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**HARVARD FIRE DEPARTMENT
HARVARD AMBULANCE SERVICE**

Management and Operations Analysis

TOWN OF HARVARD, MASSACHUSETTS

**EDWARD J. COLLINS, JR. CENTER FOR PUBLIC MANAGEMENT
GOVERNMENT ANALYTICS PROGRAM**

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The project team was assisted by a number of Harvard employees and elected officials, including the Town Administrator, Assistant Town Administrator/HR Director, Executive Assistant, Finance Director and finance staff, Fire Chief, Fire Department command staff and members, Ambulance Co-Directors, Ambulance Service management and members, and current and former members of the Board of Selectmen.

TABLE OF CONTENTS

Project Background.....	5
Summary of Strengths and Recommendations	6
Section I. Fire Department Member Survey Results.....	10
Section II. Fire Department Recommendations.....	16
Section III. Ambulance Service Member Survey Results.....	35
Section IV. Ambulance Service Recommendations	42
Section V. Sustainability of the Volunteer/Call Model in the Fire Dept. and Ambulance Service.....	62

LIST OF FIGURES AND TABLES

Figure 1. Age Grouping of Fire Dept. Members.....	10
Figure 2. Years on Fire Department	10
Table 1. Reasons for Joining Fire Department.....	11
Table 2. Reasons for Remaining on Fire Department	12
Table 3. Incentives to Continue on Fire Department.....	12
Table 4. Statements Related to Management and Operations	13
Table 5. Statements Related to Morale and Culture	14
Table 6. Statements Related to the Future of the Fire Department	15
Figure 3. Count of Firefighters Leaving and Joining the Department.....	21
Table 7. Calls by Year and NFIRS Series and Average Calls per Day.....	24
Figure 4. Number of Days by Total Calls	25
Figure 5. Calls by Day of Week and Hour of Day, 2013 through 2015.....	26
Table 8. Did the response meet the 14-minute standard, 80% of the time?	27
Figure 6. Total Fire Calls by Calendar Year and % Meeting the 14-min. Standard	28
Table 9. Average Response Time by NFIRS Series and Year	29
Table 10. Average Response Time by NFIRS Series and Hour Grouping.....	29
Table 11. Inspections and Permitting Activity, 2012 – July 27, 2016.....	32
Table 12. Strategies for Performance of Certain Fire Prevention Activities	33
Figure 7. Age Grouping of HAS Members	35
Figure 8. Tenure on Service	35
Table 13. Methods by which Members Learned about the Service	36
Table 14. Reasons for Joining the Ambulance Service.....	37

Table 15. Reasons for Remaining on the Ambulance Service.....	37
Table 16. Incentives to Continue with the Ambulance Service	38
Table 17. Statements Related to Management and Operations	39
Table 18. Statements Related to Morale and Culture	39
Table 19. Statements Related to the Future of the Ambulance Service	40
Figure 9. Ambulance Receipts Reserved Account.....	44
Figure 10. Count of Non-Cadet Members Leaving and Joining HAS.....	47
Figure 11. Number of Members by Number of Months On-Call for at least 24 Hours	50
Figure 12. Members by Average On-Call Hours per Month	51
Table 20. Calls by Year and Month and Average Calls per Day.....	54
Figure 13. Number of Days by Total Calls	55
Figure 14. Calls by Day of Week and Hour of Day, 2013 through June 28, 2016	55
Table 21. Did the response meet the 10-minute standard?.....	56
Figure 15. Likelihood 9A Will Arrive Within 10 Minutes by Month	57
Figure 16. Likelihood 9A Will Arrive Within 10 Minutes by Day	57
Figure 17. Likelihood 9A Will Arrive Within 10 Minutes by Hour of Day.....	58
Figure 18. Percent of Calls by Time to En Route	59
Table 22. Average Response Time During Certain Hour Groupings	59
Table 23. Total DTS Runs.....	61
Table 24. Did the response meet the 10-minute standard when considering the lesser of the ambulance and EMT DTS response time?	61
Figure 19. HAS Organizational Chart.....	64

PROJECT BACKGROUND

The Town of Harvard is a picturesque, rural town in North Central Massachusetts with a population just over 6,500. The Town is well-known for its scenic roads, apple orchards, and high-quality school system. The residents value Harvard's safe, small-town atmosphere and historical and environmental assets, which together define the Town's character. In order to care for and preserve these characteristics while maintaining the Town's high-quality schools and providing other municipal services, the Town must carefully steward financial resources.

To that end, the Board of Selectman and the Town Administrator requested a third-party audit of the management and operations of the Town's Fire Department and Ambulance Service (the service or "HAS").

The Collins Center's ("Center's") charge was to analyze the departments' management and operations and provide pragmatic and actionable recommendations to improve the effectiveness and/or efficiency of the department. Four key areas were considered: 1) Management Framework and Practices, 2) Information Technology and Data, 3) Human Resources, and 4) Operations. In addition, the project team investigated options for the future of each department, including the potential for greater collaboration or integration between the two departments.

The Center's approach was not to apply a set of universal best practices. Instead, taking each departments' unique facets and operating environment into account, the project team has made high-impact, appropriately-scaled recommendations. These recommendations are not the same recommendations that would be made, for example, to a full-time, combined Fire/EMS department.

In order to complete this assessment, the Center observed practices of the department, reviewed relevant materials, completed interviews of staff and elected officials, conducted an online survey of both department's members, and performed data analysis, where data were available. The data used for this analysis were provided by the client. The Center works to ensure that data sets are accurate and inclusive, but cannot guarantee that this is always the case.

The Center reviewed the Nashoba Valley Regional Emergency Communication District Agreement in the course of identifying data resources for this assessment. As a general observation, it does not appear that the NVRECC transmits data or reports phone answering and dispatch times to the district-member municipalities. These measures of performance are key to setting the foundation for the Fire Department and Ambulance Service to arrive on scene in a timely fashion which could result in lives and property saved. It would be beneficial for the Town to examine the performance of the dispatch center periodically.

SUMMARY OF STRENGTHS AND RECOMMENDATIONS

Through the course of this study, it was clear that the Fire Department and Ambulance Service already follows a number of best practices in management and operations. Although this report focuses solely on opportunities for improvement, the Center would like to acknowledge that both departments have clear and important strengths. All of the individuals interviewed for this study were eager to be helpful and honest with their perspectives.

Fire Department

The Fire Department is well-respected in the community, and rightly so. The current Fire Chief has created a culture of high-performance and professionalism, to which the firefighters have responded positively. Training and clarity of the command structure have been key areas of improvement over the last several years. The firefighters are a close-knit group that care deeply about each other and work well together. Morale in the department is high. In addition, the Town has consistently supported the capital needs of the department, and department members are attentive to maintenance of the apparatus and other equipment.

Ambulance Service

The Ambulance Service members care deeply about the community, and many spend an incredible amount of time working to keep the service running smoothly and professionally. On certain non-time sensitive calls, members often spend extra time with clients and provide compassionate care that goes above-and-beyond that of many private EMS providers. In addition, the EMS industry is highly-regulated and technical. It is impressive that the volunteers of HAS have been able to build policies and procedures to consistently meet all the demands of the State Department of Public Health.

Recommendations

The table on the following pages summarizes the recommendations found within this report, and provides suggestions as to the implementation timeframe and potential cost of implementation.

Overview of Recommendations

Page	Recommendation	Implementation Timeframe	Capital Cost	Operating Cost Impact
16	The Chief should continue to expand and update the <i>Rules and Regulations</i> manual as needed, and ensure that all members understand the policies therein. Policies and procedures should be periodically reviewed by the Chief. Each new member should be asked to sign an acknowledgement form that they have read and understand the manual, and existing members should do the same after a major revision or periodically. Every three years would be appropriate.	Ongoing	n/a	n/a
16	The Chief should develop, in consultation with Town management and the Board of Selectmen, a standard department performance report that is prepared and shared periodically.	Within the FY	n/a	n/a
17	The Fire Chief currently accepts cash and personal checks for department-related inspections and permits which are then turned over to Town Hall on a monthly basis. A better practice would be to have finance staff at Town Hall complete this financial transaction with customers. The Fire Chief should work with the Finance Director to develop a procedure so that cash and checks are no longer accepted at the Fire Station.	Within 2 months upon Finance Director hired	n/a	n/a
18	The Town should add information to its website that explains when permits and inspections are required and the process for obtaining one. The Town should procure a solution for online scheduling of inspections. If possible, the Town should include all of the above in its rollout of the new ViewPermit software.	Add info within 2 months; Procure solution within FY	n/a	Apps available <\$100/month
19	The Town should address issues with the phone system in the fire station and the Chief's email.	Within the FY	unknown	unknown
19	The Fire Chief should coordinate with Town management, the Police Chief, and ambulance managers to work with the Nashoba Valley Regional Dispatch center to determine whether it's possible to obtain raw data from IMC CAD in order to perform data analysis. Any valuable analyses within this study, or other analyses, should be repeated periodically to inform policy and management decisions.	Within the FY	n/a	Past clients were charged <\$5,000 for initial set-up
19	The Chief should collect data and design a tool to assess the value of the department's tower apparatus so that a fair assessment can be made when its replacement is proposed in 2022.	Within the FY and ongoing	n/a	n/a

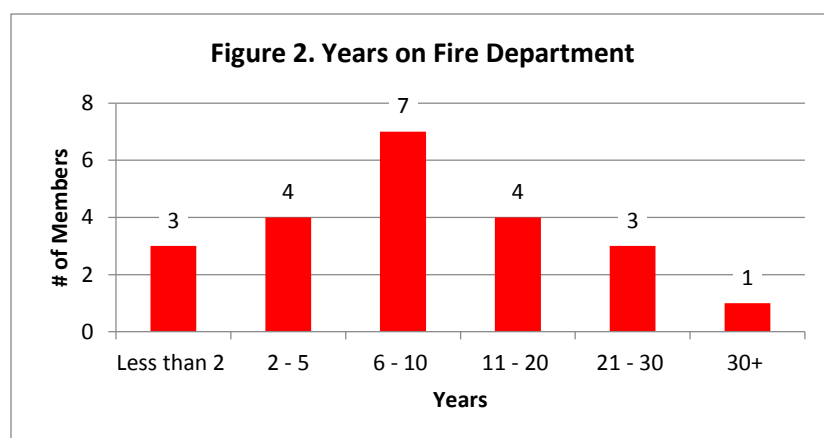
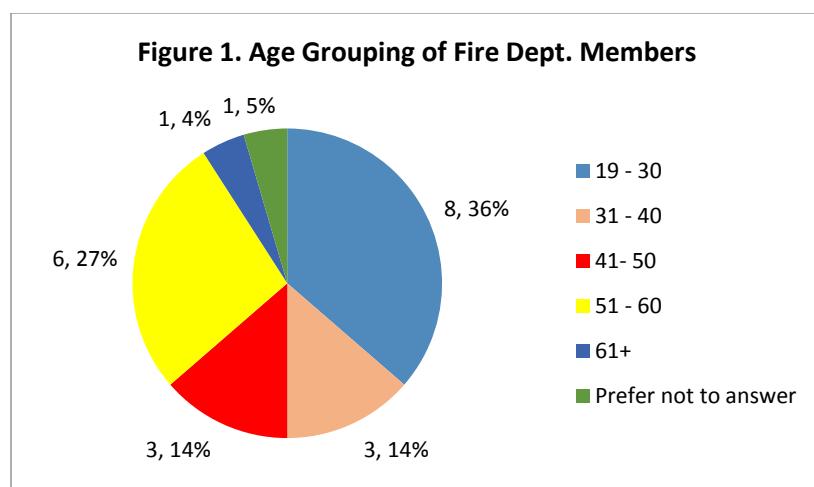
Page	Recommendation	Implementation Timeframe	Capital Cost	Operating Cost Impact
20	The Fire Chief should develop a recruitment and retention strategy that lays out specific techniques for enhancing membership. Repeating the survey conducted as part of this study periodically may be helpful in this effort. Exit surveys for departing members should be conducted to understand the reasons that members leave. The Chief should also consider applying for a SAFER grant in the “Recruitment and Retention” category to fund one or more of the strategies discussed below.	1 year and ongoing	n/a	n/a
23	The department should consider adding two policies to the <i>Rules and Regulations</i> manual related to annual NFPA-compliant medical examinations for all members and duties for firefighters over the age of 65.	Within 6 months	n/a	Medical exams est. up to several hundred dollars per FF
26	Periodically review and report response times to membership and the Board of Selectmen. Repeat the in-depth analyses below on at least an annual basis to observe trends. Command officers should review calls with response times greater than 14 minutes to determine strategies for correction. Also, the Chief should work with dispatch to determine how officer calls can be correctly coded so that they can be easily removed from future analyses.	Ongoing	n/a	n/a
30	The Chief should engage in pre-incident planning, focusing initially on high-risk locations in Town.	Immediately	n/a	n/a
31	Do more to engage the Town’s senior population by enhancing the Senior SAFE program. Use State-created curricula and coordinate with the Council on Aging and Harvard Ambulance Service to coordinate outreach to this vulnerable population.	1 year	n/a	\$400 stipend for new Senior SAFE Coordinator
32	Identify the best strategy to shift the responsibility for certain inspections away from the Chief so that the Chief can perform additional periodic inspections and other duties.	By next FY	\$20,000	Up to ~\$65,000
42	The Ambulance Service should become more integrated with Town government. The Board of Selectman should take a more active role in the oversight of the service and Town management should be more aware of the day-to-day of management of the service and provide support and oversight as necessary. Additionally, HAS should work to improve its working relationship with the Police and Fire Departments.	Immediately and ongoing	n/a	n/a

Page	Recommendation	Implementation Timeframe	Capital Cost	Operating Cost Impact
43	The Service should report a more robust analysis of key performance measures to its membership and the Board of Selectmen on a consistent schedule. HAS management should consult with the Board and Town management regarding performance measures.	Within the FY	n/a	n/a
44	The Ambulance Service should become certified to bill MassHealth.	ASAP	n/a	Enhanced revenue
44	HAS should work with the Board of Selectmen to 1) determine the best option for capital replacement of the existing ambulance and 2) agree to a policy for future capital replacement.	ASAP	n/a	n/a
46	The service should enforce its membership requirements and make the granting of special allowances transparent. Managers should monitor the use of I Am Responding to ensure that all members use it consistently and correctly. It would be beneficial to the membership for a manager to present participation data periodically at monthly meetings. This would require some redesign of the current data collection tools. Also, HAS Co-Directors should consider shifting the issuance of some benefits to a period of time after the member has sufficiently demonstrated a commitment to the participation requirements.	Immediately and ongoing	n/a	n/a
48	The Co-Directors should develop a recruitment and retention strategy that lays out specific techniques for enhancing membership. Repeating the survey conducted as part of this study periodically may be helpful in this effort. Exit surveys for departing members should be conducted to understand the reasons that members leave. Data on each member's join date, promotion date, and exit date should be consistently collected and analyzed.	18 months to fully implement	n/a	n/a
52	Further investigate potential challenges of the cadet program.	Immediate and ongoing	n/a	n/a
56	Periodically review and report response times to membership and Board of Selectmen. Set targets to incrementally increase the percentage of calls that are responded to within 10 minutes. Management team should review calls with response times greater than 10 minutes to determine strategies for correction. Continue to explore direct-to-scene response. Provide additional targeted training so that more EMTs are comfortable with the practice.	1 year and ongoing	n/a	n/a
52	Consider various scenarios for the future of the Fire Department and Ambulance Service.	By the next FY	\$20,000 for vehicle	Up to \$100,000
70	Engage in strategic visioning process with Town residents.	Within the FY	n/a	n/a

SECTION I. FIRE DEPARTMENT MEMBER SURVEY RESULTS

The project team conducted an online survey of members of the Fire Department as a way to gauge employee perception of management and leadership and further understand the department's culture. The survey also asked questions about what motivated the member to join the department, to remain on the department, and the future of the department. The results of the survey are presented here. Further analysis of findings is integrated with the discussion of recommendations in the next section.

A link to the survey was sent via email to all 23 members of the Fire Department, not including the Fire Chief. The vast majority (22 of 23 or 96%) of the members responded¹. All of the respondents were male. Figures 1 and 2, below, show the age group and years of service for the respondents. Respondents are well distributed by age and tenure on the department follows a bell curve.



¹ However, one respondent only answered the introductory questions concerning gender, age, and tenure.

Recruitment and Retention

Respondents were asked several questions about why they joined the department and what motivates them to remain on the department. The majority (15 of 22 or 68%) of respondents learned about the fire department through a family member or friend and 22% (5 of 22) learned about the department by talking to another member. Other methods included the newspaper and department website. No respondents learned about the department through local radio, local TV station, social media, booth at an event, department open house, or the Town website.

The tables below show reasons for joining and staying on the department². Percentages of members choosing each option are displayed and color-coded according to intensity. The most important reasons for joining the department were “Wanted to give back to the community” and “Work of the department is compelling to me.”

Table 1. Reasons for Joining Fire Department

Reasons for Joining Fire Department	Not a contributing factor	Contributing factor	Primary reason for joining	No answer	Primary or Contributing Factor
Wanted to give back to the community	0%	30%	70%	0%	100%
Work of the department is compelling to me	5%	40%	55%	0%	95%
Build resume or learn new skills	40%	60%	0%	0%	60%
Wanted to meet new people	40%	45%	15%	0%	60%
Sense of obligation to the Town	45%	40%	15%	0%	55%
Friends are members or joined with a group of peers	55%	30%	15%	0%	45%
Interested in exploring related career	60%	25%	15%	0%	40%
Family tradition or family members part of department	65%	5%	30%	0%	35%
Something to do while not working or retired	75%	25%	0%	0%	25%
Compensation for calls	85%	10%	5%	0%	15%
Wanted to be a hero	80%	10%	5%	5%	15%

² Two respondents did not answer the question about joining the department and one did not answer the question about remaining on the department. So, they are excluded from these analyses. Therefore, n=20 and n=21 respectively.

Table 2. Reasons for Remaining on Fire Department

Reasons for Remaining on Fire Department	Not a contributing factor	Contributing factor	Primary reason for joining	No answer	Primary or Contributing Factor
Wanted to give back to the community	0%	29%	71%	0%	100%
Work of the department is compelling to me	0%	48%	52%	0%	100%
Friends are members or joined with a group of peers	5%	62%	33%	0%	95%
Build resume or learn new skills	33%	52%	14%	0%	67%
Sense of obligation to the Town	38%	38%	24%	0%	62%
Wanted to meet new people	43%	48%	10%	0%	57%
Interested in exploring related career	57%	33%	10%	0%	43%
Family tradition or family members part of department	62%	19%	19%	0%	38%
Compensation for calls	62%	29%	10%	0%	38%
Something to do while not working or retired	71%	24%	5%	0%	29%
Wanted to be a hero	76%	14%	5%	5%	19%

A comparison of tables 1 and 2, above, indicates that 95% of respondents were compelled to stay in part because “Friends are members or joined with a group of peers” whereas only 45% joined for this reason. Also, 38% stay in part because of “Compensation for calls” whereas only 15% joined for this reason. These were the most significant changes demonstrated by these data.

Table 3, below, indicates the relative strength of the listed incentives to remain on the department. The strongest incentives are “More training,” “Stronger department leadership,” and “More input into the direction/vision of the department.” Respondents seem relatively divided on “Increased hourly rate” as an incentive.

Table 3. Incentives to Continue on Fire Department

Incentives to continue	Strong incentive	Weak incentive	Not an incentive
More training	76%	24%	0%
Stronger department leadership	76%	14%	10%
More input into the direction/vision of the department	71%	29%	0%
More social events and activities	43%	43%	14%
Increased hourly rate	24%	38%	38%
Public recognition	19%	52%	29%

Incentives to continue	Strong incentive	Weak incentive	Not an incentive
Formal recognition, such as an award ceremony after 5 years of service	14%	52%	33%
Informal recognition, such as an email of praise from the Board of Selectmen	10%	67%	24%
Differential pay for certain calls	5%	33%	62%
Fire Department branded gear, such as t-shirt or hat	0%	57%	43%

Management and Operations

Respondents were asked to rate statements pertaining to the Fire Department's management and operations on the following scale: 1- Strongly Disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree. Answers are displayed in Table 4, below.

Members appear to have a generally positive outlook of management and operations. There was agreement that members can talk openly with the Fire Chief and command staff and that department training is valuable. Survey takers were relatively split regarding the issue of discussion and consensus about decisions. It appears that management could improve its communication about and enforcement of performance standards.

Table 4. Statements Related to Management and Operations

	Avg.	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- Strongly Agree
I can talk openly with the Fire Chief about issues facing the department.	4.33	0	1	2	7	11
I can talk openly with other command staff about issues facing the department.	4.33	0	2	1	6	12
Major decisions are arrived at through discussion and consensus, rather than select people making decisions for the entire department.	3.14	3	2	6	9	0
Decisions or changes are effectively communicated to members of the department.	3.90	0	1	4	12	4
Constructive feedback on performance is provided on a regular basis, both formally and informally.	3.33	0	5	5	10	1
Standards for participation and performance are clearly communicated and enforced.	3.38	0	3	8	9	1

	Avg.	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- Strongly Agree
Training sessions are relevant and valuable to the work we do.	4.67	0	0	0	7	14
Members who are not able to give the minimum amount of time and effort required should be asked to leave the department.	2.90	1	9	4	5	2

Morale and Culture

Respondents were asked to rate statements pertaining to the Fire Department's morale and culture on the following scale: 1- Strongly Disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree. Answers are displayed in Table 5, below.

The survey results indicated a strong and positive organizational culture in the Fire Department. Morale and social cohesion appear to be high. One concerning finding is that survey takers on average disagreed that Town staff and elected officials "recognize and appreciate the value of the department."

Table 5. Statements Related to Morale and Culture

	Avg.	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- Strongly Agree
I like and trust the vast majority of members in the department.	4.52	0	1	1	5	14
Morale is high in the department.	3.95	0	1	4	11	5
Department-wide training sessions, social activities, and other events are effective in building camaraderie and a positive environment.	4.57	0	0	2	5	14
I feel that my service is appreciated not just by the department, but by the entire community.	4.14	0	0	1	16	4
Town staff and elected officials seem to recognize and appreciate the value of the department.	2.90	3	6	3	8	1

The Future of the Department

Respondents were asked to rate statements pertaining to the Fire Department's future on the following scale: 1- Strongly Disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree. Answers are displayed in Table 5, below.

Overall, survey takers have a somewhat positive outlook about the future of the department. A significant minority were neutral on the statements “My suggestions for change and improvement are appreciated and genuinely considered” and “In 10 years, I hope that the department remains largely the same as it is today.”

Table 6. Statements Related to the Future of the Fire Department

	Avg.	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- Strongly Agree
I understand and agree with the strategic goals for the department.	3.81	1	1	2	14	3
The department is moving in the right direction.	4.00	0	1	3	12	5
My suggestions for change and improvement are appreciated and genuinely considered.	3.67	0	2	5	12	2
I would recommend joining the department to a family member or friend.	4.48	0	0	1	9	11
In 5 years, I expect to still be a member of the department.	4.05	2	0	2	8	9
In 10 years, I hope that the department remains largely the same as it is today.	3.71	1	1	6	8	5

Other comments and number of individuals making comment (in parentheses):

- Would like more training (4)
- Need a new or rehabbed fire station (4)
- Need day staff to assist Chief (3)
- Conduct annual physicals for members (1)
- Increase recruitment (1)
- Enhance replacement of minor equipment (1)
- Increase the non-personnel budget (1)
- Build better relationship with HAS (1)
- Keep HAS a separate organization (1)
- Chief needs an active contract. It would be detrimental if he left. (1)

SECTION II: FIRE DEPARTMENT RECOMMENDATIONS

MANAGEMENT FRAMEWORK AND PRACTICES

A department's management framework is made up of the formal and informal, documented and undocumented policies, procedures, and practices that define how the department is operated and overseen. This management system is ideally 1) strategically-designed to create an environment where staff are able to efficiently and effectively perform their duties, 2) documented to the extent reasonable to ensure clarity for staff and promote consistent, continuous operations, 3) reflective of the Town residents' objectives and desired levels of service, and 4) easily accessible for public review.

Recommendation: The Chief should continue to expand and update the *Rules and Regulations* manual as needed, and ensure that all members understand the policies therein. Policies and procedures should be periodically reviewed by the Chief. Each new member should be asked to sign an acknowledgement form that they have read and understand the manual, and existing members should do the same after a major revision or periodically. Every three years would be appropriate.

The Fire Department has a robust *Rules and Regulations* manual that the Chief has been working to improve over time. With only one full-time employee, it is vitally important for continuity and clarity that the department document its policies and procedures.

Recommendation: The Chief should develop, in consultation with Town management and the Board of Selectmen, a standard department performance report that is prepared and shared periodically.

Currently, basic measures of workload are reported in the Town annual report. The report should be designed to reflect the priorities of the Board of Selectmen and updated as they may change. Basic measures of performance for a volunteer fire department and suggested frequency include:

- Call volume by NFIRS³ series (quarterly) compared with previous year
- Response time by NFIRS series (quarterly) compared with previous period(s)
 - It would be preferable to break response time down into: alarm handling/processing time, turnout time, and travel time. Alarm handling/processing time is a measure of the time it takes dispatch to accept a call and tone for the department. Turnout time is the measure of the time it

³ NFIRS is the National Fire Incident Reporting System, a national reporting system used by fire departments to report fires and other incidents in a uniform manner. Massachusetts has a statewide system known as MFIRS. For more information, visit nfirs.fema.gov.

takes an appropriately staffed apparatus to leave the station from the time that dispatch tones the department. Travel time is the time it takes the apparatus to travel from the station to the scene. By breaking down response time into these units, it will be easier to target improvements.

- It would be preferable to employ a data collection method that captures not only hours and minutes, but also seconds. In the Center's experience, the computer-aided-dispatch (CAD) software system used by dispatch cannot capture seconds.
- Staffing response by NFIRS series (or sub-series)
 - Based on the type of emergency, different numbers of staff are required to adequately respond. Currently these data are not available, so a new data collection method would have to be designed
- Fire inspections/permitting (quarterly)
 - Including work volume, rate of reinspections, and scheduling turnaround time
- Measures of recruitment and retention (annual)
 - Including net gain/loss of members

The department could consider recreating and building upon the analyses found in this report.

Other minor recommendation related to management include:

Recommendation: The Fire Chief currently accepts cash and personal checks for department-related inspections and permits which are then turned over to Town Hall on a monthly basis. A better practice would be to have finance staff at Town Hall complete this financial transaction with customers. The Fire Chief should work with the Finance Director to develop a procedure so that cash and checks are no longer accepted at the Fire Station.

INFORMATION TECHNOLOGY AND DATA

The Fire Department uses several different IT tools for various purposes:

- The Nashoba Valley Regional Dispatch center uses a software called IMC for CAD and records management.
- Inspections and permit data is entered into the appropriate IMC module by administrative staff at the Police Department. Historical data is currently being manually entered.

- The Chief submits all incident data to the Massachusetts Fire Incident Reporting System (MFIRS)⁴ which in turn reports to the National Fire Incident Reporting System (NFIRS). These data are analyzed for trends at the state and national level to inform firefighter safety practices and standards, consumer protection standards, etc.
- The Chief maintains several spreadsheets of data, for example each department member's training history and an equipment/apparatus inventory.
- The department has three mobile data terminals (MDTs), which allow for on-vehicle connection to the CAD system, mapping, entering reports in the field, and access to other data. One of the MDTs is in the command car and the two others will be installed on apparatus.

That said, there are several IT- and data-related recommendations for improving the department.

Recommendation: The Town and Fire Department should add information to their websites that explains when permits and inspections are required and the process for obtaining one. The Town should procure a solution for online scheduling of inspections. If possible, the Town should include this feature in its rollout of the new ViewPermit software.

One of the most inefficient processes that could be helped through a technological solution is the scheduling of inspections. The Chief currently performs all inspections, averaging approximately 320 per year over the period 2013 to 2015. The process for scheduling an inspection is cumbersome from both the customer's and Chief's perspectives. There is scant information on the Town's website regarding the parameters for determining when a permit or inspection is needed or the procedure for obtaining one. So the client must call and hope to reach the Chief in the office, or leave a message. Later, because there is no administrative support staff, the Chief himself must call back and answer questions and schedule the inspection. It is an ineffective use of the Chief's time to schedule inspections. A paper desk calendar is currently used to schedule inspections. An online scheduling solution would be much more convenient for both the customer and the Chief. There are inexpensive, general scheduling tools available that may work. Benefits may include (depending on the solution):

- Customer can schedule appointments 24/7
- Automated email or text reminders
- Smartphone app for Chief to manage appointments
- Integration with calendar tools (for example, Microsoft Outlook)

⁴ Departments are required by state law to report fires or explosions that result in a dollar loss or human casualty. They are encouraged to submit all incidents.

The Town is in the process of implementing ViewPermit, an online inspections management software. It is unknown what role this software may play in addressing the issues with scheduling fire inspections and permits. However, based on the low price of scheduling solutions, it may make sense to purchase one in the interim.

Also, after an inspection is complete, the associated paper forms are sent to the administrative staff at the police station to manually enter into IMC to replace the current system of using paper files. The Town should consider whether ViewPermit will replace, supplement, or integrate with IMC as it related to fire inspection and permit records.

Recommendation: The Town should address issues with the phone system in the fire station and the Chief's email.

The station currently has two phone lines, and the equipment is outdated. The Town should upgrade phone service so that an initial automated message instructs callers to “hang up and call 911” in the case of an emergency and so that voicemail may be left when one of the lines is in use. The Chief has also reported issues and glitches with his email that should be resolved.

Recommendation: The Fire Chief should coordinate with Town management, the Police Chief, and ambulance managers to work with the Nashoba Valley Regional Dispatch center to determine whether its possible to obtain raw data from IMC CAD in order to perform data analysis. Any valuable analyses within this study, or other analyses, should be repeated periodically to inform policy and management decisions.

Currently, raw data is not obtainable from dispatch's software, IMC. Although IMC was recently bought-out by another vendor that may be updating the export and reporting functions of the software, right now it is not possible. Raw data is essential for appropriate analysis. The pre-designed reports in IMC provide only limited answers to a few pre-chosen questions, analyses are presented in a limited way that may not best suit the department, and do not allow for a mechanism to audit the data to confirm that all the underlying data are accurate and the calculations are appropriate. By design, they are not customizable in any way. For the analyses within this study, data obtained through MFIRS were used. However, it would be preferable to use data from IMC since IMC captures more data, including data on inspections and permits, and should theoretically be easier for the Chief to obtain. MFIRS data has to be obtained from the Department of Fire Services. It also has the potential for more errors, since the data is manually entered into the MFIRS system.

Recommendation: The Chief should collect data and design a tool to assess the value of the department's tower apparatus so that a fair assessment can be made when its replacement is proposed in 2022.

Recently, the department obtained its existing tower apparatus, which was used. It is the first tower the department has owned. There is no doubt that a tower can be a valuable apparatus

for firefighters during an emergency. It has a higher and more versatile reach (i.e. horizontal reach) than ground ladders, and can be used more efficiently and precisely by fewer firefighters than can ground ladders. This is especially useful for a volunteer department that may have a more limited response force. However, the tower apparatus is a very expensive piece of equipment. The Chief estimates the current cost to be \$950,000; it will likely be higher by 2022. No doubt the Town residents, through their Board of Selectmen, will want to carefully consider whether the apparatus' value is worth its cost. Ultimately, this is a decision that only the residents can make. It is akin to the tradeoff made in terms of cost and response times of a career versus a volunteer fire department. It will be up to the Fire Chief to demonstrate with data:

- How the existing tower has been used
- How often it has been used
- How its use has benefited residents/customers
- How its use has benefited and protected firefighters
- Other potential uses of the apparatus

HUMAN RESOURCES

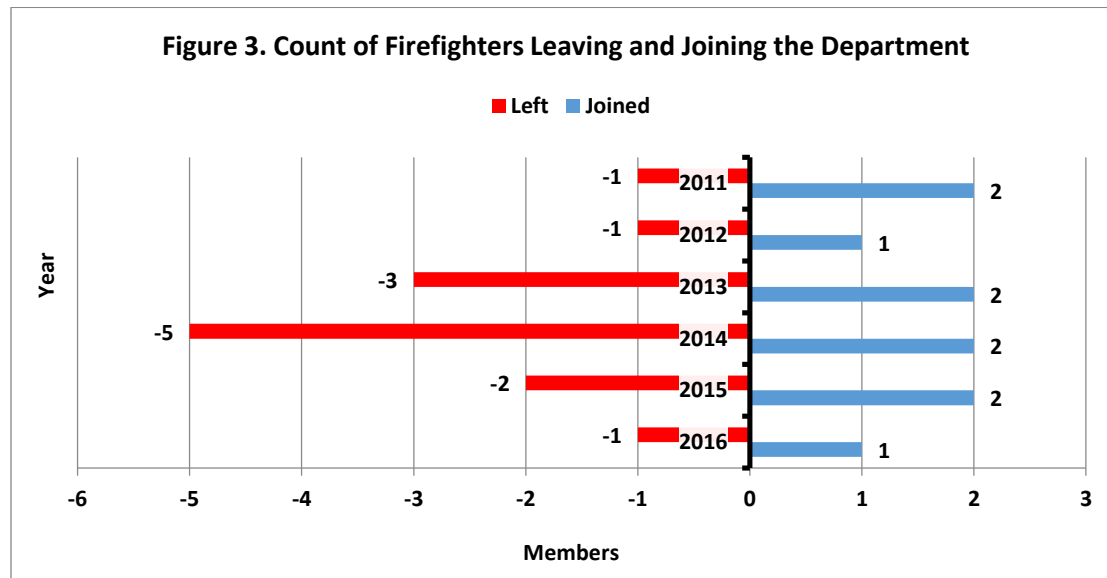
Recruitment & Retention

Recommendation: The Fire Chief should develop a recruitment and retention strategy that lays out specific techniques for enhancing membership. Repeating the survey conducted as part of this study periodically may be helpful in this effort. Exit surveys for departing members should be conducted to understand the reasons that members leave. The Chief should also consider applying for a SAFER grant in the "Recruitment and Retention" category to fund one or more of the strategies discussed below.

As a call department, the fire department relies on volunteers to fill its ranks. One of the duties of the Fire Chief is to lead recruitment and retention efforts for the department. The fire department's roster currently stands at 23 members, not including the full-time Chief. It is important that the department maintain a roster big enough that the appropriate number of staff can respond to various incidents, taking into consideration the fact that not every firefighter will be available for every call due to factors such as work or family responsibilities.

Since 2011, the department has seen a net loss of three members. See Figure 3, below. Reasons that firefighters have left include moving away, retirement, medical reasons, dismissed for

smoking on the job (per State law⁵), joining another public safety department, no longer having time to commit to the department, and disagreement with the Association. The data demonstrate an average annual turnover rate over the last five years of 9%. Turnover peaked in 2014 at 19%; in 2016, turnover was 4%.



The potential pool of new firefighters includes those 18 years of age or older who live or work within or close to the boundaries of the Town. Although the size of the pool is difficult to calculate, the project team estimates that it is perhaps as little as 6,500 individuals. A 2014 population estimate found 4,426 people between the ages of 18 and 64⁶. The Town has limited commercial development, and therefore, limited employment within its bounds. The most recent data from the 2012 Economic Census of the U.S. shows approximately 2,017 employees worked at establishments in Harvard⁷. In addition, the 2014 American Community Survey estimated that 507 Harvard residents work less than a 15-minute commute from town⁸. Of course, of those eligible, a minority will be interested and willing to join the department.

The most important step in developing a recruitment strategy is to understand who the ideal candidates are and how to reach them. This makes recruitment much more efficient. One relatively easy way of approaching this is to survey existing members. The results from the survey conducted as part of this study were that the majority (15 of 22 or 68%) of respondents

⁵ According to Massachusetts General Law Chapter 41, Section 101A, no police officer or firefighter appointed after 1988 may smoke tobacco or continue in the job if they smoke tobacco.

⁶ American Community Survey, 2014, Available:

<http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>

⁷ Economic Survey of the U.S., 2012, Available:

<http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>

⁸ American Community Survey, 2014, Available:

<http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>

learned about the fire department through a family member or friend and 22% (5 of 22) learned about the department by talking to another member. The most important reasons for joining the department were “Wanted to give back to the community” and “Work of the department is compelling to me.” Also, nearly a third of the current members cited “Family tradition” as a primary reason for joining.

Based on these results, the department should at least initially focus on reaching relatives and friend of current members with information about the work of the department and its importance to the community⁹. Some techniques might include:

- Write an “elevator pitch” for current members to draw upon when they are asked about the department
- Create materials (brochure, flyer, etc.) that highlights the work of the department and its importance to the community
- Host a “bring a friend” event for department members

The department also has plans to start a firefighter explorer program in collaboration with other volunteer departments in the region, which may turn out to be a strong component of its recruitment strategy. The department should make plans to assess the efficacy of the program as a recruitment tool by monitoring the conversion rate of junior firefighters to full department members. The Town clearly values the cadet program for the ambulance service, and this program could offer similar benefits to select students interested in the fire service.

A retention strategy should also be developed, although the department does not seem to have a high turnover rate. The Chief should continue to monitor the turnover rate of members and perform exit interviews with departing members. The survey conducted does demonstrate that the reasons that members remain on the department may be different than reasons for initially joining. As noted above, the survey results show that that 95% of respondents were compelled to stay in part because “Friends are members or joined with a group of peers” whereas only 35% joined for this reason. In particular, this means that the social aspect of the department and the positive relationships amongst members are important. Social events and team-building activities are important, as would be addressing any disruptions in morale or interpersonal issues. Also, 38% stay in part because of “Compensation for calls” whereas only 15% joined for this reason. Finally, the survey revealed that respondents want “More training,” “Stronger department leadership,” and “More input into the direction/vision of the department.” These factors would be incentives for them to stay on the department.

The Chief should also periodically analyze volunteer turnover based on tenure on the department to ensure that the department is not consistently being used as a training ground for other local full-time departments. This can be a concern for other volunteer departments,

⁹ This is a proven recruitment strategy called “concentric circle recruitment” by scholars who study volunteerism.

because of the cost of training a volunteer, but it does not appear to be an immediate concern for Harvard.

The department should consider applying for a SAFER grant in the “Recruitment and Retention” category to fund one or more of the strategies discussed above. In particular, the explorer program may make the application competitive due to its regional nature. Local departments recently successful in receiving this grant include Tyngsborough (\$96,439) and Pepperell (\$64,316), both of whom received awards in 2016 for the 2015 cycle.

Human Resource-Related Policy Recommendations

Recommendation: The department should consider adding two policies to the *Rules and Regulations* manual related to annual NFPA-compliant¹⁰ medical examinations for all members and duties for firefighters over the age of 65.

Medical Examinations

The Fire Department’s *Rules and Regulations* manual lists the physical requirements for the position of Fire Chief, but not for other positions in the department. Firefighting is a substantially physically-demanding activity and the protection of life and property and the safety of other firefighters depends on each firefighters’ abilities to perform physically. As such, NFPA standard 1582 recommends medical exams prior to participation in departmental emergency response activities and lists specific medical conditions that can affect an individual’s ability to perform these activities. The department should consider requiring NFPA-compliant medical examinations for all members annually.

Duties for Firefighters over Age 65

Massachusetts State Law requires career firefighters to retire at the end of the month in which they turn 65 years of age¹¹. There is ongoing disagreement about whether this requirement also applies to call firefighters, and it has never been satisfactorily clarified by any State authority. The Harvard Fire Department’s current policy is to allow firefighters aged 65 or older to continue as members of the department, performing on limited duty at fire suppression events. There is currently one firefighter in this situation. This policy should be reviewed by Town Counsel and that the department formally adopt a final policy, with input from Town Counsel, and include it in the rules and regulations manual.

¹⁰ The NFPA is the National Fire Protection Association is a trade association that publishes codes and standards for the fire service that are generally accepted as best practice. For more information, see nfpa.org.

¹¹ See Massachusetts General Law Chapter 32 Sections 1, 5 and Chapter 415 of the Acts of 1987.

OPERATIONS- Fire Suppression & Emergency Call Response

MFIRS data obtained from the Department of Fire Service were used for the following several analyses of call volume and response times¹².

Call Analysis

The data show that over the period 2013 through 2015, the department received 978 calls¹³. This translates to .67 calls per day, as seen in Table 7, below. From 2012 to 2013, the number of calls jumped by 26%, but that trend slowed substantially in the subsequent two years to 6% and 7% respectively.

NFIRS codes calls on several levels, the highest level being the nine series displayed in the table below. Over the period 2012 to 2015, nearly one-third of all calls were false alarms or false calls. Service calls, for example smoke/odor removal, unauthorized burning, and lock-out, represented approximately 21% of calls, while rescue and EMS calls where 18%. Fire calls represented 14% of calls.

In general, a call coded as NFIRS series Service Call, Good Intent Call, Special Incident Type, and False Alarm and False Call is considered a non-emergency call.

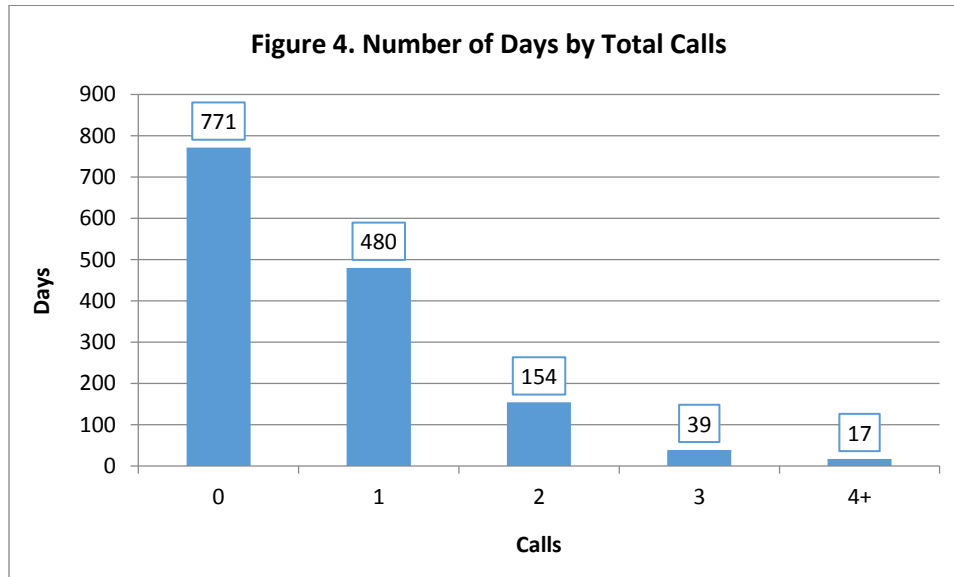
Table 7. Calls by Year and NFIRS Series and Average Calls per Day

NFIRS Series	2012	2013	2014	2015	Total	% of Total
False Alarm and False Call	43	84	95	73	295	30.2%
Fire	19	36	40	41	136	13.9%
Good Intent Call	8	15	23	38	84	8.6%
Hazardous Condition (No Fire)	22	13	15	29	79	8.1%
Overpressure Rupture, Explosion, Overheat (No Fire)				1	1	0.1%
Service Call	75	55	28	46	204	20.9%
Severe Weather and Natural Disaster	1	1		1	3	0.3%
Special Incident Type	1			1	2	0.2%
Rescue and EMS Incidents	26	41	59	48	174	17.8%
Total	195	245	260	278	978	
Yr. over Yr. Growth		26%	6%	7%		
Avg./Day	0.53	0.67	0.71	0.76	.67	

¹² Minimal anomalies in the data were found. Several records from October – December 2013 appear to be missing from the MFIRS data.

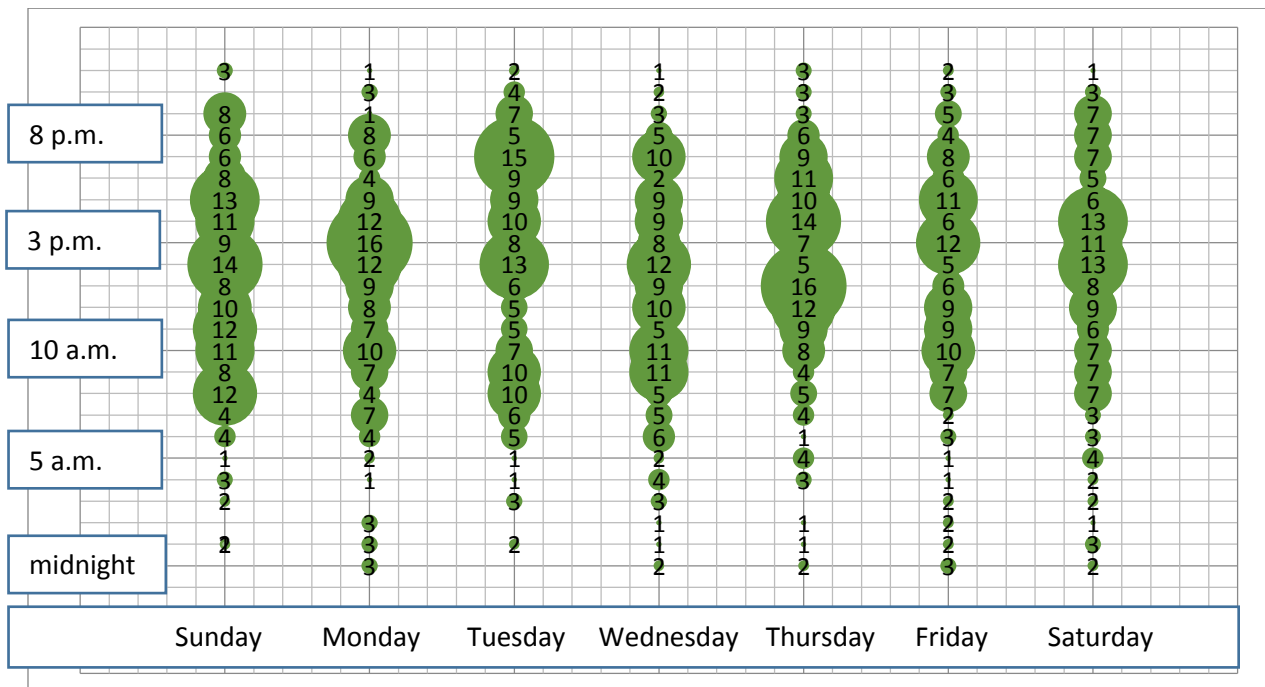
¹³ Note that this does not reflect other activities of the department such as inspections.

On a majority of days (53%) over the time period 2012 to 2015, the fire department received no calls. The department received one call on approximately 1/3 of the days in the study period. See Figure 4, below.



There appear to be no significant trends of calls based on day of the week or month. However, as Figure 5, below, shows, there are clear times during a typical week where call volume is heavier than other times. Approximately half (48%) of calls occurred Monday through Friday, between 8AM and 5PM. Thirty percent of calls occurred on Saturday and Sunday.

Figure 5. Calls by Day of Week and Hour of Day, 2013 through 2015



Recommendation: Periodically review and report response times to membership and the Board of Selectmen. Repeat the in-depth analyses below on at least an annual basis to observe trends. Command officers should review calls with response times greater than 14 minutes to determine strategies for correction. Also, the Chief should work with dispatch to determine how officer calls can be correctly coded so that they can be easily removed from future analyses.

Response Time Analysis¹⁴

Response time is a key measure of Fire Department performance. In some cases, such as fires and certain rescue scenarios, a longer response time may result in progressively worse outcomes, or even death. All clients, however, expect quick response when calling 911 for what they perceive to be an emergency. There are several components of the department's response time. First, dispatch must get in touch with volunteers to alert them to the emergency. Next, volunteers must travel to the station to retrieve the appropriate apparatus. The final component of response times is travel from the station to the location of the emergency. By all

¹⁴ Time data includes hours and minutes, but not seconds. In the project team's experience, this is a limitation of the dispatch software IMC.

accounts, the department is able to use GPS-technology to efficiently arrive on scene to an emergency.

A volunteer fire department cannot be held to as high a standard for response time as a career department, where firefighters are standing-by. Volunteers must be contacted, travel to the station, and finally travel to the scene. NFPA does provide a standard, known as NFPA 1720, for response time for volunteer fire departments based on population density. Harvard is considered a rural area for the purposes of NFPA 1720, which means that the minimum response should be six firefighters to arrive on-scene within 14 minutes, 80% of the time.

Note: There are several limitations of this standard as applied for this study. First, the standard was developed specifically for response to a fire, but not the myriad other calls received by the fire department. Second, the data available, as formatted, did not allow for analysis of response time of the first six responders. However, in lieu of a better option, the standard is used. The Town may decide that it would prefer to use a different response time standard for future analyses. What can be said is that the response time to assemble six staff would be no better than the data reported in the following table, since what is reported is the initial responding apparatus' response time, and that apparatus may have been carrying less than six firefighters.

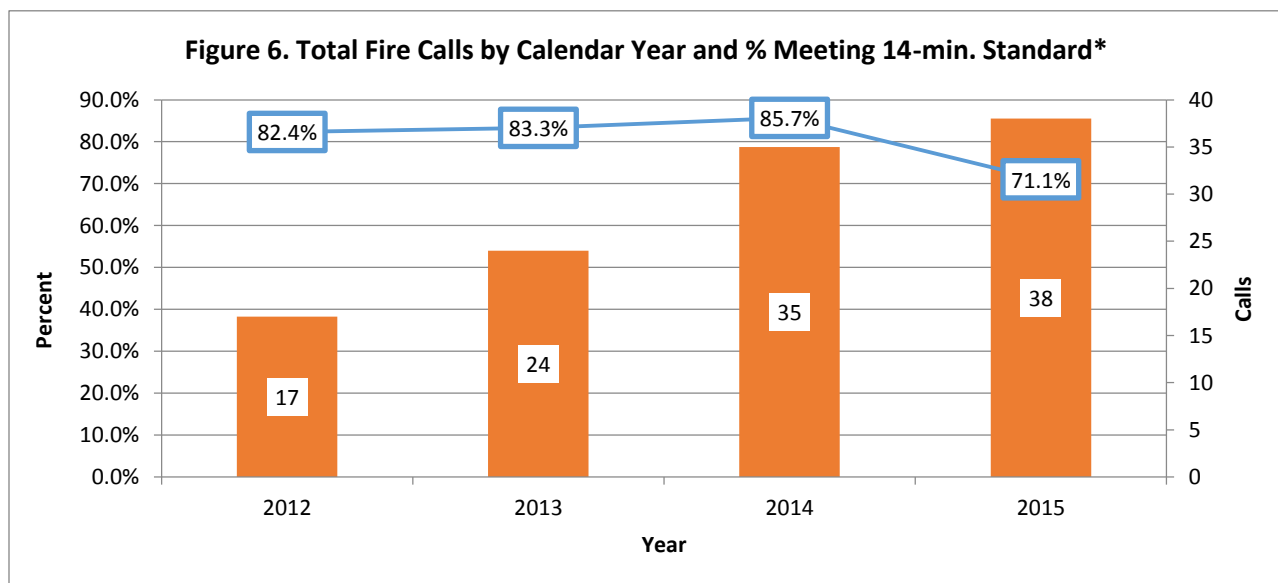
As Table 8, below, demonstrates, the fire department has responded to all emergency calls between 2012 and 2015 within 14 minutes, 71% of the time. This is just shy of the 80% standard recommended by NFPA 1720. The data do show a downward trend on this measure over the course of the study period. Figure 6, below, shows the summary response time data for fire calls by calendar year. The fire department appears to have exceeded the 80%, 14-minute standard in 2012, 2013, and 2014 for fire calls. The rate dropped to approximately 71% in 2015. Potential reasons for this drop were not apparent in the data available.

Table 8. Did the response meet the 14-minute standard, 80% of the time?*

NFIRS Series*	Year	No		Yes		Total Calls
		# of Calls	% of Calls	# of Calls	% of Calls	
Fire	4 Yr. Total	23	20%	91	79.8%	114
	2012	3	18%	14	82.4%	17
	2013	4	17%	20	83.3%	24
	2014	5	14%	30	85.7%	35
	2015	11	29%	27	71.1%	38
Hazardous Condition (No Fire)	4 Yr. Total	16	29%	39	70.9%	55
	2012	3	18%	14	82.4%	17
	2013	2	29%	5	71.4%	7
	2014	4	31%	9	69.2%	13

NFIRS Series*	Year	No		Yes		Total Calls
		# of Calls	% of Calls	# of Calls	% of Calls	
	2015	7	39%	11	61.1%	18
Overpressure Rupture, Explosion, Overheat (No Fire)	4 Yr. Total			1	100.0%	1
	2015			1	100.0%	1
Rescue and EMS Incidents	4 Yr. Total	57	34%	110	65.9%	167
	2012	4	16%	21	84.0%	25
	2013	10	28%	26	72.2%	36
	2014	21	36%	37	63.8%	58
	2015	22	46%	26	54.2%	48
Severe Weather and Natural Disaster	4 Yr. Total	1	50%	1	50.0%	2
	2012			1	100.0%	1
	2015	1	100%		0.0%	1
Grand Total (All Series)	4 Yr. Total	97	29%	242	71.4%	339
	2012	10	17%	50	83.3%	60
	2013	16	24%	51	76.1%	67
	2014	30	28%	76	71.7%	106
	2015	41	39%	65	61.3%	106

*excluded what are generally considered non-emergency calls, NFIRS series Service Call, Good Intent Call, Special Incident Type, and False Alarm and False Call and officer calls coded as other NFIRS series calls. Officer calls are non-emergency calls such as CO detector activation with no symptoms, Outside smoke investigation, Problem with a smoke detector, Unauthorized burning, Arcing wires/Pole fire, Smoke detector sounding with no smoke or fire.



*Note this figure reflects only fire calls, not all calls for the department

Tables 8 and 10, below, show average response time presented in several different ways. There were questions raised during interviews about whether the department is having a difficult time responding during business hours. The data show that the first responding apparatus arrives more quickly during business hours (defined as 8AM-6PM) than at other times. Reasons for this difference are unclear from the data, but it may be impacted, at least in part, by the fact that the Chief is available during those hours. The slowest response times occur between midnight and 6AM, when most members are likely sleeping. Naturally, it takes longer to respond.

Table 9. Average Response Time by NFIRS Series and Year*

NFIRS Series	Avg. Response Time in Minutes				
	2012	2013	2014	2015	4 Yr. Avg
False Alarm and False Call	8.10	8.49	11.60	11.73	10.27
Fire	10.41	10.50	9.71	11.24	10.49
Good Intent Call	8.00	11.00	9.80	11.06	10.26
Hazardous Condition (No Fire)	9.12	14.14	15.31	18.44	14.27
Rescue and EMS Incidents	14.84	14.29	12.38	13.59	14.00
Service Call	3.00			18.00	7.00
Severe Weather and Natural Disaster	9.48	12.61	12.16	13.02	12.11
Total	10.47	11.17	11.65	12.74	11.63

Table 10. Average Response Time by NFIRS Series and Hour Grouping*

NFIRS Series	Avg. Response Time in Minutes			
	Midnight to 6AM	6-8AM & 6-11PM	8AM-6PM	Total- All Hours
False Alarm and False Call	14.81	10.73	9.23	10.27
Fire	14.75	12.08	9.54	10.49
Good Intent Call	13.00	12.25	9.54	10.26
Hazardous Condition (No Fire)	14.50	16.36	13.68	14.27
Service Call	37.50	11.73	12.48	14.00
Severe Weather and Natural Disaster		0.00	10.50	7.00
Rescue and EMS Incidents	15.17	14.04	10.51	12.11
Total	17.20	12.46	10.49	11.63

* Overpressure Rupture, Explosion, Overheat (No Fire) and Special Incident Type series excluded from table. Data contained only 1 Overpressure Rupture, Explosion, Overheat (No Fire) call with a reported 0 minute response time. There were only 2 Special Incident Type calls, and both were officer calls. Calls dispatched and canceled en route and officer calls (non-emergency calls) coded as series: Fire (18), Good Intent Call (24), Hazardous Condition (24), Rescue and EMS Incidents (4), and Special Incident Type (2) were also excluded.

OPERATIONS- Fire Prevention

Fire prevention is a key function. Not only does fire prevention protect life and property, it protects firefighters' safety as well as the sustainability of the volunteer model by controlling call volume. A fire department's fire prevention activities typically include fire education, inspections and permitting, pre-planning, training and drills, code enforcement, and plan review. Currently, fire education is handled by a call firefighter who is the S.A.F.E (Student Awareness of Fire Education) Coordinator. The Fire Chief is responsible for all code enforcement, plan review, permitting, and inspections.

Recommendation: The Chief should engage in pre-incident planning, focusing initially on high-risk locations in Town.

NFPA Standard 1620 calls for fire departments to engage in pre-incident planning. According to NFPA, incident pre-plans "help responders effectively manage emergencies so as to maximize protection for occupants, responding personnel, property, and the environment¹⁵." The process of pre-incident planning involves identifying high-risk locations, collecting data and documenting a variety of data about the location, sharing the information with all firefighters (and other first responders in Town) and using the plan as a training tool, and updating the plan periodically.

The data to be collected should allow firefighters to respond to and control a situation more efficiently and effectively. Pre-planning should involve a visit and inspection of the location. Types of information may include: physical elements of the site, construction of the building(s), size and height of the building, utilities, occupant demographics and any special circumstances, existence of fire protection systems, water supply, any unique hazards (e.g. presence of chemicals), communication restrictions, and any unique characteristics. Using the information, firefighters should diagram the building and site and discuss and note special tactics or strategies for addressing emergency situations. Pre-incident planning may also involve drills on-scene.

Pre-planning would benefit any fire department, but there are particular benefits for the Harvard Fire Department. HFD is a volunteer department in a small, primarily-residential community with a low number of serious events, which means that firefighters rarely call upon certain skills. Pre-planning will force the department to prepare specifically for high-risk, low-likelihood events and familiarize firefighters with the most potentially-dangerous locations in Town. Many incidents are extraordinarily time sensitive, and volunteer departments are often at a disadvantage compared with career departments because they have to travel from

¹⁵ Description of NFPA Standard 1620, Available: <http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=1620>

different places to the station before sending apparatus. Pre-incident plans can mitigate part of this disadvantage in certain incidents.

There are numerous templates and pre-plan worksheets available online. See Appendix X for one example. The department should review several and develop its own that is best suited to the Town. High-risk locations might include school buildings, public library, council on aging, other public buildings, large commercial space such as the Appleworks building, and the Saint Benedict Center/Abbey. The department may also identify other locations in need of a pre-incident plan.

Fire Education

Recommendation: Do more to engage the Town's senior population by enhancing the Senior SAFE program. Use State-created curricula and coordinate with the Council on Aging, the Police Department, and Harvard Ambulance Service to coordinate outreach to this vulnerable population.

The department has a robust fire education program in collaboration with the Harvard Public Schools. However, the department could do more to engage the Town's senior population by building up its Senior SAFE program. Last fiscal year, the Town received a \$2,716 grant from the State expressly for this purpose. It was used to purchase and install smoke detectors in seniors' homes. The State has created multiple curricula targeted at the senior population that the department could choose from, including:

- Carbon monoxide safety
- House numbers program
- Space heaters and keeping warm
- Home oxygen
- Cooking safety
- Etc.

The Chief should designate the S.A.F.E. Coordinator or another call firefighter (as a Senior SAFE Coordinator) as responsible for Senior SAFE activities. A first step should be meeting with staff members at the Council on Aging, the Police Department, and Harvard Ambulance to coordinate outreach to this group. There are many areas of cross-interest for these Town departments as it relates to the senior population.

Recommendation: Identify the best strategy to shift the responsibility for certain inspections away from the Chief so that the Chief can perform additional periodic inspections and other duties.

Currently, the Fire Chief performs all the department's inspections and permitting activities. State Law, Chapter 148, and State fire prevention regulations, 527 CMR, guide a municipal fire department as to the type and frequency of inspections it should perform. Quarterly inspections of health care facilities, hotels/motels, and theaters and annual inspections of multi-family homes, commercial buildings, and any hazardous operations are required by the State fire prevention regulations. State law also requires inspection of smoke and carbon monoxide detectors in all residential sales and new construction. Furthermore, fire departments should inspect and approve all installed fire protection systems.

Table 11, below, shows inspections and permitting data for the fire department. Inspections are performed prior to the issuance of any permit, and sometimes multiple reinspections are needed to confirm that issues have been corrected.

Table 11. Inspections and Permitting Activity, 2012 – July 27, 2016

Type- Permits	2012	2013	2014	2015	2016*
Blasting	3	0	1	3	1
Dumpster	1	10	3	1	2
Fire Alarm	3	9	3	6	5
Labor Camp	2	2	2	2	2
Oil Burner Installation	45	18	45	24	21
Other	9	1	14	14	4
Propane Storage	56	73	49	39	15
Smoke & Carbon Monoxide	86	113	115	109	63
Sprinklers	8	7	8	5	3
Storage Tank Removal	2	4	0	0	0
Tank Truck	2	3	0	0	0
<i>Total permits</i>	217	240	240	203	116
<i>Total inspections (including re-inspections)</i>	324	334	356	273	164
Total Inspections Revenues			\$18,745	\$16,825	\$5,605
Open Burning Permit	710	618	468	510	522
Open burning activations	1912	1302	1292	912	1342
Total Open Burning Revenues			\$5,380	\$4,370	\$5,030
Total Revenues			\$24,125	\$21,195	\$10,635

*through approximately July 27, 2016 as provided by Chief Sicard

Unfortunately, with the Chief being the only individual currently performing inspections, all the commercial buildings in Town are not consistently inspected on an annual basis, as required by the State. This is an important activity that should not be neglected. There are various strategies for addressing this deficit, displayed in the table below.

Table 12. Strategies for Performance of Certain Fire Prevention Activities

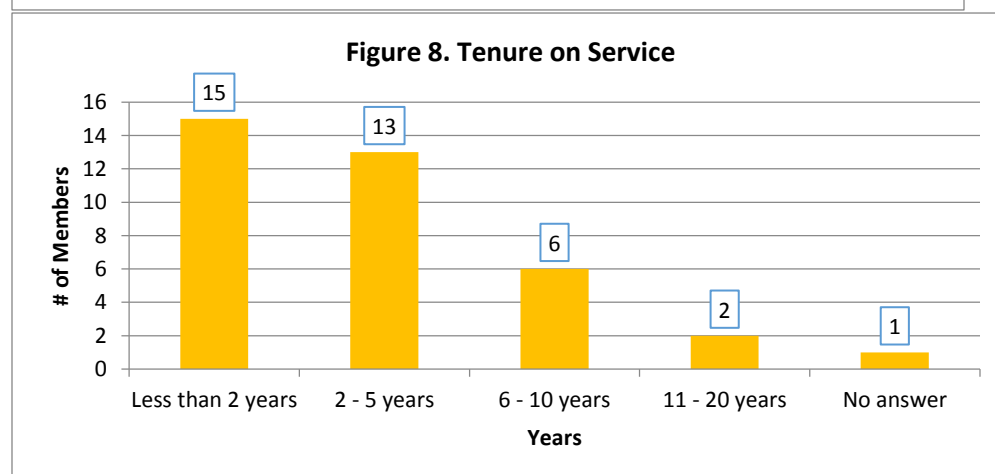
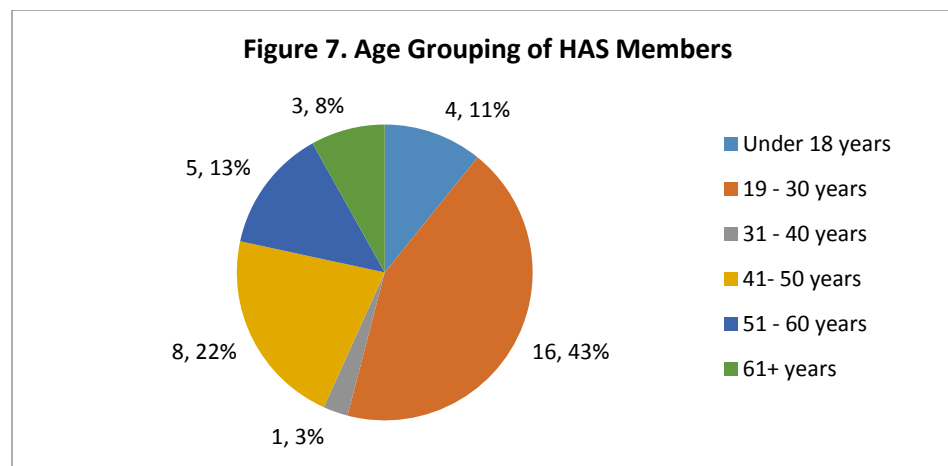
Strategy	Pros	Cons	Estimated Cost
Hire a full-time firefighter	<ul style="list-style-type: none"> • Consistent scheduling • Available to respond to calls during scheduled hours • Could be a FF/EMT who could also respond to EMS calls on ambulance 	<ul style="list-style-type: none"> • Could be perceived as a move away from volunteer model • Potential cultural conflict between call and FT FFs to be managed • Supervisory relationship with HAS managers would have to be worked out • most expensive option 	<p>Salary and 25% benefits for FF/EMT: \$43,750- \$56,250</p> <p>Vehicle: \$20,000</p> <p>Ancillary costs may include:</p> <ul style="list-style-type: none"> • Hiring costs (including physical exam/background check) • Purchase of personal protective equipment (PPE) (approx. \$3,000) • Ownership costs for vehicle (e.g. insurance, fuel, etc.)
Hire per diem firefighter(s)	<ul style="list-style-type: none"> • Consistent scheduling • Available to respond to calls during scheduled hours • Could be a FF/EMT who could also respond to EMS calls on ambulance 	<ul style="list-style-type: none"> • Could be perceived as a move away from volunteer model • Potential higher turnover • Potential cultural conflict between per diem and call FFs • Supervisory relationship with HAS managers would have to be worked out 	<p>Wages: \$16.00-\$19.00 per hour</p> <p>Vehicle: \$20,000</p> <p>Ancillary costs may include:</p> <ul style="list-style-type: none"> • Hiring costs (including physical exam/background check) • Purchase of personal protective equipment (PPE) (approx. \$3,000) • Ownership costs for vehicle (e.g. insurance, fuel, etc.)
Pay current firefighters to perform certain inspections	<ul style="list-style-type: none"> • Existing FFs become more knowledgeable about fire service • Reinforces FF's commitment to department/Town • Reinforces commitment to volunteer model 	<ul style="list-style-type: none"> • Need to determine who would schedule inspections • Existing FFs may not be consistently available at appropriate times 	<p>Wages: likely reflect current call rates (\$23.25-\$25.36 per hour)</p> <p>Vehicle: \$20,000</p> <p>Ancillary costs may include:</p> <ul style="list-style-type: none"> • Ownership costs for vehicle (e.g. insurance, fuel, etc.)

Note: There are additional duties that the Chief should undertake with more available time. Specifically, the Chief could perform pre-incident planning functions. See discussion on page 30-31.

SECTION III: AMBULANCE SERVICE MEMBER SURVEY RESULTS

The project team conducted an online survey of members of the Ambulance Service as a way to gauge employee perception of management and leadership and further understand the department's culture. The survey also asked questions about what motivated the member to join the department, to remain on the department, and the future of the department. The results of the survey are presented here. Further analysis of findings is integrated with the discussion of recommendations in the next section.

A link to the survey was sent via email to all members of the Ambulance Service, which is approximately 80 people. Thirty-seven members responded, yielding a response rate of 46%¹⁶. The respondents were 46% female and 54% male. Figures 7 and 8, below, show the age group and years of service for the respondents. More than half of respondents are 30 years old or younger. Tenure on the service varies, although the vast majority of survey takers have been members for less than five years.



¹⁶ However, one respondent only answered the introductory questions concerning gender, age, and tenure. This respondent was excluded from subsequent analysis. Therefore, for other analyses, n=36.

Recruitment and Retention

Respondents were asked several questions about why they joined the service and what motivates them to remain on the service. The majority (21 of 36 or 58%) of respondents learned about the service through a family member or friend and 42% (15 of 36) attended an information session/open house. Eight of the 21 or 38% members who learned about the service through a family member, friend, or classmate also attended an information session.

Table 13. Methods by which Members Learned about the Service

Method	# of Members
Family member(s) or friend(s)	21
Ambulance Service open house/information session	15
School/classmates	5
Newspaper	4
Other	4
Department website	1
Town website	1
Local radio or TV station	0
Social media (Facebook, Twitter, etc.)	0
Booth/table at an event	0

The tables below show reasons for joining and staying on the service. The most important reasons for joining the service were “Wanted to give back to the community” and “Work of the service is compelling to me.” Key reasons for remaining with the service include: “Work of the service is compelling to me,” “Wanted to give back to the community,” and “Continuing to work with friends.”

Table 14. Reasons for Joining the Ambulance Service

	Not a contributing factor		Contributing factor		Primary reason for joining		No answer		Primary or contributing factor
	#	%	#	%	#	%	#	%	
Reasons for joining Ambulance Service									%
Wanted to give back to the community	0	0%	18	50%	18	50%	0	0%	100%
Work of the service is compelling to me	3	8%	14	39%	19	53%	0	0%	92%
Build resume or learn new skills	7	19%	21	58%	7	19%	1	3%	78%
Wanted to meet new people	11	31%	21	58%	3	8%	1	3%	67%
Interested in exploring related career	15	42%	9	25%	11	31%	1	3%	56%
Sense of obligation to the Town	16	44%	17	47%	2	6%	1	3%	53%
Friends are members or joined with a group of peers	19	53%	13	36%	3	8%	1	3%	44%
Something to do while not working or retired	20	56%	11	31%	3	8%	2	6%	39%
Family tradition or family members part of service	27	75%	4	11%	3	8%	2	6%	19%
Wanted to be a hero	28	78%	3	8%	4	11%	2	6%	19%
Compensation for calls	33	92%	1	3%	0	0%	1	3%	3%

Other reasons cited include:

- Helping people/kids
- Career-related
- Flexible schedule

Table 15. Reasons for Remaining on the Ambulance Service

	Not a contributing factor		Contributing factor		Primary factor		No answer		Primary or contributing factor
	#	%	#	%	#	%	#	%	
Reasons for remaining on service									%
Work of the service is compelling to me	2	6%	15	42%	19	53%	0	0%	94%
Want to give back to the community	4	11%	17	47%	15	42%	0	0%	89%
Continuing to work with friends	6	17%	17	47%	12	33%	1	3%	81%
Building resume or learn new skills	13	36%	17	47%	5	14%	1	3%	61%
Want to meet new people	15	42%	15	42%	5	14%	1	3%	56%
Sense of obligation to the Town	16	44%	17	47%	2	6%	1	3%	53%
Something to do while not working or retired	16	44%	14	39%	4	11%	2	6%	50%
Interested in exploring related career	20	56%	6	17%	9	25%	1	3%	42%
Compensation for calls	26	72%	9	25%	0	0%	1	3%	25%
Want to be a hero	26	72%	6	17%	2	6%	2	6%	22%
Continuing family tradition	30	83%	4	11%	0	0%	2	6%	11%

A comparison of tables 14 and 15 indicates that 81% of respondents were compelled to stay in part to “Continue to work with friends” whereas only 44% joined because “Friends are members or joined with peer group.” Also, 25% stay in part because of “Compensation for calls” whereas only 3% joined for this reason. (Note: The Ambulance Service only began compensating members for calls this fiscal year, so the 3% could change as new members join.) These were the most significant changes demonstrated by these data.

Table 16, below, indicates the relative strength of the listed incentives to remain on the department. The strongest incentives are “More training” and “Stronger department leadership.” Respondents seem relatively divided on “Ambulance Service branded gear” and “More social activities and events” as incentives.

Table 16. Incentives to Continue with the Ambulance Service

Incentives to continue	Not an incentive		Weak incentive		Strong incentive	
	#	%	#	%	#	%
Ambulance Service branded gear, such as t-shirt or hat	13	36%	11	31%	12	33%
Differential pay for certain calls	8	22%	26	72%	2	6%
Formal recognition, such as an award ceremony after 2 years of service	13	36%	14	39%	9	25%
Increased compensation rate per call	20	56%	10	28%	6	17%
Informal recognition, such as an email of praise from the Board of Selectmen	17	47%	12	33%	7	19%
More input into the direction and vision of the service	7	19%	15	42%	14	39%
More social events and activities	10	28%	14	39%	12	33%
More training	5	14%	12	33%	19	53%
Public recognition	10	28%	17	47%	9	25%
Stronger leadership	6	17%	10	28%	20	56%

Management and Operations

Respondents were asked to rate statements pertaining to the Ambulance Service’s management and operations on the following scale: 1- Strongly Disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree. Answers are displayed in Table 17, below.

Survey takers seemed generally neutral to slightly positive about the service’s management and operations. In particular, the results show that many were neutral or disagreed with the statement “Standards for participation and performance are clearly communicated and enforced.” Survey takers were split regarding whether “Members who are not able to give the minimum amount of time and effort required should be asked to leave the service.” That statement was rated an average 3.06/5.

Table 17. Statements Related to Management and Operations

	Average	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- Strongly Agree
I can talk openly with the Co-Directors about issues facing the service.	4.16	1	2	4	9	16
Major decisions are arrived at through discussion and consensus, rather than select people making decisions for the entire service.	3.31	2	8	6	10	6
Decisions or changes are effectively communicated to members of the service.	3.91	1	1	7	14	9
Constructive feedback on performance is provided on a regular basis, both formally and informally.	3.53	1	6	7	11	7
Standards for participation and performance are clearly communicated and enforced.	3.31	1	6	10	12	3
Training sessions are relevant and valuable to the work we do.	4.25	0	0	5	14	13
Members who are not able to give the minimum amount of time and effort required should be asked to leave the service.	3.06	4	5	12	7	4
As a service, we are good at what we do.	3.94	0	3	3	19	7

Morale and Culture

Respondents were asked to rate statements pertaining to the Ambulance Service's morale and culture on the following scale: 1- Strongly Disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree. Answers are displayed in Table 18, below.

Although the vast majority of survey takers like and trust other service members, the statement "Morale is high in the service" received an average 2.91/5. Also, although most survey takers feel that the community values the service, the statement "Town staff and elected officials seem to recognize and appreciate the value of the service" received an average 2.50/5.

Table 18. Statement Related to Morale and Culture

	Average	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- Strongly Agree
I like and trust the vast majority of members in the service.	4.16	1	1	2	16	12
Morale is high in the service.	2.91	4	7	10	10	1
Training sessions, social activities, and other events are effective in building camaraderie and a positive environment.	3.91	0	3	6	14	9

	Average	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- Strongly Agree
I feel that my service is appreciated not just by others in the service, but by the entire community.	3.53	0	5	8	16	3
Town staff and elected officials seem to recognize and appreciate the value of the service.	2.50	9	8	6	8	1

The Future of the Ambulance Service

Respondents were asked to rate statements pertaining to the Ambulance Service's future on the following scale: 1- Strongly Disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree. Answers are displayed in Table 19, below.

Overall, survey takers seem neither positive or negative about the future of the service. Many of the statements received an average "neutral" rating. Although the majority of respondents plan to remain with the service and would recommend joining to a family member or friend, many also expressed hope for change in the next decade.

Table 19. Statements Related to the Future of the Ambulance Service

	Average	1- Strongly Disagree	2- Disagree	3- Neutral	4- Agree	5- Strongly Agree
I understand and agree with the strategic goals for the service.	3.69	0	3	8	17	4
The service is moving in the right direction.	3.53	0	2	14	13	3
My suggestions for change and improvement are appreciated and genuinely considered.	3.69	1	2	8	16	5
I would recommend joining the service to a family member or friend.	4.09	1	1	4	14	12
In 5 years, I expect to still be a member of the service.	3.66	4	1	4	16	7
In 10 years, I hope that the service remains largely the same as it is today.	3.16	2	8	8	11	3

Other comments and number of individuals making comment (in parentheses):

- More accountability/stronger commitment is needed (6), especially for younger EMTs/Bromfield students (2)
- Improve training/refresher training/more training for drivers /more training with Police and Fire departments (5)
- More policies and procedures to ensure consistency/better enforcement of policies (2)
- Incentives for members to be at the station when on-call/more food in the fridge (2)

- Better treatment for those who cannot meet participation requirements for good reasons (1)
- Improve treatment/respect from the Board of Selectmen (1)
- Promotions to full member are based too much on personality (1)
- More effective recruitment for adult and student members who will be committed (1)
- Leadership needs to be more professional and more open to change (1)
- Reduce emphasis on cadets; resources would be better spent elsewhere (1)
- More respect for drivers as valued members (1)

SECTION IV: AMBULANCE SERVICE RECOMMENDATIONS

MANAGEMENT FRAMEWORK AND PRACTICES

The Ambulance Service's management framework is made up of the formal and informal, documented and undocumented policies, procedures, and practices that define how the department is operated and overseen. This management system is ideally 1) strategically-designed to create an environment where staff are able to efficiently and effectively perform their duties, 2) documented to the extent reasonable to ensure clarity for staff and promote consistent, continuous operations, 3) reflective of the Town residents' objectives and desired levels of service, and 4) easily accessible for public review. Currently, the service has a robust *Policies and Procedures* manual and an extensive process for ensuring new members review it.

Recommendation: The Ambulance Service should become more integrated with Town government. The Board of Selectman should take a more active role in the oversight of the service and Town management should be more aware of the day-to-day of management of the service and provide support and oversight as necessary. Additionally, HAS should work to improve its working relationship with the Police and Fire Departments.

Some Ambulance Service members seem to perceive the service as autonomous from the Town government, which may be reinforced by the "hand-off" approach toward the ambulance service by the Board of Selectmen and Town management. It became clear through interviews that some members believe that the Town management and the Board are intentionally disengaged as it concerns the service because they do not value HAS. Survey results showed that most members disagreed with the statement "Town staff and elected officials seem to recognize and appreciate the value of the service." It received an average rating of 2.50/5.

There is only limited, perfunctory communication between the Board and Town management and HAS management, for example during budget time, and other communication is on an *ad hoc* basis. Administrative tasks such as expenditure reconciliation can be a challenge, although part of this is due to the difficulty in aligning a volunteer's schedule with Town Hall's schedule. It is also a challenge for Town staff to coordinate with multiple volunteers who each have responsibility for pieces of the service's management.

Yet, even with these challenges that are inherent to the volunteer model, it is important that the Town management staff and the Board of Selectmen have proper oversight over the service. Members are appointed by the Board and are considered employees of the Town. The Ambulance Service serves as the Town's primary EMS provider at the discretion of the Board of Selectmen¹⁷. Finally, the Ambulance Service operates from a Town-owned facility, the

¹⁷ According to State regulation, each local jurisdiction in Massachusetts must develop a service zone plan for emergency medical services and designate a primary ambulance service provider. See 105 CMR 170.5 (B)(1)-(5).

ambulance is owned by the Town, and the Ambulance Service's budget is part of the Town's general fund budget.

A discussion below on pages 60-63 discusses the potential need for a full-time employee managing the Ambulance Service. Short of that change, there are several steps that can be taken to further integrate the service with the rest of Town government. First, key HAS managers should be required to periodically meet with appropriate Town management staff (i.e. Town Administrator, Assistant Town Administrator/HR Director, and/or Finance Director) to review specific issues such as expenditure reconciliation or payroll records. Town management should be providing greater support to HAS volunteer managers as they undertake certain key administrative tasks to ensure that they are completed fully and correctly. The Board of Selectmen should request more frequent updates regarding the service's performance and activities and to ensure that any directives from the Board are carried through. There appears to be confusion or disagreement at times on the part of all involved parties as to the directives from the Board, particularly involving the service's financial self-sustainability and reliance on mutual aid for calls. Progress and adherence to goals set forth in service zone agreement should be reported. This is one of the key measures that ensure that the service is continuing to provide the service expected of it by the Town. It is the responsibility of the Board of Selectmen to require these data and explanation and action when standards are consistently not met.

Better communication and integration with the Fire and Police Chiefs would also help the service better integrate with the Town government. Currently, the working relationship with the police and fire departments appears to be strained. Although it is a challenge because they are volunteers with other jobs, it is important that HAS Co-Directors meet regularly and coordinate with the chiefs as HAS should be a key player in the Town's public safety system.

Recommendation: The Service should report a more robust analysis of key performance measures to its membership and the Board of Selectmen on a consistent schedule. HAS management should consult with the Board and Town management regarding performance measures.

Periodically, presentations about call volume and response time are made to the full membership and occasionally to the Board of Selectmen. Some statistics are also reported in the Town annual report. However, it would be beneficial to both the service and the Town writ large if more consistent and robust reporting occurred. In particular, the Center recommends that the service mimic and build upon analyses in the report regarding member participation and response times. Member participation partially reflects the ongoing success of the volunteer model, and response times is a key performance measure for any EMS provider.

There are certain limitations of the existing response time data that should be corrected, if possible. It would be helpful to have data relative to alarm handling/processing time. Alarm handling/processing time is a measure of the time it takes dispatch to accept a call and tone for

the department. It would be preferable to capture not only hours and minutes, but also seconds. In the Center's experience, the computer-aided-dispatch (CAD) software system used by dispatch cannot capture seconds.

Finally, call volume, measures of recruitment and retention, including net gain/loss of members, and the balance of the ambulance receipts reserved account should be reported on an annual basis.

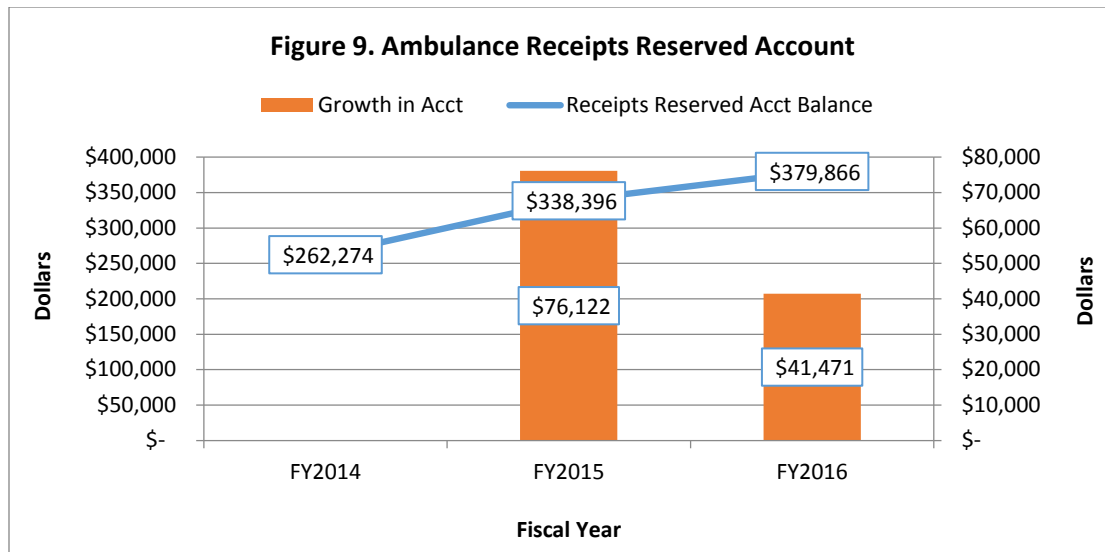
Recommendation: The Ambulance Service should become certified to bill MassHealth.

In order for an EMS provider to bill MassHealth, the provider must first be certified by the State. The Ambulance Service has undertaken this application multiple times over the past several years (according to one interviewee, seven times over the last decade) and has recently been assisted by its ambulance billing contractor, ProEMS. However, its most recent application was denied because of a technicality. Hopefully this oversight is rectified soon, as this is a small but nonetheless important source of additional revenue, especially given that the ambulance will need to be replaced soon.

Recommendation: HAS should work with the Board of Selectmen to 1) determine the best option for capital replacement of the existing ambulance and 2) agree to a policy for future capital replacement.

The Town maintains an ambulance receipts reserved account. This account is used to pay the annual expenses of the service. A positive balance has been growing over time, which is intended to be used to pay for the replacement of the ambulance in FY2018. There appears to be disagreement regarding whether or not the replacement of the ambulance was intended to be fully or only partially funded from the account. HAS and the Board of Selectmen should agree to a formal policy regarding how future capital replacements will be funded.

Figure 9, below, shows the balance of the receipts reserved account over the last three fiscal years.



In FY2017, the Town began to pay a call stipend to ambulance members based on their responses to calls. The total cost is expected to be \$40,000-\$60,000 annually. This new expense may reverse or significantly slow the trend of growth in the ambulance receipts reserved account. The balance at the end of FY2017 will likely not be enough to purchase a new ambulance outright and fund HAS expenses in FY2018. The service estimates that the new ambulance will cost approximately \$300,000 and a new stretcher will cost an additional \$25,000-30,000. There are several options that HAS and the Board of Selectmen may consider:

- The Town could subsidize the cost of the replacing the ambulance. The precise level of subsidy would have to be determined by projecting the service's expenses and revenues and determining the balance needed in the account to sustain the current system.
- The Town could borrow to replace the ambulance and annual debt service could be paid from the receipts reserved account. The Center estimates that borrowing for a five-year period would require an annual debt service payment of roughly \$70,000. There may also be other financing mechanisms and scenarios to consider. By forecasting expenses and revenues, HAS could determine whether this method would result in positive annual cash flow.
- The replacement of the ambulance could be postponed while strategies to continue the growth of the receipts reserved account are explored. This option would likely increase maintenance costs for the current ambulance, and potentially put the ambulance at risk of substantial time out of service. The vehicle maintenance records should be reviewed to determine its condition. This may also mean postponing operational improvements based on equipment upgrades associated with a new ambulance.

No matter which option is taken, the Center recommends that any available Town resources be provided to support HAS managers through this process. Municipal purchasing is highly

regulated in Massachusetts, and it is unlikely that HAS volunteers would be as knowledgeable about the process other Town employees. The Town Administrator, Finance Director, and Fire Chief could be helpful during this process. For example, the Town should be able to support or guide the service through questions related to financing options and collective purchasing options, such as the state bid list or perhaps the Metropolitan Area Planning Commission's (MAPC) fire apparatus purchasing program¹⁸. A collective purchasing opportunity may save substantial time and/or money.

INFORMATION TECHNOLOGY AND DATA

Emergency medical service is a data-rich industry with copious information technology available for managing that data. Some is required by State regulation or law and other IT is recommended. Like the Fire Department, HAS uses the technology provided through the Nashoba Valley Regional Dispatch in Devens. This includes the IMC CAD system and an application called I Am Responding that allows members to put themselves on-call. They also have their own records management software called FieldBridge by Image Trend that allows for electronic patient care reporting.

Since the service operates under a volunteer model, with little support from the Town in terms of information technology, it can be a challenge to ensure that IT is being taken advantage of completely. That said, HAS has a number of volunteers who are highly capable and willing to use the IT available to the service's advantage, as well as to maintain and analyze other data to enhance the service. There are no IT- and data-related recommendations at this time.

HUMAN RESOURCES

Recruitment & Retention

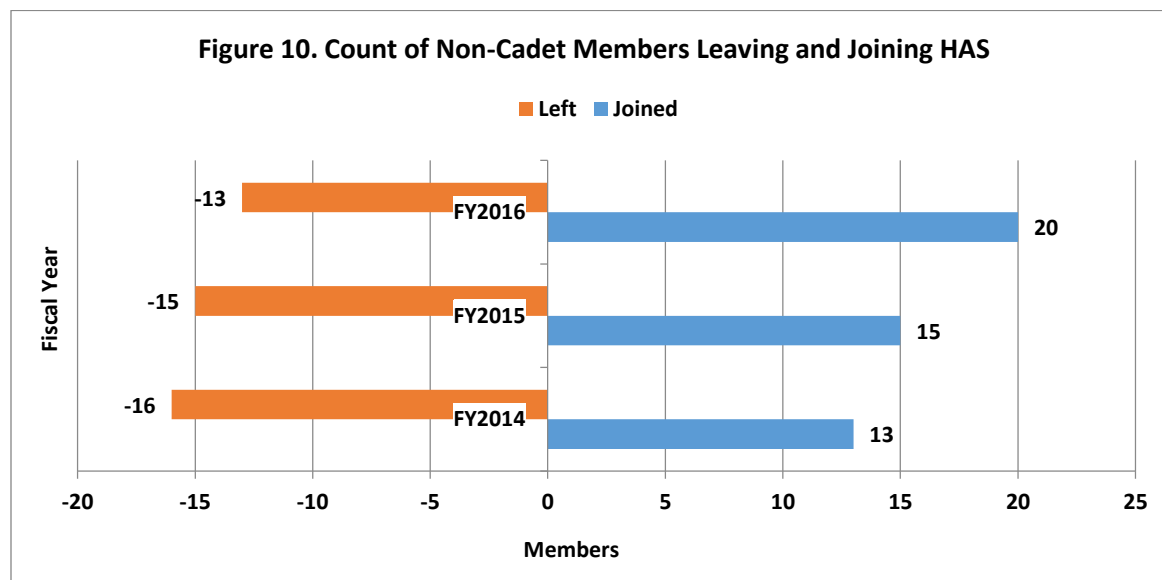
Recommendation: The Co-Directors should develop a recruitment and retention strategy that lays out specific techniques for enhancing membership. Repeating the survey conducted as part of this study periodically may be helpful in this effort. Exit surveys for departing members should be conducted to understand the reasons that members leave. Data on each member's join date, promotion date, and exit date should be consistently collected and analyzed.

As an entirely volunteer department, the Ambulance Service relies on volunteers to perform all necessary duties- from management functions such as policy setting, finance, human resources, and ambulance billing administration to staffing the ambulance. The department's current

¹⁸ For more information, see: <http://www.mapc.org/fcam>

roster stands at approximately 80 members. However, many of these members have specific restrictions regarding when they are available. Many are in high school and cannot work overnight, away at college, or live elsewhere, especially during the summer months.

Data regarding turnover in non-cadet members were available. See Figure 10, below. Over the past three fiscal years, the service has experienced a net gain of four non-cadet members.



As is true with the fire department, the potential pool of new volunteers is relatively small, and only a minority will be interested and willing to join the service. The most important step in developing a recruitment strategy is to understand who the ideal candidates are and how to reach them. This makes recruitment much more efficient. One relatively easy way of approaching this is to survey existing members. The results from the survey conducted as part of this study were that the majority (21 of 36 or 58%) of respondents learned about the service through a family member or friend and 42% (15 of 36) attended an information session/open house. Eight of the 21 or 38% members who learned about the service through a family member, friend, or classmate also attended an information session. The most important reasons for joining the service were “Wanted to give back to the community” and “Work of the service is compelling to me.”

Based on these results, the service could use the same strategies as recommended for the Fire Department. Focus on reaching relatives and friend of current members with information about the work of the department and its importance to the community¹⁹. Some techniques might include:

¹⁹ This is a proven recruitment strategy called “concentric circle recruitment” by scholars who study volunteerism.

- Write an “elevator pitch” for current members to draw upon when they are asked about the department
- Create print and digital materials (brochure, YouTube video, Facebook content, etc.) that highlights the work of the department and its importance to the community
- Host a “bring a friend” event for department members

Managers should actively analyze data to determine whether the cadet program is an effective component of the recruitment strategy. Key measures would be:

- Average hours on-call per recruit versus required on-call hours
- Average runs per recruit versus required runs
- On-call hours and runs during college breaks and times cadets are back in Harvard

A retention strategy should also be developed. Although data regarding each member’s start, promotion, and exit dates were not readily available, the service appears to have an issue with turnover. Over the past three fiscal years, approximately a quarter of non-cadet members have left the service annually. Several interviewees also mentioned that turnover was high. While high turnover amongst cadets may be expected due to the fact that young people move away to college and only sometimes move back to Harvard afterwards, the rate of turnover for non-cadet members does present a management challenge. The Co-Directors should actively monitor the turnover rate of non-cadet members and perform exit interviews with departing members to determine why members are leaving. If members are asked to leave because they are not meeting participation requirements, the Co-Directors should determine what, if anything, the service could do to ensure that more of those joining can be successful.

The survey conducted does demonstrate that the reasons that members remain on the department may be different than reasons for initially joining. Eighty-one percent of respondents were compelled to stay in part to “Continue to work with friends” whereas only 44% joined because “Friends are members or joined with peer group.” This indicates that the social aspect of the service and the positive relationships formed amongst members are important. In particular, this means that the social aspect of the department and the positive relationships amongst members are important. Social events and team-building activities are important, as would be addressing any disruptions in morale or interpersonal issues. Finally, the survey revealed that the strongest incentives for remaining with the service would be “More training” and “Stronger department leadership.” Respondents seem relatively divided on “Ambulance Service branded gear” and “More social activities and events” as incentives.

Recommendation: The service should enforce its membership requirements and make the granting of special allowances transparent. Managers should monitor the use of I Am Responding to ensure that all members use it consistently and correctly. It would be beneficial to the membership for a manager to present participation data periodically at monthly meetings. This would require some redesign of the current data collection tools. Also, HAS Co-Directors should consider shifting the issuance of some benefits to a period of

time after the member has sufficiently demonstrated a commitment to the participation requirements.

HAS has a robust policies manual. However, a key policy that states that members must meet certain participation benchmarks does not appear to be assessed or enforced. This may be creating problems with scheduling, equity, and morale/organizational culture, which may be more difficult to manage given the service's turnover rate of approximately 25%. Furthermore, although the non-cadet HAS roster has remained relatively consistent in size over the last four years (approximately 56-63 individuals), non-cadet membership grew 75% from 36 in June 2010 to 63 in June 2016. It may be that the policies and procedures successfully employed by management in the past are less effective given the larger roster.

The participation analysis below is based on several data sets maintained by service volunteers as well as records from the I Am Responding application. These data had to be cleaned and substantially reorganized in order to complete the analysis, and there were several irregularities in the data that could not be resolved. That said, the analysis conveys the best information that could be obtained regarding member participation. In the future, it would be beneficial if members were consistent in their use of I Am Responding and if data regarding start dates, leave dates, and special allowances for members were readily available as a part of a complete and accurate member roster.

Participation Analysis

The Ambulance Service has rules regarding member participation in order to maintain membership. These rules are clearly laid out in the HAS Policies and Procedures manual. The policy cites the main reasons that participation standards are in place: "...the Town has by long tradition paid most costs of Members' initial education, EMT testing and licensing, liability coverage, ongoing training, and issued equipment. The Service thus has a financial responsibility to the Town to remove inactive and non-contributing Members. More importantly, an involved, well-informed, and committed membership is vital to the Service's high standard of 24 x 365 emergency care." As discussed later, participation, or a lack thereof on the part of some members, can negatively impact members' actions and/or attitudes and perceptions about other members and the service generally.

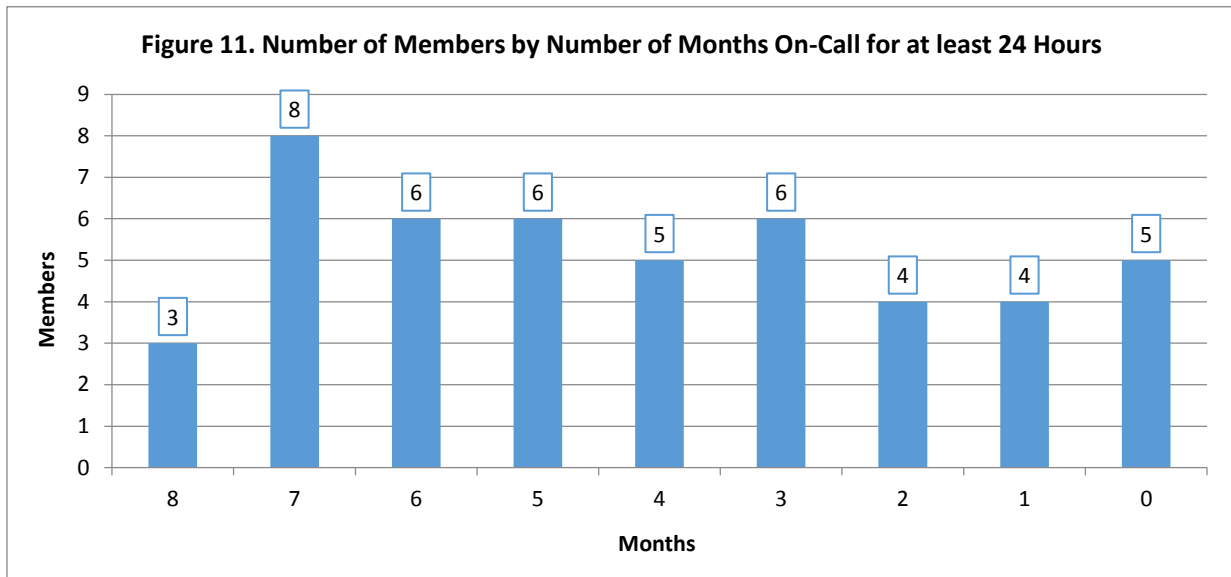
The key quantifiable measures of participation requirements include:

1. Attend at least 8 monthly meetings in a 12-month period.
2. Be on call, through I Am Responding, for at least 24 hours per calendar month.
Bromfield students must complete 24 hours above-and-beyond school-day hours.
3. Complete at least 10 calls in each rolling 12-month period.

4. Complete all required post-incident reports accurately and in a timely manner. Pre-hospital care reports for transported patients shall be completed within 24 hours and documentation for transport refusal shall be submitted within 48 hours.

Data concerning the second and third point cited above were available.

Data from I Am Responding was provided, showing each member's on-call hours by month. Figure 11, below, shows the number of members by the number of months that they were on call for at least 24 hours for the period January through August 2016. Only three members met this standard. There were another fourteen members who only missed one or two months.

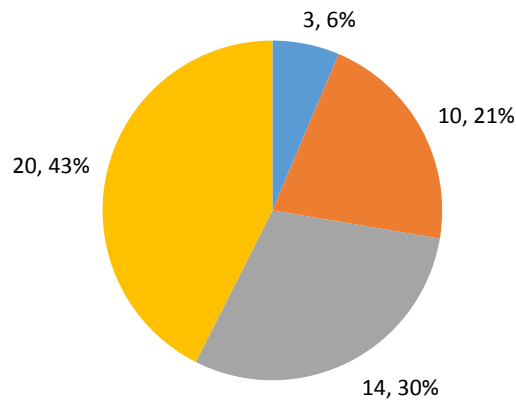


* Members with special allowances or special circumstances (e.g. away at college) and new cadets were excluded from this analysis. Approximately 25% of members have a special allowance or special circumstance that excuses them from meeting the participation standards. Data was also adjusted for members who joined mid-way through the study period. Therefore, n=47.

Figure 12, below, shows the number and percent of members by average on-call hours per month. Twenty members, or approximately 43%, were on-call for an average of 24 hours per month (though they may not have made the 24 hour mark each month). Three members were on-call on average for more than double the required 24 hours.

Figure 12. Members by Average On-Call Hours per Month

■ Less than 8 ■ 8 to 16 ■ 16 to 24 ■ More than 24



* Members with special allowances or special circumstances (e.g. away at college) and new cadets were excluded from this analysis. Approximately 25% of members have a special allowance or special circumstance that excuses them from meeting the participation standards. Data was also adjusted for members who joined mid-way through the study period. Therefore, n=47.

One of the HAS volunteers collects data regarding each run from the regional dispatch center. The data includes which members responded to each call. For the period August 2015 through July 2016, which is the most recent 12-month period available, 79% (34 of 43) of members, not including those with special allowances, participated in the minimum required 10 calls. Seventeen of those members attended more than 20 calls, nine more than 40 calls, and two more than 100 calls.

The analyses above exclude members with special allowances that exempt them from the participation requirements. Approximately 25% of members currently on the roster have a special allowance, most because they are professionals in the medical field or have moved away (for part of the year or for college) and can only make calls when they are back in Town. It is unclear how transparent the service is to its wider membership about these special allowances or how clearly managers communicate the participation data available. There seems to be a perspective among some service members that many members do not meet participation benchmarks and that the burden of work falls on relatively few. Based on the data available, it seems that a healthy majority of members are participating in at least ten calls per 12-month period, but that very few put themselves on call for the requisite 24 hours per month. It may be that this perspective is caused by the fact that all members can view who is on-call through the I Am Responding application.

These two benchmarks seem to tell competing narratives about participation of the membership. There are negative impacts of low or uneven participation that were identified throughout the study. Many of these impacts will hold true as long as there is a perception that many do not participate. Survey respondents rated the statement “Standards for participation

and performance are clearly communicated and enforced” at a 3.31/5, which falls into the “neutral” response category. They rated the statement “Members who are not able to give the minimum amount of time and effort required should be asked to leave the service” a 3.06/5, which reflects a neutral assessment. Respondents were relatively split on the statement, with 9 disagreeing, 11 agreeing, and 12 being neutral.

Negative impacts:

- Burn out: Some members, especially those shouldering a higher burden of participation, may begin to feel burnt-out and even leave the service.
- Members waiting for second tone from dispatch²⁰ to participate on a call because they want to see if others will participate, resulting in longer response times. This was reported by one interviewee. Data show that during the period January to July 2016, HAS was able to assemble a full crew at the first tone 44% of the time. For calendar year 2015, the figure was 50%. Low/uneven participation or the perception of it may be one cause of this finding.
- Feelings of not being a “team” or resentment towards other members
- Perceptions of unfairness or differential treatment by management
- Lower morale. On the member survey, the statement “Morale is high in the service” was rated at 2.91/5 which is a slightly “disagree” response.

The project team recommends that the service enforce its membership requirements and make the granting of special allowances transparent. Managers should monitor the use of I Am Responding to ensure that all members use it consistently and correctly. It may be beneficial to the membership for a manager to present participation data periodically at monthly meetings. This transparency would demonstrate a commitment to the enforcement of the participation policies as well as ensure that all members have facts, rather than rumors or hearsay, regarding participation. It may also be beneficial to shift the issuance of some benefits to a period of time after the member has sufficiently demonstrated a commitment to the participation requirements. One such example may be issuance of a HAS-branded jacket after a year of full participation.

Recommendation: Further explore potential challenges of the cadet program.

The cadet program is an innovative program in the EMS industry in Massachusetts. Generally, interviewees praised the cadet program, noting that it provided unique, positive experiences for students and often helped them explore their interest in a career in the medical field. Many

²⁰ Dispatch will tone the ambulance service, wait one minute, tone again, wait one minute, and then tone for mutual aid.

cadets were said to be very committed to the service, including well into adulthood. However, throughout the course of the interviews conducted for this study, several individuals raised various important questions about potential challenges within the cadet program. The Center was not able to independently verify these claims, but believes they are important enough to warrant further examination by HAS managers.

Potential challenges:

- The first question raised was “What are the motivations of the students joining the service?” The interviewee speculated that some cadets are more focused on building their resumes and that therefore they do the “bare minimum” required or do not meet the stated participation requirements. Data regarding cadet participation, the rate at which cadets become full members, and the length of time that cadets continue to actively participate (including when they return to Harvard during college breaks) could be gathered to assess this question.
- Another interviewee wondered whether the cadet program is “worth the cost” given cadet participation. The service pays 2/3 of the cost of the course for each cadet. The estimated cost of the course is \$1,500 per cadet, and cadets are required to pay \$500. This fall there are nine students taking the course, and participation has ranged from seven to 15 cadets over the past eight fiscal years.
- One interviewee raised the point that cadets “must be treated like adults, even though they aren’t adults.” The concern was that the work of responding to emergency medical situations often requires a high level of maturity, composure, and self-confidence. Cadets, although they are typically much more mature than their peers, may not be fully-prepared, mentally and emotionally, to do the work. Other interviewees disagreed with this assessment and thought that cadets by-and-large “rise to the occasion.” However, as one interviewee noted, it becomes more challenging to progressively give cadets more responsibility and ensure that they can handle it when the service relies on them to staff the ambulance during school hours.
- Finally, multiple interviewees raised concerns about whether cadets were properly prepared for some of the more challenging calls, in particular certain motor vehicle accidents. Interviewees recounted anecdotes about cadets being “confused” and “dazed” on-scene, making it more difficult for others to properly and expeditiously do their jobs. The service has made concerted efforts, in collaboration with the school department, to prepare and support cadets. This includes providing cadet candidates and their parents with information about the various stressors they might encounter. After a critical incident, cadets have access to supportive senior members of HAS, counseling, and critical incident stress management (CISM) resources provided by the State. Although these strategies are deployed, assessing their effectiveness is beyond the scope of this report.

OPERATIONS

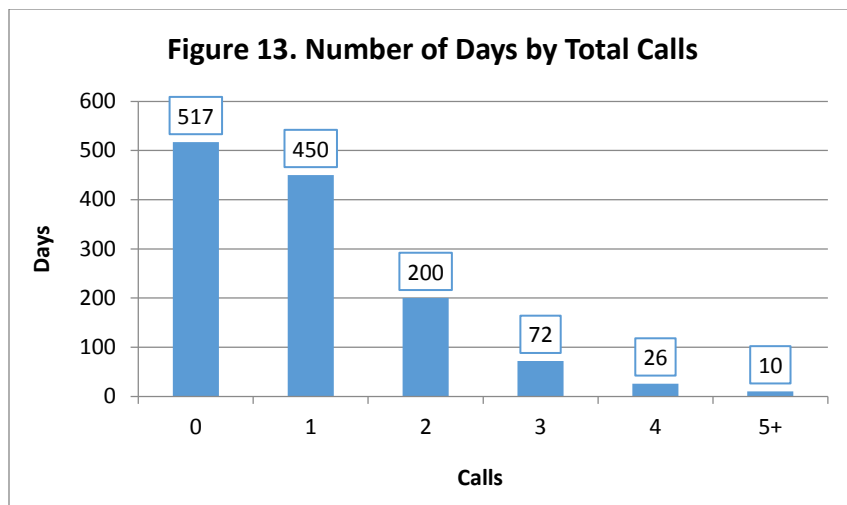
Call Volume Analysis

Data obtained from the Ambulance Service show that over the period 2013 through June 28, 2016, the service received 1,231 calls. This translates to approximately one call per day, as seen in Table 20, below. Calendar year 2016 is trending approximately 25% higher call volume through the end of June compared with the average of 2013 through 2015. Although the service did not see significant growth in the number of calls from 2013 to 2015 and even saw a 13% decrease from 2014 to 2015, if the current trend holds, 2016 may be a year of significant growth in call volume.

Table 20. Calls by Year and Month and Average Calls per Day

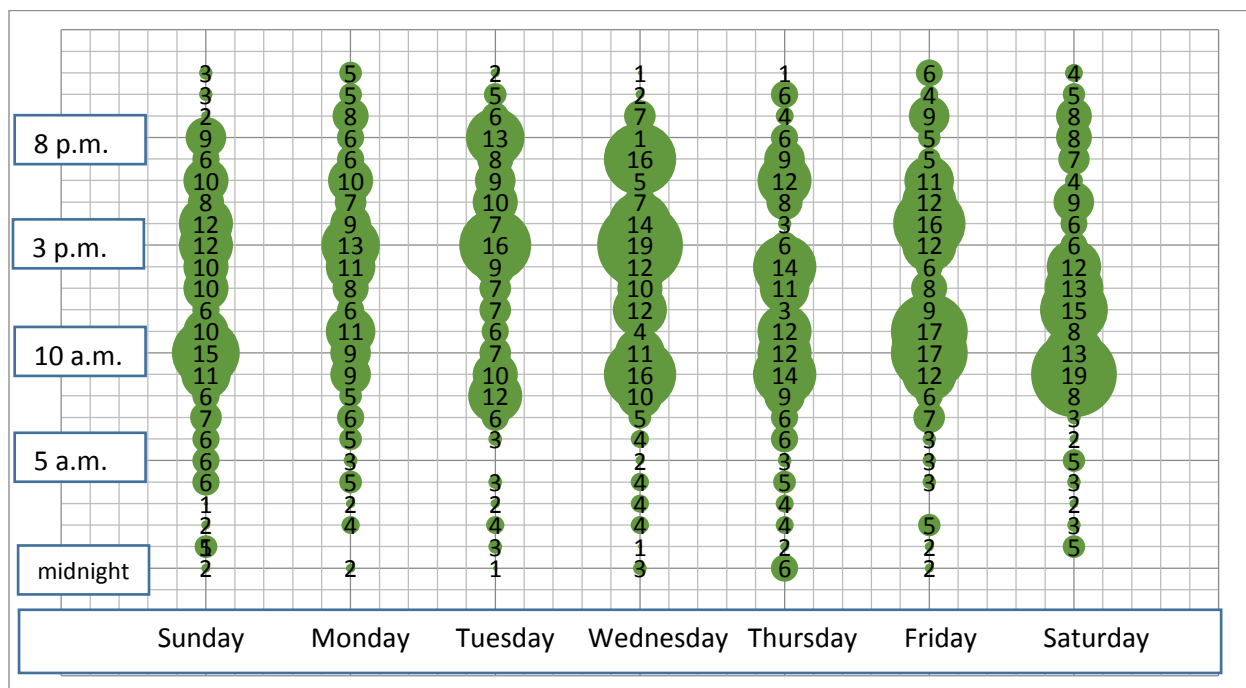
Month	2013	2014	2015	2016	Total
January	18	27	21	35	101
February	23	27	16	25	91
March	27	23	20	40	110
April	30	21	27	38	116
May	36	37	33	25	131
June	31	32	38	42	143
July	32	31	19		82
August	26	44	33		103
September	27	23	28		78
October	34	48	20		102
November	31	32	37		100
December	31	18	25		74
Total	345	363	317	205	1231
Avg/Day	0.95	0.95	0.95	1.14	0.97

Although the service received approximately one call per day, there were no calls on 41% of days in that time period. There was one call on 35% of days and more than one call on 24% of days. See Figure 13, below.



There appear to be no significant trends of calls based on day of the week or month of the year. However, as Figure 14, below, shows, there are clear times during a typical week where call volume is heavier than other times. Forty percent of calls occurred Monday through Friday, between 8AM – 5PM. Twenty nine percent of calls occurred on the Saturday and Sunday.

Figure 14. Calls by Day of Week and Hour of Day, 2013 through June 28, 2016



Note: There were 63 records with no initial call time. N= 1,176

Response Time Analysis²¹

Recommendation: Periodically review and report response times to membership and Board of Selectmen. Set targets to incrementally increase the percentage of calls that are responded to within 10 minutes. Management team should review calls with response times greater than 10 minutes to determine strategies for correction. Continue to explore direct-to-scene response. Provide additional targeted training so that more EMTs are comfortable with the practice. Also, continue to encourage volunteers to spend on-call hours at the station to improve response times.

Response time is a key measure of EMS performance. Although only a minority of calls are for emergencies where response time can be a matter of life or death for the patient, for other patients, longer response times may result in worse health outcomes generally. All clients, however, expect quick response when calling 911 for what they perceive to be a medical emergency. Volunteer EMS departments cannot be held to as high a standard for response time as a career department, where EMTs are standing-by poised to roll the ambulance. Volunteers must be contacted, assemble an appropriate crew, travel to the ambulance, and finally travel to the scene. The Harvard Ambulance Service has a target of 10 minute response time as laid out in the Town's service zone plan²². By contrast, the NFPA does provide a standard, known as NFPA 1710, which specifies response time for career EMS departments. Turnout time (the time from dispatch till the apparatus sets out) should be 1 minute and travel time should be 4 minutes for BLS units and 8 minutes for ALS capability, 90% of the time.

As Table 21, below, demonstrates, HAS has been able to meet the 10 minute response time standard 48% of the time over the past three-and-a-half years. Annual rates have ranged from approximately 45% to 53%.

Table 21. Did the response meet the 10-minute standard?*

	No		Yes	
	# of Calls	% of Calls	# of Calls	% of Calls
2013	161	54.39%	135	45.61%
2014	156	47.42%	173	52.58%
2015	159	53.18%	140	46.82%
2016 to 6/28	83	54.61%	69	45.39%
Total	559	51.95%	517	48.05%

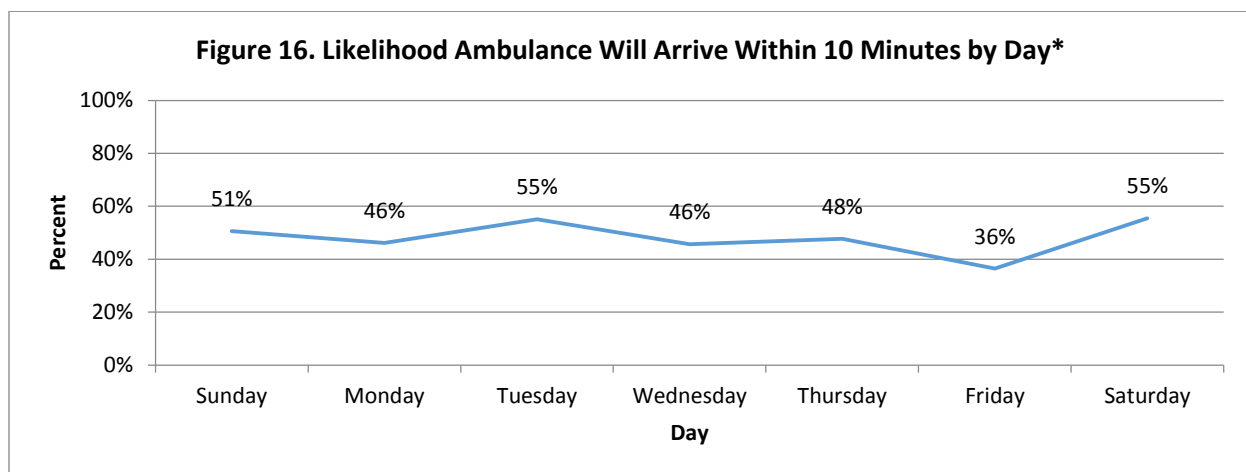
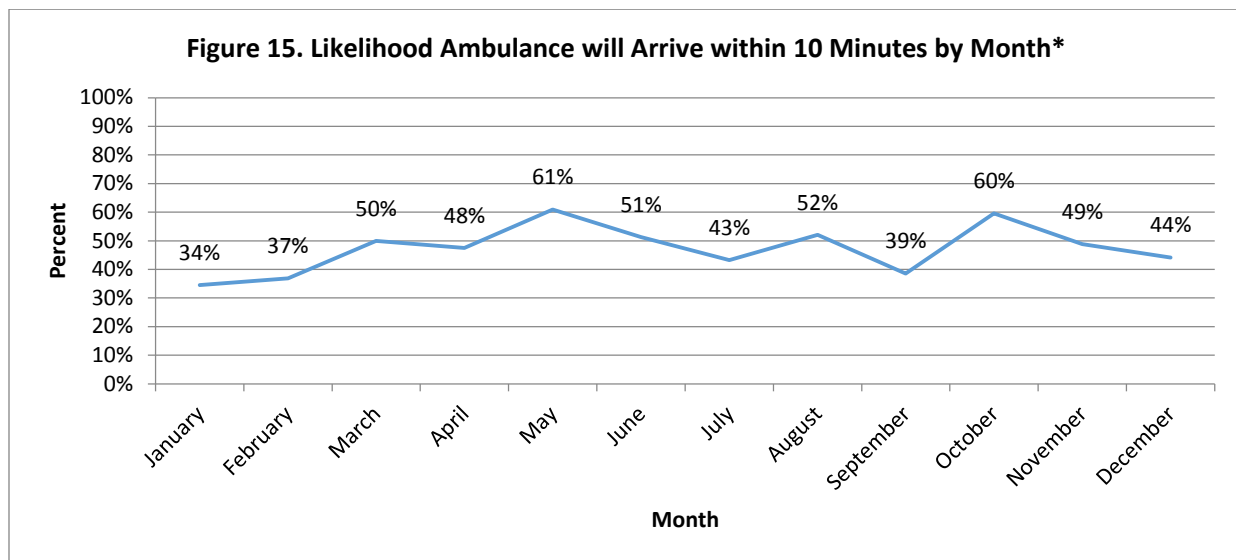
*Response is measured from the time the call is answered at dispatch till the ambulance arrives on scene. A small percentage of the response time - related to alarm

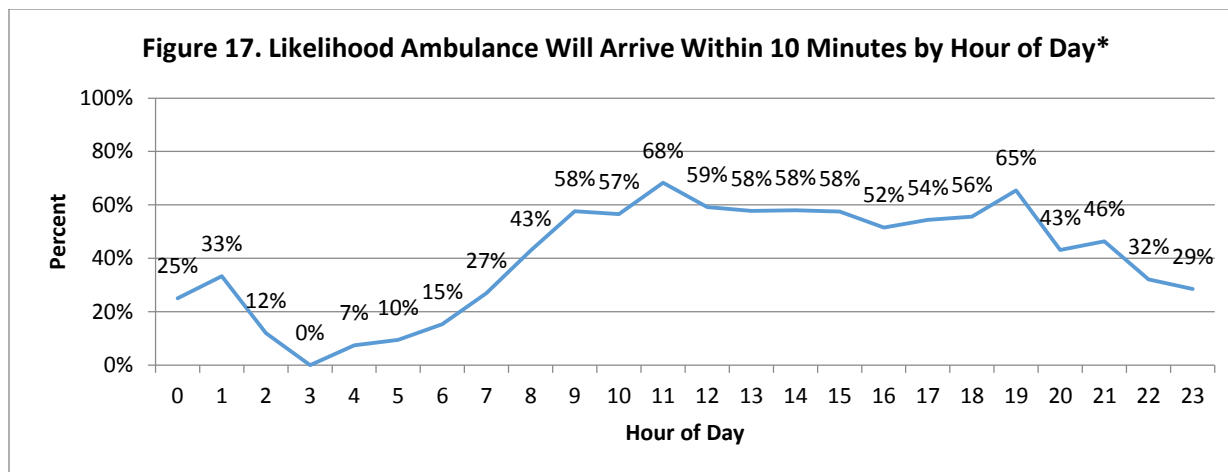
²¹ Time data includes hours and minutes, but not seconds. In the project team's experience, this is a limitation of the dispatch software rather than any HAS software.

²² The service zone plan defines response time as the time between "911 Call received at PSAP" and "Ambulance signs off at scene."

handling/processing - is outside the control of the service. This analysis excludes records without the necessary time data (111) and other cancelled calls (9).

Based on historical data, the ambulance is slightly less likely to arrive within 10 minutes in January, February, and September, and on Fridays. Reasons for this are unclear. However, the likelihood that the ambulance will arrive within 10 minutes does vary significantly based on hour of day. The data show that response times are typically slower during the late night and early morning hours. This is likely because volunteers are sleeping, so responses are naturally slower. See Figures 15-17, below.



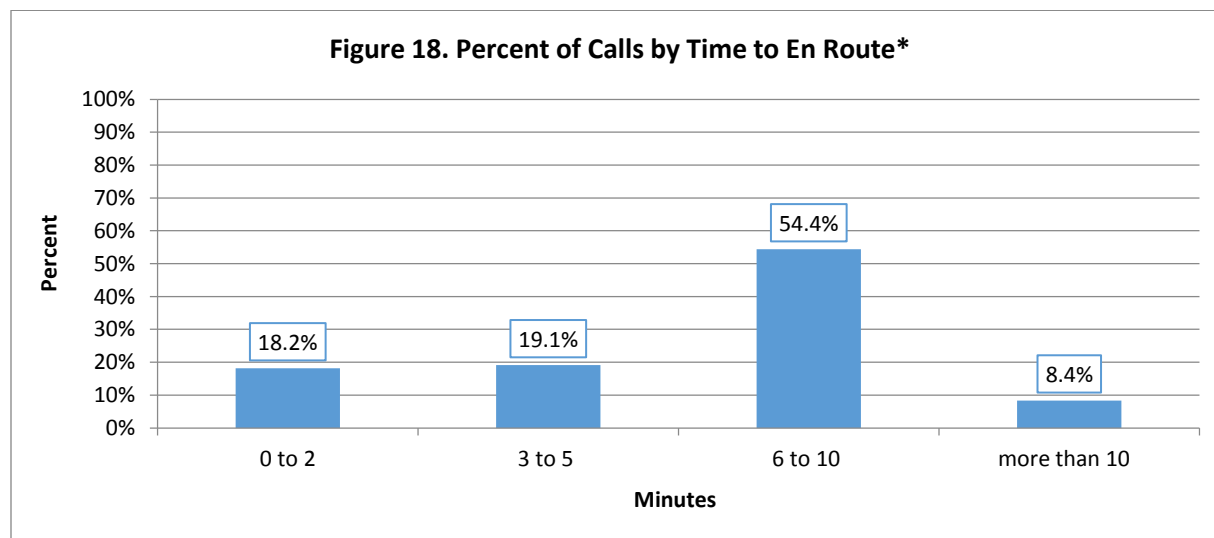


*based on historical data, 2013 to June 28, 2016. Excludes calls records without the necessary time data (111) and cancelled calls (9)

As noted above, there are several components of HAS' response time. First, dispatch must get in touch with volunteers to alert them to the emergency. The current practice of the Nashoba Valley Regional Dispatch is to tone HAS once, wait one minute, tone a second time, and go to mutual aid if no one responds within one minute. Therefore, it can take up to two minutes to ensure HAS volunteers will respond to a call. Some interviewees noted that it can be difficult to get a response from HAS volunteers till the second tone. This means that at least a minute has passed before volunteers begin to respond. There may be many reasons for this, and it is something that the HAS management team should investigate and attempt to correct. The second component is ensuring that a full crew is assembled. There must be two EMTs on board the ambulance, and at least one must be a full member and at least one must be over 18. Also, no EMT under 18 may be alone with a patient in the back of an ambulance. With HAS' many levels of membership, some may find it confusing to determine when a full crew has been assembled. The next component of the response time is when volunteers travel to the station to retrieve the ambulance. The final component of response times is travel from the station to the location of the emergency. By all accounts, the service is able to use GPS-technology to efficiently arrive on scene to an emergency.

While some volunteers do spend on-call hours at the station, this is not common. The service has been attempting to increase the number of volunteers who do this by choice by making the training room more comfortable and user-friendly. It remains to be seen whether this strategy will work. If more volunteers were on-call at the station, it will significantly reduce response times. HAS managers should identify other strategies to encourage this, such as coordinating with a group of friends to be on-call together at the station or encouraging volunteers to organize activities in the training room and be on call together. Such activities could include anything that interests volunteers, such as watching movies, sharing a meal, or playing games. Other volunteer departments have experienced a reduction in response time by convincing volunteers to be on-call at the station.

Data showing how long it typically takes the ambulance to get on route to the call were available. See Figure 18, below. Between 2013 and June 28, 2016, more than 50% of the time, it took the ambulance 6 to 10 minutes to leave the bay. Also, on average, the time it takes to get the ambulance en route represents approximately 55% of total response time.



*excludes call records without the appropriate time data and cancelled calls

Table 22, below, shows average response time by several different times of day. There were questions about whether the department has a difficult time responding quickly during business hours. The data show that the ambulance arrives on average in 11.35 minutes during business hours (defined as 8AM-6PM) compared with 10.19 minutes during times that most volunteers are assumed to be home and awake. During those times, the percent of runs meeting the 10-minute standard was approximately 43% compared to 57%. The slowest response times occur between midnight and 6AM, when most members are likely sleeping. Naturally, it takes longer to respond.

Table 22. Average Response Time During Certain Hour Groupings, 2013 to mid-2016

Hour Grouping	Avg. Response Time (Mins)	Percent of Runs Meeting 10 Minute Standard
Midnight to 6AM	14.47	13.93%
6-8AM & 6-11PM	10.19	56.68%
8AM-6PM	11.35	43.23%
Total- All Hours	11.01	48.05%

Direct-to-Scene Responses

In some instances, HAS volunteers are arriving directly to the scene (so-called “DTS” calls) in privately-owned vehicles (POV) while another volunteer or more than one retrieves the

ambulance and then drives to the scene²³. There are pros and cons to this strategy. The benefit is that a trained EMT arrives on-scene faster. Each EMT is issued certain basic medical supplies and equipment by the service (called a “mini jumpkit”), although many choose to add additional supplies and tools. Police officers respond to many medical calls, and they are equipped with oxygen and an automated external defibrillator (AED). However, the more sophisticated equipment and medications are located on the ambulance, and patients cannot be transported until the ambulance arrives, so ambulance response time is still important. Generally, there is always the concern about individuals driving safely while responding directly and whether they have sufficient insurance coverage. Furthermore, the opportunities for a DTS response are somewhat limited. Often those who are comfortable responding directly to the scene are the more experienced and confident EMTs. Some call departments limit such responses to only those members with a certain level of experience. Also, DTS response is inappropriate for certain types of calls, such as motor vehicle accidents on busy roads, mental health calls, domestic situations, and certain situations where EMTs are supporting an action by law enforcement.

Direct-to-scene response appears to be a sound strategy for HAS to employ, since many calls only require basic medical intervention or the knowledge and expertise of a trained EMT. The service is employing several strategies to encourage DTS response. These include:

- Educating members as to the value of DTS response
- Periodically sharing data demonstrating the effectiveness of DTS response
- Providing a “mini jumpkit” to be kept in the EMT’s personal vehicle
- Encouraging members to keep their radios on
- Providing positive reinforcement

The Center recommends that the service adopt a robust policy and procedural guidelines regarding DTS response so that more members are comfortable with the option. Also, HAS should confirm that members who respond directly have appropriate insurance coverage. HAS may consider whether emergency lights would be beneficial. Massachusetts State law does allow call department members to use “flashing, rotating or oscillating red lights” in personal vehicles when they are used for emergency response²⁴.

Table 23, below, shows that members responded directly to the scene on approximately 42% of calls between 2013 and mid-2016²⁵.

²³ Such responses are also widely-known as “POV responses” in the industry.

²⁴ See MGL Ch. 90 S. 7E. Lights must be permitted by the registrar, and there are use restrictions.

²⁵ These data include all DTS responses, not just those where the directly-responding EMT arrived before the ambulance.

Table 23, Total DTS Runs

Year	DTS Runs	All Runs	% DTS
2013	140	341	41.1%
2014	179	347	51.6%
2015	98	304	32.2%
2016	82	195	42.1%
Total	499	1187	42.0%

* excludes all cancelled calls (44)

The percent of runs where either the ambulance or an EMT arriving direct-to-scene within 10 minutes is 66.5% for the period 2013 through mid-2016. This is higher than the percent of calls where the ambulance arrives within 10 minutes, which is 48% for the same time period. The average direct-to-scene response time was 6.46 minutes compared to approximately 11 minutes for the ambulance. See Table 24, below, for more detail.

Table 24. Did the response meet the 10-minute standard when considering the lesser of the ambulance and EMT DTS response time?

Year	No		Yes		Avg. Response for DTS (Mins)
	# of Calls	% of Calls	# of Calls	% of Calls	
2013	108	34.7%	203	65.3%	6.72
2014	98	28.6%	245	71.4%	6.04
2015	117	38.6%	186	61.4%	6.86
2016 to June 28	55	32.0%	117	68.0%	6.48
Total	378	33.5%	751	66.5%	6.46

*Note: this excludes call records without the necessary time data and other cancelled calls

The data show that having an EMT respond directly to the scene does not appear to significantly impact the arrival time of the ambulance. On non-DTS calls, the ambulance arrived on scene within 10 minutes in 46.7% of cases, compared with 48% for all calls.

SECTION V. SUSTAINABILITY OF THE VOLUNTEER/CALL MODEL IN THE FIRE DEPARTMENT AND AMBULANCE SERVICE

As a small, nearly-exclusively residential community with a limited commercial tax base, the Town of Harvard must judiciously allocate resources for the school system and Town departments. The use of a volunteer/call model in the Fire Department and Ambulance Service has likely saved taxpayers hundreds of thousands over the years. However, many neighboring and peer municipalities have been adding full-time firefighter/EMTs to their rosters or outsourcing the provision of emergency medical services. This section examines the short and medium-term viability of the volunteer/call structure and makes recommendations for the future of the Fire Department and Ambulance Service. Several alternate scenarios are considered.

Fire Department

To examine the viability of the volunteer model for the Fire Department, the project team considered several factors:

- recruitment of new members and department strategy
- retention of existing members and department strategy
- call volume and growth trends
- current department performance measured by response times
- volume of other work

As discussed on pages 20-23 above, the department has enjoyed a relatively steady membership over the past five years. Recruitment has been able to largely fill the vacancies created by departing members. However, the department does not appear to have a formal recruitment strategy. With a limited pool of potential members, a formal strategy for recruitment will be key moving forward. Several specific suggestions were discussed above on page 20-23.

The department has been able to retain members quite well. There are many members with significant tenure on the department, but the membership is not tilted too heavily toward older firefighters. Although the department does not appear to have a formal retention strategy, many changes and practices instituted by the current Fire Chief appear to have had a significant positive impact on retention. These include: emphasis on training, formalization of policies/general professionalization of the department, focus on maintenance and care for apparatus, and creation of a deeper command and group structure. Morale in the department appears high, a finding reinforced by the results of the member survey.

Based on four years of data, the department has seen a significant increase in call volume. From 2012 to 2015, call volume increased by 43%. There were 0.76 calls per day on average in 2015. However, if officer calls are removed, there were only 200 calls in 2015, or 0.55 calls per day.

Recall that officer calls are non-emergency calls that typically do not require a timely response. Volunteers are fully capable of handling these calls. The current call volume does not justify the addition of a full-time firefighter. In addition, the department appears to be relatively close to meeting the standard of a 14-minute response, 80% of the time. There is a declining year-over-year trend in terms of the percent of calls meeting this standard. However, the department is essentially meeting this standard for all fire incidents. The overall average is perhaps negatively impacted by the response to rescue and EMS calls. It may be that response to EMS calls is slower because the firefighters are playing a supporting role to the Ambulance Service. Furthermore, although hiring a full-time firefighter would play a role in reducing response times, one alone would not be able to staff the apparatus and therefore volunteers would still be needed. As noted previously, NFPA standard 1720 calls for six firefighters to be on-scene for the initial attack during a fire. To ensure a significant reduction in response times, the Town would have to hire multiple firefighters.

So, while the Center believes that there is a need for additional staff hours for fire prevention to allow the Chief to perform annual inspections of commercial buildings and pre-incident planning activities (see discussion on pages 32-33 and 30-31), there appears to be no immediate need for the department to add career firefighters to handle call volume. Furthermore, the Town is unlikely to realize significant commercial or residential development over the short- or medium-term that may accelerate call volume growth. However, the Fire Chief should monitor trends annually.

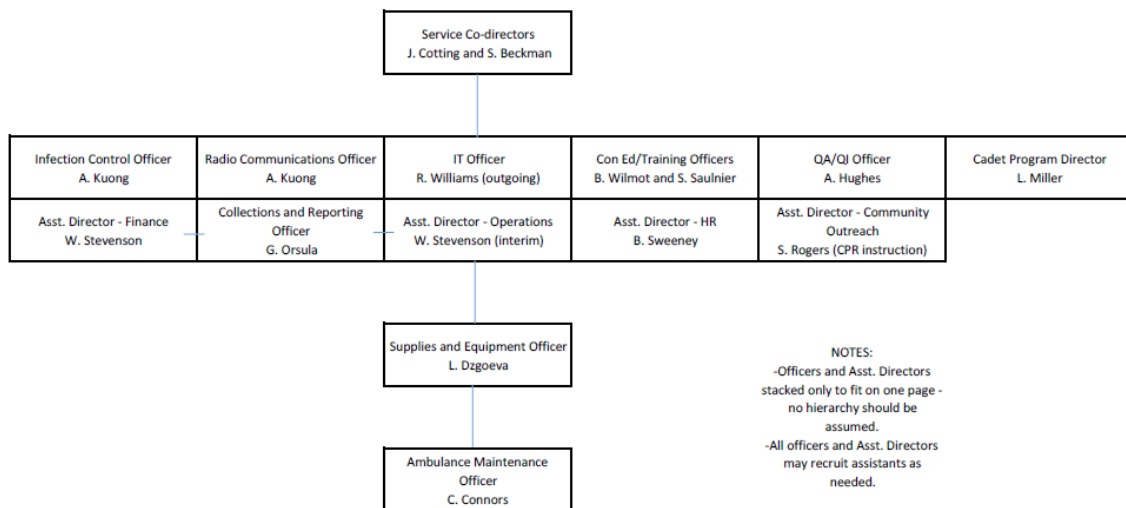
Ambulance Service

There are many significant challenges facing the Ambulance Service, some of these are a direct result of the volunteer structure and others are not. However, taken cumulatively, these challenges warrant a serious discussion regarding the current staffing model. There is, however, the opportunity to maintain a volunteer component, which so many value, if the Town residents and Board of Selectmen would like to keep it.

Here is an outline of the major challenges facing the Ambulance Service:

- *Management structure:* The volunteer nature of the department has necessitated a relatively wide, flat management structure because volunteers only have limited time to devote to managerial tasks. Therefore, roles have been parceled out to many people. Figure 17, below, shows the current organizational chart for the service. There are two co-directors and 14 other managerial positions, which may recruit assistants as needed. Where previously there was one director, there are now two co-directors. With the imminent retirement of the current Assistant Director for HR, and the challenges finding someone to replace her, there are suggestions to further split that job into multiple positions.

Figure 17. HAS Organizational Chart



While there are benefits to this structure, there are also a couple of significant, inherent challenges. The main benefits of the structure are that it can empower volunteers to learn new skills-including leadership and management skills, encourage volunteers to participate more deeply with HAS, and foster a sense of democratic participation. On the other hand, it may be a challenge for co-directors to oversee the work of the 14 managers, simply because, as volunteers, they do not have enough time. This makes it more likely that a mistake could go uncorrected. Second, the dual directorship may be creating some problems, as evidenced by anecdotes from some interviews. Some interviewees feel that the co-directors are sometimes not on the “same page” which can be “confusing” for members. Others noted that the co-directors do not seem to be working as a team to set policy and make other important decisions.

- *Volunteers performing highly-technical tasks:* The EMS industry is strictly regulated by the State, and it may be a challenge for some volunteers with limited time to appropriately perform certain time-consuming, highly-technical tasks, such as ambulance billing, financial management, HR-compliance, etc. It may also be a challenge for the service to find another volunteer with the necessary skills and time to replace those currently in these roles, if for some reason they were no longer able to do the job.
- *Inability of volunteer managers to attend meetings and collaborate with Town management, Fire Department, and Police Department:* The Ambulance Service is an integral part of the Town’s public safety strategy, and yet the volunteer managers are not able to attend regular meetings to collaborate with the Fire or Police Departments or Town management.
- *Poor relationship with Fire Department:* The relationship between HAS and the Fire Department is strained, which may make it a challenge to work together at certain

emergency scenes. Although there was no indication of unprofessionalism, the Center believes that a better working relationship could improve services to residents and others seeking help.

- *Disorganization and lack of hierarchy on-scene:* Several interviewees perceived that the service was sometimes disorganized on-scene, resulting in confusion and inefficiency. Some attributed this disorganization to training, while others thought that the ambulance crew's lack of clear hierarchy was the cause. Several interviewees believe that the use of cadets magnified this problem. The service does have a protocol for on-scene command. This finding was not able to be independently observed. It should be further investigated.
- *High response times:* The Ambulance Service has a clear performance benchmark for response time that is specified in the service zone plan, agreed to by the service and the Town, and signed off on by the State. However, analysis of call records for the last approximately 3.5 years show that the service met the 10-minute response time standard only 48% of the time. The service's strategy of sending an EMT directly to the scene provides an alternative performance benchmark. When taking direct-to-scene response time into account, 66.5% of calls were responded to within 10 minutes.
- *High turnover:* Over the past three fiscal years, the service has experienced an approximate annual turnover rate of 25%. This constant churn may be a symptom of other issues, but also likely causes management challenges relating to training, scheduling, and organizational culture.
- *Low and uneven participation/Perception of low and uneven participation:* Based on the data available, it seems that a majority (79%) of members participated on the required 10 calls in the most recent 12-month period, but that only 6% put themselves on-call for the required 24 hours per month in the most recent 6-month period. It is also important to note that approximately 25% of members are exempt from participation requirements and a significant minority of other members are new to the service. There are some members who attend many more calls- nine participated in at least 40 calls and two were on more than 100 calls over the study period. So, while it appears that on one count participation is relatively high, the perception on the part of many interviewees and survey takers that participation is "low" and "uneven" is not unwarranted.
- *Potential problems with cadet program-* As noted in the discussion above on pages 52-53, interviewees raised a number of significant concerns about the cadet program that demand further assessment.
- *Perceived lack of leadership:* The vast majority of interviewees and survey-takers had positive things to say about the current Co-Directors on a personal level. Survey takers

were strong in their assertion that they can talk openly with the Co-Directors and that Co-Directors listen willing to concerns and suggestions for improvement. However, many identified a lack of leadership in addressing the issues and challenges facing the service. Several interviewees lamented the lack of action. Eighty-four percent of survey takers identified “stronger leadership” as something that would encourage them to stay with the service.

- *Low morale and general discontent:* Both the interviews and survey reflected a sense of low morale amongst service members. The statement “Morale is high in the service” received a rating of 2.91/5, which reflects disagreement with the statement.

Given all these challenges, the Center strongly recommends that the Town consider hiring a full-time, professional EMS Coordinator/EMT who will be able to handle much, though not all, of the administrative/managerial tasks as well as respond on the ambulance while on duty. The Town could encourage qualified, interested HAS volunteers to apply. It will likely take several years for this position to fully address all the challenges in the department. However, there will be clear immediate problems that need to be addressed, namely: restructuring the management positions, ensuring adequate training and compliance with established policies, assessing and correcting potential problems with the cadet program, and building a strong, positive relationship with the Police and Fire Departments and Town management. Under this model, there will likely still be management responsibilities for volunteers, and volunteers would still be necessary to staff the ambulance.

There may also be significant ensuing turnover and team-building needs that should be addressed. However, based on interviews and surveys, many HAS members appear open to change. In the survey, members were asked to rate several statements about the future of the service. The results seemed to reflect a positive outlook about the future, regardless of the challenges. Notably, the majority of respondents expect to still be a member of the service in five years and would recommend joining the service to a family member or friend. However, more than half were neutral or disagreed with the statement “In 10 years, I hope that the service remains largely the same as it is today” indicating a potential openness to change. In fact, some expressed disappointment that the Town recently agreed to pay a call stipend rather than fund a full-time position, believing that a full-time manager is necessary to correct issues.

It is important that the Town management and Board of Selectmen are clear regarding the Ambulance Service’s position within the Town government. It will be much easier with a full-time staff member available to attend meetings and be in regular communication.

There are several issues facing the Town in the long-term that may change the equation. The general aging of the population and addition of senior housing units in Town are likely to increase call volume. An analysis of calls over the period 2013 to mid-2016 indicates that 44% of HAS clients were 65 years or older whereas the 65+ population represents approximately

less than 15% of the total population of Harvard²⁶. In addition, the future status of Devens could significantly change the recommendations for the future of the Fire Department and HAS. The project team recommends that the EMS Coordinator/EMT be tasked with working closely with the Fire Chief to monitor trends in Town and strategize as to the future of these departments. There are clear, immediate areas where closer collaboration between these two departments, and also with the Police Department, is warranted, specifically in prevention and education for children and senior citizens and emergency management. As a stronger working relationship is built, there may be the desire and need to combine these departments in the future.

The new position described above would require that the person not only be an EMT, but also have experience managing in an EMS environment. This would likely require a higher salary, estimated to be \$55,000-70,000 with benefits adding approximately 25% to bring the total personnel cost to \$68,750-\$87,500. If a full-time position is funded, it is likely that HAS expenditures will outpace the service's revenues and the balance of the receipts reserved account will be eroded over time. Even with strategies to control costs and increase revenues (e.g. billing MassHealth), it is likely that the Town would have to subsidize the service on an annual basis.

Alternative Scenarios

There are two alternative options that the Town may consider: dissolving the Ambulance Service and creating a combination Fire/EMS Department immediately or fully outsourcing BLS ambulance service.

A Combined Fire/EMS Department

A combined Fire/EMS Department, under the management of the Fire Chief, has several benefits, but also several drawbacks.

There may be volunteers in both departments who would like to be firefighter/EMTs. These individuals currently face a challenge serving on two separate departments that have a poor working relationship. Under a combined department, more volunteers willing to perform both functions may be identified. On the other hand, it is unlikely that all volunteers will choose to become firefighter/EMTs. Managing two largely separate groups of volunteers would be a challenging and time-consuming task. Furthermore, the HAS membership is quite different from the Fire Department membership. HAS members tend to be younger and therefore less "settled" in Town. For example, many of the cadets go to college and are only available for calls

²⁶ The Donahue Institute at UMASS provides population estimates for all Massachusetts municipalities. In 2015, the 65+ population was projected to be 988 out of a total population in Harvard of 7086. See <http://pep.donahue-institute.org/> for more information.

during the summer months and some of the young people eventually move out of Town. Additionally, while the Fire Department is nearly entirely male, HAS has much more gender diversity. These two departments have distinct organizational cultures and a challenging history. It would be a significant and lengthy management challenge to combine these two groups.

In a combined department, the managerial needs of the Ambulance Service will persist, and the Fire Chief would not be able to address them alone. It is likely that a full-time EMS Coordinator/EMT position would still be needed. One benefit to a combined department is that this position could also be a firefighter and able to respond to fire and EMS calls. However, this would reduce the time available to focus on managerial tasks.

A combined department would likely receive approximately 515-565 calls, with modest annual growth in call volume expected²⁷. This would mean approximately 1.4-1.5 calls per day. In a combined department with the Chief, who is an EMT, and a full-time firefighter/EMT managing the EMS function, both could be available to respond to calls during their workdays. Based on the estimated call volume, additional full-time staff would likely not be needed, assuming that the department can retain enough volunteers through the transition.

The addition of career staff may be viewed as a threat to the volunteer model in the Fire and Ambulance Departments, both by some current volunteers and some Town residents. The resistance may be due to the higher cost or the perceived inevitability of the dissolution of the volunteer model. However, there are many departments in Massachusetts that are able to maintain a minimal career staff supplemented by volunteers. It would be the Chief's responsibility to manage this culture change, as mentioned above.

The Center recommends that if the Town plans to pursue a combined department, that the Fire Chief be given enough time to formulate a transition plan, with input from fire department and HAS membership. In fact, it may be beneficial to hire an EMS coordinator to work with the Chief on a transition plan. Such a plan would likely take a full year to formulate. The Town of Lancaster combined its Fire and Ambulance Departments in 2013/2014, and may be a source of information and advice for the Town.

Regardless of whether the fire department and ambulance service are combined, there is the opportunity for closer collaboration and a stronger working relationship between the two departments. It is the responsibility of all the members, but particularly the leaders in each department, to make an effort to work toward an improved relationship. This should begin with opening lines of communication. In particular, as mentioned above, the departments should be working more closely on emergency management preparation and senior and youth education.

²⁷ The Fire Department and HAS do sometimes respond to the same call. The FD typically responds to motor vehicle accidents and certain other emergencies while HAS responds to working fires. The data available did not readily allow for cross-referencing to identify duplicated call records. Therefore the combined call volume is estimated based on general counts of these type of shared calls in 2015.

The Fire Chief and HAS Co-Directors should also periodically share data and discuss the relevant trends occurring in community that may impact both departments. The Police Chief and police department should also be involved.

Outsourcing BLS Ambulance

Currently, the Town of Harvard, through HAS, contracts with four different EMS providers for ALS service. The Town could also consider outsourcing for BLS service. This would involve dissolving the Ambulance Service and not replacing the ambulance. The Town could make certain stipulations in the contract, such as that an ambulance would be housed in the existing ambulance bay at the Harvard Police Station, based on its desired level of service.

The cost of outsourcing for BLS service is difficult to predict. It is likely that the contract would include both ALS and BLS services from one provider. Cost depends largely on the provider's ability to earn a profit in the municipality. This ability is significantly impacted by the parameters of the contract that define the level of service desired by the Town, including coverage, resource allocation, response time, etc. There are some municipalities in Massachusetts that receive payments and/or other benefits from their EMS providers and others that pay their ambulance providers. Because each private contractor would use proprietary operational and financial data to project its own profit margin, it is not possible to accurately estimate the cost of outsourcing BLS to the Town of Harvard. However, contracting for ambulance service by a governmental body is not subject to Massachusetts state bidding laws per MGL chapter 30 section 1(b)(24). Therefore, Town management could contact several private ambulance providers to assess interest and cost for BLS service.

There are several key changes that would likely occur if BLS service were outsourced:

- Harvard residents would likely be charged for services based on their insurance co-pays or deductibles or out-of-pocket, whereas right now HAS does not charge residents beyond what their insurances will pay.
- Response times would likely go down. It is standard in contracts for ambulance service to specify expected service levels, including response time.
- The Town would have to assign responsibility for managing the contract and periodically assessing contractor performance to an employee, likely the Town Administrator.

It is also fair to point out that there are a number of unquantifiable losses associated with the dissolution of the ambulance service. They are:

- Reduction in volunteer opportunities in the community
- Loss of experiential/educational opportunities for Bromfield students and other volunteers

- Loss of “neighbor-to-neighbor” care and connection when on calls

The Center recommends that the Town first obtain an estimate of cost from several private providers before initiating a conversation about privatizing BLS service. There is significant disagreement about the potential cost of such a contract, and it would be helpful to have figures from actual providers to guide the conversation.

Strategic Visioning with Town Residents

The Board of Selectmen could consider holding a “listening session” with Town residents to hear their perspective on the Fire Department, Ambulance Service, and the future of these departments. Using the data in this report, and additional data that may be obtained, the residents could have an informed conversation about the pros and cons of various future scenarios. The Center has successfully used the World Café method for strategic visioning²⁸. A key element of the model is that conversations are held in small groups, instead of one speaker in front of a microphone, and the participants have an opportunity to meet with multiple people over the course of the meeting. Report outs are held periodically during the meeting so that participants can learn from each other. Such a session would allow the Board to better understand residents’ perspectives and preferences about the future.

Conclusion

Throughout the course of this study, it was apparent that both the Fire Department and Ambulance Service have a long, proud tradition as important organizations in the community. The Center recognizes that a community’s strategic direction is deeply intertwined with its particular history, culture, and preferences. For this reason, this report lays out the pros and cons of particular future scenarios, but does not conclude which alternative is best for the Town of Harvard.

²⁸ See www.theworldcafe.org for more information