CITY OF PHILADELPHIA
PENNSYLVANIA

OFFICE OF THE CONTROLLER

Promoting honest, efficient, and fully accountable government

EMERGENCY MEDICAL SERVICES

Implementation Status of
December 2007 Recommendations

City Controller
ALAN BUTKOVITZ

CITY OF PHILADELPHIA

OFFICE OF THE CONTROLLER
1230 Municipal Services Building
1401 John F. Kennedy Boulevard
Philadelphia, PA 19102-1679
(215) 686-6680 FAX (215) 686-3832

ALAN BUTKOVITZ
City Controller

GERALD V. MICCIULLA
Deputy City Controller

September 9, 2011

Mr. Lloyd Ayers, Commissioner
Philadelphia Fire Department
240 Spring Garden Street
Philadelphia, PA 19123

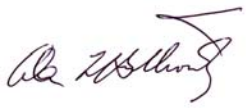
Dear Commissioner Ayers:

The City Controller's Office has performed a follow-up audit of the *Emergency Medical Services – Strained Resources Creating Major Impediments to Quick Response Time* report issued on December 20, 2007. This follow-up audit used calendar year 2009 data, which was the most recently completed annual data available for this engagement, and was performed with assistance from the accounting firm of EisnerAmper. The objectives of this audit were to evaluate whether response-times to medical emergencies had improved or worsened since our last review, and to ascertain the implementation status of the prior report's recommendations. A synopsis of the results of our work is provided in the executive summary to the report.

We discussed our findings and recommendations with you and your staff at an exit conference and included your written response to our comments as part of the report. We continue to believe that our recommendations, if implemented by management, will improve the effectiveness of the PFD's response to medical emergencies. Our recommendations have been numbered to facilitate tracking and follow-up in subsequent years.

We would like to express our thanks to you and your staff for the courtesy and cooperation displayed during the conduct of our work.

Very truly yours,



ALAN BUTKOVITZ
City Controller

cc: Honorable Michael A. Nutter, Mayor
Honorable Anna C. Verna, President
and Honorable Members of City Council
Members of the Mayor's Cabinet

FOLLOW-UP AUDIT OF EMERGENCY MEDICAL SERVICES

Executive Summary

Why the Controller's Office Did this Audit

The Office of the Controller, in connection with its authority to examine city operations under Section 6-400 of the Home Rule Charter, performed this follow-up audit on the implementation status of recommendations made in the December 2007 report on emergency medical services. That report examined the effectiveness – as measured by ambulance response time – of the Philadelphia Fire Department's (PFD) response to 9-1-1 calls for medical emergencies, and found only 60% of PFD ambulances met a widely accepted standard of arriving on scene at a medical emergency in less than nine minutes, ambulance crews were overworked, and the demand on some EMS units was excessive.

What the Controller's Office Found

The December 2007 report on emergency medical services (EMS) made nineteen recommendations. This follow-up audit used calendar year 2009 data, which was the most completed annual data available for this engagement, and focused on the status of the prior report's recommendations, as well as the conditions related to those recommendations. It disclosed the following:

- Ambulance response times only marginally improved from our last report. More than one-third of ambulance runs still took longer than nine minutes to respond to a request for EMS.
- The city implemented, or partially implemented, only two of the nineteen recommendations made in our prior report. It increased the size of PFD's ambulance fleet from 45 to 50 medic units, and it eliminated a requirement that new paramedics must live in the city for one year prior to being hired.
- The PFD continued to have difficulty filling vacant paramedic positions. Despite a general fund authorization for 280 paramedics, PFD had filled only 75% of these positions.
- Ambulance crews were still overworked. In 2009, medic units spent 73% of their time actively responding to EMS calls. This percentage may impede medical crews' ability to clean the ambulance, restock medical supplies, and prepare for the next dispatch to a medical emergency.
- Demand for EMS services remained excessively high, and continued to grow since our last review. During calendar year 2009, the PFD handled nearly 225,000 requests for EMS, which was an increase of nearly 15,000 calls since fiscal 2006. In ten years time the demand for EMS has increased by over one-third.

What the Controller's Office Recommends

More must still be done to improve ambulance response times. The Controller's Office continues to recommend that the PFD actively pursue the recommendations made in our prior report. Special emphasis should be placed on remediation efforts that will directly improve ambulance response time. These include revising the PFD's policy of providing an ambulance response to every request for EMS, and implementing a priority dispatch system. The current review resulted in two new additional recommendations – properly calculate system workload, and use traffic signal preemption systems. These and the disposition of the prior recommendations are discussed more fully in the body of the report.

CONTENTS

Page

INTRODUCTION

Background 1

FINDINGS AND RECOMMENDATIONS

Marginal Improvement in Medical Emergency Response Times 3
- Shift in Response Time Trend 3
- Demand for Emergency Medical Services (EMS) Continued to Grow 3
- Workload on Resources as Computed by PFD Has Decreased Slightly 4

Innovative Solutions Still Needed For Delivery of Effective EMS Services 5
- Increase the Number of Transport-Capable Ambulance Units Available to Respond to 9-1-1 Calls and Ensure They Are Adequately Staffed and Deployed 5
- Properly Calculate System Workload 6
- Revise, to the Extent Possible, the PFD Existing Policy of Providing a Response to Every 9-1-1 EMS Call Received 6
- Implement a Priority Dispatch System 7
- Educate the Public on How to Make a Successful 9-1-1 Call, Especially When Using Cellular Phones 8
- Seek Appropriate Financial Operating Resources That Are More in Line With the Changing Needs of the Department 8
- Address the Growing Discontent among EMS Personnel, Including the So Called “Cultural Gap” That Divides EMS and Firefighting Operations within the Department 9
- Deal with the Current Shortage of Paramedics 9
- Convert a Percentage of Engine Companies Into Paramedic-Engines to Help Meet Response Time Objectives 10
- Upgrade the CAD System to Include a User Friendly and Fully Integrated GPS System That Makes Recommendations Based on the Closest Available Ambulance Unit Rather Than the Closest Fire Station to the Incident 11
- Determine the Feasibility of Consolidating 9-1-1 Communication-Room Operations of Police and Fire Departments and Placing Them under a Public Safety Emergency Agency Directed by a Professional Public Safety Director 11
- Pursue Technology Enhancements Similar to the Police Department That Will Enable PFD’s 9-1-1 System to Identify the Location of Callers That Use Cellular Phones 12
- Equip All Ambulance Units with a GPS That Has a Direction Finding Function 12
- Improve Monitoring of EMS Performance 13
- Consider Use of Traffic Signal Light Preemption Systems 13

APPENDIX I: OBJECTIVES, SCOPE, AND METHODOLOGY 16

APPENDIX II: STATUS OF DECEMBER 2007 REPORT RECOMMENDATIONS 17

Page

FIGURES

Figure 1: Trend in Timeliness of Ambulance Response to Medical Emergencies 3
Figure 2: Number of EMS Responses Made by the PFD 4
Figure 3: Traffic Signal Sensor and Light 14

TABLES

Table 1: Computation of UHU – PFD vs. Controller's Office 6
Table 2: Budgeted, Actual, and Percentage of General Fund Paramedic Positions Filled 10

AGENCY'S RESPONSE TO THE REPORT

Lloyd Ayers, Fire Commissioner 18

CONTROLLER'S OFFICE EVALUATION OF AGENCY'S RESPONSE 20

CONTROLLER'S OFFICE CONTACT AND STAFF ACKNOWLEDGEMENTS 21

BACKGROUND

Since 1974 the Philadelphia Fire Department (PFD) has provided emergency medical services to the citizens and visitors of the City of Philadelphia. The stated mission of the department's Emergency Medical Services (EMS) division is to deliver high quality, pre-hospital emergency medical care, and transport in a timely and professional manner. Providing these services has become a significant responsibility for the PFD, and now, according to the department, represents approximately 70 percent of the demand for services.

In December of 2007 the Office of the Controller (Controller's Office) issued a report on the PFD's response to medical emergencies.[1] That report examined the effectiveness – as measured by ambulance response time – of the PFD's reply to 9-1-1 calls for medical emergencies. The Controller's Office found that although the department was very effective in getting fire apparatus to the scene of a medical emergency in fewer than nine minutes, its ability to send an appropriate level of ambulance care had deteriorated over a number of years. Using a widely held benchmark of eight minutes 59 seconds, the Controller's Office observed that the ability of PFD ambulances to arrive at medical emergencies within this time went from 77 percent of the total emergency runs in fiscal year 2002 to below 60 percent in fiscal year 2006.

The December 2007 report highlighted that the deteriorating trend in ambulance response time was the result of too few transport-capable ambulance units to manage the demand. In turn, this situation led to many ambulance units handling extremely high workloads — in many instances, well over 8,000 runs a year instead of the recommended range of between 2,500 and 3,000 runs.

The Controller's Office report raised additional issues that were impeding the PFD's ability to respond timelier to emergency calls. The more significant of the issues included:

- a steady increase in call volume, high employee turnover, and frequent understaffing that plagued the Fire Communication Center (FCC);
- a dispatch system that failed to prioritize emergencies; and
- inadequate technology that impeded the ability of dispatchers to locate the nearest appropriate ambulance.

Finally, the Controller's Office report of December 2007 suggested that performance indicators used to manage and report on EMS operations needed to be improved. It found that: (1) the PFD's definition of its key measure — "response time" — was seriously flawed; (2) reported measures lacked context and were not tied to results; and (3) underlying performance data from the PFD's computer assisted dispatch (CAD) system was sometimes incomplete and inaccurate.

[1] Emergency Medical Services – Strained Resources Creating Major Impediments to Quick Response Time, issued December 20, 2007.

In the December 2007 report, the Controller's Office offered 19 recommendations to the PFD to improve EMS operations. Work performed by the Controller's Office for this report focused on: (1) response times achieved by the PFD for calendar year 2009, and (2) the implementation status of our previous recommendations, which are summarized in the table in Appendix II.

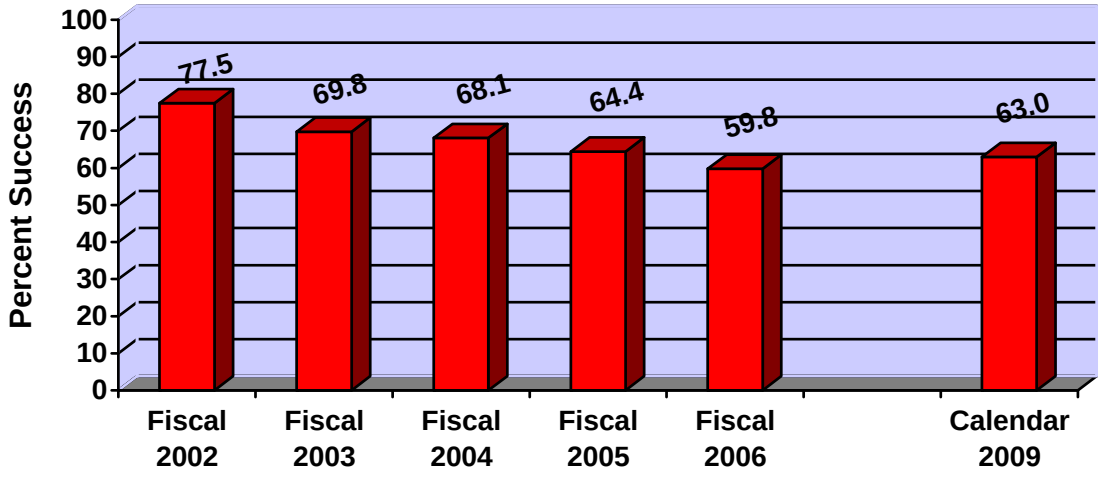
MARGINAL IMPROVEMENT IN MEDICAL EMERGENCY RESPONSE TIMES

Shift in Response Time Trend

Timely response is a critical factor that matters most in a medical emergency. A widely used standard for measuring timely response is having an ambulance arrive on scene at a medical emergency in less than nine minutes after a request for medical services is received, along with the goal of achieving this benchmark 90 percent of the time. In our prior report, we analyzed the PFD's Computer Assisted Dispatch (CAD) records for fiscal years 2002 through 2006 and found that ambulance response times had worsened during that period.

As indicated in Figure 1 below, the PFD's ability to meet the less than nine minute standard had steadily declined from a high of 77.5 percent in fiscal year 2002 to a low of 59.8 percent in fiscal year 2006. Our review of the PFD's calendar year 2009 CAD data shows only a marginal increase in ambulance response times where, for 63 percent of the time, ambulances were able to arrive on scene at a medical emergency in less than nine minutes. This represents a 5.4 percent improvement compared to fiscal year 2006, but is well below the 90 percent benchmark and the 77.5 percent achieved in fiscal year 2002.

Figure 1: Trend in Timeliness of Ambulance Response to Medical Emergencies



Source: Office of the City Controller analyses of complete CAD System database supplied by the PFD

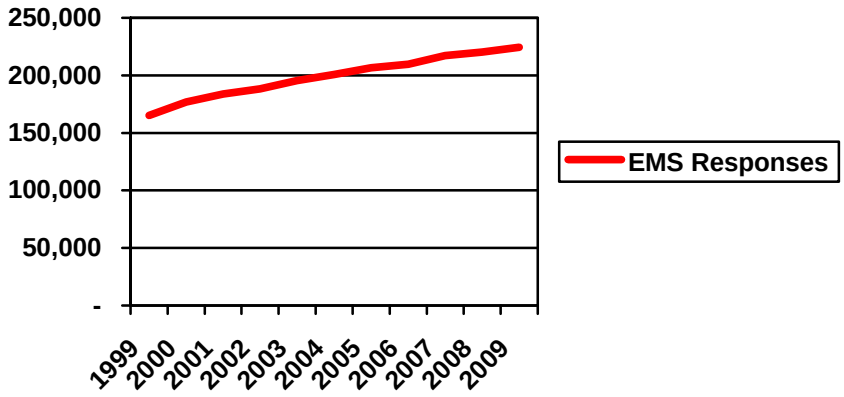
Our review of CAD data for 2009 found that PFD had success at having engines or ladders, dispatched as part of its First Responder Program, arrive on scene at a medical emergency in less than nine minutes. While personnel on these engines or ladders can offer some assistance, the engines or ladders are not capable of providing advanced life support and hospital transport. EMS ambulance units are necessary for providing this level of service.

Demand for Emergency Medical Services (EMS) Continued to Grow

One major factor affecting the PFD's ability to deliver timely responses to request for emergency medical services is the demand for these services. As indicated in Figure 2, the PFD provided

165,000 emergency medical responses in fiscal year 1999. Demand for EMS has continued to grow. In fiscal year 2006 PFD reported 210,000 EMS responses. For calendar year 2009,[2] the PFD reported nearly 225,000 emergency medical responses which represented 15,000 more than it reported for fiscal 2006. In ten years time, demand for EMS had increased 36 percent.

Figure 2: Number of EMS Responses Made by the PFD



Source: Prepared by Office of the City Controller based on the Mayor's Report on City Services for fiscal years 1999 through 2006. Calendar years 2007 through 2009 prepared by Office of the City Controller based on data provided by the EMS Continuous Quality Improvement unit from the PFD CAD.

Workload on Resources as Computed by PFD Has Decreased Slightly

Besides increased demand for services, consideration must be given to workload and its impact on ambulance crews' ability to respond timely to requests for emergency medical services. In the Controller's Office December 2007 report, we noted that the burden on PFD's emergency medical services had become strained. We reported that due to a shortage of transport-capable ambulances, EMS crews were handling excessively high workloads – some units were performing over 8,000 runs a year, which is far above the recommended range of 2,500 – 3,000 per year. The report noted that paramedics reported being fatigued or exhausted, morale was low, and turnover was high at a time when the PFD was having difficulty recruiting new paramedics.

The standard measure of ambulance usage is unit-hour utilization (UHU), a ratio of the number of unit-hours of EMS service delivery to the total number of hours medic units are available to deliver service. The below formula for computing UHU is based on the assumption that an ambulance run takes approximately one hour to complete.[3] The resulting percentage represents the portion of an hour that units are handling emergency runs versus when they are not (i.e., time available to clean the ambulance, restock supplies, or rest).

UHU = number of EMS runs ÷ number of ambulance service hours

Review of the PFD's analysis of UHUs for calendar year 2009 showed a reduction in overall UHU from a high of 0.695 in fiscal year 2005 to 0.621 in calendar 2009. Although some units

[2] EMS response data from 2007 to 2009 was provided on a calendar year basis.
[3] The assumption was deemed valid for Philadelphia based on data reviewed in the prior report on EMS services referenced in footnote 1.

still were handling over 8,000 runs a year in calendar 2009, the overall burden on the ambulance fleet, according to the PFD, declined. However, the PFD's calculation of overall UHU for fiscal years 2002 through 2006, and for calendar 2009, is misleading because it does not include EMS runs to fires and automotive accidents.

INNOVATIVE SOLUTIONS STILL NEEDED FOR DELIVERY OF EFFECTIVE EMS SERVICES

The response times for EMS have shown marginal improvement since our prior audit. As noted on page 3, the PFD's efforts resulted in the department having a medic on scene in 8:59 or less, 63.0 percent of the time in calendar year 2009 versus 59.8 percent of the time in fiscal year 2006. However, we note that continued effort and innovative solutions are still needed if the PFD is to close the gap on the industry's target of having a medic unit on scene in 8:59 or less for 90 percent of its responses.

As resources become increasingly scarce due to budget cutting made necessary in the current economic environment, we believe the PFD's continued success will only be maintained by implementing creative solutions. The prior report on EMS response times provided recommendations to the PFD for improving response times. The current status of these recommendations is addressed starting below through page 13 of the Findings and Recommendations section of this report.

Recommendation: **Increase the number of transport-capable ambulance units available to respond to 9-1-1 calls and ensure they are adequately staffed and deployed [21106.01].**

The PFD implemented the above recommendation by adding 5 medic units in February 2008. This increased the total number of ambulances in PFD's fleet from 45 to 50, and we believe this contributed to the improvement in EMS response times. The PFD cites the addition of five full-time units as improving the overall UHU of the ambulance fleet, which enabled the PFD to meet their internal target of maintaining an overall UHU under 0.65 for calendar year 2009.

Although the PFD met their overall objective, the PFD further strives to keep all EMS units under the 0.65 UHU. Our review of data provided by the EMS Continuous Quality Improvement (CQI) unit revealed that only fourteen of the 50 medic units had an UHU under 0.65. Moreover, three medic units had UHU's of 1.0 or higher indicating the units were so overworked that they were completing more than one run per hour.

As noted earlier, our review of the EMS CQI data revealed that the PFD did not include EMS units dispatched to fires or accidents in its computation of the UHU. Using the data provided by the EMS CQI unit, which included all EMS runs, we calculated the overall UHU for the ambulance fleet to be approximately 0.73 for calendar year 2009, which is higher than the 0.621 calculated by the PFD. The difference in the calculation is presented in Table 1 below.

Table 1: Computation of UHU – PFD vs. Controller's Office

	Computation of UHU		
	PFD		Controller's Office
UHU = Number of EMS runs / Number of service hours	Medical runs	Fire / accident runs	All runs
Number of EMS runs	224,485	39,896	264381
Number of service hours	361,517		361,517
UHU	0.621		0.731

Source: Office of the City Controller based on CQI provided data

The difference between the PFD's computation of the UHU and the Controller's Office calculation stems from our inclusion of fire and accident runs in the numerator of the equation. We believe that including the EMS unit runs to fires and accidents provide a better picture of the actual burden on the system. In our opinion, whether a medic unit is on a medical emergency run, or responding to a fire or an accident, that unit is unavailable to handle other calls. Including the service hours involving runs to fires and accidents while excluding those same EMS runs clearly skews the data towards more favorable results.

We consider our original recommendation to increase the number of transport-capable ambulance units to be partially resolved [21106.01]. As addressed in the December 2007 report, PFD management needs to implement this recommendation in conjunction with the many other suggestions made by the Controller's Office. We continue to believe that increasing ambulance fleet size is only one dimension of the solution and encourage the department to continually review the size of its ambulance fleet. Moreover, we believe the PFD's computation of UHU provides a false barometer of EMS utilization.

Recommendation: Properly Calculate System Workload.

While not included in the prior report, we make an additional recommendation that PFD properly calculate system workload by capturing all types of ambulance runs, including responses to fires and accidents, when analyzing the EMS system's utilization of its resources [201310.01].

Recommendation: Revise, to the extent possible, the PFD existing policy of providing a response to every 9-1-1 EMS call received [21106.02].

In the December 2007 report, and in our current work, PFD management and staff noted the significant drain non-emergency calls have on the EMS system. Although the PFD has not conducted a formal study of the impact of these calls on the EMS system, it is a widely held belief that 50% or more of calls handled by the system are not true emergencies, and therefore, inappropriate for the system.

The PFD has indicated that to effectively address this problem, the PFD must (1) implement a priority dispatch call screening system (discussed next on page 7), and (2) educate the public on the types of appropriate calls for the EMS system. The PFD provided us with documentation

supporting their public education efforts through site presentations, websites, and a 9-1-1 kiosk at the Fireman's Hall Museum.

Our review of the presentations and websites clearly indicated the PFD's educational efforts focused almost exclusively on 9-1-1 fire calls. For example, a program called *Remembering When* was directed at the elderly and people of limited mobility, and the department reported the program has reached approximately 2,500 people. Although the program explained the 9-1-1 system, it focused primarily on fire prevention and fall prevention.

The PFD had also used the *Fire Safety Cube Program* to educate children, mostly about fire safety. The PFD asserted that over 43,000 children between kindergarten and fourth grade have been reached by this program. The program has also been used at summer camps held at 30 recreation centers reaching over 2,800 children. Our review of the cube and the supporting presentation materials indicated the only reference to EMS was on one side of the cube stating, "If you see smoke or fire . . . *or for any emergency*. . . call 9-1-1 right away!"

We also observed that the PFD used three websites as part of its EMS public awareness campaign – Kidzone, FreedomFromFire, and Phila.gov/fire. Review of these sites determined they were exclusively dedicated to information on fire prevention. The Phila.gov/fire website contained the message, "Check back soon for more information on the EMS 9-1-1 Campaign!"

Additionally, the PFD reported that more than 100 people each week visited the Fireman's Hall Museum. A multi-media interactive kiosk located there teaches the proper use of 9-1-1 to report fire and medical emergencies.

Our review of the PFD's overall education efforts revealed it focused almost exclusively on fire prevention. Although this focus may be appropriate for school age children, we were not presented with information indicating any evidence that efforts made will reduce inappropriate non-emergency calls made to the EMS system.

The Controller's Office continues to recommend the PFD revise its existing policy of responding to every 9-1-1 call [21106.02].

Recommendation: Implement a priority dispatch system [21106.09].

In responding to our request about the status of this recommendation the PFD explained it was in the final stages of issuing a Request for Proposal for a Priority Dispatch Call Screening System. The PFD further noted that to obtain maximum benefit from such a system, it would need to involve other agencies that would provide resources to those calls not deemed an emergency.

The Controller's Office acknowledges the implementation of a new priority dispatch system will be a major system change for the PFD, and we agree the change will involve numerous complexities including coordinating with other city agencies to be effective. However, we report that through the end of our fieldwork, the PFD was unable to provide us with the Request for Proposal[4] for a new dispatch system. Accordingly, the Controller's Office continues to

[4] A request for proposal is simply the start of the bidding process where the city solicits bids from interested venders. Issues such as project scope, payment amounts, and project milestones are usually included.

recommend the PFD implement a new priority dispatch system, and we further urge the PFD to make the system implementation a top objective of the department [21106.09].

Recommendation: Educate the public on how to make a successful 9-1-1 call, especially when using cellular phones [21106.08].

As noted above, the PFD educational efforts include teaching the public on how to successfully make a 9-1-1 call. The PFD also uses a multi-media interactive kiosk to educate people at the Fireman's Hall Museum. Our review of the materials used by PFD in their educational programs indicated the programs are oriented toward this goal. However, we observed that the PFD's targeted audience was mostly school children and the elderly.

The PFD educational efforts also did not appear to be reaching the appropriate target audience for problematic 9-1-1 calls involving cellular phones. For example, when some cellular phone callers report an emergency event, they may not specify a property address or the actual location of the emergency. Consequently, FCC call-takers lose valuable response time trying to identify and confirm the location of the emergency. The PFD can mitigate the problem if it implements a CAD system enhancement, which will automatically identify the location of cell phone users. Until such time the enhancement can be incorporated into the system, we continue to recommend the PFD educate the public on how to make a successful 9-1-1 call when using cellular phones [21106.08].

Recommendation: Seek appropriate financial operating resources that are more in line with the changing needs of the department [21106.12].

In the December 2007 report, we reported that PFD's resources did not keep pace with the changing needs of the department. While the requests for EMS services had been increasing (based on the type of call), the demand for firefighting services had actually decreased over the same period of time. Yet despite the shift in services, the budgeted dollars over the same period of time remained skewed towards firefighting — 84 percent for firefighting vs. 16 percent for EMS.

The skewed workload and budgeting patterns continued for 2009. EMS incidents accounted for 82 percent of the workload, while budgeted dollars for EMS represented just 17 percent of the PFD's budget. Although the percentages are not perfectly comparative (for instance, certain EMS support costs such as maintaining and operating the dispatch center are blended with the firefighting budget, and there are other facets of firefighting such as prevention and fire investigations, which are not directly associated with the number of incidents), they nevertheless show that there continued to be wide disparity between EMS work effort and the resources dedicated to that effort.

Establishing the proper level of funding to support the PFD's activities was not an objective of this engagement, or the prior one. Accordingly, we offer no recommendations on the level of funding. However, we continue to suggest that the PFD develop an appropriate strategy to bring its financial resources more in line with the changing needs of the department [21106.12].

Recommendation: **Address the growing discontent among EMS personnel, including the so called "cultural gap" that divides EMS and firefighting operations within the department [21106.03].**

In our December 2007, we commented on the discontent observed among EMS personnel. The report indicated that some managers and staff believed the PFD treated its EMS operations as an afterthought. We recommended changing the mission statement to include EMS as an equal function of the department, to involve more EMS personnel in essential decision making processes, and to have management set the tone to afford all PFD members equal respect.

In providing the Controller's Office with the status of this recommendation, the PFD indicated that EMS chiefs have been made part of the PFD's strategic planning process, and that two EMS chief positions were created to increase the level of supervision over EMS personnel in the field. The PFD believes this had a positive impact on closing the so called "cultural gap."

However, the PFD reported that recent developments involving differences in the payment of overtime between the two groups have negatively impacted any earlier gains achieved. More specifically, under the Fair Labor Standards Act (FLSA), firefighters who engage in fire suppression and prevention work are exempt from being paid overtime after working 40 hours in a week. Paramedics challenged their inclusion as exempt employees, and a recent court decision ruled that the city had incorrectly classified paramedics as exempt from FLSA overtime pay requirements. Consequently, paramedics were awarded retroactive overtime pay. Additionally, the work schedules for paramedics changed in April 2009 from a four day 12-hour shift to a 42-hour work week with two hours of overtime automatically built into their schedules. PFD managers believe these events have put more constraints on their ability to close the "cultural gap" between paramedics and firefighters.

We continue to recommend the PFD work with EMS personnel to close the "cultural gap" and to ensure all departmental staff needs are being properly addressed [21106.03].

Recommendation: **Deal with the current shortage of paramedics [21106.04].**

In the December 2007 report, we remarked about the PFD having a shortage of paramedics. We indicated the department was losing paramedics due to attrition and recommended immediately hiring more paramedics. We also suggested that the PFD request a one-year waiver of the city's residency requisite, which requires job applicants to have established a city resident for at least a year prior to being hired. We concluded that such a waiver would allow the PFD to draw paramedics from a larger pool of candidates.

In response to inquires of the Controller's Office during the current review, PFD management indicated that the initial residency requirement was waived and that it has been aggressively trying to recruit paramedics. The PFD reported that for the fiscal year that ended June 30, 2008 it hired nineteen paramedics, three resigned, and five crossed over to the firefighting side. For the fiscal year that ended June 30, 2009, the PFD reported thirteen paramedics were hired, eleven paramedics separated, and three crossed over to the firefighting side.

We observed that in April 2008, City Council passed an ordinance eliminating the requirement of having to be a bona fide city resident for one year prior to employment for all civil service positions, except laborer. The change authorized by the ordinance grants an employee a six month grace period to establish and maintain a bona fide city residency. The grace period begins at the time the individual starts employment.

Although the ordinance removed part of the obstacle hindering the hiring of new paramedics, our analysis of the PFD's budget for the fiscal year that ended June 30, 2009 suggests that filling paramedic positions remained a problem for the department. Table 2 below shows that despite having 280 paramedic positions budgeted in the city's general fund, the department was able to fill only 75.4 percent of the positions.

Table 2: Budgeted, Actual, And Percentage of General Fund Paramedic Positions Filled

	Fiscal 2000	Fiscal 2001	Fiscal 2002	Fiscal 2003	Fiscal 2004	Fiscal 2005	Fiscal 2006	Fiscal 2007	Fiscal 2008	Fiscal 2009
Budgeted	266	290	294	314	314	353	311	292	292	280
Actual	260	285	291	277	273	264	244	218	224	211
Percentage Filled	97.7	98.3	98.9	88.2	86.9	74.8	78.5	74.7	76.7	75.4

Source: Prepared by the Controller Office from the city operating budgets, for fiscal years 2000 – 2009.

We recommend the PFD request the Civil Service Commission to extend the residency waiver for paramedics to a period of one year from the time they are employed, instead of the current six-month period. Further, we suggest the PFD continue to aggressively recruit paramedics and fill the budgeted positions available to it. Additionally, we suggest the PFD consider providing educational scholarships to recruits willing to make a multiple year commitment to the PFD after certification [21106.04].

Recommendation: Convert a percentage of engine companies into paramedic-engines to help meet response time objectives [21106.05].

In the December 2007 report, we noted that paramedic-engines could compliment the PFD's overall ability to respond to medical emergencies. A paramedic-engine is a fire engine equipped with paramedic supplies and manned with at least one paramedic as part of its crew. We offered three key reasons for this recommendation: (1) the PFD's first responder program was very effective, (2) the cost was about ten percent the cost of an additional ambulance, and (3) as noted again in the comment about the shortage of paramedics above, it was not uncommon for a paramedic to crossover to the fire fighting side of operations.

The PFD does not agree that this recommendation is the most cost effective way of improving the current EMS system, and believes cross training firefighters to become paramedics would be cost prohibitive. However, management has indicated that allowing former paramedics to use their skills on occasion should be further explored. The PFD has stated that to be able to use former paramedics would require them to maintain their Medical Command Status and to remain current with their continuing education requirements.

Based on cost information provided by the PFD, the cost to the city would be roughly $1,400 per paramedic-firefighter per year. This cost is basically the overtime cost incurred to cover the time that firefighters would be in training.

The Controller's Office continues to recommend the PFD consider this option, especially for its historically peak call times [21106.05].

Recommendation: **Upgrade the CAD System to include a user friendly and fully integrated GPS System that makes recommendations based on the closest available ambulance unit rather than the closest fire station to the incident [21106.10].**

The December 2007 report noted that a limitation of the PFD CAD system was the actual GPS location of an ambulance was not used when the CAD selected a medic unit from those available to dispatch to a call. The CAD considered ambulances to be located at their assigned fire station when generating the choice for selection. Dispatchers were not required to take the CAD's choice, however, upgrading the CAD to select medic units based on their actual location had clear benefits.

At the time of our fieldwork for this update, the PFD informed us that hardware and software to upgrade its CAD to make the selection of the closest available ambulance (based on the unit's actual location) was being tested for functionality. By the end of our work for the current engagement, the upgrade had not yet been implemented on the "live" system.

We commend the PFD for taking action to implement the above recommendation. We encourage the department to continue working with the vender until the upgrade is fully operational and meets management's expectations. The Controller's Office will continue to monitor the PFD's progress on implementing the original recommendation to upgrade the CAD System [21106.10].

Recommendation: **Determine the feasibility of consolidating 9-1-1 communication-room operations of Police and Fire Departments and placing them under a Public Safety Emergency Agency directed by a professional public safety director [21106.06].**

In the December 2007 report, we commented that consolidating the operations of both the Police and Fire 9-1-1 communication rooms under a public safety director could allow the city to reduce administrative costs duplicated by each of the respective departments. We believed that consolidating the two operations would elevate the dispatch function from supportive roles in the Police and Fire Departments to a primary function under a professional public safety director. The report noted that equipment for one system, instead of two separate systems, could further reduce costs in the long run. Other advantages cited in the December 2007 report were the potential to expand the career paths for dispatch personnel, and the creation of a larger pool of dispatchers to cover staff shortages.

The PFD responded by noting the issue has been considered in the past, and that an appropriate facility would need to be identified. However, the PFD was concerned that it would lose management control over this part of its operations. The PFD stated the concept was under consideration in the city's *Public Safety Strategic Plan*.

As part of this engagement, we requested a copy of the *Public Safety Strategic Plan*, but we were informed by the Deputy Director of Public Safety's staff that the document is in the process of being compiled, and it has not yet been formalized. Therefore, we were unable to review any evaluations made on consolidating 9-1-1 communications room operations, as part of our work for this report.

The PFD has further noted that a work schedule change negotiated with the union seems to have reduced dispatcher turnover. The PFD reported that, for fiscal year 2008, no dispatchers had separated from the city, and six new dispatchers were hired. For fiscal year 2009, three dispatchers left the call center, and seven new dispatchers were hired according to the PFD.

We commend the PFD for working with the union to improve working conditions for its 9-1-1 dispatchers. We continue to recommend that in conjunction with the city administration the PFD evaluate the feasibility of consolidating 9-1-1 communications room operations [21106.06]

Recommendation: Pursue technology enhancements similar to the Police Department that will enable PFD's 9-1-1 system to identify the location of callers that use cellular phones [21106.07].

In our December 2007 report, we commented that the PFD's 9-1-1 system could not identify the location of callers using cellular phones. The report recommended upgrading the CAD to have functionality equivalent to the Police Department's system.

PFD management has informed us that hardware and software to give its CAD the ability to identify, within 400 feet, the location of callers using a cellular phone to call the system was being tested for functionality during our fieldwork for this engagement. However, by the end of our work, the upgrade had not yet been implemented on the "live" system.

We commend the PFD for taking action to implement the above recommendation. We encourage the department to continue working with the vender until the upgrade is fully operational and the upgrade meets management's expectations. We will continue to monitor the PFD's progress on implementing this recommendation [21106.07].

Recommendation: Equip all ambulance units with a GPS that has a direction finding function [21106.11].

In the December 2007 report, we noted that ambulances were not equipped with a global positioning system (GPS), which had a direction finding function. We recommended that all ambulances be outfitted with this equipment.

The PFD has responded that an upgrade to the CAD will provide all medic units with GPS type directions to medical emergency scenes. During our fieldwork for this report, the PFD asserted that it was testing the functionality of GPS upgrade. However, the PFD could not provide us with detailed information regarding how this process would actually work. By the completion of our fieldwork, the PFD had not provided the additional information we requested.

We recommend the PFD carefully monitor this upgrade to determine if it meets the expectations of management and the needs of the ambulance drivers [21106.11].

Recommendation: Improve Monitoring of EMS Performance [21106.13 through 21106.19].

In the December 2007 report, we commented that opportunities existed to improve the PFD's measurement, use, and reporting of performance results. We encouraged the PFD management, as well as the city administration, to develop accurate performance information, which should be used and presented in a meaningful manner to enable all stakeholders to make more informed decisions about the use of resources. Specifically, we made the following seven suggestions to the PFD:

- affirm the mission and purpose of EMS operations [21106.13];
- identify intended users and uses of performance information [21106.14];
- identify what to measure (i.e., identify measures related to the EMS program's mission, goals, and objectives) [21106.15];
- develop performance measures [21106.16];
- choose benchmark comparisons [21106.17];
- identify needed explanatory information [21106.18]; and
- report the measured results [21106.19].

In its response to our request for an update on the implementation status of the recommendations contained in our December 2007 report, the PFD did not provide any information, and we are not aware of any formal performance measurement and reporting system that has been adopted by the department. Accordingly, we continue to recommend that PFD management improve monitoring of EMS performance by implementing the above recommendations numbered [21106.13] through [21106.19].

Recommendation: Consider Use of Traffic Signal Light Preemption Systems.

While not addressed in our previous report, during our current review we learned from interviews with EMS personnel that traffic congestion on narrow city streets, along with red traffic lights, can combine to impede an ambulance's movement to the scene of a medical emergency. This situation, which adds to the ambulance's response time, often occurs when an ambulance is behind other vehicles which cannot legally or safely move through an intersection when the traffic light is red.

One solution to this problem is the installation and use of traffic signal light preemption systems. These systems, depicted below, are commonly used by our suburban neighbors, and consist of two components – traffic signal sensors installed at selected intersections, and signal triggering devices installed in an ambulance or other emergency vehicle.

Figure 3: Traffic Signal Sensor and Light

Source: Office of the City Controller

When an ambulance approaches an intersection with a red traffic light equipped with a traffic signal sensor, the sensor detects the ambulance's triggering device, and starts to manipulate the traffic signals at the intersection by stopping conflicting traffic, and turning the traffic light in the path of the ambulance to green. This allows cars and other vehicles in front of the ambulance to move safely through the intersection and pull to the side, allowing the ambulance to quickly pass.

Two studies performed by federal agencies have shown that traffic signal light preemption systems provide significant benefits. These include improved ambulance and emergency vehicle response times, improved safety for the ambulance or emergency vehicle when it enters or crosses an intersection, and potential cost savings. A 2006 report by the Federal Highway Administration found that traffic signal light preemption systems were effective at dispersing traffic blocking the progress of emergency vehicles, and that this can cut seconds to minutes from the vehicle's response time. This same study, which reported that more that 25 percent of emergency vehicle crashes occur at intersections with traffic lights, found that these systems can reduce the chance of emergency vehicles being involved in a crash. Finally, by reducing response times, the study reported there are potential cost savings due to the fact that the

effective service radius of each emergency vehicle is increased. This can translate into budgetary savings by serving a larger area with fewer resources.

Depending on the technology and methodology used, the cost of traffic signal light preemption systems varies. The cost to equip each emergency vehicle ranges from $1,400 to $3,000, and the cost per intersection equipped with this technology ranges from $3,000 to $8,000. We have noted that other localities have obtained federal funding to defray the cost of implementing these systems.

To improve response times, help ambulances move safely through congested intersections, and realize any potential cost savings, we recommend that city management and the PFD consider installing traffic signal light preemption systems at key intersections in the city, and equip each PFD ambulance with a signal triggering device [201310.02]. We suggest that PFD identify specific intersections that would benefit from the installation of these systems, evaluate the cost of the systems, and explore grant funding options to pay for these public safety improvements.

APPENDIX I: OBJECTIVES, SCOPE, AND METHODOLOGY

The City of Philadelphia Office of the Controller performed this audit as a follow-up to our previous report, titled *Emergency Medical Services – Strained Resources Creating Major Impediments to Quick Response Time*, which we issued on December 20, 2007. This audit was performed under the Office of the Controller's authority to examine city operations pursuant to Section 6-400 of the Home Rule Charter. The audit had two objectives: 1) to evaluate whether response-times to medical emergencies had improved or worsened since our last review and 2) to ascertain the implementation status of the prior report's recommendations.

As with our last review, we utilized eight minutes and 59 seconds (8:59), with 90 percent compliance reliability measured on a fractile, not average, basis. Fractile response time measurement includes a reliability factor (90 percent) and measures all time intervals between the time the 9-1-1 communication center receives a call and the time a properly equipped and staffed ambulance arrives on the scene.

To evaluate whether response times to medical emergencies had improved or worsened since our last review, we obtained the Philadelphia Fire Department's Computer Assisted Dispatch (CAD) medical emergency call records for calendar year 2009. With assistance from the accounting firm of EisnerAmper, we determined the frequency with which both "first responders" and ambulances met the 8:59 benchmark. Similar to our last audit, in measuring ambulance response time for each incident where multiple units responded to the call, we tracked the response time of the first ambulance to arrive at the hospital with a transported patient.

To ascertain the implementation status of the prior report's recommendations, we obtained PFD management's formal response to our entrance interview in which the commissioner discussed the status of the recommendations. We interviewed appropriate department officials, and when made available, reviewed documentation to validate management's asserted improvements. As part of our work, we also obtained unit-hour utilization (UHU) ratio data from the PFD's EMS Continuous Quality Improvement unit. This data, which is a measure or work load for EMS crews, was reviewed and compared against the prior audit data because of its significant impact on response times.

Our work was conducted from March 2010 through June 2011 in accordance with *Government Auditing Standards* issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

APPENDIX II: STATUS OF DECEMBER 2007 REPORT RECOMMENDATIONS

Implementation Status of Recommendations

Rec. No.	Recommendation	Status	Rec. No.	Recommendation	Status
1	Increase number of ambulances	I	11	Equip ambulance units with a GPS	IP
2	Revise response policy	NI	12	Seek appropriate financial resources	NI
3	Address EMS personnel discontent	NI	13	Affirm the mission of the EMS	NI
4	Deal with paramedic shortage	PI	14	Identify users and uses of performance data	NI
5	Convert engines to paramedic engines	NI	15	Identify what to measure	NI
6	Determine feasibility of 9-1-1 room consolidation	NI	16	Develop accurate performance measures	NI
7	Pursue technology enhancements	IP	17	Choose benchmark comparisons	NI
8	Educate public about 9-1-1 calls	NI	18	Identify need for explanatory information	NI
9	Implement priority dispatch system	NI	19	Report results	NI
10	Upgrade CAD System	IP			

I – Implemented PI – Partially Implemented NI – Not Implemented IP – In Progress

Source: Compiled by the Office of the City Controller

CITY OF PHILADELPHIA
FIRE DEPARTMENT
240 SPRING GARDEN STREET, PHILADELPHIA, PA 19123-2991

LLOYD AYERS
FIRE COMMISSIONER

(215) 686-1300
FAX: (215) 922-3952

September 8, 2011

Mr. Alan Butkovitz, City Controller
Office of the Controller
1230 Municipal Services Building
1401 John F. Kennedy Boulevard
Philadelphia, PA 19102

Dear Controller Butkovitz,

My office appreciates your work and leadership in reviewing the operational and technical components of the Philadelphia Fire Department. We understand the work that goes into building these types of reports and respect your Office's efforts in making improvements to our system.

The Philadelphia Fire Department is one of the largest fire departments in the United States and exists in an ever-changing, fast-paced setting with a great deal of responsibility to each other and to the public. That being said, it is important to note that the report completed by your Office is outdated in some respects as it reviewed information and data from 2009 which does not provide an understanding of our current environment or the fact that some of your prior recommendations have now been implemented by the Fire Department.

For example the Department has:

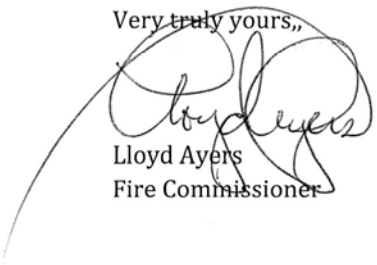
1) Implemented technology enhancements similar to the Police Department that enables our 9-1-1 system to identify location of callers who are using cellphones.

2) Equipped all medic units with GPS capabilities

Even more importantly, the report does not give enough weight to the current and projected budget realities the City faces in these tough economic times.

The recommendations however do reflect many projects and ideas the Department has been and was reviewing prior to your original report, many of which have been completed or are in the midst of being implemented. We will continue to review your recommendations and any analysis your Office can provide, and look forward to incorporating them into our decision-making process.

Very truly yours,



Lloyd Ayers
Fire Commissioner

PFD Response

In the PFD's response, management has indicated that the report completed by the City Controller's Office "…is outdated in some respects as it reviewed information and data from 2009 which does not provide an understanding of our current environment or the fact that some of your prior recommendations have now been implemented by the Fire Department."

City Controller's Office Evaluation

When the City Controller's Office began this engagement in March 2010, calendar year 2009 data was the most recently completed annual data available. Although the response times for this updated report were based on 2009 data, it is important to note that in the two years since the original report had been issued (December 2007), response times to medical emergencies had only marginally improved. The percentage of runs accomplished in fewer than nine minutes went from 59.8 percent (based on fiscal year 2006 data) to 63.0 percent cited in this report. This represented only a 5.4 percent improvement. More importantly, of the nineteen recommendations made to the PFD in the earlier report, only two had been either implemented or partially implemented at the conclusion of our fieldwork for this report.

PFD Response

Management indicates that "…the report does not give enough weight to the current and projected budget realities the City faces in these tough economic times."

Controller's Evaluation

We disagree with the department's interpretation that the report does not consider current budgetary constraints. When appropriate, budgetary constraints are always considered when the City Controller's Office makes a recommendation. For example, in the December 2007 EMS Report, we had recommended that the Fire Department seek appropriate financial operating resources that were more in line with the changing needs of the department. We had observed that EMS incidents accounted for 84 percent of the workload, while budgeted dollars for EMS represented just 16 percent of the department's budget. As part of this engagement, we found the workload and budgeting patterns continued to be skewed.

Further, with regard to our current recommendation that the PFD consider installing traffic signal light preemption systems, we suggested that management explore grant funding options to pay for these public improvements, in lieu of general fund tax dollars.

Finally, the City Controller has, in previous testimony,[5] suggested that the city administration take more aggressive actions toward collecting amounts billed for emergency medical services rendered. In fiscal year 2011, for example, the city failed to collect over $48 million of billable EMS charges. Collecting these amounts could help fund the cost of operating the EMS program.

[5] Alan Butkovitz, "Testimony on Fire Department and EMS Billings and Collections," Philadelphia, PA, January 30, 2008.

City Controller's Office Contact

Harvey Rice, First Deputy City Controller, (215) 686-8849, harvey.rice@phila.gov

Staff Acknowledgements

In addition to the individual named above, Gerald Micciulla, Post Audit Deputy Controller, John Zoltowski (Audit Administrator), Eugene McQuary (Senior Auditor), and Rhonda Green (Staff Auditor) made key contributions to this report.

City Controller's Office Mission

The Office of the City Controller is the sole auditing agency of Philadelphia city government, and the auditor for the School District of Philadelphia. The mission of the Controller's Office is to promote honest, efficient, effective, and fully accountable city government. The Controller's Office addresses this mission by:

- Providing timely and objective analyses on the availability of funds for all city contracts.
- Preventing inappropriate spending of public funds.
- Providing objective, timely, and relevant information to city officials, the public, and other interested parties about financial operations of the city, and on ways to improve city operations and the use of public resources.
- Providing objective, timely, and relevant information about financial conditions having impact on city operations and on assumptions used for budgeting public resources.

Obtaining Copies of the City Controller's Office Reports

The fastest and easiest way to obtain copies of the City Controller's Office reports is through the City Controller's website at www.philadelphiacontroller.org.

To Report Fraud, Waste, and Abuse

Contact: Telephone number 215-686-3804, or via e-mail to info@philadelphiacontroller.org.