



The Research Bureau

To Protect Lives and Property

The Role of the Worcester Fire Department in Emergency Medical Services

Report 18-02

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Research in the Public Interest

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Executive Summary

The job of firefighter goes back centuries in Massachusetts. According to the Worcester Historical Museum, the first Worcester Fire Society was formed by volunteer firefighters in 1793 following the burning of a mill. A little over 40 years later, the Worcester Fire Department was officially established on February 25, 1835 by act of the state legislature. Fire departments are rife with history and tradition.

The role of firefighter has changed dramatically in those years, however. In 2015, only 5 percent of Worcester Fire Department (WFD) activities were to fires, and only 17 percent were to false alarms or “good intent” calls. Improved building codes, fire prevention efforts, and resident awareness has resulted in a significant decline in structural fires and fire-related loss of life. Instead, 71 percent of WFD activities were emergency medical service (EMS) calls—health emergencies in which the WFD acts as “first responder” attending on behalf of or in addition to trained medical support.

While some have called for a decrease in firefighters to coincide with the decrease in fires, there is limited correlation between the two. The fire department staffing and resource model is based on population and square mileage, rather than fire outbreaks. The role of the fire department is preparedness for future fires—not reaction to past fires. Fire stations are established and staffed to ensure a minimal response time to any fire outbreak anywhere in the city rather than a tabulation of prior outbreaks. While the number of fires are going down nationally, in Worcester fires have actually increased slightly in past years and recent conflagrations in Boston’s Ashmont section (6-alarm fire) and Waltham’s Downtown (10-alarm fire) indicate the potential for significant—and resource intensive—blazes. As a result, while the appropriate number of firefighters per fire station or fire truck is sometimes debated, what is critical is that the City is able to ensure sufficient numbers of firefighters at any incident.

Since the City’s firefighting infrastructure exists regardless of fire activity, the ability to coordinate fire suppression service with emergency medical service offers benefits with limited downsides. Since the infrastructure needs for a fire response system are essentially fixed, the potential to utilize that system for additional services such as medical response is additive. Adding ambulances to the Worcester Fire Department is one intriguing possibility that leverages existing staffing levels and infrastructure to improve the department’s frequent medical responses. While the two needs may conflict in a small amount of cases, the overall result is a system that offers a minimal response time with trained personnel to any medical emergency anywhere in Worcester. Worcester’s system can undoubtedly be improved: equipment could be geared toward medical, rather than fire-related, emergencies, and staff could receive more rigorous medical training. That said, focus should be on improving current operations rather than eliminating or replacing operations in potentially a less-effective and more expensive format.

Introduction

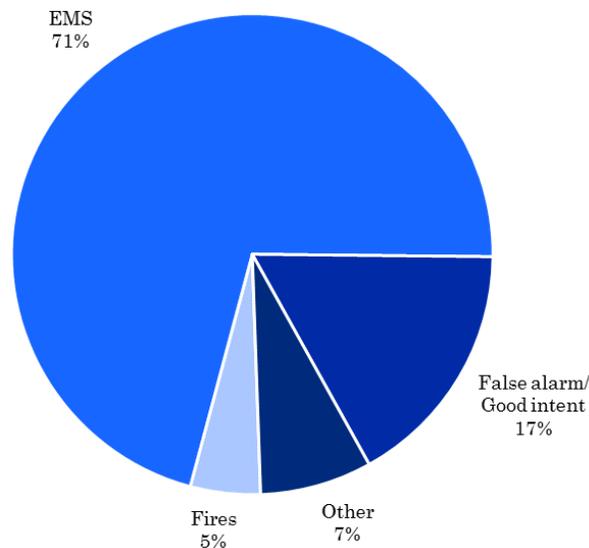
For centuries, a fire engine siren signified flames. Firefighting is listed first in Worcester Fire Department (WFD) mission statements and informational materials, and is usually seen as the department's primary duty. Yet few fire department calls today are for fires. These days, firefighters are far more likely to respond to a medical problem than combat a fire, a shift in mission that has had a substantial effect on departments nationally and locally.

Firefighters remain widely revered for their important role in ensuring public safety, putting their own lives at risk to protect people and property. Yet as their lifesaving measures shift more toward emergency medical calls and away from triggered fire alarms, municipalities are not always adapting their policies and procedures accordingly. A heart attack is a serious issue—but a 100-foot ladder truck and other apparatus equipped with hose is not the best tool to attend to it.

Emergency Medical Services (EMS) now make up the bulk of WFD responsibilities. Less than five percent of departmental responses in Worcester in 2015 were to fires, and only 24 percent were to false alarms or other types of calls, compared to 71 percent for medical emergencies or rescues. Worcester is not alone—national decreases in fire incidents have led departments around the country to take up more and more medical responsibilities. In 1977, there were nearly 3.3 million fires in the United States, resulting in 7,395 civilian deaths and 31,190 injuries. After close to 40 years of improvements in firefighting, preventative measures, and construction regulations, that number fell to around 1.4 million fires in 2015, along with 3,280 civilian deaths and 15,700 injuries.

In an era of tight municipal budgets, where fire departments compete with schools, police, and other City priorities for resources, firefighters are at risk of becoming victims of their own success. The decrease in fires opened fire departments up to the critique that they are overstaffed and a drain on municipal budgets—a rationale based in

Chart 1: WFD Responses, 2015



Source: Massachusetts Fire Incident Reporting System

the simple arithmetic that fewer fires necessitate fewer firefighters. In response, fire departments in communities across the country, including Worcester, broadened their missions. Firefighters are often “first responders”—the first agency to arrive on the scene of any accident or emergency. Many departments absorbed EMS duties wholesale, even providing transport to a hospital, while others expanded their first responder role to cover most medical calls.

Worcester's ambulance service has been provided by UMass Memorial Medical Center since 1991 at no cost to the city, leaving some to question why the Worcester Fire Department needs to respond to medical emergencies. This report will compare the WFD's budget, staffing, and equipment to other cities in Massachusetts and to national standards to analyze the proper role for the WFD in EMS response, and whether the WFD's current mission is an effective strategy and good value for the city.

The Worcester Fire Department

The mission of the WFD is to “protect the lives and property of the citizens of Worcester from the adverse effects of fire, medical emergencies or any hazardous condition both man-made and



natural.” The Department has four divisions: Fire Prevention; Training; Support Services; and Operations. Fire Prevention includes code enforcement, fire investigation, licensing, and public education. The Training Division prepares new Worcester firefighters for their chosen career and had 24 recruits in 2017. Support Services provides administrative support and oversees the internal and public information systems for the department. The Operations Division is made up of the services that epitomize a fire department: firefighting, rescue, and medical response.

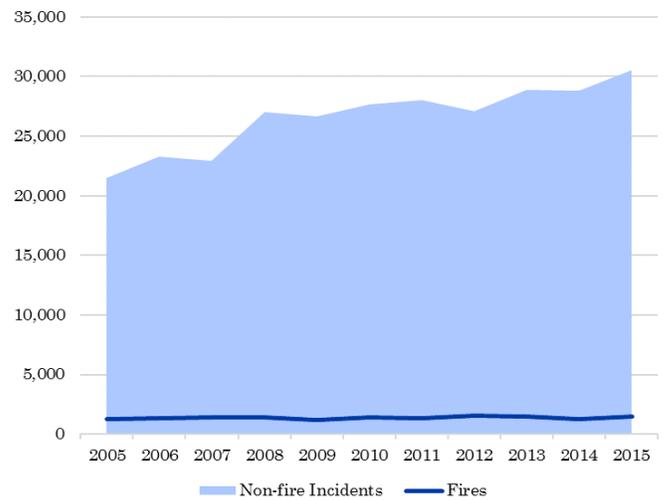
Since 2005, the WFD budget has increased by 36 percent, from \$29 million to \$39.5 million in fiscal year 2017. Accounting for inflation, the budget has increased by 8.4 percent in that time. In FY17, the WFD accounted for 6.4 percent of the City’s total approved budget. Since 2005, WFD staffing has decreased by 8.1 percent, from 446 to 410 total staff in 2017. The number of firefighters decreased by 8.5 percent in the same time period, from 437 to 400.

The WFD has 21 companies—13 engines, seven ladder trucks, and one rescue truck. The department also maintains three command cars. Scuba, Technical Rescue, and Hazmat teams are drawn from firefighters across different companies and come together for events requiring their specific expertise. Companies are spread out across 10 stations strategically located around the city to ensure proximity to any problems (see map on page 11).

In 2015, the most recent year for which data is available, the WFD responded to 32,079 total incidents. Of these, 1,511 were fires, 22,779 were rescue/EMS calls, 5,378 were false alarms or “good intent” calls, 1,342 were calls for service, 998 were hazardous condition calls with no fire (gas leaks, chemical spills, accidents, and similar problems), and 71 were for special incidents or other non-fire calls (overpressure ruptures, severe weather, or other uncategorized calls).

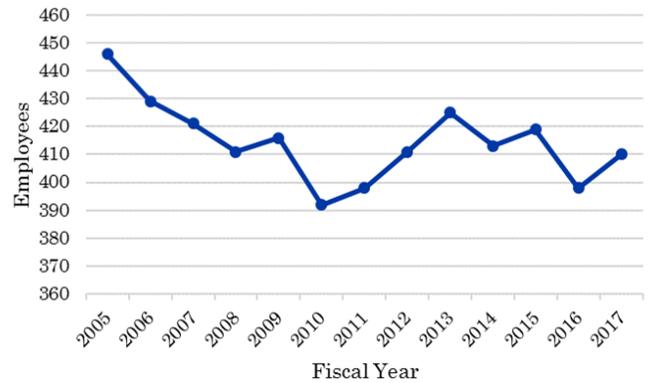
The National Fire Protection Association (NFPA), while an industry-supported nonprofit rather than a government regulator, is the generally accepted authority on fire response. It sets

Chart 2: WFD Fire and Non-fire Incidents



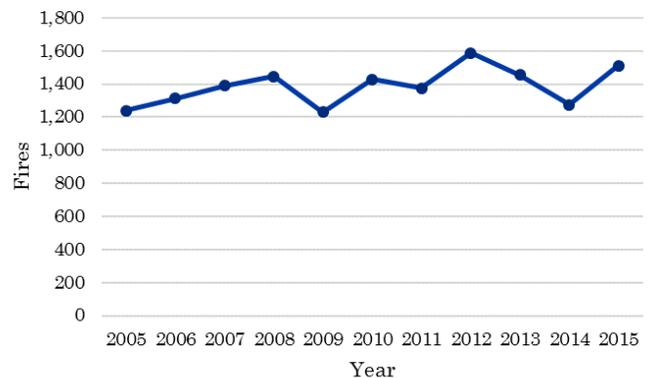
Source: Massachusetts Fire Incident Reporting System

Chart 3: WFD Staffing Levels



Source: Worcester Fire Department

Chart 4: Worcester Fire Incidents



Source: Massachusetts Fire Incident Reporting System

standards for fire suppression staffing, equipment, and response times, and while the adoption of the standards by a community is voluntary, the Massachusetts Office of Medical



Services recommends they be taken into account when communities are developing emergency response plans. Reducing the number of medical calls the WFD responds to will not result in a decrease in staffing, since the City tries to meet NFPA standards that take city size and hazard risks into account. Staffing is dictated by fire standards, not annual activity.

NFPA standards state that the minimum requirement for staffing a fire emergency based on a 2,000 square-foot, two-story, single family occupancy home with no basement, exposure, or unusual hazards is four firefighters per engine company. In areas “with tactical hazards, high hazard occupancies, high incident frequencies, or geographical restrictions,” the standard calls for a minimum of five or six firefighters per engine. NFPA standards also state that travel time to a fire suppression incident by the initial arriving company should be four minutes or less.

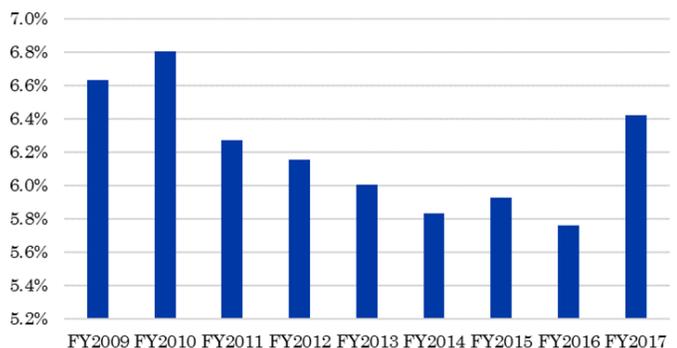
While NFPA standards focus on engine staffing, Worcester, like many communities, targets response numbers rather than engine numbers, and the WFD does not currently meet NFPA standards on every shift. Stations without another station close by, such as Tatnuck, have four firefighters on the trucks as recommended. Downtown, however, where fire stations are closer to each other, three firefighters are assigned to each truck. In addition, brownouts, where one piece of equipment is shut down in a station (often due to vacations leaving positions unfilled), occurred 273 times in 2016, in 37 percent of total shifts. Brownouts can increase response times, which can affect the ability to meet timing goals.

The NFPA calculates that in an urban area, especially a downtown environment where traffic and density can slow down emergency vehicles, the maximum distance from any point in the community to the nearest fire station should be 1.5 miles to achieve the recommended four minute response times. Based on a cursory study of a city map, it appears the majority of Worcester properties are within 1.5 miles of a fire station.

The number of units and firefighters sent to a fire depends on the severity of the incident. At the initial “first alarm,” four engines, two ladder trucks and a rescue truck are dispatched. If the fire becomes more serious, two additional engines and a ladder are sent at a second alarm, two more engines and a ladder at the third alarm, and two more engines at the fourth alarm. At a fifth alarm, mutual aid resources from other communities are called in.

How well a community and its fire department meet the national standards can have an effect on commercial and residential insurance. If a home is located more than five road miles from a responding fire station, for example, the property owner is more likely to pay higher insurance rates, since it may take the fire department longer to respond to a fire event. Verisk Analytic’s Insurance Services Office (ISO) Mitigation unit, which evaluates insurance risks, uses a weighted formula to grade a community’s fire suppression system for insurance purposes, with the fire department’s preparedness and response making

Chart 5: WFD Funding as Percent of City Budget



**FY2016 and FY2017 data based on approved budget*

Chart 6: WFD Budget Breakdown, FY17

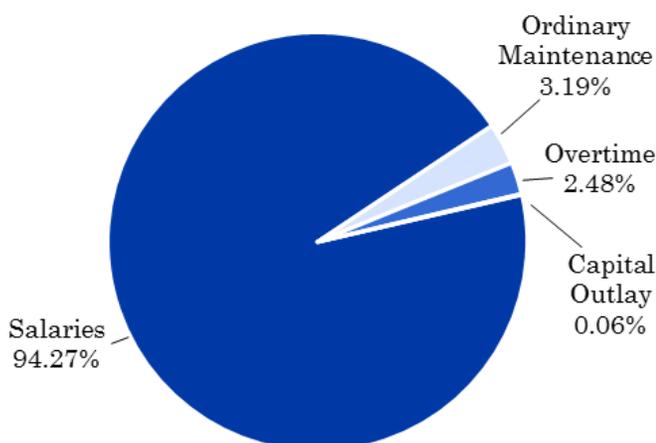
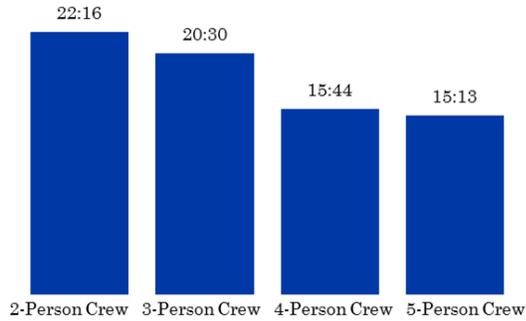


Chart 3: Average Time On-Site to Suppress Fire



Source: National Institute of Standards and Technology

up 50 points on the 105.5 point scorecard. Water supply, which takes proximity to fire hydrants into account, is worth 40 points, while emergency communications and community risk reduction measures make up 10 and 5.5 points respectively. On a scale of 1-10, with 1 being the best rating, Worcester’s ISO rating is 2. A rating of 1 is extremely rare, with fewer than 250 communities nationally—out of an estimated 45,000 fire districts graded by the ISO—receiving a top score.

The more firefighters there are at a fire, the faster the fire can be put out with less loss of life and property damage. A 2010 study by the National Institute of Standards and Technology quantified the effects of the size of a fire crew. As shown in Chart 3, the study found that a four-person crew was able to complete 22 essential

firefighting and rescue tasks in a typical residential structure 30 percent faster than a two-person crew and 25 percent faster than a three-person crew. The four-person crew was able to deliver water to a similarly-sized fire 15 percent faster than a two-person crew and six percent faster than a three-person crew. A four-person crew was able to complete search and rescue 30 percent faster than two-person and five percent faster than a three-person crew.

Comparable Cities

Worcester has not followed the national trend of a recent decrease in fire incidents—in fact, between 2005 and 2015, the total number of fires in the city increased by an average of three percent per year, rising from 1,239 in 2005 to 1,511 in 2015. The number of non-fire calls increased by nearly four percent per year, on average, from 21,450 in 2005 to 30,568 in 2015. Taken together, these trends show a department that is taking on more and more work every year, especially when it comes to medical calls, which are rising as a percentage of total calls from an already dominant position.

In a sample of Gateway Cities (see Table 2), between 2005 and 2015, five cities experienced increases in fires, with Worcester’s three percent average increase falling within the usual range of changes. Springfield saw a three percent decrease per year, Fall River registered a one percent decrease, and Lawrence, Lowell and Boston all saw increases between three and five percent. Brockton was an outlier, with a 21 percent average annual increase in fires since 2005.

In terms of funding, the Worcester Fire Department’s resources are also in line with that of other Gateway Cities as evident in Table 3, at 5.8 percent of the city’s operating budget in fiscal year 2016. This does not include money set aside in the capital budget for new apparatus or equipment.

Worcester matches up with similar communities by other metrics. The city’s 10 fire stations over 37 square miles are more spread out than cities

Table 1: Buildings, Businesses, and Activities that Factor into Public Safety Risks in Worcester
14% agriculture, wildland, open space
26% commercial and industrial property
60% residential property
955 occupied structures over 3 stories
3 major hospitals including a Level 1 trauma center
Biomedical research facilities
Four major interstate highways
Large freight and commuter rail lines
Key electrical transfer and power grid facilities
Major natural gas pipeline routes
Colleges and universities with 35,000 students



Table 2: Characteristics of Selected Gateway City Fire Departments

	Fire Stations	Population	Population per Station	Square Miles	Square Miles per Station
Lynn	2	92,074	46,037	13.5	6.8
Fall River	6	88,902	14,817	40.2	6.7
Springfield	8	153,991	19,249	33.2	4.2
Worcester	10	183,677	18,368	37.4	3.7
Brockton	6	94,813	15,802	21.6	3.6
Lowell	8	109,871	13,734	14.5	1.8
Lawrence	5	79,337	15,867	7.4	1.5
Boston	38	658,279	17,323	48.3	1.3

Populations from 5-year American Community Survey estimates

such as Boston or Lawrence, which cover around 1.5 square miles with each station, but more concentrated than Lynn or Fall River, where each station has to cover more than 6.5 square miles on average. Each station in Worcester also covers an average of around 18,250 people, not much higher than most of the other Gateway Cities examined in this report. Worcester's 400 firefighters for a city of about 180,000 residents work out to about 2.22 firefighters per 1,000 citizens—significantly higher than the national median of 1.24 for cities between 100,000 and 250,000 residents, as reported in an NFPA survey from 2015, but in line with the 2.15 median rate for cities of similar size in the Northeast.

Table 3: Select Gateway Cities' 2016 Fire Budget

	Fire Budget	Total City Budget	Fire as % of Total Budget
Boston	\$213,722,812	\$2,860,000,000	7.5%
Lynn	\$17,551,278	\$292,712,740	6.0%
Brockton	\$22,941,712	\$384,000,000	6.0%
Worcester	\$34,557,528	\$599,582,142	5.8%
Fall River	\$14,075,919	\$245,178,981	5.7%
Lawrence	\$12,096,769	\$256,355,261	4.7%
Lowell	\$16,698,190	\$363,844,076	4.6%
Springfield	\$21,413,297	\$594,911,802	3.6%

Worcester's Emergency Communications

The WFD and/or UMass Memorial ambulances are dispatched to an emergency based on a 911 call received at the Emergency Communications Center on Coppage Drive in Worcester, a site that handles 911 calls for both Worcester and the town of Leicester.

When a 911 dispatcher receives a call, he or she uses training and experience to determine the proper response. Each call is unique and may require the presence of one, two, or all three public safety agencies—police, fire, and EMS. If the call requires a medical response, the dispatcher connects with UMass Memorial EMS to dispatch an ambulance. UMass Memorial's own EMS dispatch then takes over the medical response. The 911 dispatcher monitors the situation throughout the emergency and works with field units to adjust the response as needed.

UMass Memorial pays a subsidy to the city and agrees to offset the cost of the city's dispatch services. In fiscal year 2017, this subsidy totaled nearly \$280,000.

Even with the agreement between the City and the hospital, the WFD responds to all Level 1 and Level 2 medical emergencies—the most serious incidents, requiring complex or urgent care—and to any less serious Level 3 medical emergency assigned to a subcontracted ambulance.

The city's ordinances specify that in addition to fire suppression, the WFD is to provide "first responder and emergency response management services for the city." According to the NFPA, it is not unusual for a fire department to provide first responder services—in 2015, 61 percent of U.S. fire departments provided basic or advanced life support EMS services in their municipality.



Emergency Medical Services in Worcester

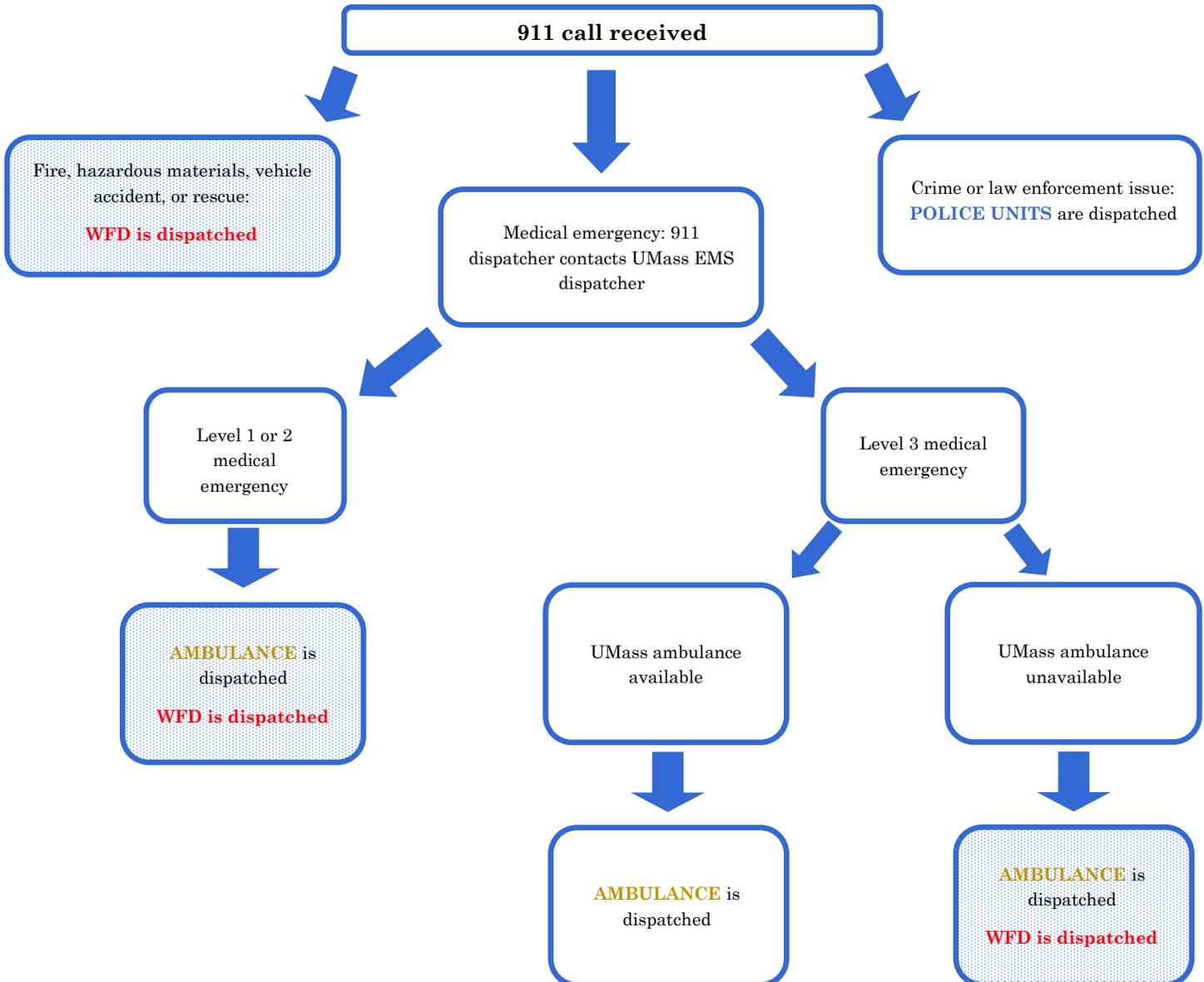
There is tension between the EMS community and fire departments across the country over resources and budgets. In Worcester that tension is mitigated by UMass Memorial providing paramedic ambulance service, which means fire and EMS do not compete for money in the municipal budget. There is no apparent appetite on the City's part to take back the service, as it would otherwise require an allocation of taxpayer dollars.

The current contract for ambulance service between the city and UMass Memorial expires

December 31, 2019. Under the agreement, UMass Memorial operates advanced life support paramedic service 24 hours per day, seven days per week. The hospital is required to provide at least six ambulances for EMS, maintained "in good repair at its sole cost and expense." The agreement allows for there to be fewer than six ambulances in the case of maintenance requirements, but "no less than three shall be available at all times for patient transport" with an additional ambulance for backup.

UMass Memorial may subcontract with outside ambulance services to provide backup when there are not enough hospital ambulances available. In 2016, the hospital passed nearly one in five EMS

Chart 8: 911—Who's Responding?



incidents to other EMS partners, for a total of 7,678 calls. Worth noting is that overall, UMass ambulances have been making fewer runs in recent years, and other ambulance companies are picking up more and more work. Non-UMass ambulances in Worcester have also consistently reported slightly better response times to the state Office of Emergency Medical Services over the past few years, arriving at an incident at least 20 seconds faster, on average, than a UMass vehicle, although these figures were disputed in local interviews.

The hospital system staffs dispatch services for UMass Memorial EMS, which answers and monitors calls from Worcester’s 911 call center, and a few information-sharing requirements are built into the EMS agreement. According to the contract, UMass Memorial is required to provide the city with computerized data about each call one of their ambulances responds to, including the date of service, time the call was received, time the ambulance was dispatched, time on scene, chief complaint, zip code or zone, and name of the facility to which the patient was transferred. The contract also calls for monthly meetings of the Directors of Communications for Worcester and UMass Memorial. The City and the hospital also agree to participate in the Service Zone Planning Committee for oversight of all EMS activities in Worcester, although this is currently handled via more informal conversations between agencies.

On the WFD side, all firefighters are trained in basic first aid, including CPR and other first responder skills. Approximately 30 of the

department’s nearly 400 firefighters are certified EMTs, with more advanced first responder training and the ability to work on a Basic Life Support ambulance. The department also has three certified paramedics, with much more extensive medical training and ability, on staff. Paramedics are required for an ambulance to provide Advanced Life Support. In similarly-sized cities nationally (with populations between 100,000 and 250,000 residents), around 56 percent of firefighters are certified EMTs and 35 percent are paramedics, in departments performing emergency medical services. The remaining 10 percent had first responder training or no certification.

One broadly recognized benefit of having the fire department respond to a medical emergency is a faster response time. Because of the placement of stations throughout the city, the WFD target response time is 4 minutes for 90 percent of calls, while the UMass Memorial target response time is 8 minutes for 90 percent of calls. Having firefighters respond to medical calls also builds a redundancy into the EMS system, ensuring a first responder gets to a call even if there is traffic or an accident with some of the responding vehicles.

Sending more people to a medical scene improves the quality and speed of care. The greater number of first responders there are on a scene, the faster a patient can be stabilized and brought to a hospital, if needed. The Town of Auburn Fire and Rescue Department, which provides EMS, recently staged a simulation timing how long it takes to stabilize a patient with chest pain and get him or her into the ambulance on the way to

Chart 9: Total Ambulance Runs in Worcester

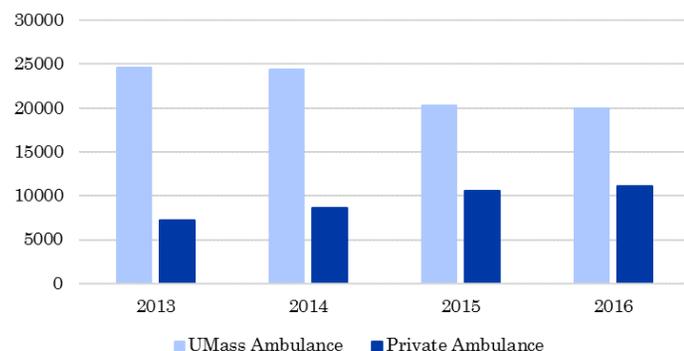
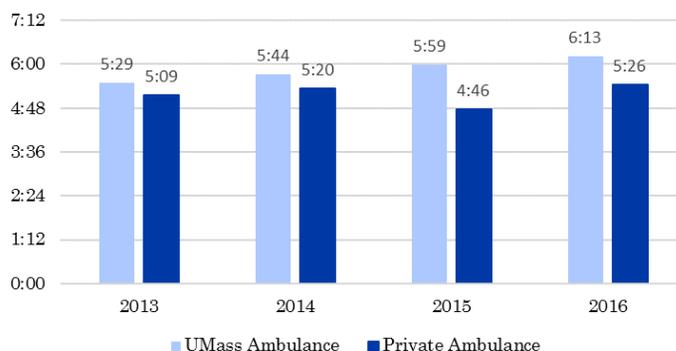


Chart 10: Average Ambulance Response Time



Source: Massachusetts Office of Emergency Medical Services



the hospital with a two-, three-, and four-person firefighter/EMS crew. The two-person crew took more than 15 minutes to get the patient into the ambulance; the three-person crew took nearly eight minutes; and the four-person crew took nearly seven minutes. The simulation did not include scenarios such as the presence of panicked family and friends, rescue challenges, or weather issues.

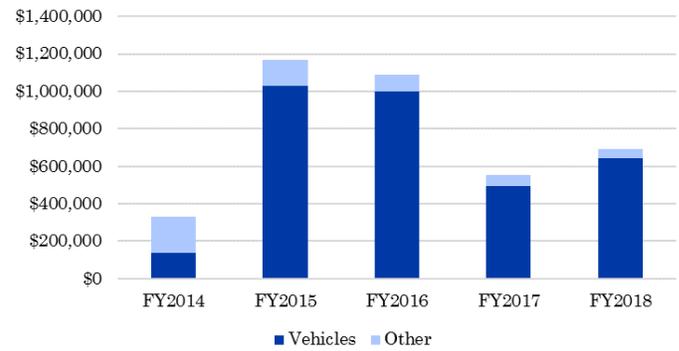
If a patient’s injuries are severe, both paramedics may need to attend to the patient and one of the firefighters on scene may be needed to drive the ambulance to the hospital, an arrangement regulated by the EMS contract. Firefighters on the scene can also help calm and remove distraught friends and family members from the scene while the paramedics attend to the patient. Some medical emergencies, such as car accidents, also require rescue, which firefighters are trained to provide.

Fire-based EMS Transport

In a world where fire departments are sending vehicles and personnel to a medical scene anyway, fire departments can argue that taxpayer-funded first responder efforts are masking drawbacks in a private ambulance model. These “service subsidies” are not accounted for when calculating the cost or effectiveness of an EMS system, and some have argued they allow private providers to operate with fewer vehicles and longer response times than if they were responsible for the whole EMS system. It is generally accepted that private ambulance service comes with a smaller dollar amount than the same service when provided by a municipality, but “service subsidies” from cities and towns mean private providers pay only a fraction of what the whole EMS system really costs, leaving taxpayers to make up the rest.

A clause in the City’s contract with UMass Memorial states that “... the City shall not utilize the services of any other ambulance service provider for the 911 emergency medical response system except as expressly provided herein. Furthermore, the City shall not provide any 911 ALS [Advanced Life Support] or BLS [Basic Life

Chart 11: WFD Capital Budget—Equipment



Source: Worcester Department of Administration and Finance

Support] ambulance services (however the City may provide BLS emergency first responder services)”

While UMass Memorial and their Worcester EMS team have been valuable partners for the City, limiting Worcester’s options for ambulance transport might not be the most efficient way to run the EMS system. While the paramedic-level ALS service UMass Memorial provides is difficult to attain, it is feasible for the Worcester Fire Department to run BLS ambulance service. Many fire departments offer medical transport—54 percent of Massachusetts fire departments offer EMS ambulance transport, according to the U.S. Fire Administration’s National Fire Department Registry (45 percent of Massachusetts fire departments are career or mostly career departments, as opposed to volunteer departments). Gateway Cities like Worcester have chosen both paths—of the cities examined in this report, two have fire-run ambulance systems, while the remainder contract with private companies or community partners.

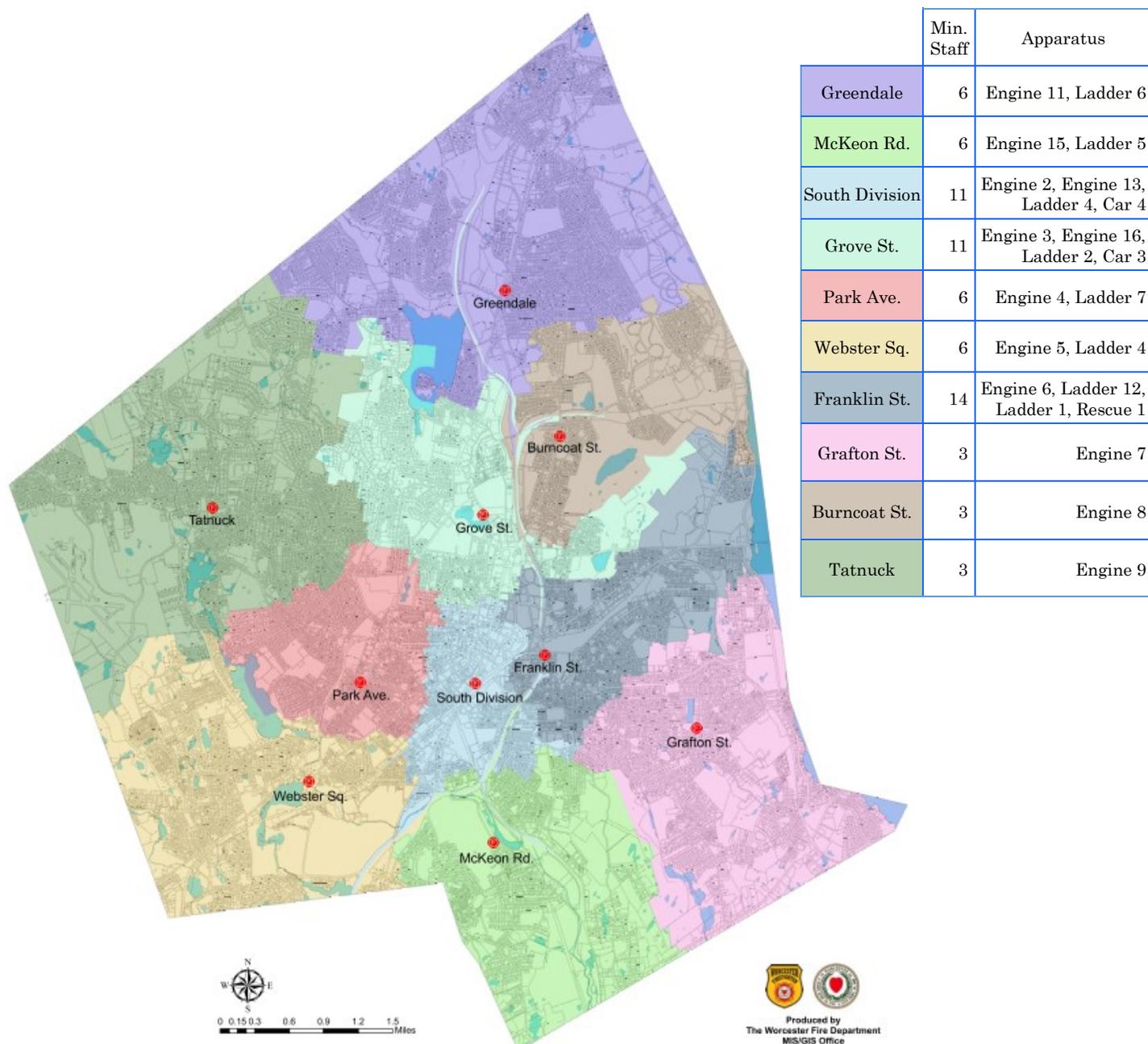
Nationally, many run all-ALS systems (that also cover BLS incidents), but a “two-tiered” system is not uncommon. Having separate ambulances for each level of care complicates the dispatch and triage process somewhat, but has the advantage of keeping paramedics free for serious emergencies rather than tying them up with incidents that could be handled by an EMT. EMTs and BLS care in general are also less expensive than paramedics and ALS care.



It makes little sense for UMass Memorial to insist on an exclusive contract with the city for ambulance transport and then refer nearly 20 percent of their 911 calls to third-party ambulance companies. This is especially noticeable as third-party ambulance runs are increasing as UMass vehicles go on fewer calls. The lack of capacity to handle 100 percent of EMS calls in the city is understandable, but shows an opening for the fire department to take on BLS transport duties to handle some low-complexity medical situations while leaving the ALS partnership with paramedic-level service untouched.

The current healthcare reimbursement system means that financial payments are allocated to the agency that delivers the patient to a hospital, not the first responder, so the Worcester Fire Department does not currently receive any reimbursements for their EMS responses. The agency that was the first on scene, or even the agency that provided the most care or benefit, is irrelevant in the billing process. Private ambulance companies, therefore, have little financial incentive to improve their response times, and little ability to do so without adding more vehicles and personnel (which would cut into profits). Fire departments making the case for a city-run ambulance service have cited their ability

Chart 12: WFD Station and Firefighter Distribution



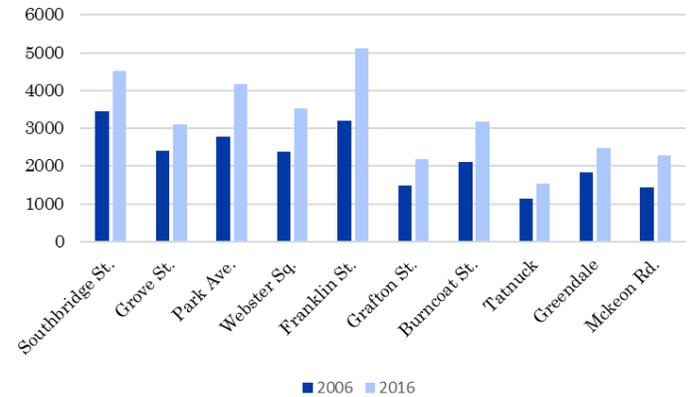
to meet a 4-minute response time target by making use of existing station infrastructure – an ability that is already on display in Worcester.

UMass Memorial does not make its Worcester EMS financial data public, making it difficult to determine the expected revenues and expenses for an ambulance operation in Worcester. It is also difficult to draw conclusions from systems in municipally-run EMS systems, since besides differences in demographics and incident levels, cities and towns usually handle fire and EMS budgets as one, rather than separating them. If the City were to pursue the possibility of adding ambulances to the fire department fleet, the financials of such a move must first be estimated.

The up-front costs of starting a fire-based EMS system are substantial. Purchasing and outfitting a new ambulance could cost around \$250,000, and any system would need multiple ambulances to effectively cover the city. New fire station construction would need to factor in garage space for ambulances. EMT training, which should be done for all or most of the department’s approximately 400 firefighters who are not already certified, can cost as much as \$1,000 per certification. If the city were to pay for all the eligible firefighters’ EMT certification classes, this would cost around \$370,000 for the current staff and a few thousand dollars for each new incoming class of firefighters. This is in addition to the regular ongoing costs of maintaining a fleet of vehicles and maintaining equipment and supplies.

Taking on transport duties, however, would allow the WFD to bill insurance companies for their medical responses. Currently, the Medicaid/Medicare adjusted base rate for emergency BLS service in the Worcester area is around \$370 per trip and \$7.50 per mile, but municipalities are allowed to charge higher rates and bill private insurance or individuals. These rates vary wildly based on different demographics, challenges, response conditions, and healthcare options in each city or town, but a 2013 *Journal of Emergency Medical Services* survey of first responder and transport agencies serving the 200 largest cities in the United States found an average transport charge of about \$684 for a BLS

Chart 13: WFD Responses by Station, 2006 and 2016



Source: Worcester Fire Department

emergency. A *Boston Globe* study in the same year found fire-based ambulance charges for BLS emergencies south of Boston ranging from \$525 and \$15 per mile in Westwood to \$1,360 and \$44 per mile in Foxborough.

Potential revenue from a city-run ambulance program depends on how many ambulances the WFD maintains and how many runs they take over. UMass Memorial handled around 31,000 EMS incidents in 2016 with three to six ambulances active at a time. They transferred around 7,600 incidents to third-party vehicles. Recognizing that not every response ends in a trip to the hospital, and that responses are a mix of ALS and BLS, it is clear the WFD could take enough calls to eliminate third-party responses, and reduce the burden on UMass Memorial EMS, with a relatively small number of ambulances.

Making 10,000 runs per year at the adjusted base rate of \$370 per trip would result in \$3.7 million in potential revenue, plus mileage reimbursements. At the average transport charge of \$684, that potential revenue could be \$6.8 million plus mileage. The City would, of course, determine its own rates, weighing the need to offset the cost of the service with the desire to keep rates reasonable.

Billing for fire-based ambulance transportation could be accomplished by in-house personnel or by contracting with an outside firm that would take a small percentage of collected income. However,



any financial analysis must take into account the fact that no system collects 100 percent of its charges, whether due to rejections from an insurance company or uninsured patients. A 2013 Central Massachusetts Regional Planning Commission report that explored regionalizing EMS in three towns in Greater Worcester found that Leicester charged an average of \$950 per call (including ALS, which has a higher reimbursement rate and cost), but only collected an average of \$248 per call. Spencer and Charlton reported similar results—\$1,109 charged and \$473 collected in Spencer, and \$1,591 charged and \$696 collected in Charlton. Worcester’s reimbursement levels would depend on a number of factors, especially the percentage of Medicare/Medicaid patients in the city.

The WFD and local medical partners are not the only organizations that would need to adapt for a fire-based transport system to work. A more targeted dispatch system would need the expertise to direct ambulances or fire engines, and less frequently both, to a scene in order for the City to realize the efficiencies and service improvements of adding ambulances to the fire department fleet.

One of the main advantages to a fire-based ambulance transport system would be the ability to respond to medical emergencies in an appropriate vehicle, instead of in a ladder truck or engine. While ambulances are expensive, fire suppression apparatus can cost anywhere from \$400,000 up to \$1 million—and the more often they are used, the more often they need maintenance and replacement. Since large apparatus often run on diesel and are not fuel efficient, it can be much more expensive for a fire engine to respond instead of a smaller truck. Portland, Oregon calculated the cost of driving a fire engine to a scene at \$6.97 per mile, and the cost of driving a ladder truck at \$12.73 per mile. The cost per mile for maintenance, repair, and fuel for ambulances has been calculated at between \$1 and \$2. WFD apparatus also recorded 27 accidents in fiscal year 2017, and although most are minor and involve stationary vehicles or objects, more nimble vehicles could likely cut down this accident rate.

Conclusion

Before considering modifications to WFD’s policy on 911 medical calls, it is important to understand the rationale, benefits, and risks of a policy change.

Regardless of whether Worcester firefighters act as medical first responders, Worcester needs adequate staffing and resources to respond to a fire. The current frequency of fires is not a determinant of future activity, and when a fire or emergency occurs there must be a certain number of staff, dispersed over a certain geography, to manage equipment and respond in a timely manner. Eliminating first responder services does not eliminate the burden of a well-resourced fire department.

Since firefighters are available and dispersed, the benefits of having firefighters as first responders include faster response and treatment times, improved rescue capabilities, backup personnel to drive ambulances in case of emergency, and redundancy in case of trouble with other responders. The corresponding risks are the additional demands on firefighting personnel and equipment and the additional wear and tear on expensive apparatus.

There would be financial savings in reducing the size of the WFD with a reduction in fires, but Worcester would be acting against best practices as put forth by NFPA. Any policy change must consider the impacts on life, property, and even individual household resources. Having a highly rated, well-functioning fire department does not just mean a safer city—it can mean cost savings for Worcester residents, as the higher rating a fire department receives, the lower the insurance rate for commercial and residential property owners.

On the other hand, it is anachronistic to continue to treat the WFD as primarily a firefighting organization when the vast majority of its calls are not fire related, with no sign that the preponderance of medical calls will diminish. Worcester can no longer afford to treat EMS as a side job for its firefighters. The City needs to



transition from unwieldy, expensive fire suppression apparatus and target its resources and actions.

Recommendations

Given available evidence on current and best practices, The Research Bureau suggests that the City of Worcester consider the following changes:

The City should **explore the financial and operational aspects of giving the Worcester Fire Department ambulance transport capabilities**. To do this, the City would have to renegotiate its EMS contract with UMass Memorial Medical Center before renewing it for 2020. The current Worcester EMS system stretches UMass Memorial staff thin, referring around 20 percent of emergency medical calls to third-party ambulance companies. This means the WFD goes to more minor incidents in addition to its already heavy medical workload, all the while watching reimbursement dollars that could be used to subsidize this service drive off with the ambulance. Using firefighter EMTs—in appropriate vehicles, rather than ladder trucks—for Basic Life Support would free up UMass Memorial’s paramedics for incidents requiring Advanced Life Support, and would reduce costs, although a more thorough financial analysis should still be completed.

The City should **eliminate its current practice of responding to Level 3 emergency medical calls if a subcontracted ambulance is dispatched**. It places demands on fire personnel and wear and tear on fire vehicles because of a lack of confidence in subcontracted medical response, and given current trends, these demands will continue as long as UMass Memorial keeps its ambulance and personnel deployments level. Private ambulance companies are licensed by the state and meet the same regulatory requirements as UMass Memorial ambulances. If concerns continue, the City could consider changing their emergency response contract so that UMass Memorial has more ambulances available, reducing the need to turn to subcontracted ambulances.

The dormant EMS Committee should be reinvigorated to facilitate discussions around coordinating emergency responses. This should not just include the fire department, but police and UMass Memorial’s EMS team, to make sure Worcester has the most effective and efficient use and placement of resources with a focus on meeting national standards. The committee should engage with the public to determine what level of service residents are willing to pay for and if there are any improvements that can be made to the system based on civilian feedback.

Finally, **the City should consider changing the Worcester Fire Department’s name**. “Worcester Fire and Emergency Services,” or something similar, would more accurately capture the role of the modern department. It would incorporate not only the medical calls that make up the bulk of the department’s work but the various rescue tasks the department undertakes. While it may appear to be a cosmetic change, a more accurate name would make the department’s duties clearer to the general public in an age of evolving responsibilities.



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