TELE-NURSING:

Lifting the Burden on Emergency Medical Services

April 2009

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EXECUTIVE SUMARY

The Philadelphia Fire Department should introduce tele-nursing in order to maximize resources and improve the effectiveness of Philadelphia's Emergency Medical Services (EMS) Units. Tele-nursing, the utilization of nurses in the 9-1-1 emergency dispatch network, can provide non-emergency care to callers who would otherwise be serviced by an ambulance. At the same time, the EMS system should begin to prioritize dispatches to reflect the nature of the emergency rather than the chronological order of calls. The diversion of non-emergency calls to a qualified nurse will save the Philadelphia Fire Department (PFD) as much as $2.5 million annually by increasing productivity and reducing the wear-and-tear on vehicles and equipment, as well as reducing stress on personnel.

More important than the fiscal impacts of tele-nursing are the impacts that it can have on all types of EMS patients. The appropriate resources can be made available for those who are in immediate need of care, while those who might become mired in the system can be provided with personal attention.

As the demand for EMS services has increased, the PFD has struggled to keep up:

- The number of EMS responses has risen from 165,000 in FY1999 to 210,000 in FY2006.
- The percentage of ambulances reaching the patient in less than nine minutes dropped from 77.50% in 2003 to 59.77% in 2006.
- The PFD has 50 ambulances:
    - 24 full-time ALS
    - 12 peak ALS
    - 19 full-time BLS
    - 5 peak BLS
- According to industry standards, the PFD should have 70 ambulances, based on the size and population of the city.
- PFD ambulance units are extremely overworked, making 8,000 runs a year, nearly three times the recommended workload of about 2,500-3,000 runs per ambulance per year

Tele-nursing is an effective tool used in other cities to reduce demand for responses, which can save money and free up resources for serious emergencies.

- Tele-nursing diverts about 2,500 ambulances per year in 3 cities in the U.S.
- The use of tele-nurses saves over $660,000 per year in these 3 cities.

- Tele-nursing has resulted in no reported medical emergencies or inappropriate diversions in cities where it has been implemented.

If tele-nursing were implemented in Philadelphia, the Controller's Office anticipates the following benefits to the EMS system, based on similar systems in use in other cities:

  - Responses diverted: 3,991 per year, although it may be as high as 18,789.
  - Cost savings: $320,653 per year, although it may be as high as $2,588,693.

Introduction
A 2007 audit of the Philadelphia Fire Department's (PFD) Emergency Medical Services (EMS) Unit performed by this office found that resources have been stretched thin for years, and that the quality and timeliness of that service suffers. EMS resources are limited, and their use should be prioritized. The 2007 report recommended a number of resource utilization improvements, including: "revise, to the extent possible, the existing policy of providing a response to every 9-1-1 call received," and to "implement a priority dispatch system." The following report suggests a way to achieve both goals, thereby reducing the strain on EMS resources. Maximizing the efficiency of the EMS Units will save the PFD money by increasing productivity and reducing the wear-and-tear on vehicles and equipment, as well as reducing the stress on personnel. Most importantly, it can save lives.

This office, with the goal of increasing the efficiency and efficacy of Philadelphia's EMS Units, recommends the implementation of "tele-nursing" in the emergency dispatch system. Tele-nursing (also called "tele-triage") is the utilization of nurses within the 9-1-1 network to divert non-emergency calls from dispatchers (and ultimately EMS Units) to trained personnel who can direct the caller towards an appropriate course of action.

This report was prepared as part of an ongoing effort by the Controller to explore ways for the City to minimize operating costs and make more funds available for essential services.

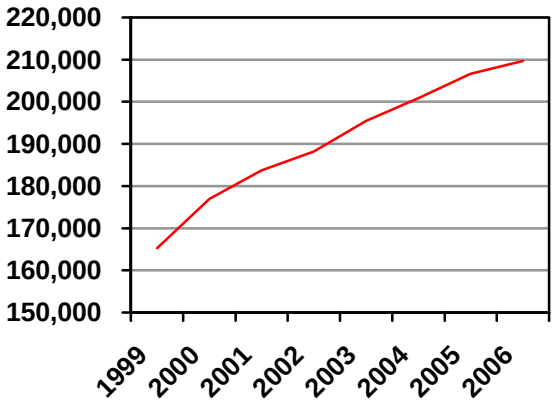
Scope & Methodology
For this report, the Controller's Office examined costs incurred when an emergency vehicle is sent to a 9-1-1 caller, as well as how many of those calls may have been serviced without dispatching personnel and equipment. Indirect costs associated with emergency responses are outside the scope of this research. The Controller's Office analyzed the savings associated with tele-nursing in three cities, and estimated the potential savings if Philadelphia were to implement such a system. Finally, we also examined best practices in the field and local and state ordinances that govern Emergency Medical Services.

Background
Often used as a tool during large-scale emergencies, tele-nursing is a process which separates 911-Emergency calls into at least two piles: those that need an ambulance or other emergency vehicle dispatched immediately, and those that do not. Emergency Call Center operators, upon receiving a call that is not obviously one that needs immediate action, use a series of prescribed questions to determine the seriousness of the case. If the caller is, for example, in need of care for a toothache, flu symptoms, a bloody nose, or a sprained ankle, the operator can divert that call to a registered nurse who will then recommend treatment to the caller.

By diverting non-emergency calls, EMS resources are more readily available for the calls where they are needed, and will be able to get to those patients faster. The 2007 EMS audit says "public demand for emergency medical services in Philadelphia has steadily

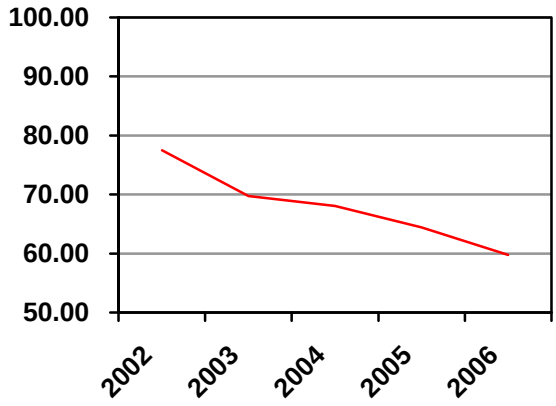
increased over the last eight years as measured by the number of EMS responses—from 165,000 responses in fiscal year 1999 to 210,000 in fiscal year 2006." Meanwhile, the percent of ambulances reaching the patient in less than nine minutes, the industry standard, dropped from 77.50% in 2003 to 59.77% in 2006.

Figure 1: EMS Responses made by the PFD have increased significantly in the last decade



Source: Prepared by Office of the City Controller based on the Mayor's Report on City Services

Figure 2: The percentage of EMS ambulances reaching their destination within 9-minute goal has declined

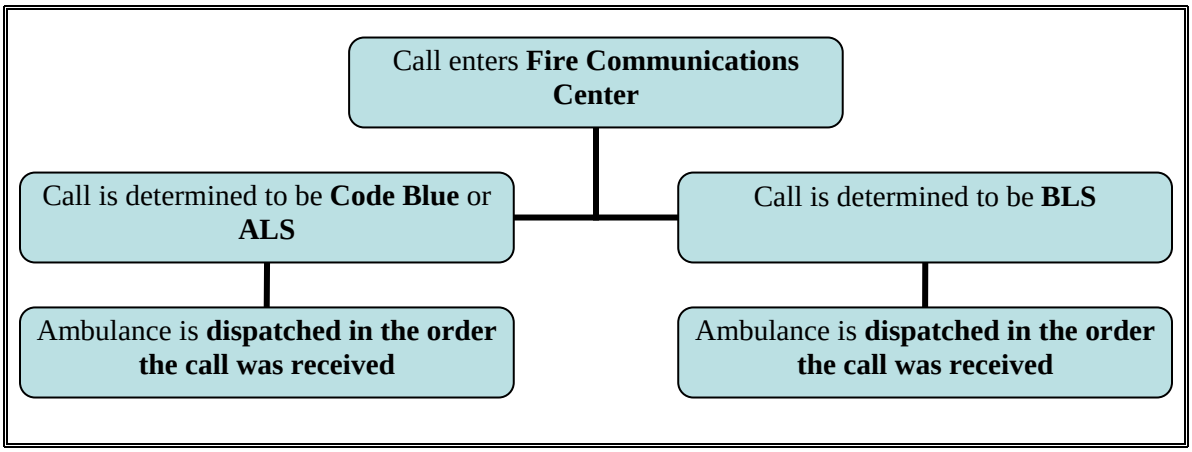


Source: Office of the City Controller analyses of complete CAD System database supplied by the PFD

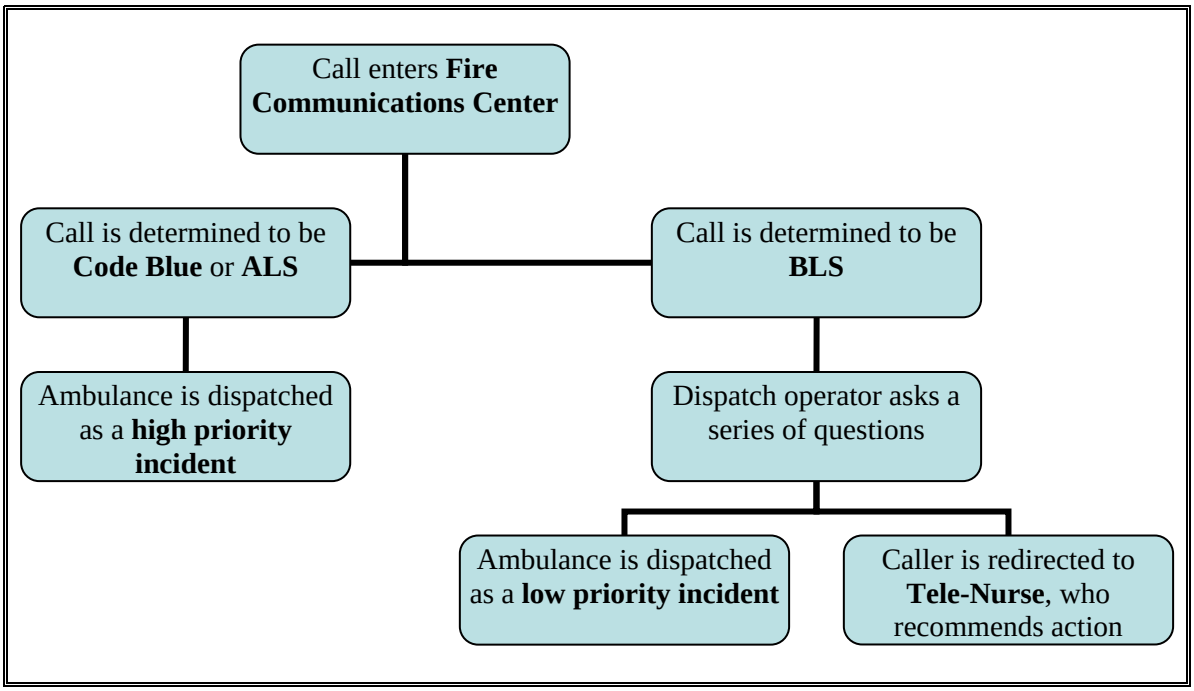
As the number of incidents has risen, so has the strain on the EMS network. The PFD staffs thirty three ambulances 24 hours a day, seven days a week. The remaining 17 units are used for "peak hours" and staffed at varying hours and days of the week. According to the International Association of Firefighters, a city the size of Philadelphia should have as many as 70 full-time units to avoid running out of resources at any given time. While the primary recommendation of this office was to bring more ambulances online, we're also acutely aware of the budgetary difficulties faced by the PFD and other departments. Maximizing resource efficiency is another way to accomplish the overall goal of decreasing response time.

Calls to 911 are currently classified 3 times before an ambulance is dispatched: first as either a police emergency or a fire/medical emergency, second as fire or medical, and third as Code Blue (patient not breathing), ALS (Advanced Life Support)/Trauma, or BLS (Basic Life Support). By this time, the operator knows the nature of the emergency, and has dispatched the most appropriate response. With Code Blue and ALS calls, the operators should and do dispatch emergency responders to the caller. With BLS calls, which generally involve "conditions such as minor injuries, minor bleeding, flu-like symptoms, or simply not feeling well," the operator may be able to reduce the use of PFD resources by diverting the call to a tele-nurse, following diversion standards used in other cities, such as asking clear and concise yes-or-no questions written by a panel of experts.

Current Dispatch Flow



Recommended Dispatch Flow



When a person dials 9-1-1, the call is received by the City of Philadelphia's Public Safety Answering Point (PSAP), operated by the Philadelphia Police Department. Callers in need of fire or medical assistance are rerouted to the Fire Communications Center (FCC), where they are then determined to be either fire or medical emergencies. Following established protocols, the dispatcher asks the caller a series of questions to determine the severity of the medical emergency. Calls are prioritized into one of three categories:

1. **Code Blue** — calls of this nature generally involve an emergency where the caller describes the patient as not breathing.

2. **Advanced Life Support or Trauma —** denotes an ALS/Trauma situation such as a patient described as having difficulty breathing, in cardiac arrest, as having a stroke, or as having been the victim of a shooting, stabbing, or falling from a distance of greater than 10 feet.

3. **Basic Life Support —** refers to a BLS event and involves conditions such as minor injuries, minor bleeding, flu-like symptoms, or simply not feeling well.

While calls are prioritized by these three categories, they are not dispatched according to their priority level—ambulances are dispatched based on the time of the call (first-come-first-served). Implementing a priority dispatch system, along with utilizing tele-nursing to reduce the number of non-emergency incident responses, will decrease the time it takes to respond to patients who need help the fastest.

Findings

Tele-nursing has been used for many years in England and other Commonwealth nations. At least three other jurisdictions in the U.S. employ tele-nursing. Seattle, WA introduced tele-nursing in 2000, Richmond, VA has used it since 2006 and Houston, TX introduced it in July 2008.

Tele-nursing systems vary widely in their cost and manner of implementation. Seattle out-sources their needs, contracting to a firm that handles a number of other nursing projects. As a result, Seattle's costs are fairly low at their current diversion rate ($14,476), as most of the cost is charged per call. The Seattle contract includes $3,626 in fixed annual costs, and a per call cost of $15.50. Richmond's system, which was developed and is operated by the city (rather than by an outside vendor), has cost $336,000 since implementation in 2006, for an average of about $84 per call. In Richmond, contract nurses work side-by-side with emergency dispatchers at a fixed annual cost, which results in a higher average cost per call. As usage increases, the per-call cost decreases and, today, it has declined to about $50/call.

Implementation also varies. Seattle and Houston both out-source their tele-nursing, while Richmond keeps theirs in-house. All three use software to determine diversion based on a series of questions—which are based on one of a number of protocols. In each, the computer prompts the dispatch operator to ask a number of simple questions, and instructs them to divert or send an ambulance depending on the answers. It is important to note that the 'send an ambulance' prompt can appear at any time in the questioning, and an ambulance will be immediately dispatched if the caller ever explicitly asks for one. In Houston and Richmond, tele-nurses follow up with callers after the call to ensure their well-being. Seattle does not require nurses or dispatchers to follow up, although they do so in some cases.

Benefits of Tele-nursing

In addition to reducing the strain on EMTs and paramedics, the use of tele-nurses can reduce the costs of running an EMS unit through the reduced wear-and-tear on equipment. Maintenance and replacement of vehicles can be relaxed, extending the life of an ambulance and with it the purchase cycle increments. As fuel costs continue to rise, additional savings will be found in reducing the miles-traveled for vehicles. The Controller's 2007 audit found that many PFD ambulance units are "handling extremely high workloads—in many cases well over 8,000 runs a year instead of the recommended range of between 2,500 and 3,000." Bringing these numbers down will have a corresponding effect on the costs that each unit incurs by responding to too many calls.

Best Practices

Of utmost importance when dispatching or diverting 911 calls is safety. The caller is either sick or injured, or with someone who is. To prevent calls from being incorrectly diverted, 911 operators should use a prescribed series of questions that determine the nature of the emergency. If any of the answers indicates that the emergency may be life threatening, protocol must specify that operators should dispatch responders. Typically, the questions should be in the "yes-or-no" format, and should all answer "no" for not-life-threatening and "yes" for life-threatening. For example, rather than asking the caller to describe a pain, the operator should ask the caller specific questions about the pain.

A study of tele-nursing as a 911 call evaluation tool in Ontario, Canada found that "the teletriage service was providing appropriate advice." The study was conducted by having three auditors ("one physician, one nurse-practitioner and one registered nurse with teletriage experience") listen to 73 calls. In the minority of cases where one or more auditors felt the advice was inappropriate, auditors were "three times more likely to rate the advice as 'overly-cautious' rather than 'insufficient'." This office recommends that 911 operators err on the side of caution. Should a similar audit be performed following the adoption of a tele-nursing system, the results would ideally be similar to those in Ontario.

A study of Emergency Room usage in Houston from 2002 to 2006 found that 50% of non-hospitalized patients were there for reasons that are considered "primary care related"—meaning that half of these visitors were using the ER as they would a family doctor. Similarly, a 2007 report by the Philadelphia City Controller found that "over 50 percent of the [EMS] calls and runs [were] non-emergency in nature," and other estimates, including those by Philadelphia Fire Commissioner Lloyd Ayers, placed that number as high as 80 percent. Each of these figures point to the overuse of emergency services as a replacement for traditional family medicine. Utilizing nurses and/or nurse practitioners in the dispatch system will reduce the percentage of ambulance runs.

To see how tele-nursing has performed in other cities, we examined the experiences in Houston, Seattle, and Richmond. The cities vary considerably in size, how long tele-nursing has been in use, and the approach taken to tele-nursing. Nevertheless, a few key variables can be viewed as success metrics: the Diversion Rate (how many calls are sent from the dispatcher to a tele-nurse), the Send-back Rate (how many of these calls are

returned to the dispatcher), the Final Diversion Rate (the Diversion Rate minus the Send-back Rate, or the actual number of calls that do not result in an ambulance being dispatched). Gross Savings are based solely on the per-response cost multiplied by the number of Final Diversions. The System Cost for each city is taken from phone interviews with officials in each city, and is subtracted from the Gross Savings to determine Net Savings.

The Send-back Rate is an important metric because there may be a number of different causes for a call to be sent back to the dispatcher. A caller may simply request an ambulance, which means that the nurse has to send the call back to dispatch. In some cases, a caller may need to see a doctor (albeit for non-emergency reasons), but be unable to get there, triggering a send-back. In Seattle, which has the lowest send-back rate of the three cities, most send-backs are the result of under-triage related to the time pressures put on dispatch operators—they have 60 seconds to determine the nature of the patient's problem and decide upon a course of action. This pressure leads to calls being sent to the nurseline before all the information is available, which leads to under-triaged callers being sent back to dispatch.

Despite these problems, none of the cities has reported adverse outcomes related to tele-nursing. The tiered system of prioritization establishes the severity of the call very quickly, leading to under-triaged patients with relatively minor problems, not under-triage of life threatening emergencies.

A 2001 study in Kings County, WA, concluded that a telephone referral program "designed to identify minimal-risk BLS calls and refer the patient to a consulting nurse line resulted in a high level of patient satisfaction and decrease in BLS calls."[1] The same study found that many citizens use 911 for primary care conditions "that could be better managed with other, less costly community resources." Most importantly, the study found "no evidence of adverse [medical] outcome due to the intervention. A high percentage of patients reported that they felt better after the intervention, and none reported feeling worse."

The following chart shows how variables interact to help evaluate the success of tele-nursing in terms of direct cost savings. The Diversion Rate, Send-back Rate and System Cost for Philadelphia are based on averages of the other cities, and should be seen as conservative estimates rather than precise expectations. All other Philadelphia numbers are data pulled from the 2007 EMS report, interviews with PFD officials, and budget documents.

[1] *Emergency Medical Services Telephone Referral Program: An Alternative Approach to Nonurgent 911 Calls*, William R. Smith, et al, Prehospital Emergency Care, April/June 2001, Vol. 5 No. 2, p. 174-180.

City-by-City Comparison of Tele-nursing Programs
(with estimates for Philadelphia)

	Houston*	Seattle	Richmond	Philadelphia
Population (2007 Census Est.)	2,208,180	594,210	200,123	1,449,634
Year Started	2008	2000	2006	
Runs/year (2006)	**300,000**	**136,000**	**40,880**	**260,957**
Cost/Run**	$ 305	$ 400	$ 356	$ 160
Cost/Call	$ 35	$ 21	$ 50	$ 35
Diversions/Year	5,475	700	3,285	9,025
Diversion Rate	**1.83%**	**0.51%**	**8.04%**	**3.46%**
Send-back Rate	**75%**	**9%**	**83%**	**56%**
Final Diversions/Year	1,369	637	548	3,991
Final Diversion Rate	0.46%	0.47%	1.34%	1.53%
Gross Savings	$ 417,925	$ 254,800	$ 194,910	$ 638,578
System Cost	$ 89,363	$ 14,476	$ 164,250	$ 317,925
Net Savings	**$ 328,562**	**$ 240,324**	**$ 30,660**	**$ 320,653**

Philadelphia Diversion Rate, Send-back Rate, & System Cost are averages of the other cities

* Some data from that Houston was unavailable. Cost/Run and System Cost are estimated based on the other cities.

** Cost per run is calculated by dividing the annual budget for ambulances by the number of incident responses per year. This method of accounting is flawed, in that it does not accurately capture the cost to a city. However, that is how all four cities estimate their emergency response costs, so all four cities are comparable.

Houston

Houston, with the youngest system, has just begun to work out the kinks. Of note is their extremely high send-back rate (the percent of calls that are sent to the tele-nurse, and then back to the dispatcher for an ambulance). While their diversion rate is a reasonable 1.83%, their send-back rate of 75% brings the actual diversion rate down to that of Seattle. The Houston tele-nurses call anyone who doesn't need an ambulance within 24 hours to check up on them. One of the problems with tele-nursing is that people who don't have access to a doctor often use 9-1-1 to get to a hospital for routine health-care. In an effort to reduce the number of people doing so, Houston plans to add a system where dispatchers can make doctor's appointments for callers, and arrange transportation.

Seattle

Seattle has been taking advantage of tele-nursing for the longest period of time, and therefore has had the most time to optimize their system. Their send-back rate is low, at about 9%, indicating that their series of questions is working fairly well to determine the severity of the patient's system. However, their diversion rate is also quite low, which is due to the number of questions that they ask—there are a lot of possible diversion criteria, making the question-and-answer period take too long (The industry standard goal is to move from incoming call to dispatched ambulance in 60 seconds, regardless of the priority level of the call). To meet their goal of 2-3% diversion to tele-nurses, Seattle is considering a change in the time goals, in effect lengthening the amount of time that is appropriate for BLS-level calls. This extension is also expected to lower their send-back rate due to under-triage. A year-long pilot program to evaluate the effectiveness began in November 2008. Like Houston, Seattle is also looking into the feasibility of offering rides for those who cannot get to a doctor on their own.

Richmond
Richmond implemented a tele-nursing system in 2006 and has seen a significant reduction in unnecessary EMS runs since then. Of the three cases studied, Richmond has the highest diversion rate, even after their extremely high send-back rate of 83%. As in Seattle, many of the send-backs in Richmond are due to patients who cannot get to a doctor. Richmond, like the other two cities, is working on a system to provide transportation to these patients. Because their system cost is high, especially when compared to that of Seattle, their net savings is relatively low, at just over $30,000. While tele-nursing has the greatest impact in Richmond, the system costs drastically affect the cost savings—demonstrating the importance of keeping costs low while maintaining service.

Cost Savings
It is clear that there are considerable potential savings in tele-nursing, as long as costs are contained. In Seattle, where the annual cost is less than $15,000, the savings are almost 20 times the costs. Richmond, which has the smallest EMS department, and the lowest per-run cost, saved more than Seattle by having the highest diversion rate. But their savings were eaten up by high system costs. Houston, by virtue of being the largest city, saved the most before factoring in system costs, despite a high send-back rate.

Safety & Liability
As with anything related to medical treatment, liability is a concern. Malpractice or liability risks are similar to those of emergency medical services, while the addition of a remote medical provider may present an additional source of claims that the City would have to defend. All nurses will have to be licensed in Pennsylvania, and the series of questions that lead a dispatcher to divert a call should be written by a Pennsylvania licensed medical professional. Risk is somewhat mitigated already by the existing series of questions that determine the severity of the call; to further mitigate risk, the questions will need to be clear, yes-or-no questions, and the course to diversion should involve all-yes or all-no answers. To get to the tele-nurse, the dispatcher will have to determine that A) the call is not Code Blue, B) the caller does not require Advanced Life Support, C) the caller does not require Basic Life Support, and finally, D) the caller may be assisted by a tele-nurse.

Seattle and Richmond take different approaches to liability mitigation which relate to how they incorporate tele-nursing into their dispatch systems. Seattle determined that any liability concerns related to tele-nursing would be similar to those relating to dispatch in general. Because their nurses are employees of an outside contractor, Seattle does not do very much in-house quality control beyond that which is done for the rest of their dispatch system. Richmond, which operates their tele-nursing system in-house, tends to err on the side of caution. Richmond sends an ambulance to the caller if there is any indication of need, they follow-up with patients within 24 hours, and they regularly review calls to ensure that there are no adverse effects due to the use of tele-nurses. None of the cities have recorded any fatalities or injuries as a result of tele-nursing, indicating that the protocols that err on the side of caution are effective at mitigating risk while providing service and lowering costs.

Estimated Savings for Philadelphia

With Philadelphia's current response rate (about 260,000 runs per year), and with a conservative system cost estimate ($50/telenurse call, based on the high system cost from Richmond), the annual savings are moderately impressive, at about $200,000. In Seattle, the annual cost of their system is about $15,000, or about $23 per call. Changing the cost per call in the Philadelphia scenario shows how the net savings is affected by the system cost – bringing costs down to Seattle's level more than doubles the net savings to nearly $500,000.

Cost per Call Scenario Comparisons

Runs/year (2006)	260,957	260,957	260,957	260,957	260,957
Cost/Run**	$ 160	$ 160	$ 160	$ 160	$ 160
Cost per Call	**$ 20**	**$ 30**	**$ 40**	**$ 50**	**$ 60**
Diversion Rate	3.46%	3.46%	3.46%	3.46%	3.46%
Send-back Rate	56%	56%	56%	56%	56%
Diversions/Year	9,029	9,029	9,029	9,029	9,029
Final Diversions/Year	3,973	3,973	3,973	3,973	3,973
Final Diversion Rate	1.52%	1.52%	1.52%	1.52%	1.52%
Gross Savings	$ 635,649	$ 635,649	$ 635,649	$ 635,649	$ 635,649
System Cost	$ 180,582	$ 270,873	$ 361,164	$ 451,456	$ 541,747
Net Savings	**$ 455,067**	**$ 364,776**	**$ 274,485**	**$ 184,194**	**$ 93,903**

The diversion rate similarly affects the cost. Applying the range of 0.5% (the lowest of the cities) to 8% (the highest rate) to the conservative cost estimate of $50/call, the net savings range from a paltry $26,000 to nearly $500,000.

Diversion Rate Scenario Comparisons

Runs/year (2006)	260,957	260,957	260,957	260,957	260,957
Cost/Run**	$ 160	$ 160	$ 160	$ 160	$ 160
Cost per Call	$ 50	$ 50	$ 50	$ 50	$ 50
Diversion Rate	**0.50%**	**1.00%**	**2.00%**	**4.00%**	**8.00%**
Send-back Rate	56%	56%	56%	56%	56%
Diversions/Year	1,305	2,610	5,219	10,438	20,877
Final Diversions/Year	574	1,148	2,296	4,593	9,186
Final Diversion Rate	0.22%	0.44%	0.88%	1.76%	3.52%
Gross Savings	$ 91,857	$ 183,714	$ 367,427	$ 734,855	$ 1,469,710
System Cost	$ 65,239	$ 130,479	$ 260,957	$ 521,914	$ 1,043,828
Net Savings	**$ 26,618**	**$ 53,235**	**$ 106,470**	**$ 212,941**	**$ 425,882**

Because it determines the final diversion rate, the send-back rate has the most effect on net savings. The three cities range from a low of 9% to a high of 83% – the low end of which brings the potential net savings in Philadelphia to about $850,000. At $50/call, the net savings drop to zero when the send-back rate is 68.75%, after which the system would cost the city more than it would save.

Send-back Rate Scenario Comparisons

Runs/year (2006)	260,957	260,957	260,957	260,957	260,957
Cost/Run**	$ 160	$ 160	$ 160	$ 160	$ 160
Cost per Call	$ 50	$ 50	$ 50	$ 50	$ 50
Diversion Rate	3.46%	3.46%	3.46%	3.46%	3.46%
Send-back Rate	**10%**	**30%**	**50%**	**70%**	**90%**
Diversions/Year	9,029	9,029	9,029	9,029	9,029
Final Diversions/Year	8,126	6,320	4,515	2,709	903
Final Diversion Rate	3.11%	2.42%	1.73%	1.04%	0.35%
Gross Savings	$ 1,300,192	$ 1,011,261	$ 722,329	$ 433,397	$ 144,466
System Cost	$ 451,456	$ 451,456	$ 451,456	$ 451,456	$ 451,456
Net Savings	**$ 848,737**	**$ 559,805**	**$ 270,873**	**$ (18,058)**	**$ (306,990)**

Clearly, realizing the potential cost savings from tele-nursing would require careful monitoring of the cost-affecting variables. At worst, the implementation of a tele-nursing system may cost the city more than it would save, up to about $700,000 per year. At best, with a low per-call cost and send-back rate and a high diversion rate, tele-nursing could save the city as much as $2.5 million annually. The three variables that most affect the net savings (cost per call, diversion rate, and send-back rate) interact in predictable ways. The highest savings would be found with a system where the cost per call and the send-back rate are low, and where the diversion rate is high. Conversely, a low diversion rate along with high cost per call and send-back rate make the overall system cost higher than the savings, resulting in a net cost to the city. Of the three variables, the send-back rate has the most impact on the bottom line, especially when combined with a high diversion rate. As such, the diversion and send-back rates should be monitored closely and kept high and low, respectively. If the cost per call needs to stay relatively high to accomplish appropriate diversion and send-back rates, the effect on net savings is less than if the cost per call is kept low to the detriment of the other variables.

Philadelphia Could Save Up To $2.5 Million With Tele-nursing

	Best Case	Success	Moderate Success	Break Even	Worst Case
Runs/year (2006)	260,957	260,957	260,957	260,957	260,957
Cost/Run**	$ 160	$ 160	$ 160	$ 160	$ 160
Cost per Call	**$ 20**	**$ 35**	**$ 50**	**$ 50**	**$ 50**
Diversion Rate	**8.00%**	**8.00%**	**8.00%**	**8.00%**	**8.00%**
Send-back Rate	**10%**	**30%**	**50%**	**69%**	**90%**
Diversions/Year	20,877	20,877	20,877	20,877	20,877
Final Diversions/Year	18,789	14,614	10,438	6,524	2,088
Final Diversion Rate	7.20%	5.60%	4.00%	2.50%	0.80%
Gross Savings	$ 3,006,225	$ 2,338,175	$ 1,670,125	$ 1,043,828	$ 334,025
System Cost	$ 417,531	$ 730,680	$ 1,043,828	$ 1,043,828	$ 1,043,828
Net Savings	**$ 2,588,693**	**$ 1,607,495**	**$ 626,297**	**$ -**	**$ (709,803)**

The 2007 EMS Report predicted that, at the current rate of growth, the PFD will be responding to 332,000 ambulance calls per year by 2010, costing the city an additional $11 million (at current per-run costs). The potential savings to the City of Philadelphia through the implementation of tele-nursing are significant, and realizable.

While the cost savings are impressive, the *lives* saved are the most important function of an EMS system. While it is difficult to quantify the number of lives saved because of tele-nursing where it is in use, it is reasonable to suggest that the increased availability of ambulances and paramedics has been beneficial. Fewer non-emergent incident responses can free up valuable resources for those who need them while reducing stress and strain on personnel, equipment and vehicles, saving money and lives in the process.

Recommendations

- The City should integrate a tele-nurse option into its 911 protocols. Within the structure of the existing call-prioritization system, the City should add a series of questions after determining that a call is a "BLS" call.
    - Use the series of questions to divert the call to a tele-nurse if appropriate
    - The questions should be structured in a yes-or-no format, with either all yeses or all no's leading to diversion
    - The questions should be written by a qualified team of experts, sanctioned by state authorities, to ensure their simplicity and efficacy
- For calls that are diverted and where the caller does need to go to a doctor (but not urgently), implement a system that allows tele-nurses to assist the caller in making a doctor's appointment and arrange transportation.
    - Doctors should be a part of existing public medical networks, such as the 10 Public Health Clinics around Philadelphia, or specific doctors in area hospitals.
    - Non-emergency transportation should take advantage of existing transportation networks of SEPTA, ParaTransit and/or Taxi Cabs.
- Contain system costs by striving to meet the goal of high diversion rate coupled with low send-back rate, rather than by focusing solely on cost per call.