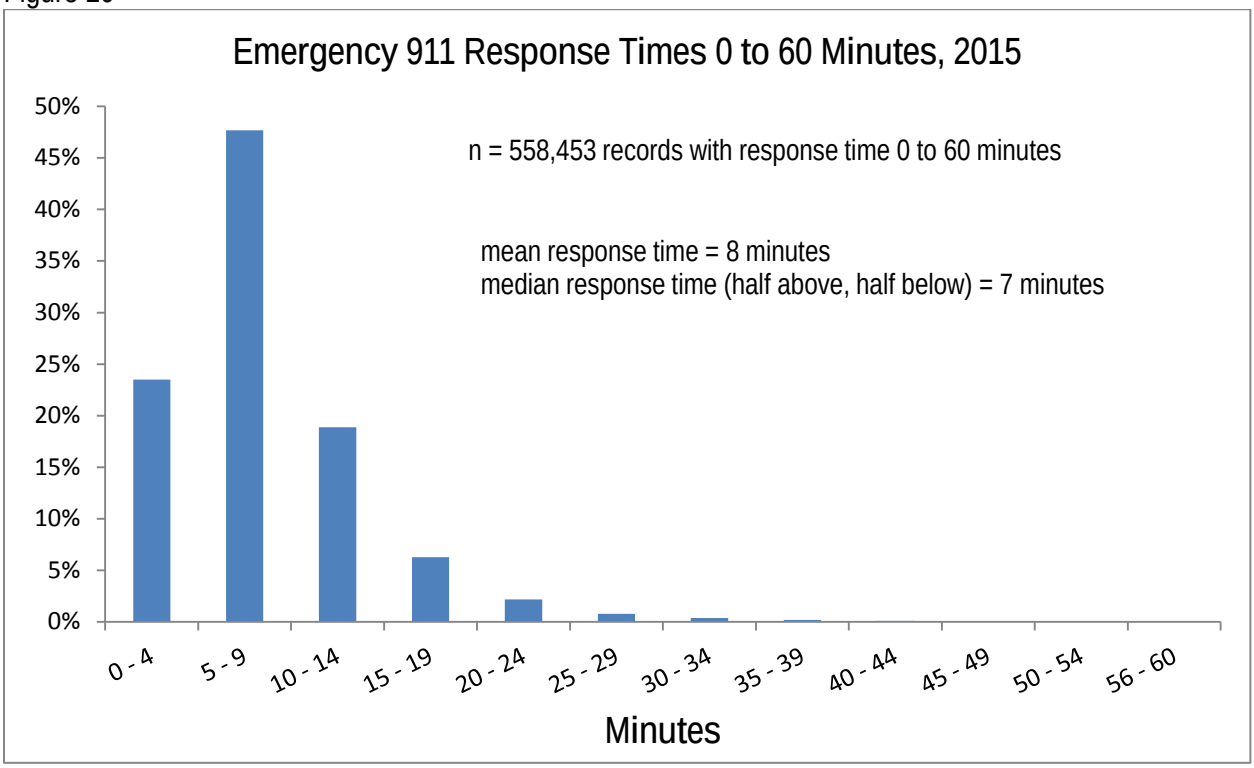
Figure 19



Response time for Emergency 911 Calls

There were 585,890 emergency call records in the data available for year 2015.[24] Response time estimates were done for records with date and time data, using the reported time an EMS unit was notified by dispatch and the reported time of arrival on the scene, as in previous years' reports. Records were removed from the calculation if either time point was missing for about 5% of records. For the 2015 report, the calculated response interval included was 0 to 60 minutes (558,453 records). The overall mean response time was 8 minutes and the median response time (half above and half below) was 7 minutes. [25] *Please refer to appendices A and B.*
Statistics are not reported for agencies with incomplete data submission or with less than 30 records.

Figure 20



[24] Data submissions for year 2015 were not complete as of the July 25, 2016.
[25] 673 records had response times that were questionable, so were not included in the calculation of mean and median.

Data Issues Noted

DPH monitored record counts for each EMS agency for year 2015, based on the most reliable date field (date the unit was notified by dispatch). This uncovered processing issues that required collaboration between local EMS agencies and their software vendors. The record count patterns brought to the attention of all EMS agencies resulted in a significant increase of 2015 records available for analysis, but the task is not complete.

Edits of data entered into electronic PCRs were incomplete or lacking entirely. Incoming data did not uniformly follow NEMSIS version 2.2.1 standards for data collection, nor were local code lists always translated into NEMSIS codes. Invalid or incorrect codes could be submitted as final data. As of 2017, the software for collecting data is designed for compliance with at least the NEMSIS version 3.4 business rules. This will shift the edit requirements to the point of data entry. A complete data dictionary may also point out state-specific data points that require additional criteria.

Patient demographic information was sometimes lacking for age and sex. Race is not always reasonably ascertained at the point of service and could be better documented for people transported to emergency rooms if EMS data was linked to hospital data.

Response Mode to Scene for emergency 911 calls should not contain invalid null codes. Incident Location type is missing for 11% of emergency 911 records.

The Type of Service Requested is not coded consistently, leaving some calls out of the subset for emergency 911 calls. Example: 655 calls answered by one EMS agency were not included in the 911 calls due to miscoding. Therefore, they were not a part of analyses of traumatic injuries. The explanation of how established codes are to be used should be part of an EMS data dictionary. Improper use of codes or edit overrides should be minimized.

Enhanced scope of practice for different levels of EMS providers was not matched by uniform changes in data entry procedures at EMS agencies. This favored an under-report of medications actually given that may be of public health interest. Instead, the medications may have been entered by BLS providers into general patient care narratives that are not available for analysis. (Example: naloxone).

A similar need for re-training applies to data for possible performance measures. For example, if an EMS performance measure is the percentage of people with cardiac chest pain who were given aspirin, the fields for medications given must be open to events handled by both ALS and BLS practitioners. If not, then most of the aspirin administrations will be documented only in Advanced Life Support (ALS) records. The end result will be that the giving of aspirin for cardiac chest pain will be under-reported in BLS records.

The transition in 2017 to data collection following the NEMSIS version 3.4 data dictionary requires local EMS software to support new and renamed data fields. It establishes validation criteria to be fulfilled before patient care data can be successfully uploaded to OEMS. This first step should provide a platform that can be added to over time through the work of OEMS and the data quality committee.

Seating position data for crash calls is needed to distinguish drivers and their injuries data from passenger data.

Twenty-eight percent of EMS trauma records did not code the patient destination type (hospital, medical office or clinic, home, transfer to another EMS responder, nursing home, police/jail or “other”). Between the two top causes of injury, falls and motor vehicle traffic accidents, the destination type was not coded for over 10,000 records. More than two-thirds of those records were also missing the name of the destination. This information is important for assessing the use of designated trauma centers and for future linkage of pre-hospital and hospital records.

Emergency 911 records that were missing age data (12%) were examined for data about cause of injury and type of destination (where the person was taken). The majority (>95%) of records that were missing age data were also missing cause of injury and destination. The relatively few records in this subset which had cause of injury data documented problems such as falls, motor vehicle traffic accident and firearm-related injuries. The lack of documentation (e.g. type of service requested) for cause of injury or destination could be minimized by standardization of coding and field level validation in data collection.

The patient disposition for all calls should be validated. A significant number of records had a patient disposition of "No Person Found" or "Call Cancelled", yet there was information in the Medications Given fields. This problem is particular to one agency and highlights the need to deliver final data that uses coding which matches the NEMSIS data dictionary.

The "prior aid" fields in cardiac arrest calls could not be easily analyzed because they contained a mixture of incomplete codes and free text. Validation criteria and "business rules" will be a continuing effort in the update of data collection systems. Outcome of defibrillation attempts must be required if cardiac arrest is documented.

Cardiac arrest etiology could be documented as: presumed cardiac, trauma, drowning, respiratory, electrocution or "Other". Almost one-quarter (836) records which documented cardiac arrest were missing etiology or presumed cause. Of the records missing etiology, more than one third (38%) also lacked the provider's primary impression.

Almost 8,000 records had invalid /missing incident zip codes (83%) or out of state zip codes (17%).

Appendix A: Estimates for Reported Response Times, by EMS Agency, 2015 [Emergency 911 calls]

Response time (RT) estimates are based on calculated response time of 0 to 60 minutes to exclude the most egregious date/time documentation errors. The 95% confidence interval (CI) brackets the mean response time that would be expected from repeated random sampling of response times for each agency in 2015. Statistics are not reported for fewer than 30 records or for agencies with incomplete data.

EMS Agency	# Records	Mean RT	95% CI for Mean	
Aetna Ambulance Service Inc.	16,614	6.0	6.0	6.1
Ambulance Service of Manchester LLC	20,706	7.8	7.7	7.9
American Ambulance Service Inc.	14,331	8.5	8.4	8.6
American Legion Ambulance Fund	1,792	8.7	8.4	8.9
American Legion Comm. Amb. dba Griswold	incomplete data			
American Medical Response of CT Inc.	190,495	8.5	8.5	8.6
Andover Vol. Fire Dept	297	10.9	10.5	11.3
Ansonia Rescue & Medical Services	2,868	6.2	6.1	6.3
Ashford Vol. Fire Dept.	278	11.1	10.3	11.9
Baltic Fire Dept.	213	12.0	11.2	12.7
Bantam Fire Co.	271	13.3	12.7	13.9
Beacon Hose Co.	incomplete data			
Bethany Vol. Fire Dept. Ambulance	376	11.8	11.2	12.3
Bethel Volunteer Fire Dept.	1,062	6.5	6.2	6.7
Bethel-Redding Paramedic Alliance Inc.	1,412	7.6	7.4	7.9
Bethlehem Ambulance Assn.	incomplete data			
Bloomfield Vol. Ambulance	incomplete data			
Bozrah Vol. Fire Company	271	13.7	13.1	14.4
Bradley Airport Emergency	407	5.2	4.9	5.5
Branford Fire Department-EMS	4,360	7.0	6.9	7.1
Bridgewater Vol. Fire Dept	61	12.3	10.9	13.8
Brookfield Vol. Fire Co.	1,388	5.6	5.4	5.8
Burlington Vol. Fire Dept.	601	10.8	10.4	11.2
Campion Ambulance Service	28,263	7.8	7.7	7.8
Chester Hose Company	80	11.8	10.5	13.1
Chesterfield Fire Co.	142	6.4	5.7	7.1
Clinton Vol. Fire Department	1,054	14.0	13.6	14.4
Colchester Hayward Vol. Fire Co.	1,516	9.7	9.4	10.0
Columbia Vol. Fire Dept.	incomplete data			
Community Fire Co.	772	9.7	9.3	10.2
Cornwall Vol. Fire Dept.	305	15.9	15.2	16.6
Coventry Vol. Fire Assn. Inc.	831	10.5	10.2	10.9
Cromwell Fire Dept.	1,881	7.4	7.2	7.6
Danbury Ambulance Service/aka Danbury Me	485	10.5	9.9	11.2
Danbury EMS/Div. of Danbury Fire Dept.	10,387	7.4	7.3	7.4
Darien EMS - Post 53	1,490	6.0	5.8	6.2

EMS Agency	# Records	Mean RT	95% CI for Mean	
Deep River Ambulance Assn.	396	14.2	13.7	14.6
Durham Volunteer Ambulance Corps	404	11.7	11.2	12.2
East Haddam Ambulance Assn. Inc.	617	20.1	19.5	20.6
East Hampton Ambulance Assn.	919	13.2	12.9	13.6
East Hartford Fire Dept.	8,114	5.7	5.6	5.7
East Haven Fire Department	2,732	5.5	5.3	5.6
East Lyme Ambulance	2,062	5.5	5.4	5.7
East Windsor Ambulance Assn.	2,475	8.3	8.1	8.4
Easton Vol. EMS	394	8.4	7.8	8.9
Echo Hose Hook & Ladder Vol. Amb.	4,293	9.4	9.2	9.5
Electric Boat Corporation	incomplete data			
Ellington Vol. Ambulance Corps	1,055	8.1	7.9	8.4
Enfield Community Ambulance	6,520	7.0	6.9	7.1
Essex Ambulance Assn.	674	13.9	13.5	14.3
Falls Village Vol. Fire Dept.	73	15.4	13.7	17.2
Franklin Vol. Fire Dept.	109	14.3	13.1	15.6
Gardner Lake Vol. Fire Co.	304	11.4	10.8	12.0
Georgetown Vol. Fire Dept.	582	7.7	7.4	8.1
Glastonbury Vol. Ambulance Assn.	2,994	6.1	5.9	6.2
Goshen Vol. Fire Co.	178	13.2	12.3	14.2
Granby Ambulance Assn.	1,643	8.9	8.7	9.2
Greenwich EMS	6,185	5.6	5.5	5.7
Groton Ambulance Assn.	3,964	8.1	8.0	8.3
Haddam Vol. Ambulance Service	655	13.1	12.7	13.5
Harwinton Ambulance Assn.	389	9.5	9.0	10.0
Hebron Vol. Fire Dept.	527	11.6	11.1	12.1
Heritage Village Ambulance Assn.	936	7.2	7.0	7.4
Hunter's Ambulance Service	28,291	7.7	7.7	7.8
KB Ambulance Corps Inc.	3,291	9.3	9.1	9.5
Kent Vol. Fire Dept.	incomplete data			
Killingworth Ambulance Assn.	328	18.7	18.0	19.3
Lawrence & Memorial Hospital	4,412	9.0	8.9	9.2
Lebanon Volunteer Fire Dept. Inc.	455	15.0	14.4	15.6
Ledyard Vol. Emergency Squad	796	12.9	12.4	13.4
Lime Rock Park Ambulance	< 30 records. No statistics			
Litchfield Vol. Ambulance Assn.	1,063	8.3	8.0	8.6
Lyme Ambulance Assn.	155	19.0	17.8	20.2
Madison Ambulance Association Inc.	1,904	6.6	6.4	6.8
Middlebury Vol. Fire Dept.	535	10.4	10.0	10.8
Middlesex Hospital	7,173	11.2	11.0	11.3

EMS Agency	# Records	Mean RT	95% CI for Mean	
Milford Fire Dept.	1,316	6.0	5.9	6.2
Mohegan Fire Co.	689	6.1	5.8	6.3
Mohegan Tribal FD	2,719	6.0	5.8	6.2
Monroe Vol. EMS	1,154	10.0	9.7	10.3
Montville Fire Co. Ambulance	697	6.1	5.9	6.4
Morris Vol. Fire Dept.	175	9.2	8.5	9.8
Mortlake Fire Co. Inc.	899	10.1	9.7	10.5
Mystic River Ambulance Assn.	2,177	8.5	8.3	8.6
New Britain EMS Inc.	13,811	6.4	6.4	6.5
New Canaan Vol. Ambulance Corps	1,759	7.5	7.3	7.7
New Hartford Vol. Fire Dept. Amb. Svc.	697	13.7	13.2	14.3
New London Fire Dept.	5,859	5.0	4.9	5.0
New Milford Community Ambulance	2,125	10.4	10.2	10.7
Newington Vol. Ambulance Corp	1,392	4.8	4.7	5.0
Newtown Vol. Ambulance Corps	2,527	10.2	10.0	10.4
Norfolk Lions Club Ambulance	183	14.1	13.2	15.0
North Branford Fire Dept. Amb. Co. #4	1,035	11.6	11.2	11.9
North Canaan Vol. Ambulance Corps	1,061	8.1	7.8	8.4
North Haven Fire Department	2,519	6.5	6.3	6.6
Norwalk Hospital Assn.	12,967	8.3	8.2	8.4
Oakdale Fire Co.	337	6.0	5.6	6.4
Old Lyme South End Vol. Amb. Assn.	568	12.0	11.5	12.5
Old Saybrook Amb. Assn.	1,364	11.6	11.4	11.9
Oxford Ambulance Assn., Inc.	876	10.7	10.3	11.0
Petengill Ambulance Marlborough	245	12.2	11.7	12.7
Pfizer Inc	58	3.6	3.0	4.2
Plymouth Vol. Ambulance Corps	1,262	7.4	7.1	7.6
Poquetanuck Vol. Fire Dept.	381	12.3	11.6	13.0
Pratt & Whitney Div. of UTC	87	3.6	3.2	4.0
Pratt & Whitney-Med Team-Middletown	43	2.5	2.0	3.1
Putnam E.M.S. Ambulance Service Inc.	1,179	6.7	6.5	6.9
Redding Fire District	186	9.9	9.2	10.7
Ridgefield Fire Dept.	1,867	6.9	6.7	7.0
Rocky Hill Vol. Ambulance	891	7.5	7.2	7.8
Roxbury Ambulance Assn.	153	13.6	12.4	14.7
Salisbury Vol. Ambulance Service	326	15.5	14.7	16.2
Sharon Fire Dept. Ambulance Squad	316	10.5	9.9	11.1
Sherman Vol. Fire Dept.	236	15.6	14.8	16.5
Sikorsky Aircraft Corporation	149	2.6	2.2	2.9
Simsbury Volunteer Amb. Assoc.	incomplete data			
Somers Fire Dept. Ambulance Div.	683	8.5	8.2	8.9
South Manchester Fire Department	5,926	5.0	5.0	5.1
Southbury Ambulance Assn.	2,020	8.4	8.2	8.6

EMS Agency	# Records	Mean RT	95% CI for Mean	
Southbury Training School	471	6.8	6.4	7.3
Stafford Ambulance Assn.	836	8.9	8.5	9.2
Stamford EMS Inc.	13,313	7.3	7.2	7.4
Stonington Vol. Ambulance Corps	450	10.4	9.9	11.0
Stony Hill Vol. Fire Co.	768	7.5	7.1	7.8
Storm Engine Co. Amb. & Rescue Corps	1,253	7.1	6.9	7.4
Stratford EMS	7,607	6.9	6.8	7.0
Submarine Base Fire Dept.	226	5.9	5.3	6.4
Suffield Vol. Ambulance Assn.	1,458	10.2	9.9	10.5
Thomaston Vol. Ambulance Corps., Inc.	940	8.1	7.7	8.4
Tolland Fire Dept.	1,226	12.4	12.0	12.7
Town of Canton Vol. Fire & EMS	1,016	9.6	9.3	10.0
Town of Guilford FD Ambulance	2,175	8.5	8.3	8.7
Town of Mansfield Div. Of Fire and Emerg	1,594	7.8	7.6	8.0
Trumbull EMS	4,684	8.6	8.5	8.8
UCONN Fire Dept Storrs	incomplete data			
UCONN Health Center Fire Department	incomplete data			
Valley EMS	5,775	8.4	8.3	8.5
Vernon Fire Dept.	incomplete data			
Volunteer Fire Dept. of New Fairfield	841	11.97	11.5	12.45
Voluntown Volunteer Fire Company #1	incomplete data			
Wallingford Dept. of Fire Svs.	5,008	6.3	6.2	6.4
Warren Vol. Fire Co. Inc.	112	15.4	14.2	16.5
Washington Ambulance Assn. Inc.	279	18.7	17.9	19.5
Waterford Ambulance Assn.	2,708	6.6	6.5	6.8
West Redding Vol. Fire Dept. District Co	143	13.9	12.9	15.0
Westbrook Ambulance Assn.	795	12.7	12.4	13.1
Westerly Ambulance RI	840	5.1	4.9	5.3
Weston Vol. EMS	483	15.3	14.7	15.9
Westport EMS	2,850	6.6	6.5	6.8
Wethersfield Vol. Ambulance Assn.	incomplete data			
Willimantic Fire Dept.	incomplete data			
Willington Fire Dept.	390	9.5	9.0	9.9
Wilton Volunteer Ambulance Corps	1,272	8.3	8.1	8.6
Windham Community Memorial Hospital	3,593	8.4	8.2	8.6
Windsor Locks Lions Club Ambulance	1,460	5.0	4.8	5.1
Windsor Vol. Ambulance Inc., Windsor EMS	2,614	8.4	8.3	8.6
Winsted Area Ambulance Assn.	1,600	8.5	8.2	8.8
Wolcott Vol. Ambulance	1,367	6.8	6.6	7.0
Woodbury Ambulance Assn.	759	16.2	15.8	16.6
Woodstock EMS/Woodstock Vol. Fire Assoc.	491	12.1	11.5	12.7
Yale EMS	< 30 records. No statistics			

Appendix B: Estimates for Reported Response Times, by Town of Incident, 2015 [Emergency 911 calls]
Records with valid Connecticut zip codes were included in this chart. Response time (RT) estimates are based on records with a calculated response time of 0 to 60 minutes to exclude the most egregious date/time documentation errors. The 95% confidence interval (CI) brackets the mean response time that would be expected from repeated random sampling of response times for events reported for each town in 2015. Statistics are not reported for fewer than 30 records.

Incident City/Town	# Records	Mean RT	95% CI for Mean	
Abington	< 30 records. No statistics			
Amston	138	13.2	12.3	14.1
Andover	415	11.5	11.1	11.9
Ansonia	3,687	6.4	6.3	6.5
Ashford	336	11.9	11.2	12.6
Avon	1,864	8.8	8.5	9.0
Ballouville	< 30 records. No statistics			
Baltic	305	13.0	12.4	13.6
Bantam	275	13.0	12.4	13.5
Barkhamsted	335	13.5	12.8	14.2
Beacon Falls	114	14.1	13.3	14.9
Berlin	2,092	7.1	7.0	7.2
Bethany	536	12.7	12.2	13.3
Bethel	2,852	6.6	6.4	6.7
Bethlehem	90	17.6	16.4	18.8
Bloomfield	2,481	12.8	12.5	13.0
Bolton	302	10.0	9.5	10.5
Botsford	< 30 records. No statistics			
Bozrah	370	13.1	12.5	13.6
Branford	4,510	7.2	7.0	7.3
Bridgeport	30,662	7.4	7.3	7.4
Bridgewater	82	12.2	11.0	13.5
Bristol	251	13.3	12.5	14.1
Broad Brook	582	11.1	10.8	11.4
Brookfield	1,382	5.8	5.6	6.0
Brooklyn	1,144	10.3	10.0	10.6
Burlington	501	9.8	9.4	10.2
Canaan	1,029	8.1	7.8	8.5
Canterbury	164	16.8	15.8	17.8
Canton	1,081	11.2	10.8	11.6
Canton Center	33	16.9	15.1	18.7
Centerbrook	116	12.1	11.3	12.9
Central Village	201	6.3	5.6	7.0
Chaplin	119	11.9	11.1	12.7
Cheshire	5,068	7.2	7.1	7.3
Chester	359	16.1	15.5	16.8

Incident City/Town	# Records	Mean RT	95% CI for Mean	
Clinton	1,627	13.3	13.0	13.6
Cobalt	77	14.5	13.4	15.5
Colchester	2,047	10.8	10.5	11.0
Colebrook	138	15.5	14.4	16.6
Collinsville	128	6.7	6.0	7.4
Columbia	354	9.5	9.1	10.0
Cornwall	66	13.1	12.0	14.2
Cornwall Bridge	150	17.3	16.3	18.3
Cos Cob	373	4.5	4.1	5.0
Coventry	1,227	11.1	10.8	11.3
Cromwell	2,443	8.1	8.0	8.3
Danbury	10,570	7.3	7.2	7.4
Danielson	2,476	8.4	8.2	8.6
Darien	2,055	6.9	6.7	7.1
Dayville	1,230	9.5	9.3	9.8
Deep River	566	14.5	14.0	14.9
Derby	2,054	7.3	7.1	7.5
Durham	580	12.3	11.9	12.8
East Berlin	180	6.7	6.4	7.1
East Canaan	< 30 records. No statistics			
East Glastonbury	< 30 records. No statistics			
East Granby	440	8.0	7.6	8.4
East Haddam	586	21.0	20.5	21.6
East Hampton	1,165	13.0	12.6	13.3
East Hartford	15,371	6.6	6.5	6.6
East Hartland	102	13.5	12.5	14.5
East Haven	7,458	9.1	9.0	9.2
East Killingly	42	12.8	11.2	14.4
East Lyme	1,208	7.1	6.8	7.3
East Windsor	1,241	6.2	6.1	6.4
East Windsor Hill	< 30 records. No statistics			
East Woodstock	< 30 records. No statistics			
Eastford	92	16.3	14.7	18.0
Easton	553	10.0	9.5	10.6
Ellington	1,366	8.8	8.5	9.1
Enfield	6,705	7.4	7.3	7.6
Essex	678	13.6	13.2	14.0
Fairfield	5,668	7.1	6.9	7.2
Falls Village	86	14.2	12.5	15.9
Farmington	3,766	7.8	7.6	8.0

Incident City/Town	# Records	Mean RT	95% CI for Mean	
Gales Ferry	479	13.5	12.9	14.0
Gaylordsville	58	15.9	14.5	17.3
Georgetown	33	14.5	13.2	15.8
Gilman	< 30 records. No statistics			
Glastonbury	4,281	7.2	7.0	7.3
Goshen	89	15.2	13.8	16.6
Granby	841	7.6	7.3	7.9
Greenwich	4,529	5.7	5.6	5.8
Grosvenor Dale	< 30 records. No statistics			
Groton	5,915	8.2	8.0	8.3
Guilford	2,085	8.3	8.1	8.6
Haddam	486	14.6	14.1	15.1
Hadlyme	< 30 records. No statistics			
Hamden	8,143	11.6	11.4	11.7
Hampton	90	12.6	11.8	13.3
Hanover	< 30 records. No statistics			
Hartford	35,179	7.4	7.3	7.5
Harwinton	314	9.3	8.8	9.8
Hebron	552	11.9	11.4	12.4
Higganum	294	12.2	11.5	12.9
Ivoryton	130	14.9	14.1	15.6
Jewett City/Lisbon	1,813	9.0	8.7	9.2
Kent	404	16.6	15.9	17.3
Killingworth	506	17.9	17.4	18.4
Lakeside	< 30 records. No statistics			
Lakeville	110	12.0	10.2	13.7
Lebanon	656	14.1	13.7	14.6
Ledyard	2,096	8.0	7.7	8.3
Litchfield	668	9.8	9.4	10.2
Madison	1,868	6.6	6.5	6.8
Manchester	12,882	6.2	6.1	6.3
Mansfield Center	991	8.2	8.0	8.4
Mansfield Depot	< 30 records. No statistics			
Marlborough	962	20.1	19.4	20.8
Mashantucket	104	6.1	4.6	7.6
Meriden	11,557	5.8	5.7	5.9
Middle Haddam	< 30 records. No statistics			
Middlebury	907	10.1	9.9	10.4
Middlefield	324	9.3	8.8	9.7
Middletown	11,242	6.7	6.6	6.8

Incident City/Town	# Records	Mean RT	95% CI for Mean	
Milford	7,113	8.4	8.3	8.5
Milldale	< 30 records. No statistics			
Monroe	2,104	9.9	9.7	10.1
Montville	96	6.3	5.6	6.9
Moodus	276	19.1	18.3	19.9
Moosup	792	10.1	9.7	10.5
Morris	195	12.3	11.3	13.4
Mystic	2,126	8.8	8.6	9.0
Naugatuck	464	12.1	11.6	12.7
New Britain	13,837	6.7	6.6	6.8
New Canaan	3,022	7.5	7.4	7.7
New Fairfield	849	12.0	11.6	12.5
New Hartford	615	13.9	13.4	14.4
New Haven	39,076	8.2	8.1	8.2
New London	7,108	5.1	5.1	5.2
New Milford	2,505	10.1	9.9	10.4
New Preston Marble Dale	114	17.2	16.2	18.3
Newington	5,413	7.6	7.5	7.8
Newtown	2,001	10.4	10.2	10.7
Niantic	1,502	7.2	6.9	7.4
Norfolk	194	13.2	12.5	13.9
North Branford	793	13.1	12.8	13.5
North Franklin	276	12.8	12.1	13.4
North Granby	39	10.8	9.0	12.6
North Grosvenordale	498	8.9	8.4	9.3
North Haven	5,946	9.2	9.1	9.3
North Stonington	220	12.7	11.8	13.5
North Westchester	< 30 records. No statistics			
North Windham	492	8.7	8.4	9.0
Northfield	54	12.9	11.8	14.1
Northford	341	9.2	8.6	9.8
Norwalk	10,378	8.3	8.3	8.4
Norwich	7,300	6.8	6.7	6.8
Oakdale	719	8.6	8.2	9.0
Oakville	719	8.8	8.5	9.1
Old Greenwich	343	6.2	5.7	6.6
Old Lyme	896	13.9	13.5	14.3
Old Mystic	< 30 records. No statistics			
Old Saybrook	1,875	11.0	10.8	11.2
Oneco	54	15.7	13.2	18.1
Orange	3,536	9.0	8.8	9.2
Oxford	1,322	11.2	11.0	11.5

Incident City/Town	# Records	Mean RT	95% CI for Mean	
Pawcatuck	271	6.6	6.1	7.2
Pequabuck	< 30 records. No statistics			
Pine Meadow	< 30 records. No statistics			
Plainfield	1,182	10.1	9.8	10.5
Plainville	2,341	8.0	7.8	8.2
Plantsville	1,384	6.2	6.0	6.4
Plymouth	386	9.8	9.4	10.2
Pomfret	112	15.7	14.6	16.7
Pomfret Center	130	13.9	13.0	14.9
Poquonock	< 30 records. No statistics			
Portland	1,382	8.7	8.5	8.9
Preston	666	11.1	10.6	11.5
Prospect	789	12.0	11.7	12.4
Putnam	1,602	7.3	7.0	7.5
Quaker Hill	339	8.2	7.8	8.7
Quinebaug	73	12.2	10.9	13.5
Redding	868	10.5	10.0	10.9
Redding Center	161	10.3	9.5	11.0
Redding Ridge	68	10.2	9.1	11.4
Ridgefield	1,875	7.0	6.8	7.2
Riverside	526	3.7	3.4	3.9
Riverton	< 30 records. No statistics			
Rockfall	104	7.2	6.7	7.8
Rocky Hill	3,081	6.3	6.2	6.5
Rogers	< 30 records. No statistics			
Roxbury	142	13.7	12.6	14.9
Salem	368	12.5	12.0	13.1
Salisbury	150	14.4	13.4	15.5
Sandy Hook	731	11.2	10.8	11.6
Scotland	30	14.3	12.6	16.0
Seymour	847	8.4	8.2	8.7
Shelton	7,106	9.5	9.4	9.6
Sherman	215	15.6	14.8	16.4
Simsbury	332	15.5	14.7	16.3
Somers	1,004	9.6	9.2	10.0
Somersville	< 30 records. No statistics			
South Britain	< 30 records. No statistics			
South Glastonbury	206	11.7	11.0	12.4
South Kent	52	18.2	16.6	19.8
South Lyme	< 30 records. No statistics			
South Windham	47	8.4	7.2	9.6
South Windsor	2,771	6.8	6.7	6.9
Southbury	4,328	10.0	9.8	10.2

Incident City/Town	# Records	Mean RT	95% CI for Mean	
Southington	3,562	6.6	6.5	6.7
Southport	440	8.8	8.3	9.3
Stafford	< 30 records. No statistics			
Stafford Springs	1,386	9.2	8.8	9.5
Stamford	12,898	7.2	7.2	7.3
Sterling	255	16.1	15.4	16.8
Stonington	1,027	7.8	7.4	8.1
Storrs Mansfield	1,687	6.3	6.1	6.5
Stratford	8,133	7.1	7.0	7.2
Suffield	1,433	9.8	9.5	10.1
Taconic	< 30 records. No statistics			
Taftville	463	9.8	9.4	10.1
Tariffville	< 30 records. No statistics			
Terryville	1,016	7.5	7.2	7.8
Thomaston	1,102	8.7	8.4	9.1
Thompson	381	11.8	11.1	12.6
Tolland	1,651	11.9	11.6	12.3
Torrington	7,574	6.2	6.1	6.3
Trumbull	5,293	8.9	8.8	9.1
Uncasville	3,610	5.1	5.0	5.2
Unionville	686	10.7	10.3	11.0
Vernon Rockville	3,899	8.1	7.9	8.4
Versailles	< 30 records. No statistics			
Voluntown	174	14.3	13.2	15.3
Wallingford	6,806	7.7	7.6	7.9
Washington	179	18.8	17.8	19.8
Washington Depot	75	18.4	17.0	19.8
Waterbury	22,368	7.3	7.3	7.4
Waterford	2,873	6.9	6.8	7.0
Watertown	1,543	11.0	10.8	11.2
Wauregan	146	8.9	8.1	9.7
Weatogue	< 30 records. No statistics			
West Cornwall	111	14.7	13.5	15.8
West Granby	35	11.3	9.1	13.4
West Hartford	12,163	6.2	6.1	6.3
West Hartland	34	17.0	15.4	18.6

Incident City/Town	# Records	Mean RT	95% CI for Mean	
West Mystic	< 30 records. No statistics			
West Simsbury	< 30 records. No statistics			
West Suffield	243	13.6	12.8	14.4
Westbrook	1,721	19.9	19.2	20.5
Weston	868	13.8	13.4	14.2
Westport	3,061	7.5	7.3	7.7
Wethersfield	3,644	6.1	6.0	6.2
Willimantic	2,990	5.1	5.0	5.2
Willington	526	10.9	10.5	11.4
Wilton	2,244	8.2	8.0	8.4
Winchester Center	59	10.8	9.6	12.0
Windham	430	8.6	8.2	8.9
Windsor	3,512	8.7	8.6	8.9
Windsor Locks	2,088	5.4	5.2	5.5
Winsted	2,041	7.7	7.5	7.9
Wolcott	1,640	8.1	7.8	8.3
Woodbridge	2,239	8.3	8.0	8.6
Woodbury	1,075	17.0	16.7	17.4
Woodstock	605	12.5	11.9	13.1
Woodstock Valley	49	17.6	15.7	19.4
Yantic	< 30 records. No statistics			

Appendix C: Agencies which did not report EMS data for year 2015

Agency Name	AgencyID	CITY
Bradley International Emergency Services Div.	C165P1	WINDSOR LOCKS
Canterbury Vol. Fire Co.	C022B1	CANTERBURY
Canton Vol. Fire and EMS	C023P1	COLLINSVILLE
City of West Haven Fire Dept. Allingtown	C156P3	WEST HAVEN
CT State Police, Emergency Services Unit	C028P1	COLCHESTER
EFK of Ct, Inc., d/b/a Nelson Amb. Svc.	L015P3	Connecticut
Hamden Fire Dept.	C062P1	HAMDEN
Hamilton Sundstrand Emer. Svcs. Dept.	C165B2	WINDSOR LOCKS
Hampton-Chaplin Ambulance Corp.	C063B1	HAMPTON
Lisbon Fire Dept., Inc.	C073B1	LISBON
New Haven Fire Dept.	C093P2	NEW HAVEN
North Stonington Ambulance	C102B1	NORTH STONINGTON
Northern Duchess Para., Inc./dba NDP	L00RP1	NEW YORK
Scotland Volunteer Fire Dept.	C123B1	SCOTLAND
Seymour Ambulance Association	C124I1	SEYMOUR
West Hartford Fire Department	C155P1	WEST HARTFORD
West Haven Fire Dept.	C156P1	WEST HAVEN
West Shore Fire District	C156P2	WEST HAVEN
Western CT Health Network Affiliates	C034P3	DANBURY
Wilton-Weston ALS Assn., Inc.	C161P1	WILTON

* Some of these agencies have submitted data for year 2016.

Appendix D: Software Vendors (Local EMS software.)

Software Creators, 2015 Data
American Medical Response
Beyond Lucid Technologies
emsCharts Inc.
ESO Solutions
FIREHOUSE
ImageTrend Inc.
Physio-Control/Sansio
TriTech (formerly Ortivus)
Web Medic Pro
ZollDataSystems

Appendix E: Cause of Injury List, Emergency 911 Calls

Cause of Injury	Percent
Falls	51.6%
Motor Vehicle traffic accident	24.8%
Drug poisoning	6.7%
Struck by Blunt/Thrown Object	5.3%
Motor Vehicle non-traffic accident	3.2%
Pedestrian traffic accident	1.4%
Motorcycle Accident	1.0%
Stabbing/Cutting Assault	1.0%
Bicycle Accident	0.8%
Machinery accidents	0.7%
Bites	0.6%
Stabbing/Cutting Accidental	0.5%
Fire and Flames	0.4%
Excessive Heat	0.3%
Firearm assault	0.3%
Chemical poisoning	0.2%
Rape	0.2%
Child battering	0.1%
Electrocution (non-lightning)	0.1%
Mechanical Suffocation	0.1%
Water Transport accident	0.1%
Firearm self-inflicted	0.1%
Non-Motorized Vehicle Accident	0.1%
Smoke Inhalation	0.1%
Excessive Cold	0.1%
Venomous stings (plants, animals)	0.1%
Firearm injury (accidental)	0.1%
Drowning	0.1%
Aircraft related accident	<0.1%
Lightning	<0.1%

n = 45,991 records