



**Division of
Emergency Medical Services**



***2009 Annual Report
to the King County Council***

September 2009

Preface

I am very pleased to present and introduce the Emergency Medical Services (EMS) Division 2009 Annual Report, as required by King County Ordinance #12849.

This is the eleventh EMS Division Annual Report, and the second report for the Medic One/EMS 2008-2013 levy period. The EMS Annual Report provides updates on the operational, programmatic, planning, and financial aspects of the regional Medic One/EMS system, and presents a statistical profile of EMS activities in King County. The EMS Annual Report serves to remind us how the regional EMS system works, how emergency medical care is provided to over 176,000 patients by dispatchers, emergency medical technicians, and paramedics.

In addition to its regional character, the EMS Annual Report also includes useful information on the many regional support programs provided by the King County EMS Division that help ensure effective, standardized care across our region. It is a highly significant achievement from a medical perspective that a system that relies on strong partnerships across thirty fire departments, seven paramedic providers, five EMS dispatch centers and nineteen hospitals, is able to provide standardized EMS medical care to residents in their homes, at work, and as they travel around the county.

The EMS Annual Report provides a good view of the programs and activities that are ongoing in the region. There are several important themes that I'd like to highlight here as Director and Health Officer. Part of the reason the EMS system in this region is so effective medically is that programmatic efforts extend across the different segments of the entire EMS system, and are not centered solely on ensuring fast response by EMTs or paramedics. One way to appreciate this is to consider that the basic elements of the regional EMS response system include (1) prevention activities, (2) citizen CPR and public use of automated defibrillators (AEDs), (3) dispatch centers where the first calls for medical assistance are received and processed, and where dispatchers can assist with CPR and AED instructions, (4) fast response by emergency medical technicians and paramedic response to more critical medical emergencies, and (5) medical care transport to a hospital.

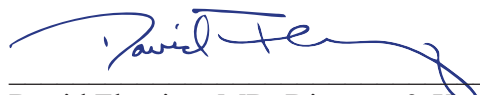
For example, the regional EMS system includes injury prevention programs that help ensure the safe use of car seats for infants and prevent falls among the elderly and are important programs in managing the occurrence of medical emergencies that impact our system. Citizen CPR and automated external defibrillator (AED) programs help ensure that witnesses to cardiac arrests will have the training to enable them to respond by notifying 9-1-1 quickly and providing initial care at the scene until EMTs and paramedics arrive and continue patient care and transport.

It is clear from the EMS Annual Report that the enhanced emphasis on dispatch and dispatcher training outlined in the *Medic One/EMS 2008-2013 Strategic Plan* is providing additional system and patient benefits. Web-based training of dispatchers, EMTs and paramedics through EMS Online provides a cost-effective training alternative and enhances the provision of uniform, standardized care. The profile included of King County Medic One shows the variety of support activities that form an important part of the region's paramedic programs.

I was interested in the enhanced efforts in the development of regional medical quality improvement (QI) efforts at the dispatch, EMT, and paramedic level. These efforts will have important dividends in the care which residents in our region receive. The QI activities also dovetail nicely with important grants received by the division, and with efforts to share the lessons learned in this system with medical directors, providers, and administrators in other EMS systems through the Resuscitation Academy funded by the Medic One Foundation.

The EMS 2009 Annual Report to the King County Council continues to show that the regional system is strong, actively follows the program directions outlined in the EMS Strategic Plan, and continues to develop and provide quality EMS care to the residents of King County.

David Fleming, MD, Director & Health Officer
Public Health – Seattle & King County



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Acknowledgements:

The Emergency Medical Services (EMS) Division would like to thank all of the individuals who contributed to the ***EMS 2009 Annual Report***, including managers of the various EMS projects and programs depicted in the report; **Leonard Roberts** and the Seattle Fire Department; and the EMS Division data analysis team of **Linda Becker**, **Dan Henwood**, and **Dmitry Sharkov**.

The EMS Division would also like to thank **Dr. Leonard Cobb** and **Dr. Michael Copass** of the Seattle Medic One program for their collaborative efforts in partnering with the EMS Division.

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Commonly Used Acronyms:

Emergency Medical Services (EMS)
Advanced Life Support (ALS)
Basic Life Support (BLS)

Emergency Medical Dispatch (EMD)
Emergency Medical Technician (EMT)

Executive Summary

During the past year, the Emergency Medical Services (EMS) Division completed an enormous number of activities, including an in-depth regional analysis of medic unit service needs, enhanced referral of low acuity calls to 9-1-1, improved case review of ST segment elevation myocardial infarction patients, sustained cardiac arrest survival rates, and completion of the first countywide CPR training survey.

The following is a summary of each major section of the annual report:

Part I - EMS System Review (page 10): The EMS System Review focus this year is on the regional process for planning and implementing new paramedic services. When the current levy was being planned in 2006-2007, forecasts were made about when additional paramedic services might be needed. This year, the region needed to determine whether or not to add the equivalent of a 0.5 paramedic unit in September 2010 as projected in the EMS Strategic Plan. The results of the analysis indicated:

- North and East King County paramedic service was stable.
- South King County indicators reflected increased workloads and response times that could not be addressed solely by relocating units.

Based on the findings, the recommendation includes:

- Medic unit relocation (Medic 5 to downtown Renton and Medic 7 to Hwy 167 in Kent).
- A four-month delay in additional paramedic service (transition Medic 13 in Des Moines from 12-hour to 24-hour service in January 2011).

Part II - EMS Division Programs and Activities (page 14): The *Medic One/EMS 2008-2013 Strategic Plan* was devised to define the roles, responsibilities and programs for the EMS system to improve patient care, manage growth in paramedic services, and develop system efficiencies and cost savings. The plan identified new programs and initiatives that would contribute to the successful achievement of the plan's policy and financial goals, most notably new dispatch initiatives and a new Regional Medical Quality Improvement Section. The following two programs are of particular interest:

- The Community Programs Section strategic initiative to better manage non-emergency calls to 9-1-1 (see page 50) has improved the referral of low acuity calls to a Telephone Referral Program/Nurseline by 154% to over 2% of all calls to 9-1-1.
- The new Regional QI Section has embarked on a comprehensive case review and evaluation of STEMI patients (see page 24) to identify ways that both the EMS system and hospitals can improve the identification, triage and management of these patients based on the new American Heart Association goal of providing balloon inflation (PCI) within 90 minutes of first contact with EMS personnel.

Year 2008 Statistics (page 63): In Seattle and King County, the EMS system responded to a total of 176,006 calls to 9-1-1 and 50,796 responses for advanced life support (ALS) in 2008. Despite continued modest increases in population, the average medic unit response time remained steady at 7.7 minutes. Cardiac arrest survival for witnessed cases of cardiac etiology with ventricular fibrillation reached an unprecedented high at 49% in 2008. The *Public Health Highlight* this year presents summary findings from the Survey of CPR Training in King County (see page 66) that reports an unexpected 79.3% of respondents had attended a CPR training class and emphasizes the important role of bystander CPR in cardiac arrest survival.

Part III - EMS Funding and 2009 Financial Plan (page 71): The EMS system in King County is funded primarily by a six-year EMS levy. Forecast revenues for 2009 are \$68,106,467 (not including the City of Seattle). The 2009 budgeted expenditures are \$59,822,623 not including contingencies or reserves. Economic conditions have changed significantly since the levy was planned in 2006 and 2007, and the impact of the economic downturn on the EMS levy fund is currently being reviewed. Recent analysis concludes that while a decline in revenue will pose a challenge to the EMS fund, the fund will be able to maintain the spirit and intention of the Strategic Plan in providing essential EMS services in King County.

The EMS Division's 2009 Annual Report is available online through the Public Health - Seattle & King County website: <http://www.kingcounty.gov/healthservices/health/ems>.

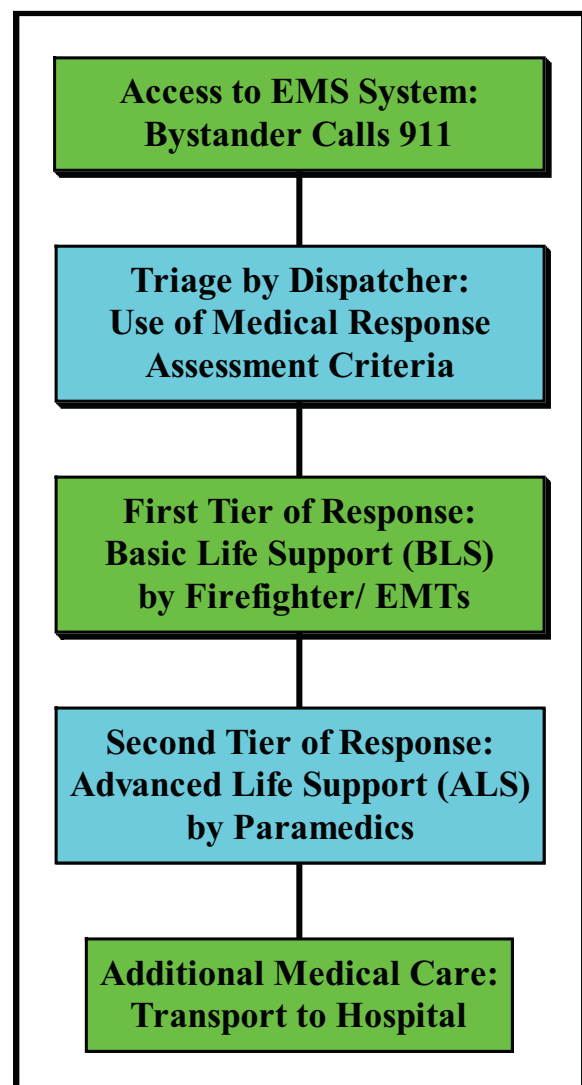
A Brief Description of the Medic One/EMS Tiered System

The **Medic One/Emergency Medical Services (EMS)** system provides an internationally renowned regional service to the residents of Seattle and King County, responding in an area of 2,134 square miles and serving a population of over 1.8 million. The EMS/Medic One system operates in a coordinated partnership among the various cities, fire districts, private ambulance companies, and local area hospitals in King County to provide high quality pre-hospital medical care. The EMS response system is tiered to ensure that 9-1-1 calls receive medical care by the most appropriate care provider.

There are five **major components** in the regional tiered EMS/Medic One system described below:

- **Universal Access:** Patient or bystander accesses the EMS system by calling 9-1-1 for medical assistance.
- **Dispatcher Triage:** Calls to 9-1-1 are received and triaged by trained professional dispatchers in five dispatch centers throughout King County. Most dispatch centers use the Criteria Based Dispatch (CBD) Guidelines to provide uniform triaging to callers.
- **Basic Life Support (BLS) services:** BLS personnel provide the first level of response to most calls and are staffed by firefighters trained as Emergency Medical Technicians (EMTs). On average, BLS units arrive at the scene in under five minutes.
- **Advanced Life Support (ALS) services:** ALS services are provided by paramedic agencies responding to patients with more critical or life-threatening injuries and illnesses. Paramedics respond to about 30% of all EMS responses and arrive on average at the scene in under eight minutes.
- **Transport to Hospitals:** Some patients require additional medical care and are transported to local area hospitals.

Tiered EMS Response System



Part I: EMS System Review

Planning Future Paramedic Services: Regional Process and Analysis

Thomas Hearne, PhD., EMS Division Director

This year's topic for the EMS System Review focuses on the regional process for planning and implementing new paramedic services. The addition of new paramedic services is one of the most important decisions made over the course of the EMS levy. New services represent a significant long-term operational and financial commitment within communities, and much rides on making the correct decision as residents grow to depend very quickly on the new service. Support for regional paramedic services is the leading priority of the *Medic One/EMS 2008-2013 Strategic Plan* and the EMS levy provides 100% financial support. When the current levy was being planned in 2006-2007, forecasts were made about when additional paramedic services might be needed in order to ensure that placeholder funding existed for those anticipated new services within in the overall financial plan. Paramedic service forecasting in the planning stage of the levy relied primarily on workload growth forecasts that looked as many as eight years into the future.

Background

Although planning forecasts are conducted, the process for determining whether new paramedic services are actually needed requires very careful regional review that includes consideration of other operational and financial factors besides growth in paramedic workloads. The process that is used regionally to make that determination of need is a very interesting one, and demonstrates the importance of specific criteria, good regional data, strong partnerships between providers, and careful consideration of alternatives (including not adding services) in making that decision. If the cooperative regional process results in a recommendation to add new service, it is included in the EMS Division's annual budget request. The final decision on paramedic service recommendations is made by the King County Executive and the King County Council as part of the annual budget approval process. The recent planning review process regarding the addition of paramedic service in 2010 is a particularly successful example of how the regional process works and is worthy of summary review.

The *Medic One/EMS 2008-2013 Strategic Plan* - p. 37 projected adding additional paramedic service in King County 2008, 2010, 2012, and 2013, the last year of the levy period. New paramedic service is typically added in half-unit increments during peak workload hours (9 a.m. to 9 p.m.) each day. Funding for these new units is calculated at 50% of the annual paramedic unit allocation plus startup costs. Previous workload reviews have shown that the addition of units during these times enables new units to respond to 60% or more of a 24-hour workload. Addition of units in this manner also allows new services to keep pace with changing population, workload, response time, and other operational characteristics. For example, new paramedic services were added in the Shoreline area in 2008; and this unit completed a half-time unit added in Shoreline in 2002, the first year of the last EMS levy.

Planning Process, Data Review, and Criteria

This year, the region needed to determine whether or not to add the equivalent of 0.5 unit paramedic service in 2010 as projected in the EMS Strategic Plan prepared in 2006-07. Some of the major questions included:

- What is the status of current paramedic services countywide?
- What are current service gaps, where do they occur geographically, and what is their magnitude?
- Are there alternate ways to address these service gaps rather than add new paramedic service? Could we meet new service needs by relocating existing units?
- Are new services needed in 2010, or are there options to delay adding service, especially in light of the economic downturn?
- What are the financial implications for the levy of adding or delaying service?

The process for answering these questions and others is very deliberate, systematic, and depends on a thorough regional review and update of services so that physicians, service providers, and administrators all have a good sense of the service issues and have time to consider the alternatives. The overall goal of the regional review process is to come to a data-driven, consensus-based decision regarding the best methods to address service gaps, possible relocation of existing units, the service implications of delaying new service, and consideration of the most cost-effective alternatives. The process seeks to achieve a reasonable balance between local and regional system needs while ensuring paramedics continue to maintain experience in caring for critical cardiac, neurologic and trauma patients and exposure to paramedic skills such as intubation and IV administration.

The first major step in this process is to characterize the current status of paramedic service countywide and for each paramedic provider. In addition to Seattle Medic One, these providers include Shoreline Medic One (Shoreline-Bothell area), Redmond Medic One (Kirkland, Redmond, Woodinville, Duvall area), Bellevue Medic One (Bellevue and Mercer Island and east along the I-90 corridor), King County Medic One (entire south King County area), and Vashon Medic One (Vashon and Maury Island). Specific data and criteria are utilized to ensure a standard comparison across each of the paramedic programs in the county and extensive geographical information systems (GIS) geocode modeling is used to assess unit placement options.¹ The criteria include:

- **Workload trends** with regional standard range of 1,400-2,500 responses per year per 24 hour unit. Units in outlying areas have smaller paramedic workloads as expected.
- **Average Unit Response time trends** with regional standard average unit response times <10 minutes, and 80% of calls in <= 14 minutes. Response time averages are good depictions of overall response, but are less effective in measuring system changes.

¹ I want to acknowledge the important regional work that is done by Michele Plorde, Section Manager for Planning and Evaluation at the EMS Division, and Dmitry Sharkov, EMS Geographical Information Systems (GIS) for the excellent data collection and analysis, mapping, and modeling programs that make these analyses possible. The high-quality analysis the region is able to do would not be possible without their work.

- **Fractile response time trends** (% of calls less than <8, <10, <12, <14 min.) with regional standard range of response times >80% in less than 14 minutes. Fractile measures are fairly sensitive measures that can often reveal early system response changes before they appear in other indicators such average response times. For example, decreasing fractile trends may indicate some eroding of response times due to changing workload distributions, unit placement relative to workload, or changing traffic patterns.
- **Percentage back up response trends** by unit. Backup responses typically result in longer response times. The regional standard is that medic units should not require >20% backup from other units. Increases above that may represent operational stresses that need to be considered. This indicator will likely phase out as AVL is implemented in the region and the 'closest available unit' becomes dispatched.
- **Critical patients/skill trends.** Critical patient/skills exposure includes cardiac arrests rate, intubation, peripheral IV, central line IV, and proportion of paramedics to 100,000 population. Proposed additions of new services are reviewed in terms of impacts on paramedic skill maintenance.

Summary Regional Findings

These criteria were utilized in reviewing five-year trends (2004-2008) in paramedic service from both the paramedic program perspective and from the perspective of the fire departments whose residents receive paramedic service. Service gaps and magnitudes were determined, and using GIS modeling, we analyzed whether or not these service gaps could be addressed by relocating existing units. If not, then we also modeled alternative locations for the placement of new services in order to select the most effective location for the new services. We also assessed the potential impacts of delaying the addition of services.

Although each paramedic program was carefully examined for changes, only the major summary trends are reflected here, including:

- Long-term paramedic service trends (1990-2008) showed steady call volume increases countywide from 1990-1998. Since 1999, however, there has been an overall leveling of paramedic workloads, managed in part by careful and safe periodic revisions in ALS dispatch protocols. This approach in managing growth in paramedic workloads has proven to be a successful long-term strategy.
- Paramedic service has increased since 1999 by the addition of 5.0 new medic units, reflecting expansion into outlying areas (1.5 units), unit conversions from EMT/paramedic model to units staffed by two paramedics as requested by medical directors (2 units), and new service added in urban and suburban areas (1.5 units).
- Regionally, workloads and response times have been stable over the past five years (2004-2008); well within established standards. North King County has remained quite stable (with the exception of the expected increases associated with the transition of the Evergreen paramedic program to Shoreline and Redmond in 2003). In South King County, however, steady call volume and average response time increases have occurred since 2002.
- In addition, there were significant sub-regional differences between North King County

and Vashon paramedic programs compared with South King County. For example, there was a countywide overall net increase of 2,053 calls in the five-year period 2004-2008, 98% (2,014 responses) of which occurred in South King County. All North King County programs and Vashon experienced a net increase of 39 calls during the same period.

- Response time trends were likewise somewhat different in North and South King County. Overall, average response times remained about 8 minutes, well under response time standards. Programatically, North King County programs have very stable, slightly better average response times (about 8 minutes), whereas KCM1 has overall average times about 9 minutes and worsened over time.
- Fractile response time trends in South King County also showed significant worsening compared with North King County and Vashon programs.
- Workload and response times differences between North and South King County reflect geographical, population, and socio-economic factors.
- It was determined that service issues could not be addressed solely by relocating units, although response improvements could be gained by moving Medic 5 within Renton and moving Medic 7 closer to Highway 167.
- New paramedic service in South King County was needed in order to address these identified paramedic service challenges.

Based on these findings, the recommendation that emerged from the analysis combined medic unit relocation with a delay in added service. The first step would move Medic 5 to downtown Renton as soon as possible. This would be followed by relocating Medic 7 closer to Highway 167 when the existing half-time paramedic unit Medic 13 was increased to a full time unit in January 2011. The addition of new service provides a cost-saving, four month delay from the estimated time in the strategic plan. Strong regional partnerships and cooperation with the City of Renton makes the relocation efforts for Medic 5 possible.

Conclusion

The long-term combination of unit relocation and addition of new service will address paramedic service needs in South King County, possibly through the remainder of the current EMS levy. Most significantly, the strong regional partnerships that exist across the county, excellent operational data, and a clear evaluation process allows for careful decision-making and analysis, and results in a strong regional consensus on the addition of paramedic service.

Part II: Status of EMS Division Programs and Activities

Introduction

The Emergency Medical Services (EMS) Division of Public Health - Seattle & King County is dedicated to increasing survival and reducing disability from out-of-hospital emergencies by providing the highest level of patient care in the pre-hospital setting. The *Medic One/EMS 2008 - 2013 Strategic Plan* provides the regional policies and financial direction to accomplish these goals, including adherence to a medical model of integrated regional EMS/Medic One services, a philosophy of cooperative decision-making, and development of innovative strategic initiatives that address the demand for services and encourage system efficiencies.

The EMS Division acknowledges the exceptional efforts of all the EMS partners involved in implementing the various new programs and activities identified in the strategic plan and continuing to support the already well established EMS programs across the region. The time, energy and collaborative effort required of the EMS community to develop plans, oversee implementation, and evaluate the outcomes is extraordinary and plays a substantial role in why the EMS system in King County is an international role model. The EMS Division is committed to maintaining these strong partnerships and providing leadership and innovation in the emergency medical field. The following section summarizes the current programs and activities involving the EMS Division, including King County Medic One, and highlights the development of the strategic initiatives.

A. King County Medic One Program: *A Message from Chief Jim Fogarty*

This section contains our report for King County Medic One describing our operations for all of 2008 and early 2009. The report is but a brief snapshot of the results of some very talented and dedicated individuals, our paramedics and the physicians that guide them, in addition to the dedicated support staff that keep things organized. King County Medic One's success is a collaborative effort of many people and organizations that dedicate themselves to providing for the emergency medical care needs of our residents, wherever and whenever they present. Medic One operates under a premise of medical excellence and industry leadership. Our culture is rich in history and diversity yet we are paving new roads toward our future.



Thank you for taking the time to read of our many accomplishments. Thanks also to the residents of King County that provide the support and involvement to make it all possible. I would like also to acknowledge the important role our partners in response fulfill. The Fire Departments, Dispatch Centers and the many supportive professionals in the EMS Division all make such an effective response system possible.

On behalf of all us at King County Medic One, thank you!

Sincerely,

James G. Fogarty

Structure of King County Medic One Organization

King County Medic One (KCM1) is one of the six Advanced Life Support (ALS) providers within King County. Our service area includes all of South King County and covers approximately 450 square miles with a population now close to 700,000. Our Medics work side by side with local fire agencies in a seamless process of providing just the right level of emergency medical care to those in need 24-hours a day, every day of the year.

King County Medic One works in conjunction with 15 area fire departments providing cost effective and superior clinical emergency medical services. Medic units co-locate inside fire stations promoting a team atmosphere while eliminating a need for additional facilities (see *Appendix C: Regional Map of the ALS Provider Areas* on page 87). Physicians provide medical oversight for both the clinical care decisions that must be made and the strategic planning decisions that guide the organization over the years. This ‘medical model’ provides the most appropriate level of service to patients and is recognized worldwide.

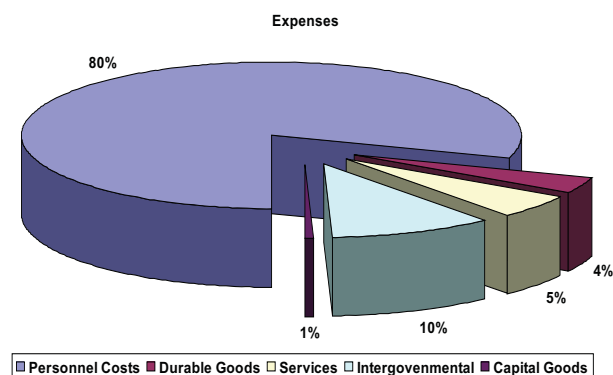
For many medical emergencies, a BLS agency is sent to handle the needs of the patient. For more severe medical emergencies, King County Medic One ALS units respond. A sophisticated system of dispatch triage is in place, known as a tiered response system, that sends the correct response based upon the medical needs of the patient. In 2008, KCM1 responded to 14,316 calls for this advanced care. The following provides descriptions of the five KCM1 functional areas.

Administration

King County Medic One is part of the EMS Division, Public Health - Seattle & King County and operates within the existing Public Health infrastructure thus realizing economies of scale in areas of Human Resources, Information Technology, Risk Management, Records Management and some Fleet Services.

General Administrative Support: Administration provides payroll, procurement and records management in addition to oversight of highly sophisticated software systems that manage the details of emergency operations. KCM1 administration maintains all items associated with ten different locations, 70+ employees, several hundred vendor and venue contracts and other such support items to sustain operations 24/7.

Each month the electric bills, water bills, medical waste contractors, pharmaceutical supply orders, deliveries, and hundreds of other tasks large and small are managed effectively (see graph on next page for expenditure categories). Together the office staff, including an office administrator, two administrative assistants, an inventory specialist and a fleet/electronics specialist work behind the scenes as a team, keeping KCM1 running.



Technology Support: Software programs help track inventory, manage scheduling, create remote access to vehicle data, provide mapping and vehicle destination locations, and enable record keeping. KCM1 depends heavily on a combination of Public Health Management Information Systems (MIS) professional support and in-house subject matter expertise to stay current with state-of-the-art software tools.

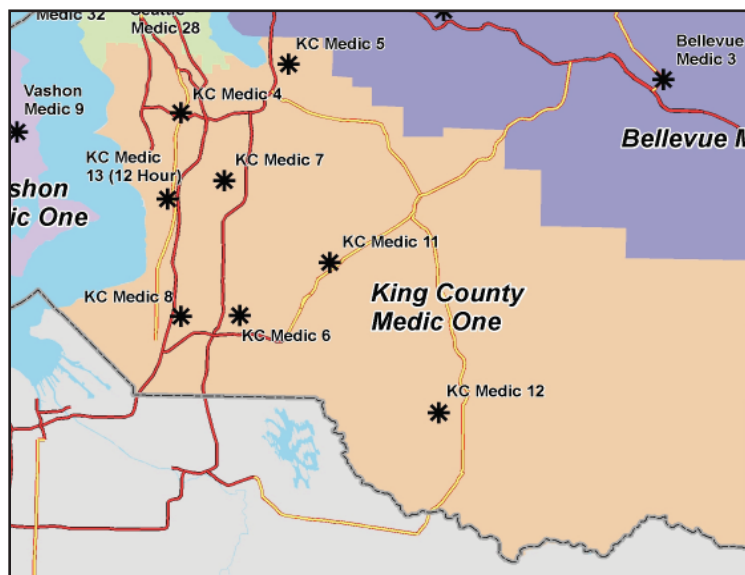
Research: KCM1 continues to be an active participant in research that sets the standards for pre-hospital emergency medicine. Each research project receives close review and oversight by the Public Health institutional review board and is monitored continuously throughout the project. Study topics include the multi-year studies of hypothermia, hypertonic saline, airway devices.

Grants: KCM1 applied for grant funding from the Department of Homeland Security for protective gear upgrades, from the Medic One Foundation for consideration for support of a vascular access device known as the bone drill, and the Washington State Department of Health Trauma Fund. KCM1 continues to seek grant funding for training and equipment and employee development purposes.

Operations

Operations ensure that daily core functions remain uncompromised. These include personnel oversight, station management, inventory control, and vehicle maintenance.

Medic Unit Locations: KCM1 has eight medic unit locations. Each location has a mobile intensive care unit (Medic One truck) less than 3 years old and a dedicated reserve unit. A replacement



schedule allows for up-to-date, reliable equipment and an economy of scale purchasing. Our KCM1 fleet stands ready to handle daily responses as well as large scale disasters, special events, and routine maintenance replacement.

Station Relocations: KCM1 is working with the Cities of Kent, Renton and Auburn on potential station relocations. This year, we are relocating the medic unit that primarily serves Renton to optimize response times to their residents. The EMS Division continues its relocation reviews on a regular basis to ensure

calls to 9-1-1 receive a timely medic unit response. Partner cities are included in the review to ensure that their future growth and special needs are considered.

Electronic Records: KCM1 has been a national leader in data collection and uses an EMIRF

(Electronic Medical Incident Report Form) as the tool to allow paramedics to directly enter critical information into a secure database. This information is used on a regular basis to conduct research studies, quality assurance, and improve patient care.

Paramedic Safety: KCM1 has achieved virtually 100% compliance on requiring its paramedics to wear body armor (ballistics vests) on high risk calls, including stabbings, shootings, civil disturbances and SWAT incidents. This year, we have applied for a grant to replace our protective fire resistant outerwear.

Supplies and Equipment Purchasing: KCM1 is the lead contract agency responsible for the regional medical purchasing contracts (see page 43), including the EMS supplies and equipment contract. This contract is used by most fire departments in King County and enables economy of scale purchasing for medical supplies and equipment. This year, we hope to expand the regional purchasing (economy of scale) to include heart defibrillators and vehicles. On a weekly basis, KCM1 replaces its medical inventory for all eight paramedic units located throughout South King County. Our 'warehouse on wheels' can also move large volumes of inventory during a disaster.

Communications: Valley Communications Center, KCM1's dispatch center, will be upgrading their wireless data transmission speed, requiring new hardware to be installed on each medic unit. KCM1 will also reprogram more than 50 radios to better communicate with local cities and to be better prepared in case of a disaster.

Supervision: Shift supervisors known as Medical Services Officers (MSOs) provide administrative and clinical oversight while continuing to maintain their skills as paramedics. In addition to providing administrative oversight and patient care, they serve command officer roles on large scale events under the Incident Command System (ICS) structure.

Fires: At the request of our partner fire departments in South King County, KCM1 began responding to all confirmed structure fires. Paramedics provide support to injured south county residents and firefighters on a regular basis.

SWAT: KCM1 paramedics and supervisors respond to numerous law enforcement SWAT incidents. KCM1 supports the very active Valley Cities Special Response Unit (SWAT and King County SWAT).

Winter: KCM1 added extra service to serve our partner cities during the hard winter of 2008-2009. This extra service reduced response times and handled a higher than normal demand for service.

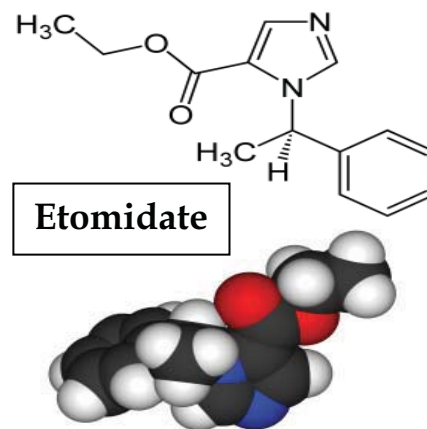


Emergency Power: Two of our stations lack emergency back-up electrical power. In 2009, KCM1 will be installing generators to support these facilities.

Training

Grand Rounds Training (GRT): GRT is an ongoing paramedic training activity typically done five times each year and is designed to refresh skills while crews are on duty. The emphasis is primarily on manipulative skills, but operational updates, equipment changes, and safety awareness training are often included. Each session provides KCM1 paramedics the opportunity to practice high-risk, low-frequency procedures. Subject matter for future GRT classes will continually involve manipulative skills development, but the goal is to incorporate incident management, hybrid vehicle extrication, collapse rescue, low angle rescue, swift water rescue awareness, among other subjects, to broaden the depth of paramedic knowledge.

Medication of the Month (MoM): Each month the KCM1 Training Division tests our paramedics on a medication carried on our medic units in addition to commonly prescribed medications that patients are often taking. This practice helps keep paramedics informed about newer and older prescription medications frequently encountered in the pre-hospital setting. In addition, testing paramedics reinforces and augments the paramedic's knowledge of pharmacology and application. For example, in May 2009, each paramedic reviewed and logged their knowledge of a pharmaceutical known as Etomidate. This confirmed each medics continued working knowledge of that agent when needed. With each passing month a similar review is performed with a different pharmaceutical.



Doctor's Meetings: Doctor's Meetings are quarterly shift meetings with paramedics, Associate Medical Directors, Shift Medical Services Officer (MSO) and the Training/Quality Improvement MSO to review specific medical cases. Paramedics receive feedback regarding patient admitting diagnosis, in-hospital care, and final disposition. Often the Associate Medical Director will provide a brief lecture on a specific illness or disease process, and answer questions regarding specific cases. Paramedics may receive written feedback regarding how their clinical work-up and care matched the hospital diagnosis and treatment with the goal of having paramedic care appropriately match the level and type of illness.

Case-of-the-Month: Case-of-the-Month is a discussion of an actual response by one of our paramedic teams that was unusual or challenging providing an opportunity for our paramedics to learn from each other. The Case of the Month is designed as a single subject, disease process, or injury pattern, formatted in an overview and summary followed by a quiz. The April 2009 Case-of-the-Month tested paramedics on non-invasive end-tidal CO₂ monitoring. The addition of the Case of the Month provides another source for our paramedics to gain valuable continuing medical education.

Continuing Medical Education: Each KCM1 paramedic must attend a minimum of 50 hours of education each year, including nine hours of 'Tuesday Series' conducted by Harborview Medical Center. Each paramedic must also attend sessions on Advanced Cardiac Life Support, Pediatric

Advanced Life support and successfully pass a written exam every other year. Thirty-three of our current 67 medics recertified this year. The remaining medics will recertify next year.

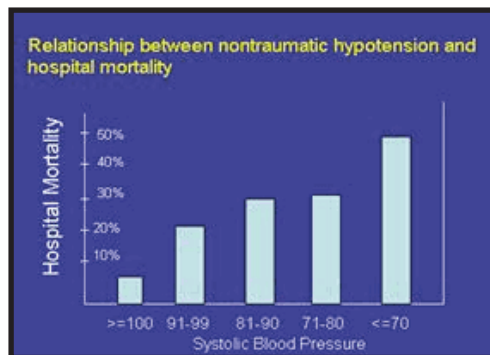
Medical Direction and Quality Assurance

Dr. Tom Rea is the Medical Program Director for KCM1, assisted by Associate Medical Directors associated with each area hospital. Together they provide medical oversight for our paramedics. Each of the four paramedic shifts has a physician assigned as its liaison. These physicians assist the Medical Program Director with quality review, guidance for procedures, new equipment and training needs for the program. Twice per year, the KCM1 Training Division hosts the KCM1 Medical Directors Meeting. This year meetings were held in January and May 2009, covering Operational, Medical and Research Updates for KCM1 (Dr. Rea), Experience with Inter-Osseus Devices (Dr. Boehl), Systematic Assessment of KCM1 Airway Management (Dr. Grabinski), and 'Son of Arrest' - The Amiodorone Study (Dr. Kudenchuck).

The goals of quality assurance are to evaluate and improve the pre-hospital emergency care provided by KCM1. To this end, we engage in a variety of activities aimed at ensuring or improving quality patient care. These activities include systematic review of specific medical conditions or critical procedures and case-based review and feedback. The following is an excerpt from one such report:

Management of the hypo-tensive patient: Hypotension can be a marker for serious illness. As shown in Figure 1, worsening pre-hospital hypotension is associated with increasing mortality. KCM1 paramedics make important triage and care decisions for hypo-tensive patients. Correct decisions are essential for good patient care. The project evaluated patients presenting to KCM1 with hypotension (SBP $\leq$ 90) for 6 month period during 2007 to determine: 1) frequency of hypotension, 2) paramedic care, 3) outcome, and 4) triage decisions.

Hypotensive patients account for $\sim$ 8% of KCM1 evaluations. Approximately 80% receive IV treatment and ALS triage. Continue to work to document treatment volume. On average patient hemodynamics improve substantially. BLS triage was done safely though extra caution should be practiced with older patients and patients with liver disease. Management of hypotension requires reasonable caution, active clinical judgment, and a variety of clinical care. KCM1 exercises such caution, judgment, and care.



Emergency Preparedness

Emergency Preparedness is dedicated to maintaining the integrity of the KCM1 program during extraordinary circumstances, such as earthquakes, inclement weather, or pandemic outbreaks. KCM1 works within the framework of regional services and partners, including Public Health -

Seattle & King County, the Seattle Fire Department and other BLS providers, the King County Regional Communication and Emergency Coordination Center (RCECC) and regional hospitals to strengthen the entire County's ability to withstand unique and challenging conditions.

Departmental Emergency Operations Center (DEOC): King County Medic One maintains a local departmental operations center which helps coordinate responses during heavy call load, unusually large incidents, and disasters. They also have a presence inside the RCECC run by King County during disaster situations such as occurred during the recent windstorms.

Regional Drills and Exercises: KCM1 continues to provide leadership in emergency preparedness by participating in regional fire and EMS Mass Casualty drills and exercises. KCM1 personnel recently assisted the Port of Seattle (POS) with a simulated air crash incident which served as the annual review and test of their response system. An MSO and three dedicated medic units participated in handling the large numbers of patients on the tarmac while updating and practicing the existing plan. The drill also allowed updating of the internal communication plan between the POS and KCM1 and other responders. It was considered a success and is an integral part of the FAA certification standards for Sea-Tac Airport.

Equipment Purchasing: KCM1 participates in the regional Multi-Disciplinary Equipment Purchasing Group (MEPG) and helped set purchasing priorities for the limited funds available through the EMAC and its committees. In conjunction with public health preparedness, area police and fire agencies and other disciplines, a list of priority items totaling over \$1.5 million has been forwarded for consideration.

Infectious Disease & Pandemic Preparations: KCM1 continues its leadership role in preparing the Seattle - King County EMS community for infectious disease and pandemic conditions. Updates to the EMS Infectious Disease and Pandemic Plan that establish 'best practice' guidelines for managing infectious disease incidents continues at both the BLS and ALS levels. We are currently participating in the update and re-write of the mass casualty MCI plan for the area in conjunction with the City of Seattle.

Public Information: KCM1 works in conjunction with the Public Health - Seattle & King County Public Information Officers (PIOs) to ensure the most accurate and up to date information is relayed to the public regarding local and regional events, as well public safety announcements. This was demonstrated during the 2008- 2009 winter snowstorms.

B. EMS Division Programs and Activities

The *Medic One/EMS 2008-2013 Strategic Plan* was devised to define the roles, responsibilities and programs for the EMS system to improve patient care, manage growth in paramedic services, and develop system efficiencies and cost savings. The EMS Division plays a significant role in developing, managing, and evaluating many of these critical EMS activities throughout King County. The following section describes many of the ongoing regional programs managed by the EMS Division.

I. EMS Advisory Committee

The EMS Advisory Committee was officially enacted in June 1997 with the passage of King County Council Motion #10293 authorizing approval of the *EMS 1998-2003 Strategic Plan*. The plan included the creation of a representative body of EMS advisors to assist in the implementation of new directives detailed in the plan. Membership was to include representation from physicians, ALS and BLS providers, private ambulance, dispatch, labor, health plans and regional services. The committee was designed to provide valuable insight, commentary and feedback regarding all aspects of EMS operations and management to the EMS Division.

The current EMS Advisory Committee membership and their respective representation can be found in *Appendix F: 2009 EMS Advisory Committee Listing* on page 93. The committee continues to meet quarterly to discuss the progress of the current *Medic One/EMS 2008-2013 Strategic Plan*, review the development and implementation of strategic initiatives and provide a forum for discussion of important regional EMS issues. In the past year, the EMS Advisory Committee played an important role in reviewing and overseeing the progress of the many new strategic initiatives, specifically the Systemwide Enhanced Network Design (SEND) Project (see page 58) and Advanced EMD Training (see page 49), provided input regarding the new Financial Subcommittee, and reviewed the findings of medic unit analysis in the region as described in the Part I: EMS System Review on page 10.

II. Regional Medical Control

The current Medical Program Director (MPD) for King County is Mickey Eisenberg, MD, PhD. The MPD position is a state-mandated position and every county in Washington State has a designated MPD. The role of the MPD is to authorize EMS protocols, supervise training of EMTs, conduct quality improvement, recommend certification of EMS personnel to the state, delegate responsibility for online medical control, initiate disciplinary action of EMTs (when necessary), assist in disaster management, and coordinate policies and procedures among the paramedic program medical directors (PMD).

There are six PMDs for the six paramedic programs in Bellevue, Redmond, Seattle, Shoreline, South King County and Vashon. The paramedic medical directors include Jim Boehl, MD, Adrian Whorton, MD, Michael Copass, MD, Gary Somers, MD, Tom Rea, MD, and Sam Warren, MD, respectively. The medical directors, along with the medical service administrators for each of the paramedic programs, meet quarterly to discuss and take action on paramedic related matters. The Medical Program Director also participates in EMS Division Senior Staff, the EMS Advisory Committee, the Central Region EMS/Trauma Council, and the Washington State Medical Program Directors.

Every other year, updated EMT patient care protocols are issued by Dr. Eisenberg and provided to every EMT in King County in a convenient pocket-sized format (the Blue Book - page 35). On an annual basis, the program medical directors and the MPD issue paramedic protocols which define in detail the therapeutic steps for critical emergencies such as cardiac arrest and major trauma.

In addition, the approved medication list along with adult and pediatric dosages are issued every other year, also in a convenient pocket-sized format (the White Book).

In the past year, special protocols for patients with acute coronary syndrome and stroke were issued to expedite the initial therapy and transport of these patients to the hospital. Both conditions require special diagnostic procedures and therapies and time is of the essence in limiting the damage from acute myocardial infarction and acute stroke. Starting in January 2009, the EMS Division is conducting detailed QI on all patients with suspected ST-elevation acute myocardial infarction. In January 2010, a program to perform detailed QI for all patients with suspected stroke will begin.

III. Regional Medical Quality Improvement

Increasing survival and reducing morbidity from major medical and traumatic conditions by optimizing pre-hospital emergency care.

The Regional Medical Quality Improvement (QI) Section of the Emergency Medical Services (EMS) Division was created in 2008. The importance of medical QI was recognized by the EMS levy stakeholders who approved the creation of this section as part of the ***Medic One/EMS 2008-2013 Strategic Plan***. The goal of the Medical QI Section is to improve the quality of EMS patient care in King County by conducting programmatic, scientific, and case-based evaluation. These evaluations involve emergency medical dispatch, basic life support services provided by firefighter - emergency medical technicians (EMTs), advanced life support services provided by paramedics, and other aspects of the regional EMS system. The Medical QI Section partners with EMS agencies across King County to conduct these project evaluations and implement significant findings.

In the past year, the Medical QI Section has undertaken a range of activities to develop and expand important evaluations of pre-hospital care and is supported by a section manager, three research assistants, and a half time epidemiologist who all work under the medical direction and supervision of Dr. Mickey Eisenberg, Dr. Tom Rea, Dr. Peter Kudenchuk, and Dr. Hendrika Meischke. Many of the QI evaluations are done in collaboration with other EMS Division sections, including the Strategic Planning and Data Management Section, the Community Programs Section, the BLS Training Section, and the Center for the Evaluation of EMS. The following summarizes some of these important evaluation efforts.

Cardiac Arrest Quality Assurance

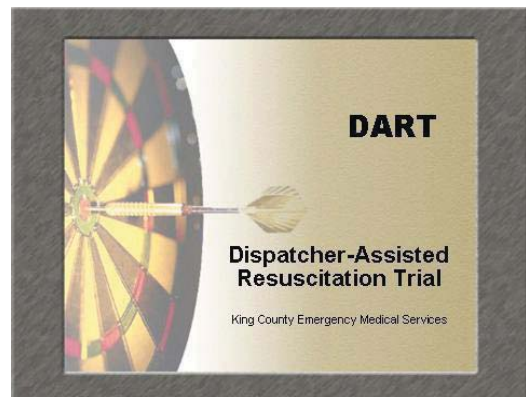
The Medical QI Section is responsible for the ongoing surveillance and evaluation of pre-hospital care provided to persons who suffer out-of-hospital cardiac arrest. Out-of-hospital cardiac arrest - also termed sudden cardiac arrest – strikes upwards of 1,000 persons each year in King County and is a leading cause of death in the United States. The condition is characterized by sudden cardiovascular collapse where a patient becomes unconscious and unresponsive due to an ineffective heart rhythm. In most communities, sudden cardiac arrest is almost uniformly fatal. Yet successful resuscitation and survival from out-of-hospital cardiac arrest is possible if the EMS system can deliver a coordinated set of time-sensitive rescue measures.

The survival rate from out-of-hospital cardiac arrest is a critical benchmark of EMS performance and is a reflection of individual and integrated components of the system. As such, substantial resources are dedicated to measuring care and outcome. Data on EMS care and outcome is obtained through in-depth reviews of pre-hospital and hospital records. Sources of information include the dispatch, EMS, defibrillator, and hospital records. The review provides opportunity for individual case feedback and system evaluation. This information has been used to enhance pre-hospital interventions and has enabled survival from cardiac arrest in King County to be among the best in the world. Because of the close and coordinated interface between pre-hospital and hospital, EMS performance directly impacts hospital resources and care for this critical condition. Consequently, beginning in 2008, the EMS Division significantly expanded its efforts to include detailed review of hospital information for all patient transported to the hospital following cardiac arrest.

The Dispatcher Assisted Resuscitation Trial (DART) Study

Best care during cardiac arrest generally requires early CPR by laypersons until emergency medical responders can arrive. However, not all laypersons have been trained in CPR skills. In these cases, emergency dispatchers offer and provide CPR instructions over the phone to the layperson so that CPR can be started prior to arrival of the emergency medical responders. Although CPR in general improves survival, variation in the content of the CPR may provide differential benefit. Experimental and clinical studies provide conflicting results with regard to whether survival outcomes differ between CPR instruction that includes chest compression alone or chest compression plus ventilations. Both types of instruction are approved by the American Heart Association and are practiced in Washington State.

The purpose of the DART study is to compare these two types of approved, emergency-dispatcher CPR instruction (chest compressions alone or chest compressions plus ventilations) to determine if one approach produces better survival. DART is a randomized trial involving dispatch centers in King County, Washington; Thurston County, Washington; and London, England. Anticipated completion of the DART project in 2009 will provide the basis for improving local dispatch care and practice.



Highlight of Cardiac Arrest Review: Emergency Dispatch Communications

The Medical QI Section has worked closely with the Community Programs Section to continue to improve the critical component of emergency dispatch for resuscitation care. Emergency dispatch provides an important link in the chain of survival from cardiac arrest by identifying persons who have potentially suffered cardiac arrest and working to ensure early bystander CPR. Early bystander CPR whereby citizen bystanders provide chest compressions and/or rescue breathing can double the chances of survival from cardiac arrest. Dispatchers provide CPR instructions over the phone to assist bystanders. This effort by emergency dispatchers can nearly double the rate of

bystander CPR prior to the arrival of EMS and in turn improve the odds of survival.

The emergency dispatchers from King County continue to be leaders in this vital responsibility. Efforts continue to improve care from the emergency medical dispatchers. A subject matter expert reviews emergency dispatch recordings of cardiac arrest calls. The reviews identify opportunities for more accurate and timely identification of cardiac arrest patients and help us understand the impediments to comprehensive bystander CPR for cardiac arrest. These evaluations have identified case-specific issues and system-wide trends for potential improvement that have been incorporated into subsequent training and education efforts. For example, dispatchers recently received focused education on hypoxic seizure as it relates to sudden cardiac arrest. The objective was to give them additional tools to quickly identify patients that need CPR. Activities such as these have produced one of the highest rates of bystander CPR in the world and illustrate the importance of coordinated dispatch efforts.

Comprehensive Heart Attack Surveillance and Evaluation (CHASE)

Like cardiac arrest, an ST segment elevation myocardial infarction (STEMI) is regarded as a cardiovascular emergency for which time to treatment is critical. A STEMI occurs when blood flow to the heart is blocked by a blood clot in the coronary artery. Up to one third of patients with a STEMI will die within 24 hours of onset of their symptoms, however, the outcome can be significantly improved in many cases with rapid restoration of coronary blood flow by percutaneous coronary intervention (PCI) in a hospital cardiac catheterization laboratory. Recognizing that “time is muscle,” the American Heart Association has established a goal of 90 minutes from the time of first medical (EMS) contact until balloon inflation (PCI) in patients with a STEMI.

Achieving this goal is challenging and requires a critical partnership between the EMS system and hospitals. Patients with signs and symptoms suggestive of an acute MI must be rapidly identified in the field. The presence of a STEMI must be verified on the pre-hospital ECG and the receiving hospital must be forewarned of the need to quickly activate the cardiac catheterization laboratory team and prepare for expedited patient care. Appropriate steps taken in the field can dramatically shorten the “time to balloon”, resulting in saved lives.

Beginning January 1, 2009, the EMS Division embarked on an ambitious project to achieve the same objectives in STEMI evaluation - namely, comprehensive case review and evaluation - as we do for sudden cardiac arrest. The Comprehensive Heart Attack Surveillance and Evaluation (CHASE) initial project goal is to characterize the care provided in the field for STEMI patients and track the treatment and outcome through to hospital discharge. The ultimate purpose is to identify ways that both the EMS system and hospitals can improve the identification, triage and management of these patients.

Supporting Public Health with Emergency Responders (SPHERE)

The SPHERE program is an innovative approach to enhance the involvement of emergency responders to provide public health services to the citizens of King County. The Medical QI Section is responsible for the administration, ongoing monitoring and evaluation of the SPHERE

program. At its inception in 2005, SPHERE was designed to identify persons with inadequately treated hypertension or diabetes and connect them to community resources to effectively manage these two conditions. Under the SPHERE protocols, EMTs provide informational cards to patients during the medical incident if they have an abnormally high blood pressure or blood sugar reading during the patient exam. The cards document the high reading as well as provide a listing of available community resources.

In 2008, the SPHERE program was featured by separate EMS trade journals and in turn elicited inquiries from EMS systems across the country. After learning more about the SPHERE program, many of these EMS agencies have adopted similar programs in their communities. The SPHERE program is currently under review to find even more effective methods for assisting patients with chronic disease in our community. We are grateful to the EMTs of King County for being leaders in the arena of patient health education.

Airway Quality Assurance Report

Interventional airway management is a critical paramedic skill. The EMS Division, in conjunction with the Training Section, has supported a secure Web-based skill reporting format. The quality assurance activity is designed to enable paramedics to detail the process of endotracheal intubation. The case-based information from this quality assurance form supplements the medical incident reports and describes the circumstances, challenges, and remedies for each attempted intubation. The information documents important individual skills required for paramedic certification while benchmarking system interventional airway management performance.

Resuscitation Academy

Survival from out-of-hospital ventricular fibrillation cardiac arrest is extremely variable throughout the United States with high survival rates of 46% in Seattle and King County and low survival rates of zero in Detroit, 3% in Chicago,



Resuscitation Academy
improving cardiac arrest survival rates, one community at a time

5% in New York, and 7% in Los Angeles. Recognizing the fact that we are leaders of pre-hospital treatment for cardiac arrest, the EMS Division and Seattle Medic One, in collaboration with the Medic One Foundation, created the Resuscitation Academy in 2008.

The purpose of the Academy is to share local strategies for success so that other communities in the Pacific Northwest can improve their cardiac arrest care and survival rates. Managers and directors of EMS systems are invited to enroll in a mini-fellowship program that extends over an



entire year. Through pre-course work, an intensive week of lectures and site-visits, and targeted projects mentored by Academy faculty, participants learn the skills to make meaningful changes in their home departments that can effect improvement in their community's cardiac arrest survival. The first Academy session was piloted in the fall of 2008 and included fellows representing Western

Washington, British Columbia, and Oregon. The initial activities of Academy were deemed constructive and useful by both the faculty and the fellows alike. The Academy was officially launched in October 2009 with a group of 15 fellows from Washington and Alaska and will be supported by both the Medic One Foundation and the Life Sciences Discovery Fund.

EMT Advisory Committee (EMTAC)

The EMS Division is committed to strengthening the partnership between the Division and EMS personnel in King County. To help achieve this goal, the EMT Advisory Council (EMTAC) was established in 2009. The EMTAC is comprised of 15 EMTs from around the county who meet quarterly with EMS Division personnel. Discussions are designed to engage field providers in helping to shape policies, programs, research designs, and day-to-day service interactions. Working together, our aim is to continuously improve the care experience for all EMS patients and providers.

Research to Improve Emergency Medical Care

Advances in clinical care require efforts to translate best established practice as well as develop new understanding and establish new knowledge. With this appreciation, the Regional Medical QI Section partners with investigators to advance the science of resuscitation and EMS patient care. This partnership enables productive and unique collaboration among EMS and multidisciplinary clinical investigators from across the community. This collaboration produces careful investigation that has continuously worked to improve care and outcomes and in turn improve the health of King County residents.

Evaluating the Scope of Practice: Should EMTs administer glucagon for low blood sugar?

Hypoglycemia is a condition characterized by low blood sugar and can cause a reduced level of consciousness. The standard therapy for hypoglycemia is oral glucose and when oral glucose cannot be administered, IV dextrose. Treatment with oral or IV dextrose can reverse hypoglycemia quickly – typically within minutes. An alternate therapy is glucagon injection. Glucagon is a hormone that can reverse hypoglycemia over the course of 10 – 15 minutes. Although glucagon can correct low blood sugar in time, the treatment can sometimes cause side effects such as nausea and vomiting. In King County, EMTs are authorized to use glucometers to measure blood sugar and can administer oral glucose. Paramedics, on the other hand, are authorized to administer IV dextrose or glucagon (when intravenous access cannot be safely secured). Paramedic treatment of out-of-hospital hypoglycemia with intravenous dextrose and on occasion glucagon is safe and effective, yet little data are available for EMT treatment of hypoglycemia.

Last year, proposed state legislation would have authorized and mandated EMTs to administer glucagon to treat for hypoglycemia. Hence, King County undertook a project to evaluate the potential role of EMT glucagon administration. During the review period, EMTs responded to 803 hypoglycemic calls and were able to treat a patient's hypoglycemic episode without paramedic assistance in 32% of cases. Paramedic response was required in the remaining 68%. Of those cases, the average response time for BLS units was 5 minutes and the average response time for

ALS units was 9.5 minutes. Most patients were successfully treated with intravenous dextrose with only approximately 10% requiring paramedic-administered glucagon.

The results indicate there is not a compelling need for EMTs to administer glucagon in King County. The time interval between EMT and paramedic arrival is 4.5 minutes, an interval in which glucagon would only begin to have therapeutic benefit. Moreover, paramedics can usually reverse hypoglycemia with intravenous dextrose and rarely need to proceed to glucagon. Given these results, there is likely to be little benefit of EMT-administered glucagon treatment in King County. The proposed legislation was not passed in 2008 though it could be reintroduced in the future.

Limited English Proficiency Callers: Challenges for Emergency Medical Dispatchers

A dispatcher needs specific information from the caller to help correctly identify a potential cardiac arrest victim and then communicate CPR instructions. When the caller has limited English proficiency, efficient and effective delivery of CPR via instruction may be challenging. Limited English proficiency has been associated with poor quality of medical care and increased risk of adverse events in several clinical circumstances but has not been rigorously assessed in pre-hospital emergency care, specifically in cases of cardiac arrest. This ongoing study evaluates the frequency of limited English proficiency callers and its impact on the recognition of cardiac arrest and the timeliness of CPR instruction and bystander CPR performance. Initial results indicate that challenges related to limited English proficiency callers occur in over 5% of cardiac arrest calls and produce delays in arrest recognition and CPR delivery. Findings from the evaluation may be used to provide training or modify approaches aimed at improving timely care of cardiac arrest patients.

Socioeconomic Status and Survival from Out-of-Hospital Cardiac Arrest

One of the core concepts of pre-hospital emergency care in King County is universal access. The EMS system strives to deliver consistent and expert care across King County regardless of community or individual characteristics. Lower socioeconomic status has been related to poorer health outcomes for a number of health conditions. This investigation is assessing the relationship between traditional socioeconomic status characteristics and survival from cardiac arrest in King County. Efforts to better understand this relationship are important if we are to address health disparities and improve health. The study is currently in the evaluation stage. If lower socioeconomic status is linked to poorer cardiac arrest survival, then EMS may want to direct efforts to improve the links in the chain of survival for particular geographic or demographic groups in the community.

Long Term Outcome of Pediatric Out of Hospital Cardiac Arrest

Cardiac arrest in children is an uncommon but especially tragic event. Because of its rare nature, little is known about best treatments or outcomes. The current study partners with area hospitals to understand the long term implications for children resuscitated from out-of-hospital cardiac arrest. This investigation is currently in the implementation stage. The results will help guide care and expectations for families whose child suffers a cardiac arrest.

Cardiac Arrest in Exercise Facilities

Prior research suggests exercise facilities are relatively high-risk locations for cardiac arrest. Not coincidentally, many states have recently enacted or are considering legislation requiring the placement of automated external defibrillators (AEDs) at exercise facilities in case of a cardiac arrest on the premises. In 2009, the Regional Medical QI Section initiated a study of cardiac arrest at exercise facilities in Seattle and King County, WA to determine the frequency and characteristics of these events. An evaluation of the impact of on-site AEDs on survival from cardiac arrest will also be completed. It is hoped that data from this study will be used to assist planning efforts for medical emergencies at exercise facilities.

Antiarrhythmics Used in Cardiac Arrest

Antiarrhythmics are medications used by paramedics during a cardiac arrest. They are thought to induce a favorable cardiac rhythm and lead to better patient survival odds. After an analysis of King County data on the use of procainamide, one such antiarrhythmic, it was determined that these medications can be variably characterized as good, bad or inconsequential, depending upon the type of analysis performed and the variables employed. This is a complex relationship that warrants further investigation in the future.

IV. Emergency Medical Dispatch (EMD)

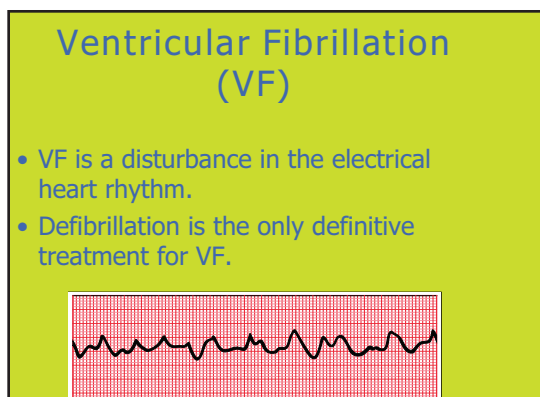


The EMS Division developed and continues to administer a comprehensive Emergency Medical Dispatch (EMD) program ‘Criteria Based Dispatch’ in King County, not including Seattle. These services include EMD Basic and Continuing Education training, Web-based training, quality improvement, and medical oversight of the CBD Guidelines. The guidelines used in Criteria Based Dispatch allow the dispatcher and call-receiver to triage callers to determine the appropriate response and level of care as well as provide valuable pre-arrival instructions to the caller and patient. There are approximately 172 emergency medical dispatchers and call-receivers in King County. During the past year, 19 dispatchers from King County completed the Basic EMD Training class. In addition, 146 dispatchers were provided 8 hours of Continuing Medical Education in EMD related topics. The EMD Instructor Course (train-the-trainer) is being redesigned to meet the standards of the more student-driven and scenario-based delivery method that is used in the CBD Basic Course. This revision is scheduled to be piloted in early 2010. The following highlights some of the activities related to Emergency Medical Dispatch:

Enhanced Criteria Based Dispatch Basic Training and Continuing Education Curricula

The Basic Emergency Medical Dispatch course and all continuing medical education courses continue to be delivered using the revised, more participant-centered method of delivery enhanced with more scenario-driven content. With the addition of the pre-requisite Anatomy and Physiology

course, the Basic CBD course is approximately 36-40 hours. The Anatomy and Physiology pre-course requirement can be met with either classroom attendance or online participation. This



course content consists of a review of basic anatomy and physiology with the objective of providing the student with information on body systems and how they function in a normal, healthy state.

The 32-hour Basic CBD course content focuses on body system pathology (pathophysiology), signs and symptoms of 26 chief complaints, pre-arrival instructions including all emergency instructions with a primary focus on the identification and treatment of sudden cardiac arrest. This 2002-2007 strategic initiative to develop the curricula was transitioned into

an ongoing program following successful implementation. There will continue to be a focus on raising the bar in medical education for dispatchers through the development of more challenging online courses as well as construction and delivery of more complex scenarios.

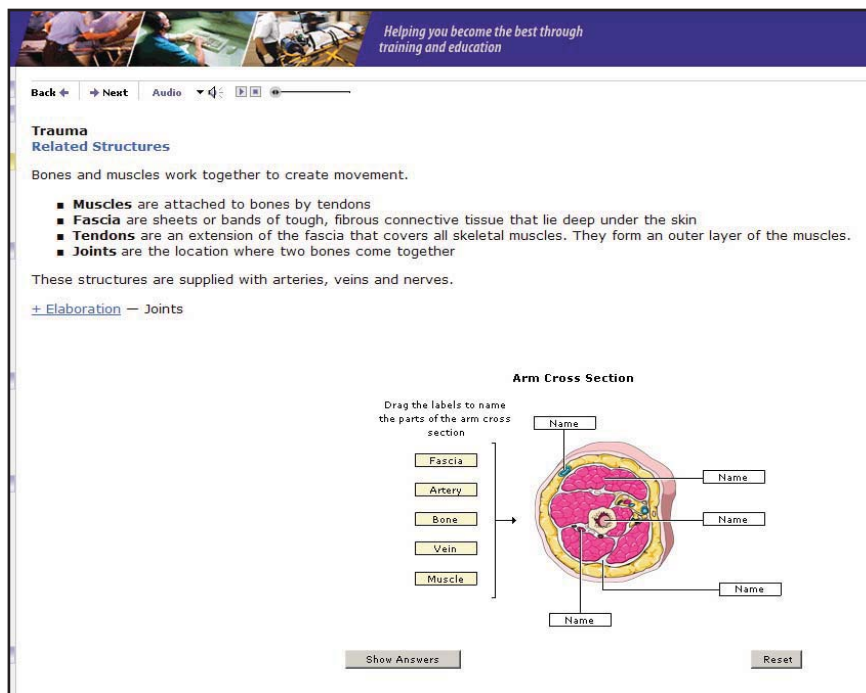
EMD On-line (Web-based Training for Dispatchers)

King County Emergency Medical Dispatchers are required to attend a minimum of 8 hours of continuing medical education each year. On-line continuing medical education was first developed and delivered in 2003 with the objective of allowing dispatchers and call-receivers the ability to obtain at least half of those continuing medical education credits at their convenience in a Web-based format. Staffing the dispatch centers takes priority over attendance at classroom trainings making it difficult to schedule each and every emergency medical dispatcher for classroom courses each year. The EMS On-line tool allows the dispatchers and call-receivers access to training 24-hours-a-day right at their consoles and even on-duty if their workload permits. The content of the online courses is based on issues, system-wide trends and new emerging medical standards of patient care.

The courses are not your typical online courses. The EMD Program Manager and EMS Training Section Instructional Designer develop these courses with multiple interactions, activities, flashcards, graphics and the tools and resources for participants to access other information about the subject using Web site links with the objective of enhancing knowledge base. In King County, this Web-based training is supplemented with in-classroom training which allows the students to ask questions and apply the knowledge from their Web-based training to specific scenarios and guided group discussions. There have been several modules developed since 2003. They include Pediatric Emergencies, Telephone CPR, Infectious Disease EMD, Anatomy and Physiology, Overdose and Poisoning, Stroke/Seizure, EMD Sick/Not Sick, Decreased Level of Consciousness, and Trauma.



Every year two new modules are developed and delivered. The spring 2009 module was Diabetes and the fall 2009 module will be Seizure/Altered and Decreased Level of Consciousness. These courses have been very well-received by dispatchers in King County and many other counties in this state.



Emergency Medical Dispatch (EMD) Quality Improvement

During the past year there has been continuous development and expansion of the already implemented EMD Quality Improvement (QI) Program. This program was first developed in 2001, as part of the 2002-2007 strategic plan, and included random and selected case reviews of individual 9-1-1 tapes and associated dispatch and EMS records. Reviewers included dispatchers



and paramedics partnered up for each case review. The new QI program was designed and implemented in December of 2008 with the objective of providing feedback to the call-receivers and dispatchers quickly and efficiently and ensuring a regional, consistent focus to the QI effort.

The new format includes call audio and records review by the Quality Improvement Program Coordinator with results entered into an Access database. The EMD QI database was developed and designed to streamline the process and provide aggregate reports regarding identified issues and system-wide trends. The EMD

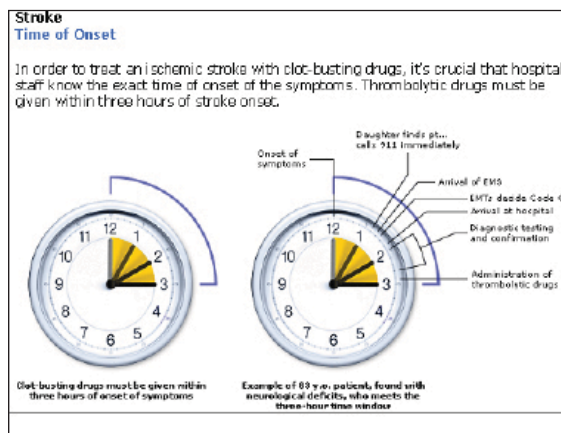
Program Manager uses these identified trends and issues to develop continuing medical education courses that are delivered by paramedics and dispatchers in the classroom as well as EMS Online Continuing Education modules. The addition of the full-time QI Program Coordinator has allowed

for continued efforts toward streamlining to a paperless or electronic EMD Quality Improvement Program.

It also provides the necessary resources to move toward our 2008-2013 Strategic Initiative of providing advanced level EMD training for dispatchers (see page 49) by assisting in identifying objectives for this training. The new Regional Medical Quality Improvement Section coordinates closely with all existing QI activities in order to implement this initiative as well as work toward the recommendation to add a component of Patient Outcomes to EMD that would include outcome feedback to the dispatchers.

EMD Annual Continuing Medical Education Courses at Washington State APCO Conferences

Since 2003, the EMS Division has participated in statewide and nationwide continuing medical education for dispatchers. Our EMD Program Manager, paramedics and dispatchers have been asked to deliver courses in Washington state for the Washington State Chapter of APCO (the Association of Public Safety Communications). Several courses have been delivered, including those designed around current research in methods of CPR, Stroke, Cardiac Arrest, Seizure, Pandemic Influenza, and Quality Improvement. Agencies in Washington state are able to fulfill their continuing medical education requirements by attending these trainings.



Nursing Home/Adult Care/General Medical Clinic Facilities

Since 2005, EMS provider agencies and the EMS Division have provided a specialized training to facilities in an attempt to reduce unnecessary requests for EMS services at nursing homes, adult care facilities and general medical clinics. The Education Specialist has attended numerous state-sponsored events that include trainings and presentations to nursing home and adult care facility administrators. A lesson plan was developed which included the following participant objectives:

- Identify Guidelines that are used to establish EMS responses to their Nursing Home or Adult Care Facility.
- Identify the different levels/services of EMS providers in King County.
- Identify and discuss the differences and similarities between a BLS, ALS and private

ambulance response.

- Identify scenarios in which it would be appropriate to call a private ambulance directly.
- Identify a Physician Orders for Life-Sustaining Treatment (POLST) and discuss the issues when dealing with requests for EMS services under these circumstances.
- Use the job aid ‘Calling 9-1-1 for EMS Services’ when making a call to 9-1-1 for EMS assistance (see example below).

To enhance this training and provide a means for administrators to provide training to new employees, the EMS Divisions developed a video to achieve these objectives. The video is included in a

packet accompanied with a job aide card that serves as a reminder to employees when to call 9-1-1 and what information the call-receiver will need to assist in dispatching the appropriate level of service. The packet also includes stickers and magnets that can be placed near telephones and work stations to serve as reminders.

Since August 2006, over 600 nursing homes, adult care facilities and boarding homes have received training and/or training materials either through in person trainings delivered by our staff or through a mailing which included all the training materials along with a cover letter explaining the objectives.

In addition to this, the nursing homes in Shoreline and Redmond received trainings from their respective EMS provider agencies, Shoreline FD and Redmond FD. South King Fire and Rescue continues to work with our Education Specialist to provide more training opportunities in their region. Bellevue Fire will begin working with the Education Specialist to reach out to

specific facilities as a priority for this project in their jurisdiction.

Emergency Medical Dispatch (EMD) Annual Awards

The EMS Division had the pleasure and honor of recognizing the outstanding work of the 9-1-1 emergency medical call-receivers and dispatchers in King County during National Public Safety Telecommunicators Week, April 12-18, 2009. These awards, given out since 2004, recognize overall excellence as well as expert response to critical incidents. For the past several years the EMS Division EMD Program Manager has responded to each of the Communication Centers in King County during this week to relay our appreciation for their continued commitment to quality patient care through the use of the Criteria Based Dispatch Guidelines.

2009 Award Winners: This year’s award winners include Regina Keller and Justina Dreisbach from Valley Communications Center and Erin Mitchell and Becky McCracken from Eastside

GUIDELINES FOR EMS RESPONSE AND TRANSPORT REQUESTS King County Emergency Medical Services	
CALL 911 TO REQUEST EMS RESPONSE FOR THE FOLLOWING: • Acute, life-threatening medical condition or complaint • Medically unstable patient • Immediate health risk	
When calling 911: Be ready to relay the following information: Your Name/Name of facility Address where help is needed Call-back number Patient Information: • Age • Gender • Specific medical complaint or problem, i.e. "Chest Pain", "Shortness of Breath", etc. • Medical history • Any medical treatment provided and status change ***Remember to call 911 again if conditions worsen	When EMS Arrives: They will expect to be met by a Physician, Nurse or health care provider, who can provide the following information: • Patient age and gender • Details of medical complaint/problem • Level of consciousness • Vital signs (BP, HR, Respiratory rate, ECG, O2 saturation) • Medical history • Medications • Care provided: oxygen, ECG, IV, medications etc. • Plan and transport destination • Medical orders/directives
<u>Private ambulances should be called for inter-facility transports of medically stable, non-acute patients.</u> Private Ambulance _____ Phone Number _____	
Your local fire/EMS agencies are dedicated to providing emergency medical response and transport services for acutely ill or seriously injured patients. To accomplish this, units must remain available to respond to life-threatening situations within the community... "HELP US SERVE THE COMMUNITY!"	

Communications Center. Ms. Dreisbach and Ms. Mitchell both received the award for sustained exemplary performance throughout the year. Ms. Keller and Ms. McCracken both received their awards for exemplary handling of a critical Emergency Medical Services incident. Ms. Keller received her award for her skilled and calm response to a sudden cardiac arrest, while Ms. McCracken was honored for her expert response to a search and rescue incident involving children trapped in an ice cave.

Regina Keller – Recipient Emergency Medical Dispatcher of the Year – Exemplary Handling of a Critical Incident: In December 2008, Regina received a call regarding a female that was not breathing. The caller was extremely distraught and Regina took charge of the call and used her training and developed skills to get the caller to focus and prepare to deliver CPR. There were a few curve balls thrown at Regina with physical barriers and existing medical orders. She made adjustments to each of these situations and continued to provide appropriate instructions all the while remaining calm and empathetic. Regina has been employed at Valley Communications since 1999.



Justina Dreisbach – Recipient Emergency Medical Dispatcher of the Year – Sustained Performance: Justina has been employed with Valley Communications Center since 1998. She began her career as a call receiver and currently holds the position of Communications Training Officer / Dispatcher. She has been instrumental in the changes to the Zone 3 Strike Team and Task Force policies and consistently trains new fire dispatchers in EMS dispatch. Justina instructs the Fire Dispatch Academy and consistently instills the importance of the CBD guidelines and the responsible management of the field units. She provides the best service possible and works very hard to be a positive mentor for EMS while modeling the desired behavior.

Becky McCracken – Recipient Emergency Medical Dispatcher of the Year - Exemplary Handling of a Critical Incident: On August 21, 2008, Becky received a frantic call from the mother of one of two boys who just had an ice cave collapse on them near Denny Creek. For over an hour Becky stayed on the line, alternating speaking to the two mothers while rescuers made their way to the scene. Among the many challenges that Becky dealt with were obtaining the exact location of the ice cave (the caller was not sure of the name of the trail), the long response time, and the unpredictable condition of the remaining ice pack. Becky did an exceptional job calming the caller down so she could focus on obtaining vital information that the rescuers needed, as

well as ensuring safety for the other hikers, two of which were young children. This call had the potential to end very tragically, but Becky's excellent skills as an EMS Call Receiver and her calm and reassuring tone directly contributed to the positive outcome. Becky has been a Call Receiver/Dispatcher in the Communications Center for almost nine years. In addition to her Dispatch duties, Becky is also a Communications Training Officer.



Erin Mitchell – Recipient Emergency Medical Dispatcher of the Year – Sustained Performance:

Erin has been a Call Receiver/Dispatcher in Eastside Communications Center for almost ten years, and has played a significant role in the training of new employees as a Communications Training Officer for over five of those years. Her Supervisor gave her the following praise:

'The positive attitude and influence that Erin brings to work on a daily basis makes her an integral team player. She is readily available, proactive, and can be counted on, time and time again, to assist both her coworkers and those she serves in the field. What makes Erin stand out is her desire to do the right thing, with empathy and integrity. Erin has taken hundreds of 9-1-1 calls, speaking with hundreds of our citizens. I have listened to many of those calls, and can say with complete certainty that she can be counted on to treat the person on the other end of the line with the respect and the individual attention that each merits.'

V. Basic Life Support (BLS) Training and Education Program

Helping you become the best through Training and Education!



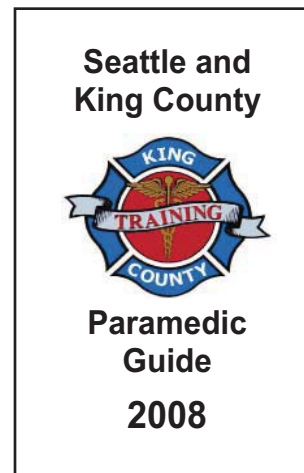
The Basic Life Support (BLS) Training and Education Program provides initial training, continuing education, instructor education and oversight of the recertification process for over 4,000 Emergency Medical Technicians (EMTs) in King County. This requires considerable coordination and communication between the BLS Training Section staff and the EMS agencies to ensure that training and education programs meet agency needs as well as State of Washington requirements. In addition, the BLS Training

Section serves as the liaison between the Washington State Department of Health and the thirty EMS/fire agencies in King County. In this capacity, the EMS Division provides EMS agencies pertinent information from the state regarding continuing education, certification, recertification, and regulatory and policy changes.

The following highlights current BLS Training and Education Projects:

Paramedic Patient Care Guidelines

The BLS Training Section is producing an update to the Seattle and King County combined Paramedic Guide that debuted in 2006. This guidebook was written in cooperation with the University of Washington/ Harborview Medical Center Paramedic Training Program and offers a countywide approach to paramedic-level treatment and medications. Similar to the EMT Patient Care Protocols, it is distributed to paramedics throughout King County with updates every two years. The latest version was distributed in the summer of 2008 and is being updated for 2010.



Initial Training Classes for EMTs

An initial EMT training course is offered in the spring and fall of each year to personnel from all EMS/Fire agencies in King County. Seattle Police, King County Sheriff and King County Search and Rescue applicants are also permitted to participate in this educational opportunity. Each course consists of 120 hours of classroom and practical instruction, in addition to 10 hours of hospital observation time, using the U.S. Department of Transportation EMT - Basic curriculum as a baseline. In the spring of 2009, 47 EMTs completed the EMT basic course and similar numbers are expected for the fall course. The spring course was held in partnership with the Woodinville Fire & Life Safety and the Bellevue Training Center.



On some occasions, the BLS Training Section partners with other fire departments to sponsor EMT classes outside the standard course structure. The BLS Training Section developed and approved a succinct model (still 120 hours, but employed eight hour days over a four week period) for Kent Fire Department in the Spring of 2009 with excellent results. This relationship demonstrates the EMS Division's commitment to community partnership and the continued efforts toward quality regional education. In order to ensure the EMT students become competent in

basic skills, the BLS Training Section employs a significant amount of hands-on skill exercises that require real equipment and training simulators. The section strives to keep equipment in good working order with regular maintenance and replacement of out-of-date items. In 2009, the BLS Training Section purchased equipment to include automated external defibrillators, suction units and OB manikins.

As a part of the BLS Training Section's efforts to provide both ongoing EMT skills in our bi-annual

classes, and meet the new needs and concerns of the community and fire agencies that we serve, we offer training in domestic violence and elder abuse. Our initial EMT classes receive training to recognize, evaluate and treat victims of domestic violence and elder abuse, as well as offering classes to the individual fire agencies throughout King County.

Competency Based Training (CBT)

Each year, the State of Washington mandates that EMTs complete 10 hours of continuing medical education or a medical-approved program of continuing medical education and evaluation. In King County, the topics are prescribed by the Medical Program Director and include six annual modules on various emergency medical topics, a total of eighteen modules in a three-year recertification cycle. In aggregate, this program is referred to as Competency-Based Training (CBT). The BLS Training staff develops materials and implements an updated curriculum each year. The 2009 CBT curriculum was complete as of January 1st and includes the following selected topics: Cardiovascular Emergencies, Stroke, Head, Spine and Chest Trauma, Diabetic Emergencies, Death and Dying, and Street Medicine - Street Drugs. The BLS Training Section puts on over 20 CBT Instructor workshops in the fall and winter of each year to train the 572 instructor-evaluators who oversee the practical skills training. These day-long workshops cover topics in basic skills, new techniques, protocol updates and instructional delivery.



EMS Online Training Web Site

The EMS Division continues to expand the offerings for EMS Online, a Web site that delivers Web-based training. It was developed in 2001 with the assistance of a grant from the Medic One Foundation and later received approval as a 2002-2007 strategic initiative with designated funding. This 'tech-savvy' educational approach to continuing education utilizes current Web-based technologies and allows participants access to training modules during non-peak service hours. Thirty-eight modules are now available online with over 14,000 EMTs enrolled throughout Washington state (100% of the approximate 4,000 EMTs in King County use this program). Over 275,000 examinations/courses have been completed resulting in a dramatic reduction of CBT training costs to agencies since Web-based training is approximately \$18/EMT per year and standard classroom instruction is approximately \$133/EMT per year. Costs associated with providing this service outside of King County are covered by user subscriptions.

Test results are automatically stored in an electronic database for centralized record keeping and reporting to county fire departments and EMS agencies. Each module has a practical skills evaluation conducted by an onsite instructor to ensure clinical skills meet King County standards. BLS Training staff provides full-time technical support for the Web site and supports a full time instructor hotline for questions about the modules and treatment protocols. The Web site is currently being revised for the 2010 curriculum and will add improvements to this state-of-the-art training system including improved interactivity, site customization, new and innovative testing procedures, improved Web site management capabilities and advanced reporting features.

The EMS Online Web site was originally designed for local area EMT training, but rapidly expanded to include both dispatcher and paramedic training modules. In addition, the goal of EMS Online was to have national/international exposure for all EMS Online courses. A pilot program with Wayne Township Fire Department in Indiana was completed in 2007 and officially incorporated EMS Online as their sole source of educational content. National pilot projects initiated in the fall of 2006 include EMS training programs using EMS Online within the states of Idaho, Oregon, Utah, Iowa, Alaska, Wyoming, and Minnesota and each has incorporated EMS Online as their educational tool. Additionally, EMS Online was recently adopted by the Navy NW (Department of Defense) and is approved by the Department of Homeland Security as appropriate educational content for certified EMS providers. Agencies outside of King County pay a modest fee per person to have this program available for their EMS providers. Included in the *Medic One/EMS 2008-2013 Strategic Plan* is a strategic initiative to support Interactive Enhancements to EMS Online (see page 57). Several organizations have contracted with the EMS Division to host courses and deliver instruction through EMS Online including the Northwest Stroke Regional Network, the Resuscitation Outcomes Consortium, and Whatcom County EMS.

Regional EMS Tracking Resource - Online (RETRO) Project

The RETRO Project was an approved strategic initiative in the 2002 - 2007 Strategic Plan to build a centralized database to track and store information related to EMS personnel across King County and has now been integrated into the BLS Training Section as an ongoing program. The electronic records system has multiple benefits over paper-based records, including enhanced search capabilities and data extraction methods. Types of EMS personnel records include dates and requirements related to certification and recertification, reciprocity requirements, practical skill set requirements for certification, and teaching certification requirements. In 2009, the BLS Training Section upgraded software that supports RETRO and completed training to allow expanded capabilities for internal staff to update program functionality.

EMT Defibrillation Program

The goal of the EMT Defibrillation Program is to ensure the greatest number of people in cardiac arrest are resuscitated using a comprehensive plan that includes initial defibrillation training, continuing medical education, field documentation and reporting, equipment maintenance procedures, and quality improvement activities. All resuscitations that occur in King County are evaluated in detail and the gathered information is used to provide timely feedback to each individual EMT and their training officers. In aggregate, the data is used for improved EMT resuscitation training and feedback to manufacturers regarding software and hardware design.

Evidence of the efficacy of such a program can be demonstrated in light of the sustained increase in cardiac arrest survival following the implementation of the new defibrillation guidelines in January 2005 (see graph on page 70). The new guidelines specified one shock followed by two minutes of CPR. The 2006 American Heart Association (AHA) guidelines for cardiac resuscitation incorporated many of the King County changes. Dr. Tom Rea is the Medical Director for the EMT Defibrillation Program. In 2009, the BLS Training Section upgraded computer hardware to allow for quicker data collection of resuscitation events.

VI. Cardiopulmonary Resuscitation (CPR) and Public Access Defibrillation (PAD)

King County Student CPR/Automated External Defibrillator (AED) Program

The CPR/AED Student Program in King County trained 11,647 students in life-saving CPR/AED skills during the 2008-2009 school year. Many of these students received First Aid training as well. The target group for this training is grades six through twelve. The students receive nationally recognized American Heart Association (AHA) completion cards from teachers and local firefighters that have been trained to be AHA instructors through the program. Many schools in King County have an Automated External Defibrillator (AED) accessible for public use hanging on the walls within elementary, junior high and high schools. There are currently 375 AEDs located in public schools registered in the King County Public Access Defibrillation Registry.

A teacher at a King County high school is attributed with saving the life of student in June 2009: (<http://blog.seattlepi.nwsourc.com/seattle911/archives/172343.asp>)

Teacher at Hazen High Saves Student with Defibrillator

Quick action by a teacher at Hazen High School is earning praise from the Renton School District for likely saving a freshman's life. On June 17, 2009, the student collapsed during a 1-mile run as part of a physical education class final. Teacher James Landsverk told supervisors he saw the student's eyes roll back and heard him gasping. The teacher performed CPR, yelled for one student to call 9-1-1 and another to get the school's automated external defibrillator. Landsverk used the AED to shock the student's heart muscles back into a regular rhythm. The school nurse took over CPR until medics arrived, and the student was eventually able to breathe on his own. The student was taken to Seattle Children's Hospital Medical Center and is recovering, a district spokesman said.



Landsverk had worked in the district for two years as a PE teacher and assistant football coach and knew how to operate the AED following a training he'd received last fall from EMS Division staff. The Renton School District has 38 AEDs placed at all schools. All Middle and high schools in the district have at least two of the devices at each school.

"He (Landsverk) asked me to not send anything out to press on this until after he left," district spokesman Randy Matheson said, "because he did not want any attention. (Source: Seattle 911: A police blog)

King County Employee CPR/AED Training Program

This program provides CPR/AED training to King County employees during their regular workday. Approximately 1,700 employees were trained in 2008. There are currently 78 AEDs located in King County facilities. The King County Chinook Building has an AED located in the main lobby

beside the security desk, in the group activity room, and one inside the door next to the elevator lobby on each floor 8-13. Councilmember Kathy Lambert has championed the effort to ensure that AEDs in King County facilities are prominently located with proper signage so that employees know how to find them. All King County AED site coordinators were encouraged to purchase proper signs for the AEDs.



King County Councilmember Kathy Lambert views newly installed Council AED/display case

Seattle King County Responder CPR\AED Program

This Public Access Defibrillation program is a joint effort between the Seattle Fire Department and Public Health - Seattle & King County. The purpose of this program is to encourage businesses and residents to purchase an automated external defibrillator and assist in locating proper training and placing the device in the best location within the business or residence. Medical direction is provided if needed, and staff provide support for site coordination.

Registering the AED with the EMS Division puts the site in compliance with Washington state law concerning AEDs. Currently, there are 2,232 AEDs registered in the Community Responder Program. Information on the location of AEDs is sent to 9-1-1 communication centers for entry into their Computer Aided Dispatch (CAD) premise information. This allows the dispatcher to be alerted when an AED is present in the vicinity of a cardiac arrest and to provide the location of the AED to the caller if needed.

King County Project RAMPART

King County Project RAMPART
A Regional Approach to Municipal Public
AED Registry and Training
'Building a Defense Against Cardiac Arrest'

In June 2009, the EMS Division received Public Health approval to implement a pilot project to improve and enhance Public Access Defibrillation in King County. This proposal was presented to

the EMS Advisory Council in March, 2009 and received overwhelming support to move forward. The pilot project will create a partnership between King County and several local municipalities to provide incentives to maintain and expand their county and city PAD programs. The pilot will include registration of municipal AEDs in the regional registry, effective guidance and placement of devices in higher-incidence/higher risk settings where sudden cardiac death is more likely to occur, purchase of AEDs, and provision of CPR/AED training for county and city employees.

Specific RAMPART objectives are to:

- promote better inclusion of AEDs in the PAD Registry used by EMS and dispatch agencies (9-1-1 call centers) as required by state law;
- provide an incentive and guidelines for purchase and most efficient placement of AEDs in higher-incidence/higher risk locations;
- promote training in use of AEDs (related to a legal requirement).

Approximately four municipalities will be encouraged to participate along with King County government. Funding for the pilot was established at \$60,000 for the first year. Funding for city and county participants is allocated based on the number of county/city employees, the number of city/county owned and registered AEDs and the number of private AEDs in their communities. Funding allocations will be reconfigured each year to provide incentive for city/county agencies to increase the number of registered AEDs.

This proposal for a pilot project is complementary to the 2008-2013 Strategic Initiative promoting Public Access Defibrillation and increasing AED registration through public awareness. Funds are available for a public awareness campaign focused on King County residents and private business (see page 57).

VII. Injury Prevention

Currently, most injury prevention programs receive strategic initiative funding (see pages 53-57). The Child Passenger Safety & Used Car Seat Program is funded by Regional Services money and is a collaborative effort by the EMS Division and the Community Health Services Division to address the needs of low income pregnant mothers.

Child Passenger Safety & Used Car Seat Program

To further our goal of providing appropriate seats to needy families, a used car seat program was developed in collaboration with the Washington State Safety Restraint Coalition, a non-profit organization dedicated to educating the public on vehicle occupancy protection. The program was fashioned after the Kent Police 'Pass-it' Program which provides proper documentation in acquiring and distributing used car seats and enabled an EMS certified car seat technicians to provide car seat education as well as a free car seat to low income pregnant mothers at six Public Health Centers (Eastgate, Columbia, Northshore, Federal Way, White Center, and Kent - Springwood and Aldersquare). The King County Prosecuting Attorney's office and the risk management team

of Public Health ensured proper protocols were developed to make sure seats were safe. Merry-Go-Round, a local retailer of high end car seats, was the designated collection point for the slightly used car seats, and during the period August 2008 through May 2009, 316 clients had been through the program.



In addition, a pilot study called ‘Providing Car Seat Checks with Well-child Visits at an Urban Health Center’ by Kyrán P Quinlan, Janet Holden, Marcie-jo Kresnow evaluated a pilot program of providing child restraint system (CRS) checks by certified technicians in well-child care in an urban health center serving a low-income community. During well-child care visits, nationally certified child passenger safety technicians assessed CRS use, educated care givers, corrected misuse, and provided a new CRS if necessary.

The program’s effectiveness was assessed at a subsequent medical visit. A total of 3,650 CRS checks were performed. Among those using CRSs, misuse was detected in 95% (1,417/1,448) of infants, 98% (604/615) of toddlers, and 84% (70/83) of children using belt positioning boosters. CRS non-use was found for 307 (17%) infants, 604 (50%) toddlers, and 593 (88%) booster seat-sized children. Exposure to the program was associated with a significant positive effect on CRS use ($p = 0.001$) and significant improvements in the major components of misuse ($p = 0.05$).

This urban health center has high rates of CRS non-use and among CRS users at baseline, misuse was nearly universal. Exposure to the CRS check at the well-child visit was associated with significant improvements in the components of proper use months later. Providing CRS checks by certified child passenger safety technicians at the time of well-child care is a promising new means of promoting child passenger safety in this high-risk population.

VIII. Critical Incident Stress Management Program

Occupational danger has various definitions within the emergency services profession. Often considered are physical dangers of firefighting, law enforcement and other emergency services that help protect the public. Included are risks to latent health effects from hazardous material and chemical exposure or biological hazards. Only over the past couple of decades some have considered the intangible effects of critical incident and chronic stress reactions to be as disabling as physical injury. This topic drew the attention of leaders to keep our area’s emergency services personnel at their level best and developed a program that considered our emergency services professionals’ behavioral health.



In 1987, the Community Programs Section within the EMS Division established the Critical Incident Stress Management (CISM) Program and a 19 members all-volunteer team who were specially trained to provide emotional and psychological services to emergency services professionals (ESP). It has faithfully served 24/7, responding to provide focused support and educational awareness on stress and its impacts. In the past years, when events such as WTO (World Trade Organization), the Nisqually earthquake, the Mary-Pang Warehouse fire and many other incident specific events, ESP have had another source of human resource support. In 2008, the CISM Program celebrated its 20th anniversary of service to emergency service professionals.



CISM Services: Stress management comprises various components of behavioral wellness. CISM service requests have included more than single focused stress impacts, Critical Incident Stress Debriefings (CISD), one-on-one counseling or similar services for groups. Recently CISM services not fitting traditional CISM criteria have included support for returning combat veterans' reintegration back into their emergency service professional role, grief support for agencies and their employees who have suffered a tragic loss to one of their own, and agency support suffering organizational stress. The majority of this year's projects focused upon aiding provider agencies' development and training of Peer Support Teams. Evidence concludes that Peer Support (co-worker to co-



worker) care creates 'Psychological First Aid' at the lowest level. A recently enacted law allows law enforcement and firefighters Peer Counselors privileged communication when providing immediate support following a critical incident. This protection aids peer support team members in the performance of their duty without threat of confidential disclosure.

CISM Program management has provided administrative leadership to allied agencies in their development of specific stress management service models for their organization. Strategic planning for the future will include behavioral wellness initiatives that incorporate increased partnerships in a variety of crisis intervention and stress management services for provider agencies to maintain our region's emergency services personnel psychological 'resilience' to common stress and intervention support in critical incident stress events.

A continued objective is to enrich the partnerships with other public service CISM Teams in the Seattle/King County region by working cooperatively on training endeavors, large critical incidents, and enhanced relationships with EMS provider agencies. Strategic plans have focused upon mutual aid cooperatives across geo-political boundaries that increase efficiency and effectiveness of the regional CISM collective.

Strategic Plan: Staff continue to follow the recommendations outlined in the 2004 published CISM Position Statement. The primary focus of that effort was to identify the philosophy, strategies and goals of behavioral wellness issues, crisis intervention techniques and stress management educational services provided by the EMS Division to emergency services professions in greater King County.

Services provided by the CISM Team to emergency service personnel and their families are based on the following public health model:

- Primary Prevention – Reinforcing one’s ‘resilience’ to extreme stress reactions and occupational stress impacts;
- Secondary Prevention - Mitigating the impact of the occupational exposure to extreme stressors by incorporating ‘Psychological First Aid’ intervention and ancillary services; and
- Tertiary Prevention - Follow-up referrals for treatment when a higher level of psychological support care, beyond debriefing/crisis intervention, is required.

2002 - 2009 CISM Program Review

- 20th year Anniversary of the CISM Program and the all-volunteer CISM Team.
- Total requests for CISM services: **190**(plus agency administrative support)
- Volunteer hours contributed: **2416**
- Provided various training modules for CISM Team and Agency Peer Support Team members.
- Published an administrative manual for establishing a Peer Support Team and assist agencies in their development.
- Sponsored initial peer support training for emergency services professionals and agencies.
- Revised the Basis Stress Management Agency Training curriculum and lesson plan; with new multimedia.
- Lead the development of partnerships regionally and with the Washington CISM-Network, Inc.

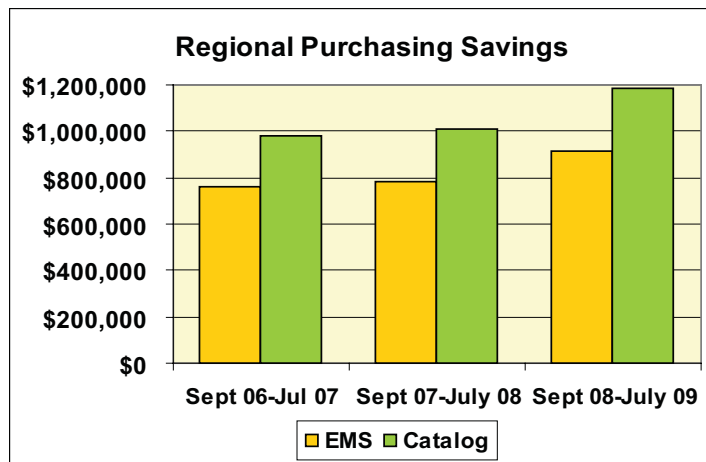
The King County CISM Team also partners with a Washington State and an international network of CISM teams.

IX. Regional Purchasing Program

The Regional Purchasing Program is a voluntary countywide program designed to reduce supplies and equipment expenses by maximizing the joint purchasing power of EMS agencies. Initiated as a pilot project in 1998 with a few select EMS agencies, the program has since operated on a regional basis allowing any EMS agency in King County to purchase EMS supplies and equipment using the regional contract. In 2004, the program was expanded to create a separate regional medications contract. Vendors for each of the EMS Regional Purchasing Program contracts are selected through a competitive bid process. Life Assist, Inc. is currently in the final year of a three-year contract for supplies and equipment and the contract will be put out to bid shortly. Boundtree was the recipient of the medications contract and is in the second year of a three-year contract.

The Regional Purchasing Program is managed by an oversight committee that meets on a quarterly basis to address operational issues, review new EMS products, and evaluate the status of the program. Regional administrative costs are minimal as product orders, agency invoicing, and shipping are all managed at the agency level. The program has consistently demonstrated significant cost savings to EMS agencies since the program was developed in 1998. Recent data

comparing actual costs to catalogue prices are reflected in the graph below, confirming the overall cost savings to the region.



X. Administrative Functions

The EMS Administration Section is responsible for management and coordination of divisional and regional activities in the following areas:

- Personnel, payroll, and union negotiations
- Diversity management and mandatory training
- Implementation and management of policies and procedures
- Compliance, liability, and EMS audit
- Contract administration and oversight (including Regional Purchasing Program)
- Budget preparation and monitoring, and long term financial planning
- Planning and management of levy funds, including strategic initiatives

The Administrative Section is responsible for the review of all divisional contracts, including administration of advanced life support (ALS) contracts with five paramedic provider groups and 28 Basic Life Support (BLS) agencies. The section is responsible for preparation of the annual budget and monthly monitoring and projections, long term financial planning, participating in the EMS audit, and providing management of levy funds.

The Administration Section also coordinates services with other Public Health - Seattle & King County divisions in addition to other county agencies, councils, and offices, including the King County Executive, Prosecuting Attorney, Risk Management, and the King County Council. The division also maintains close relationships with the University of Washington and Harborview Medical Center as well as ongoing relationships with local hospitals and medical providers. The EMS Division provides regional medical oversight, EMT training, community training, dispatch training, quality data and planning activities, and research. The EMS system possesses an international reputation of providing excellent service to the residents of King County.

C. 2008-2013 Strategic Initiatives

The *Medic One/EMS 2008-2013 Strategic Plan* contains specific strategic initiative projects designed to improve patient care, manage growth in paramedic services, and develop system efficiencies and cost savings. Some projects were a continuation of strategic initiatives from the previous levy period, and some were new programs and initiatives that would contribute to the successful achievement of the plan's policy and financial goals. The table below summarizes the current status of each strategic initiative (a Summary Financial Report is located on page 95) and is followed by individual project descriptions.

2008-2013 Strategic Initiative Summary Table

Strategic Initiative	2009 Status
Dispatch Enhancements:	
Complete CAD Integration	Completed: Phase I - 2005 (Enumclaw and POS); Phase II - 2006 (Eastside). In Development: Phase III - Dec 09;
Dispatch Center Performance Standards	Established Criteria - Dec 08 Initiated: Jan 09
Advanced EMD Training	Developed Recommendations - Jun 09 Initiated: Jul 09
Better Management of Non-emergency Calls to 9-1-1	Completed: Evaluation of Telephone Referral Program, Nov 08; Enhanced Rapid Response Pilot (VCC) - Apr 09
Injury Prevention:	
Expanded Countywide Falls Program	Doubled enrollment - 08 Expected to exceed 2008 enrollment - 09
Small Grants Program for BLS Agencies	Eight departments awarded grants - 08 Four agencies awarded grants to date - 09 RFP completed for 2010
Community Awareness Campaign	Safe Steps Campaign - 08 ShapeUp Campaign - 09
Grant and Other Funding Opportunities	Hired Marketing Specialist - Mar 09
Public Access Defibrillation Campaign	Development of plan - 09
Interactive Enhancements to CBT Online	Developed 24 new interactive courses - 09
Systemwide Enhanced Network Design (SEND)	Completed: Development Plan - Feb 09 Completed: Implementation Plan - Aug 09
All Hazards Management Preparation	Developed plan - 09
EMS Efficiencies & Evaluation Studies	Identified three major areas of focus - 09
Strategic Planning for Next EMS Levy Period	Not applicable at this time

Complete CAD Integration

In 2005, the EMS Division created a custom software application, the eCBD Tool, to allow dispatchers to use the CBD Guidelines more efficiently. During Phase I, a stand alone version of the software was implemented at Enumclaw Police and Port of Seattle (POS) Police communication centers in July 2005. Phase II was implemented at Eastside Communications Center in Bellevue in July 2006 and integrated the CBD software application with the Tri Tech, Inc. Computer Aided Dispatch (CAD) used at Eastside Communications.

Use of the eCBD Tool has been steadily increasing as reflected in Table 1. In January 2008, the dispatchers were using the eCBD Tool in 61% of the total EMS call volume for the center. In December 2008, the eCBD Tool was used in 80% of the 3,074 calls processed for the highest monthly use to date. Table 1 shows the increase in use during the 1 year period.

Table 1: Rate of eCBD Tool Use

	EMS Call Volume	Use of eCBD Tool	Percentage of Use
Jan 2008	3,519	2,144	61%
Feb 2008	3,292	2,153	65%
Mar 2008	3,601	2,424	67%
Apr 2008	3,222	2,479	77%
May 2008	3,479	2,642	76%
Jun 2008	3,592	2,604	72%
Jul 2008	3,494	2,698	77%
Aug 2008	3,552	2,882	81%
Sep 2008	3,486	2,869	82%
Oct 2008	3,540	2,851	81%
Nov 2008	3,233	2,596	80%
Dec 2008	3,841	3,074	80%

Phase III will implement a custom Reporting Solution for the CBD data captured at the Port of Seattle. A CBD/CAD integrated version was pursued as a part of this initiative, but was not developed due to cost and the limited EMS call volume of the POS. The POS Reporting Solution will allow the EMS Division to capture information from the eCBD Tool and the POS CAD and transmit it to a CBD database that is used for EMD QI review.

This project received approval of the King County IT Project Review Board in May 2009. It is expected to be completed by December 2009. Phase IV and Phase V of this initiative are on hold due to new CAD implementation projects at Valley Communications and the newly formed North East Regional Communications Agency (NORCOM). NORCOM took over police, fire and EMS dispatching from Eastside Communications in the north end of King County in July 2009.

KING COUNTY CRITERIA BASED DISPATCH GUIDELINES - Connected

New Call View Previous Calls Preferences Help

CBD Introduction IDC Codes Medical Abbreviations Glossary All Caller Interview TRP Transfers Emergency Instructions

5157 - Diabetic

DIABETIC

DISPATCH CRITERIA Add Patient P1

Medic Response

9M1 Unconscious or not breathing

9M2 Respiratory Distress (one required):

- Sitting/leaning forward or struggling to breathe
- Unable to speak normally
- Noisy breathing
- Pale and diaphoretic

9M3 Decreased LOC or Uncooperative (Not following commands)

9M4 Signs of shock (three required):

- Diaphoresis
- Syncope/near syncope when sitting/standing
- Nausea
- Pale, clammy skin
- Chest pain/discomfort

9M5

9M6

9M7

9M8 Seizure

BLS Red Response

9R1 Disoriented, unusual behavior or acting strange

9R2 Not feeling well, non-specific

9R3

9R4 No verifiable info available from RP

9R5

TRP

9T1 Awake/alert

9T2 Wellness

Q Codes

9Q1 Request from Scene

9Q2 Request from Scene

9Q3 Request from Scene

9Q4 Request from Scene

9Q5 Request from Scene

9Q6 Request from Scene

9Q7 Request from Scene

9Q8 Request from Scene

9Q9 Request from Scene

ASK VITAL POINTS

Sex Male Age

Medic

Ask to speak directly to the patient, if possible!

1. Is the patient speaking normally?

2. Is the patient having any trouble breathing?

3. Is the patient acting normally?

3a. If not, what is different?

4. Can the patient respond to you and follow simple commands?

5. Can the patient answer your questions?

6. Does the patient know who they are?

6a. Where are they?

7. Does the patient take insulin?

7a. When did the patient last take their medication?

8. When did the patient last eat?

9. What is the patient's blood sugar level?

10. How does the patient look?

11. How does the patient feel when they sit up?

12. Is the patient complaining of any discomfort?

13. Has the patient had a seizure?

TRP

14. Is the patient feeling well?

PRE-ARRIVAL INSTRUCTIONS

☐ Nothing by mouth, if patient unable to take it by themselves.

☐ Give juice with sugar (2-3 tbsp.) if patient able to take by themselves.

☐ Clear area around patient

☐ Gather patient meds (if not done already). Test the patient's blood sugar, if you have the equipment and training to do this. Give the results to the ad crew when they arrive.

SHORT REPORT

Call History

Time	Detail
12:04:29 CU	CC9 Diabetic 7/10/2009 12:04

Chief Complaint D START NEW CALL Flag for Review Flag for Training

1.Abdominal/Back Pain	2.Allergic Reaction	3.Infect. Disease	4.Bleeding(NomTR)	5.Breathing Difficulty	6.Cardiac Arrest	7.Chest Pain/Heart
8.Choking	9.Diabetic	10.Environ./Toxic Exp	11.Med Knowledge	12.Head/Neck	13.Mental/Psych	14.O.D./Poison
15.Preg./Childbirth	16.Seizures	17.Sick(?) /Other	18.Stroke (CVA)	19.Unconscious	20.Pediatrics	21.Assault/Trauma
22.Burns	23.Drown/Water	24 Falls /Acc./Pain	25.MVA	26.Animal Bites		

eCBD Tool Chief Complaint Guideline for Diabetic Patients

Dispatch Center Performance Standards

The *Medic One/EMS 2008-2013 Strategic Plan* includes a strategic initiative to ‘strengthen the recognition program for Dispatch Centers and create criteria/list of standards and tie funding to meeting these standards and for their participating in required training and quality improvement activities.’ In August 2008, the EMS Division convened a group of representatives from dispatch, BLS, and ALS, and the Medical Program Director to establish the standards for this initiative. The 2009 Dispatch Standards recommended by the Dispatch Performance Standards Group included:

1. Use of CBD Guidelines Software Tool (if the EMS Division has made the software available to the dispatch center). Use of the tool on a minimum of 80% of all EMS calls within 1 year of implementation at the center.
2. CBD Basic Training - Successful completion of CBD Basic Training for 100% of all new line employees answering 9-1-1 calls.
3. EMS Online EMD Continuing Education - Successful completion of required online CE modules for 100% of line employees answering 9-1-1 calls. (Two CE modules annually)

4. In classroom EMD Continuing Education - Successful completion of required 4 hours of in-classroom training for all line employees answering 9-1-1 calls. (4 hours annually)
5. Ensure the following data elements are populated in CAD:
 - 1) Incident address (100% compliance)
 - 2) Initial Dispatch Codes (98% compliance)
 - 3) Alarm Time (100% compliance)
 - 4) Aid/Medic Dispatch Times (100% compliance)
 - 5) Geocode or lat/long (98% compliance)
6. Provide the EMS Division with electronic, remote access to CAD data. (Unless RCW restrictions for police data prevent access or the technology is not available to do so. Dispatch centers must make a reasonable effort to separate EMS calls from police calls, if feasible, in order to provide EMS data).
7. Provide the EMS Division with electronic digital audio recordings of all EMS 9-1-1 calls, accessible from the EMS office.
8. Conduct internal case review on EMS 9-1-1 calls for the purpose of quality improvement. Six EMS calls for each employee shall be reviewed each calendar quarter (average 2 per month).

The agreed upon funding allocation for 2009 is provided below:

Eastside Communications	\$97,900
Enumclaw Police	\$4,929
Port of Seattle Police	\$9,858
Valley Communications	\$133,757
Contract Allocation	\$246,444
<u>Indirect Cost</u>	<u>\$49,289</u>
Total Allocation	\$295,733

The 2009 contracts currently include this performance standards funding. Several significant improvements in records access and data collection have been made as a result of these standards. In 2009, King County gained access to CAD dispatch reports from two major dispatch centers and audio call recordings from one major dispatch center. Access to audio recordings from the second major dispatch center is anticipated in August 2009. EMS incident data provided to the EMS Division has also improved in 2009. Meetings will convene in July 2009 to discuss any changes to the dispatch performance standards initiative for 2010.

Advanced EMD Training

The *Medic One/EMS 2008-2013 EMS Strategic Plan* identified and committed funds to focus on enhanced dispatch training. The Advanced EMD Training Strategic Initiative allows for the use of those funds to provide dispatchers and call-receivers with learning opportunities in-line with improving performance of their job tasks, knowledge, skills or abilities.

The Dispatch Review Committee, composed of agency representatives from dispatch, ALS and BLS, discussed the best and most appropriate way to utilize this funding. During these discussions and brainstorms, there were attempts to identify gaps in service delivery and effective use of the CBD guidelines that could be filled by in-house training and could be developed by the EMD Program Manager. After several discussions the group was not able to identify any in-house training objectives that would improve dispatcher performance but did identify the following courses that would fill gaps in desired performance:

- Provide dispatchers with opportunities to improve their understanding of cultural and language issues encountered in their daily operations, including attendance at courses or conferences designed to improve crisis communications with limited English populations.
- Provide networking and more general exposure to public safety EMS/EMD issues.
- Provide quality improvement feedback training to supervisors and leads.
- Provide refresher basic EMD course to dispatchers and call-receivers.

Cultural Competence / Cross Cultural Communication: There are several courses and conferences pertaining to limited English proficiency communities that also embrace the concept of cultural competence including building an understanding of the different cultures and some of the barriers they face with public safety in general.

EMT Basic Course Lectures: This course already exists and dispatchers and call-receivers could attend the lecture sections of the EMT Basic course already delivered in King County with the objective of broadening their understanding of pre-hospital medicine.

Conferences: There are several EMS and 9-1-1 conferences that take place on a yearly basis and provide advanced continuing education for dispatchers and call-receivers. The Strategic Initiative funding will provide money for the communication centers to send their personnel to these conferences including registration, travel, lodging, per diem and back-fill costs.



QI/Feedback Course: This course is being designed by the EMD Program Manager with assistance from the EMD QI Coordinator with the objective of providing 9-1-1 center supervisors with guidance on providing EMD feedback as well as facing issues that arise in the process. It will also help them understand the QI/Feedback process at the regional level and how decisions are made, reports are derived etc. The course will also help the participants understand the consequences of undelivered feedback including the related system issues that can occur as a result.

Basic EMD Course: Dispatchers and call-receivers that have not been through the basic class in several years (approximately 5 years to 10 years) will go back to the basic class to enhance their knowledge and decision-making skills. The focus of the course has changed drastically and it is believed that this retraining may help some of those dispatchers and call-receivers to become more focused on the Sick- Not Sick concept that is used in the current Basic CBD course. This course has already been developed and is being delivered quarterly.

Better Management of Non-emergency Calls to 9-1-1

The goal of this initiative identified in the *Medic One/EMS 2008-2013 Strategic Plan* is better management of non-emergency medical calls to 9-1-1, thus reducing stress on the entire EMS system. A program manager funded for four years was hired in May 2008 to develop and administer projects related to this initiative.



Telephone Referral Program/Nurseline: One of the initial priorities has been to maximize use of the Telephone Referral Program/Nurseline (TRP/NL). It has been greatly under utilized since inception in 2000 with a yearly volume of less than 1% of total BLS responses. In 2007, for example, there were 700 TRP transfers out of over 107,000 BLS incidents; a usage rate of 0.07%. Yet during the same period, 3,528 incidents were assigned a T-IDC, indicating patient symptoms met the inclusion criteria that qualified for a transfer to the TRP/NL.

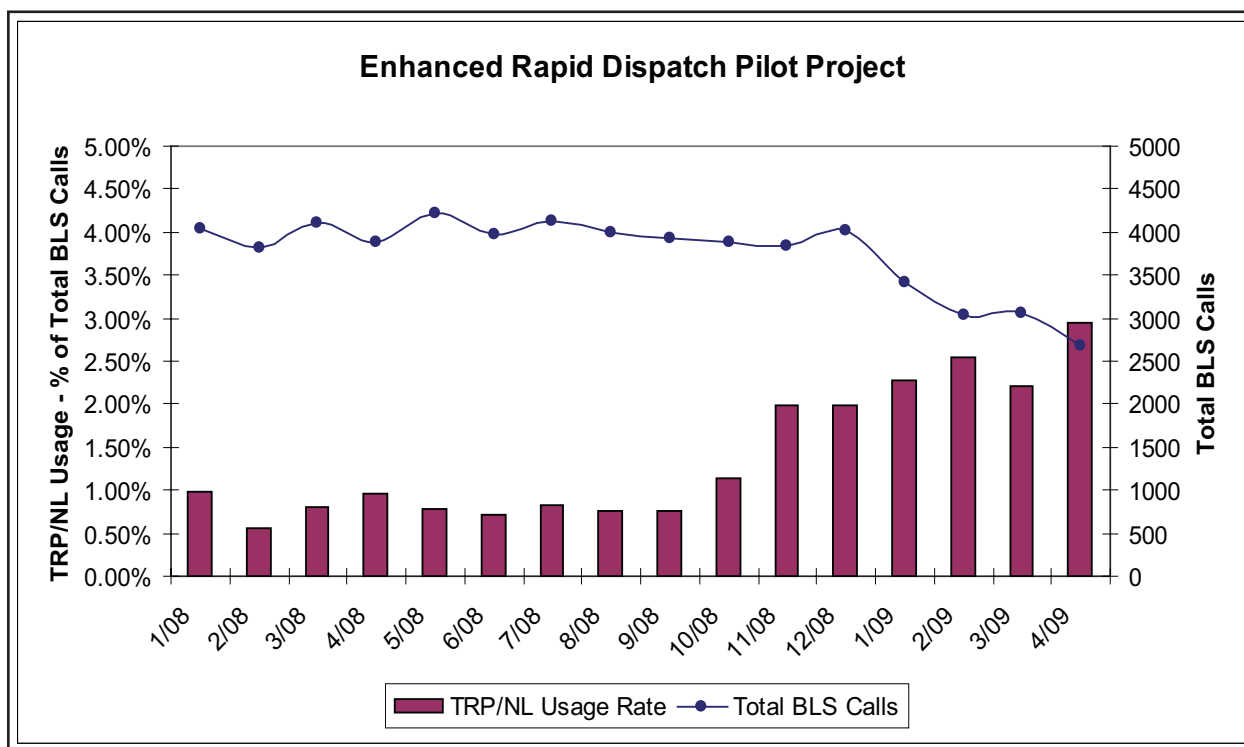
A review of the TRP/NL program and a survey of 9-1-1 telecommunicators was conducted to determine why the TRP/NL was not utilized more often. Three primary reasons were identified:

- Rapid Dispatch policies hinder the call receiver's ability to appropriately triage and transfer patients to the TRP/NL.
- A perception exists that Evergreen Healthline nurses are not answering transfers in a timely manner. Under the pressure of heavy workloads, call receivers are reluctant to engage in a time-consuming transfer process.
- Some dispatchers do not cancel EMS responders enroute to calls that have been transferred to the TRP/NL. Likewise, some call receivers do not see the point in transferring patients to TRP/NL once BLS is already enroute.

Based on these findings, several issues are being addressed. First, a six-month Enhanced Rapid

Dispatch (ERD) pilot project was initiated in South King County. The pilot, conducted with Valley Communications Center, involved minor changes in the Criteria-Based Dispatch (CBD) All-Caller questions. The intent was to improve the 9-1-1 call receiver's ability to effectively distinguish critical from non-critical chief complaints and triage low-acuity calls away from BLS response to the TRP/NL. A primary goal was to ensure BLS units were not dispatched needlessly to low-acuity medical problems.

The pilot project concluded April 30, 2009 and results were encouraging (see graph below). The TRP/NL usage rate throughout the project rose to over 2% of total BLS calls (in South King County), increasing an average of 84 per month during the pilot, a 154% total gain, compared to a previous 10-month average of 33 per month. Each additional transfer to TRP/NL saved one unneeded BLS response, conserving EMS units for more critical responses. We will now begin working toward obtaining approval to institute Enhanced Rapid Dispatch in North King County.



*Note: Total BLS Calls data incomplete; >90% 1/09-3/09; 56% for 4/09

In addition to the ERD pilot project, we have worked closely with Evergreen Healthcare, provider of TRP/NL services, to improve their responsiveness and efficiency in answering transfers from the 9-1-1 dispatch centers. Monthly and bi-monthly meetings have focused on improving their answer times, ensuring efficient handoff of patients, troubleshooting transfer problems, and maintaining an effective partnership with the dispatch centers. New contractual language also provides incentive for efficient measures.

Finally, continuing education sessions were conducted with all dispatch center personnel in Fall and Winter 2008-09 to inform them of the ERD pilot project as well as efforts to improve Evergreen

Health's responsiveness to TRP/NL transfers. This training re-emphasized to call receivers and dispatchers their crucial role in managing non-emergency EMS calls by choosing the most appropriate response level for each patient, including use of the TRP/NL.

A special thanks to our partners in these efforts: the staff of Valley Communications and Evergreen Nurseline, as well as the Regional Medical QI Section, who compiled data supporting the effectiveness of the revised All-Caller questions and provided medical direction for the project.

TRP/Nurseline Transportation Protocols: Evergreen Healthcare piloted new patient transportation protocols intended to reduce the Sendback rate (calls that are returned to the dispatch center) for patients who have low-acuity medical issues but do not have the means to travel to a doctor, clinic, or urgent care facility. These types of Sendbacks have typically comprised only 2% of the patients transferred to the TRP/NL, however they are an inefficient and unnecessary use of BLS resources. The two-month pilot began on 12/1/08. Nurses at Evergreen Health used the protocols to walk patients through a decision matrix, offering solutions such as obtaining rides from family/friends/neighbors, a taxi, or as a last resort, requesting their own private ambulance. The protocols were used successfully during the pilot project and are now being used by Evergreen nurses on a permanent basis. While the initial number of patients assisted is modest, they illustrate the potential to save EMS resources for more critical medical emergencies.

Community Medical Technician: One element identified during the 2008-2013 strategic initiative planning as a promising response to non-emergency medical calls is use of a Community Medical Technician (CMT). CMTs are envisioned as single-responder, non-transport capable units that could quickly respond to low-acuity incidents. Targeted use of CMTs would reserve other BLS responders and transport-capable vehicles for more serious medical emergencies. They would provide basic patient evaluation, patient assist, specified BLS treatment at the scene, and arrange for transport if medically necessary.

Anticipating the possibility of initiating a pilot CMT project once the Enhanced Rapid Dispatch project was complete, a review was undertaken of 2005-2007 BLS responses to determine chief complaints that had required little on scene EMT interventions and had low transport rates (<30%). Twenty criteria were identified as potential CMT responses, a level between a TRP/NL transfer and a BLS low acuity response. As 2009 progresses, we are working to identify partnering EMS agencies and initiate a pilot project.

Public Awareness: Funds for a public awareness campaign are available in the 2009 and 2011 budget years. Previous focus in public education has often been on reducing calls to 9-1-1 by helping callers better determine emergencies vs. non-emergencies. Past experience in various communities has sometimes shown that such approaches can be counter-productive; not measurably effective in decreasing EMS service demand and not effective in decreasing non-emergency calls to 9-1-1. An unintended side-effect can also be delays in dialing 9-1-1 by populations (limited English proficiency, elderly) who are unfamiliar with EMS services. We are currently working on several options for targeted public awareness, the goal being to reduce the number of non-emergency calls to 9-1-1 or at least limit their growth in the years ahead.

Injury Prevention

The Medic One/EMS 2008-2013 levy funded four injury prevention strategic initiative programs that directed efforts to address the most prevalent types of 9-1-1 calls. Since fall-related events comprised 17.4% of EMS responses among persons 65 years and older, all four strategic initiative programs address the fall injury issue in 2008. The four programs include:

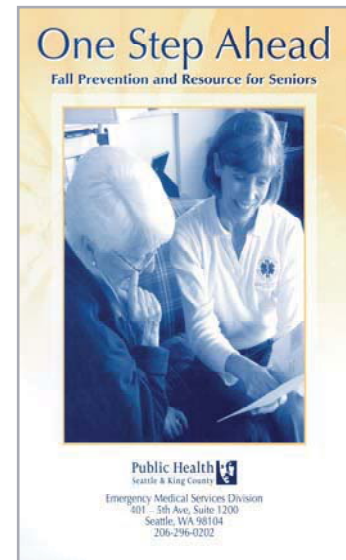
- Expansion of the One Step Ahead Fall Prevention Program
- Small Grants Fund for EMS agencies
- Hiring of a Fund Raiser/Grant Writer
- Community Awareness Campaign

Approximately one-third of community-dwelling persons older than 65 years of age fall each year, most commonly in the home setting with 10 to 15% of these events resulting in serious injury. Half of these serious injuries are fractures. For elderly persons who suffer hip fracture, half require hospital discharge to a nursing home and more than a quarter die in the year following injury. Falls also have more subtle adverse consequences resulting in self-imposed limitations and a decline of functional ability and quality of life.

A recent review of fall prevention interventions recommended that successful fall prevention programs consider health screening of at-risk elderly people followed by interventions that target both intrinsic and environmental risk factors of individual patients (Gillespie, et al. 2000). Stevens and Olson (2000) add that prevention strategies that include a multi-faceted approach with both behavioral and environmental components are most necessary. Important elements include education and skill-building to increase knowledge about fall risk factors, exercise to improve strength and balance, home modifications to reduce fall hazards, and medication assessment to minimize side-effects.

Expanded Fall Prevention (One Step Ahead Program)

Falls are a major cause of injury and result in substantial morbidity and even mortality. Two of the strongest risk factors for falls are older age and a prior history of falls. As part of the One Step Ahead Fall Prevention program, the EMS Division has collaborated with local fire departments to identify and intervene with those at highest risk in the community. The EMS Division screens 9-1-1 calls to identify older adults who have required EMS care for a fall, although some participants are also referred by healthcare professionals that have assessed their patients and meet our criteria for inclusion in the program. Criteria include over 65 years old, independent living, at risk for a fall or a history of falling in the past 6 months, not in subsidized housing, no dementia or Alzheimers, and ambulatory capabilities. A part time physical therapist was hired in February 2008 to expand the program to all areas of King County that did not have a fall prevention program.



The One Step Ahead Fall Prevention program enables an efficient and directed approach to identify those persons living in the community who are at the highest risk of serious injury due to falls. Once high-risk persons have been identified, they are offered a multi-pronged, no-cost approach to reduce their individual risk for falling and receive follow-up to assure that their risks are being addressed. The program has gradually increased over time. In 2008, the program enrolled 113 persons, nearly double the average number compared to prior years, and the 2009 enrollment is on pace to exceed 2008 participation. The average age of participants is about 80, two-thirds are women, and about half live alone. Participants come from all parts of King County and have a variety of backgrounds based on the profile of past occupations, income, and race.

The challenge to successfully prevent future falls is identifying the specific risk factors for each individual. For example, a fall may be due to environmental risks such as uneven carpets or a slippery tub, a patient's physical limitations such as poor vision or weak leg strength, or treatments provided to the patient to manage chronic health conditions that cause side effects, such as some therapies for poor sleep or high blood pressure. The most successful fall prevention strategies match the risk profile to specific interventions so that the individual receives a personal program. Therefore, the Falls Prevention Program meets with each participant in their home to identify the



exact set of risk factors and design a prevention action plan. The falls prevention specialist evaluates the individual's physical balance and strength, surveys the home for fall hazards, and reviews medical conditions and medications treatments in order to customize the action plan.

The specialist also works with the individual to help coordinate fall prevention care. For example, in a third of individuals the specialist arranges for safety equipment to be installed around the home to reduce risk. This equipment includes grab bars

for the bathroom, improved lighting, and repositioning or even removal of carpets. Another example is the use of optimal footwear so that individuals wear supportive well-fitting shoes that enhance rather than detract from balance. A final example is letter of communication, sent upon approval of the participant, to their personal physician. The letter explains the Fall Prevention Program and details the findings of the evaluation so that the physician may consider if other medical management might also help prevent additional falls. A core component of each specific intervention is providing education to the participant so that the decrease in risk can be sustainable. The Program has been a large success among the participants. There is a very high level of participant satisfaction based on surveys. Moreover, follow-up indicates a relatively low risk of repeat falls when compared to national averages in this high-risk group.

Small Grants Program for BLS Agencies

The grant applications had to utilize a ‘best practice’ fall prevention strategy or one that has a strong evaluation plan that assess the effectiveness of the project at its conclusion. In addition, all projects should be able to be duplicated by other fire departments. The following table provides a summary of the specific activities provided by departments that received grant money in 2008:

Summary of the 2008 Small Grants Program

Bellevue Fire Department	Implemented Wii Exercise program w/ North Bellevue Community Center.
Bothell Fire Department	Implemented Wii exercise program and Matter of Balance program with Northshore Senior Center. Results: 85% of participants showed improvement.
Shoreline Fire Department	Implemented Wii exercise program and Matter of Balance classes with Shoreline Senior Center. Participants had flexibility, strength and balance gains.
Renton Fire and Emergency Services	Partnered with Valley Medical Center and Renton Senior Center to develop a three-phase program with a health fair, Wii exercise program and fall prevention workshops.
Eastside Fire & Rescue	Partnered with Snoqualmie hospital for community fall presentations.
Northshore Fire Department	Trained one Matter of Balance Master instructor and four coaches.
South King Fire & Rescue	Implemented fall home assessment program.
Valley Regional Fire Authority	Produced fall prevention brochures for firefighter/EMTs to distribute to patients.

In 2009, Bothell Fire Department, the King County Fire & Life Safety Association (KCFLSA), Renton Fire & Emergency Services Department, and Shoreline Fire Department received grants for a variety of programs such as community fall presentations, becoming Matter of Balance Master trainers, vision checks, and continuation of Wii Programs as well as the Matter of Balance classes. This contract period ends in December 2009.

Community Awareness Campaign

The 2008 Community Awareness Campaign called *Safe Steps - Health, Safety & Independence for Seniors* was created through a collaboration of organizations (the King County Fire Marshall's Office, the King County Fire & Life Safety Association, and the Healthy Aging Partnership) to promote fire and fall safety among seniors. The campaign was a two-phased approach of educational workshops and a regional public awareness campaign. The two half-day educational workshops were hosted in May 2009 where 110 people healthcare professionals attended to learn about fall and fire prevention.

All attendees received a 'tool kit' that had key messages for fall and fire prevention as well as various state, federal and local best practice fire and fall prevention programs. In addition, 21 organizations (senior community centers, parks departments, UW, fire departments, hospitals, senior housing facilities, and YMCA's) implemented a Safe Steps educational event in their community during September 18 through September 27 where over 1,100 people attended the events. These events, along with key fall and fire prevention messages, were promoted through the Web site www.kcsafesteps.org. People could also call the Senior Services of Seattle/King County hot line 1-888-4ELDERS for more information.



The community awareness campaign started on September 1, which included radio ads, bus boards and a public relations campaign. The media campaign consisted of 264 - ten and 60 second radio spots which aired on KING FM and KOMO 1000 for a 4-week blast. The total radio reach for 55+ was 281,100 and 560,800 for 18+. An additional 88 (44 paid and 44 pro bono) bus boards were placed on Metro buses that canvassed all of King County with possible impressions of 21,923,012 during the same time period. In addition, Parsons Public Relations Company was hired to market the campaign to print and electronic media.



For the 2009 campaign, in collaboration with the Healthy Aging Partnership, four community/senior centers (Burien Senior Center, North Bellevue Community Center, Seattle Parks & Recreation Bitter Lake Community Center and Northshore Senior Center) were selected to participate on a newly named campaign called ShapeUp. These community centers were selected due to their high risk for BLS responses to a fall, location near senior public housing, capacity to provide additional older adults exercise classes, and willingness to evaluate the program. The ShapeUp campaign educates older

adults on the benefits of exercise and how it can reduce the risk for a fall. Targeted print display advertisements are used as well as flyers, discount coupons for exercise classes and other means of getting older adults to exercise at the community centers are being implemented. The campaign starts in September 2009 and culminates in December 2009.

Grant and Other Funding Opportunities

The addition of a part time fund raiser/grant writer in April 2009 will support efforts to contact various corporations and foundations in support of the ShapeUp community campaign as well as the One Step Ahead fall prevention program.

Public Access Defibrillation (PAD) Community Awareness Campaign

The focus of this strategic initiative is to increase public awareness of the need to purchase Automated External Defibrillators to help save lives when cardiac arrest occurs. It is also intended to encourage existing and future owners of AEDs to register their devices in the PAD Registry. This registry enables the EMS Division to contact AED owners if necessary and helps owners be in compliance with Washington State Law requiring registration of the AED. The Community Programs and CEEMS Sections of the EMS Division will partner to meet both the objectives of the initiative but also the Life Sciences Discovery Foundation grant (see page 61). Discussions are in progress to develop the campaign content. A University of Washington student completing a fellowship as a Ph.D candidate will assist the EMS Division in planning.

All cardiac arrest incidents occurring between January 2004 and December 2008 in a public location that did not have access to AED were reviewed to determine specific locations, contact information and telephone number. Persons at those locations with a high frequency of cardiac arrest incidents will be contacted and a brief telephone survey will be conducted to determine barriers that may be preventing the owners from purchasing and/or registering a device. Additional efforts to promote the importance of AEDs in the community will continue in 2009.

Interactive Enhancements to CBT Online

EMS Online is an interactive Web-based teaching tool designed for EMTs, paramedics, and dispatchers to study subject matter in an interactive format, including realistic video case studies with complete online evaluations. All course content is produced by BLS Training staff (for more details see page 36). Included in the *Medic One/EMS 2008-2013 Strategic Plan* is a plan to develop additional interactive enhancements to EMS Online. The Web site was originally intended to serve only a small number of EMS providers and deliver only a limited number of courses. However, its offerings have expanded tremendously due to its effectiveness in delivering quality training at a low cost.

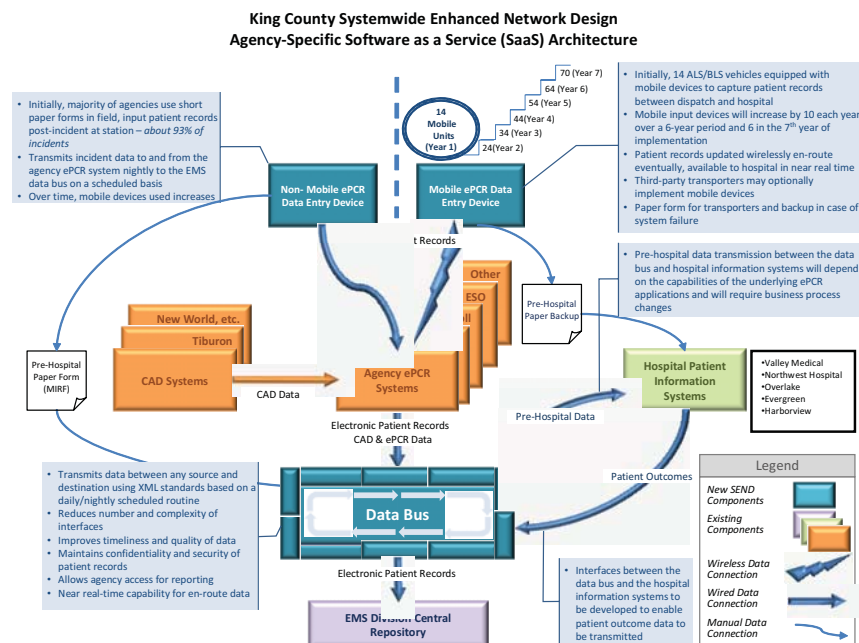
There has been a constant demand for additional content and expanded features to EMS Online. Using updated software tools, EMS staff has been able to support an increased content offerings and functionality and provide quality technical support. Thanks to strategic initiative investments, the Web site now offers customized protocols for all agencies using EMS online. This allows them to

tailor general medical topics to meet local standards. In addition, EMS Online staff has developed 24 new or improved interactive exercises for engaging the users of the Web site. In addition, the acquisition of a commercially developed assessment and examination system will result in improved productivity in creating content and offer more robust functionality. One example is the updated exam system that expands the types of tests, adds images or video, and reduces the time that exam authors spend writing, editing and reviewing exams. It also improves data reporting capabilities for purposes of exam validity and verification.

Systemwide Enhanced Network Design (SEND)

The Systemwide Enhanced Network Design Strategic Initiative is a five-year project included in the *Medic One/EMS 2008-2013 Strategic Plan* to develop enhancements to the existing EMS data network that would improve data accuracy and enable timely data integration into a central repository, allowing for secure data sharing between EMS agencies, dispatch centers, hospitals, and the EMS Division. Pre-hospital data generates over 200,000 records per year and is created by five separate dispatch centers and thirty different EMS agencies using six unique non-King County records management systems.

Although most EMS agencies transmit their data electronically, each EMS record still requires local agency review for accuracy and completeness creating a six week to six month delay in processing the record into the central repository. This delay prohibits the EMS Division from conducting critical analysis in a timely fashion. In addition, hospital outcome data for transported EMS patients is housed at over a dozen major hospitals and current methods for obtaining this information requires accessing each medical record individually. Conducting this task for all cases is time consuming and is thus limited only to cardiac arrest patients and special studies. Acquiring patient outcomes would assist greatly in the accurate assessment of patient care protocols and development of patient care policies.



In 2008, the King County Project Review Board (PRB) approved the release of funds to hire a technical systems consultant (Pacific Technologies Inc. was awarded the bid) to examine all possible options for improvement, prioritize and select the optimal option, and create an implementation plan based on the selected option. Discussion items included mobile data collection, transmission methods, and feasibility rating. The analysis was completed as planned in December 2008. The recommended option for system improvement included two parts: the inclusion of an EMS data bus in the architecture design (see diagram on page 58) and development of an implementation plan that would work with an initial set of EMS agencies and hospitals.

Since the estimated costs for a custom built data bus were outside the project budget and the initial pilot agencies had not been identified yet, PTI was asked to return and update the cost-benefit analysis and implementation plan to reflect the identified EMS agency initial participants and an analysis of alternative solutions to a custom data bus. This analysis was completed on April 30, 2009 as planned. Ten (10) EMS agencies were identified as participants in the initial pilot project along with five (5) hospitals. In addition, an outsourced, Software as a Service (SaaS) model was identified as the most effective and efficient option for implementation of the data bus. These findings will be brought before the PRB for review in October 2009 with a request for funds to begin implementation in November 2009.

All Hazards Management Preparation

This strategic initiative provides funding to ‘assess the current Disaster Management program to determine if the EMS system is prepared in its staff, supplies, and education.’ Current efforts are concentrating on continuity of business operations at the EMS Division, working with EMS providers on updating the regional EMS pandemic/infectious disease plan (in light of the recent experience with the H1N1 outbreak), and regional planning around the Howard Hansen dam flooding scenario.

EMS Efficiencies & Evaluation Studies

The Efficiency and Evaluation Studies Strategic Initiative allows EMS to further pursue areas showing a potential for additional efficiencies, to add additional evaluation of programs and protocols, and to review the use of levy funds. The emphasis behind all Strategic Initiative projects is to improve patient care, manage growth in paramedic services, and develop system efficiencies and cost savings. This initiative provides funds to further pursue areas identified by other strategic initiatives (by working in tandem with other initiatives) and to also review the existing system.

Pursue areas showing potential for additional efficiencies: The Community Medical Technician pilot project is an example of how the region is pursuing areas showing potential for additional efficiencies. The pilot is sponsored and managed by The Better Management of Non-emergency Calls to 9-1-1 Strategic Initiative described on page 50. The Community Medical Technician project will assess the feasibility of providing a single-responder in a non-transport capable vehicle in response to low-acuity incidents rather than dispatching BLS responders and transport capable vehicles. The Efficiency and Evaluation Studies Strategic Initiative money will cover the fire department costs of the pilot testing.

Review of use of levy funds: A study to review the levels of reserves in the EMS levy will be conducted in 2009 using existing staff.

Additional evaluation of programs and protocols: Discussions are beginning to look at updating a study conducted in the late 1990s benchmarking the EMS system in King County to other EMS agencies. The preliminary focus is for this study to look at per capita use of services, costs, and patient outcomes.

Strategic Planning for Next EMS Levy Period

The *Medic One/EMS 2008-2013 Strategic Plan* incorporates the necessary policy, programmatic, and financial aspects of the EMS system. The financial plan focuses on four separate EMS levy sub-funds of ALS services, BLS services, Regional Services and Strategic Initiatives. The plan was approved by the voters in November 2007, effective January 1, 2008, and will expire on December 31, 2013. King County Ordinance #15862 identifies the creation of an EMS Advisory Task Force to develop ‘interjurisdictional agreement on an updated EMS strategic plan and financing package for the next levy funding period.’ Recommendations are due to the King County Executive and King County Council by September 15, 2012.

D. Center for the Evaluation of Emergency Medical Services (CEEMS)

The Center for the Evaluation of Emergency Medical Services (CEEMS) is a research center established by the King County Emergency Medical Services (EMS) Division to conduct grant-funded projects designed to objectively and scientifically study the care and treatment of life-threatening medical emergencies. An important goal of research is to improve survival outcome and reduce morbidity from life-threatening emergencies.

For over 20 years, the research leadership for CEEMS has been provided by nationally distinguished UW faculty. This is made possible by a collaborative partnership between EMS and the University of Washington. The principal investigators are assisted by research staff and employees of the EMS Division. Dr. Mickey Eisenberg, MD, PhD, is the Medical Program Director for King County Emergency Medical Services and co-director of CEEMS. Dr. Eisenberg provides continuity in directing the research activities and has been joined by three other faculty from the University of Washington who also serve as CEEMS co-directors: Thomas Rea, MD, MPH, Associate Professor of Medicine and Medical Director for King County Medic One; Hendrika Meischke, Ph.D, Professor of Health Services; and Peter Kudenchuk, MD, Professor of Medicine and Cardiology.

These research activities advance scientific knowledge of pre-hospital emergencies, evaluate services delivered by EMS providers and help to establish standards of care and treatment. Training and ongoing continuing education for EMTs and paramedics along with 9-1-1 dispatchers can be tailored with more efficiency and effectiveness based on the findings of research projects. Results from research affect all pre-hospital services and help shape the future of EMS care. Research investigations are designed to answer specific questions. Studies are either observational or interventional. An observational study looks at groups of people and factors that cause a condition

or event over a certain period of time. An interventional trial is designed to evaluate new therapies compared to standard care. The University of Washington and Public Health - Seattle & King County govern the conduct of research by strict codes and regulations to protect the privacy, safety, and dignity of human participants. The following is a summary of current CEEMS activities:

Home Automatic External Defibrillator Training of High-Risk Patients

The At-Home Automatic External Defibrillator Training Study is a federally funded grant from the National Institutes of Health. This study will evaluate four different training approaches in the use of an automatic external defibrillator (AED) for family members of high-risk patients to determine which approach achieves optimal skill performance and retention of skills. It will also determine which approach achieves the best psychological adjustment among patients and family members. Over 300 couples have been enrolled. The study is in the final evaluation stage. The results will provide insight into the best methods to train laypersons in lifesaving emergency skills.

Pre-hospital Resuscitation Using an Impedance Threshold Device and Early versus Delayed Rhythm Analysis (ROC – PRIMED)

The Resuscitation Outcome Consortium (ROC) is an international consortium of 10 sites, including King County, established to evaluate pre-hospital management and treatment of cardiac arrests and traumatic injuries. ROC is funded by a 5-year National Institutes of Health award.

ROC PRIMED is an interventional trial designed to evaluate whether the following therapies performed by emergency medical technicians (EMTs) can improve survival outcome from cardiac arrest. (1) Analyze Early or Analyze Late CPR groups are randomized to perform CPR for 30 seconds before analyzing the heart rhythm (analyze early) or to perform CPR for 3 minutes and then analyze the rhythm (analyze late) before a defibrillatory shock is delivered. This trial will help to determine if defibrillation first or CPR first improves outcomes. (2) Separately, patients will also be randomized to the use of an impedance threshold device (ITD) while compressions are being performed during a CPR event. The ITD is a one-way valve that fits between the airbag used to introduce air into a person's lungs and the flexible plastic tube that goes through the nose or mouth and into the lungs to help with breathing. The valve can also be used with a facemask that goes over the patient's nose/mouth. During CPR, the one-way valve creates a small vacuum inside the patient's chest, which increases the return flow of blood to the heart. Both studies compare treatment options and new therapies so EMS providers can determine which treatments will most likely benefit the public.

Life Science Discovery Fund (LSDF) Grant Award

Public Health - Seattle & King County and the EMS Division were awarded a 4-year program grant from the State of Washington LSDF Authority. The "Program to Integrate Technology and Cardiac Arrest Resuscitation" will implement several research projects aimed at advancing our understanding of resuscitation science and technologies that may increase survival and improve outcomes from out-of-hospital sudden cardiac arrest (SCA). These projects will encompass aspects of the links in the chain of cardiac arrest survival: (1) increasing early defibrillation through

dispatch innovation and improving communication with limited-English-proficiency 9-1-1 callers; (2) optimizing delivery of cardiopulmonary resuscitation (CPR) by improving performance and minimizing interruptions in CPR; (3) identifying high-risk sites for sudden cardiac arrest and encouraging participation in public access to defibrillation among the lay public and police; (4) maximizing defibrillation through ventricular fibrillation wave form analysis and characterization; (5) evaluating the effectiveness of advanced procedures performed in the field; (6) enhancing training and continuing education of EMS providers to sustain readiness and identify areas for improvement in SCA care.

Mentorship

The CEEMS investigators continue to provide direction and experience through mentoring UW medical and graduate students, medical fellows, junior faculty, and King County paramedics. More than a dozen medical students have participated over the past 4 years resulting in a number of peer-review publications and a wealth of analyzable data.

Summary

The collective work of the CEEMS investigators has shaped resuscitation science and pre-hospital emergency care through thoughtful research. As CEEMS moves forward, there is substantial opportunity to make important new discoveries in resuscitation science as well as improve translation of scientific understanding to achieve better field-based, clinical care.

E. Conclusion

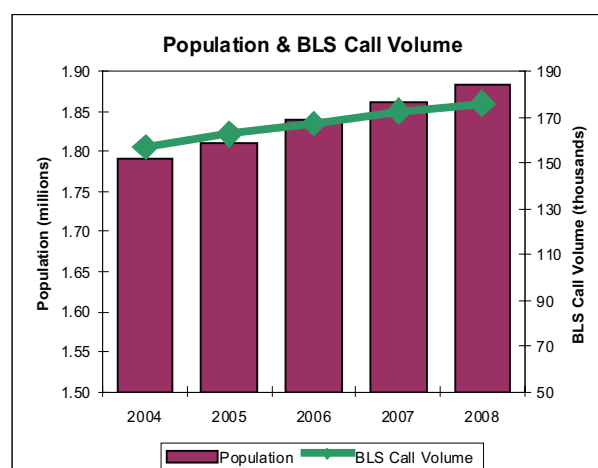
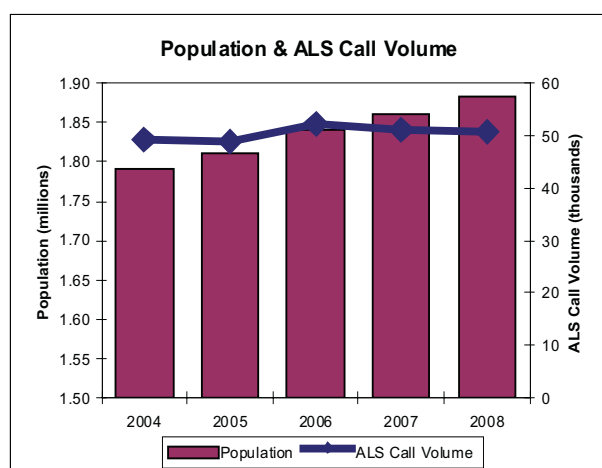
The EMS Division is committed to providing the highest level of pre-hospital care to the residents of King County. EMS programs are developed and maintained through strong partnerships with other EMS agencies in the region and innovative leadership in the emergency medical field in accordance with the direction outlined in the *Medic One/EMS 2008-2013 Strategic Plan*. Examples of this effort are varied and range from new and innovation approaches to reducing the rate of increased calls to 9-1-1 to the many investigations conducted by the new Regional Medical Quality Improvement Section and the commitment to incorporation of data analysis in policy and decision-making. The EMS Division is proud to encourage and support these types of contributions to the EMS system.

Summary of 2008 EMS Statistics (Seattle and King County)*

The following statistics are derived from the local EMS agency Medical Incident Report Forms (MIRFs) and submitted to the EMS Division for the year 2008.

Population	Seattle-King County	% Growth (Annualized)
1980	1,269,898	
1990	1,507,305	1.87%
2000	1,737,034	1.52%
2008	1,884,200	1.06%

Population growth is often correlated with growth in EMS call volumes. In the 1980s and 1990s, the population in King County has grown well above an average rate of 1% per year. Since 2000, however, the annualized rate of increase to just 1.06%. The two graphs below depict the population growth relative to both BLS and ALS call volume patterns. Over the past five years, the growth in ALS call volumes has remained relatively stable while the BLS rate of growth continues to increase. Please note that the scales for population and call volumes are different.



Operations:

ALS

Number of Responses:	50,796	
	Total	Unit
Average Response Times (min):	11.4	7.7
8 Minutes or less	45.7%	70.6%
10 Minutes or less	61.1%	83.9%
12 Minutes or less	71.5%	91.4%
14 Minutes or less	78.6%	95.0%
Cancelled Enroute Calls	9,015 (17.8%)	

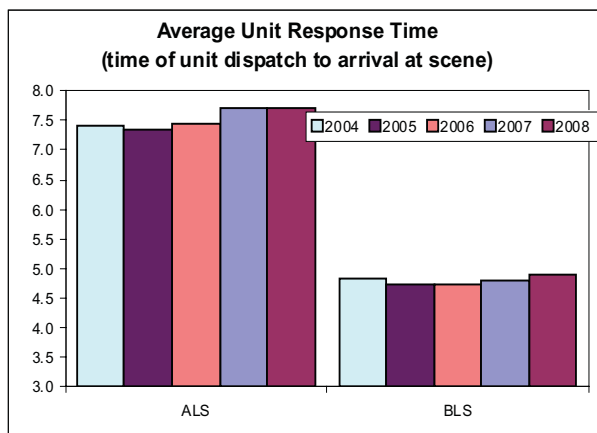
BLS

Number of Responses:	176,006	
	Total	Unit
Average Response Times (min):	5.9	4.9
6 Minutes or less	77.4%	85.6%
Cancelled Enroute Calls	3,907 (2.2%)	

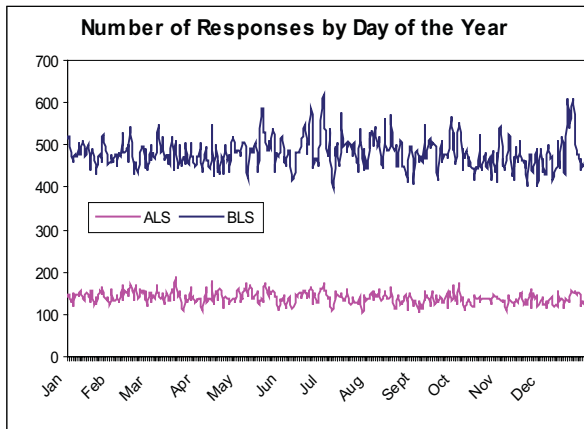
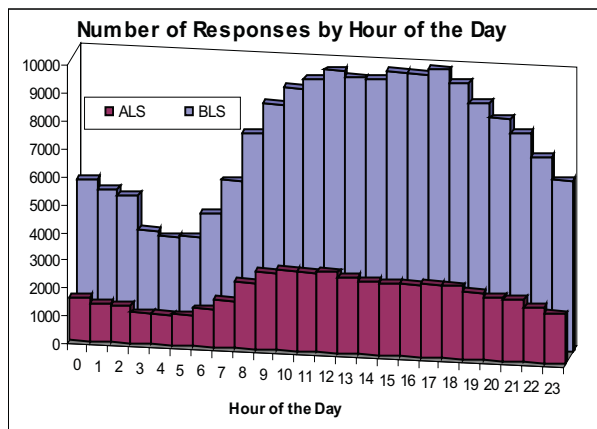
Dispatch

Telephone Referral Calls 858

*The 2008 EMS data reflects changes in the inclusion/exclusion criteria for cancelled calls which may limit a comparison of data between years. Response times are defined as follows: **Total** - the time of call arrival at dispatch to the time of arrival at the scene, and **Unit** - the time of unit dispatch to time of arrival at the scene. In some instances, totals differ due to missing values.



Although the growth in population and BLS call volumes has steadily increased over time, average BLS unit response times have remained stable as reflected in the graph to the left. Average ALS response times remained stable as expected. The two graphs located directly below reflect the patterns of ALS and BLS response during the day and throughout the year. Much greater variation occurs in BLS responses per day over time (~370-575 calls) when compared to ALS responses (~110-190 calls). Note the increased call volumes during the winter snowstorm in December 2008.

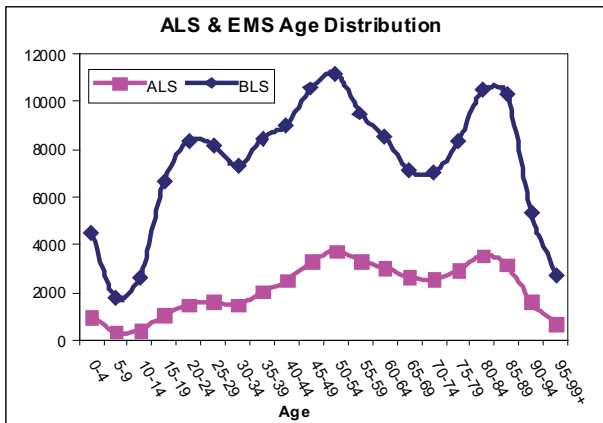


Characteristics of Responses:

The following information reflects data that characterizes the types of both BLS and ALS calls, including a comparison of age groups, types of medical complaints, where incidents take place, and patient transport information. As indicated in graphs below, paramedics providing advanced life support are more likely to attend to older patients for cardiac conditions, while EMTs often tend to trauma in young adults. An aging population will likely affect ALS call volumes and is a trend the EMS Division has been monitoring.

Responses by Age Group:

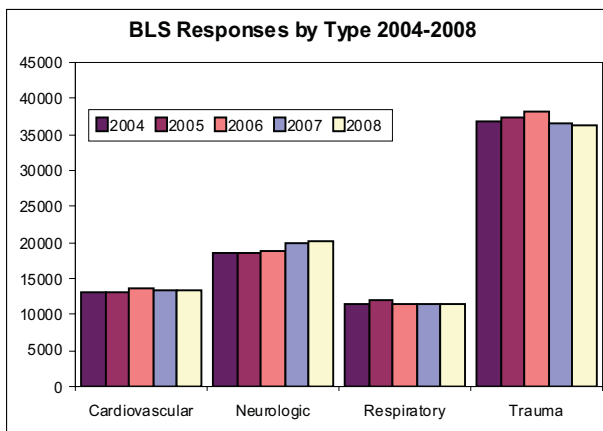
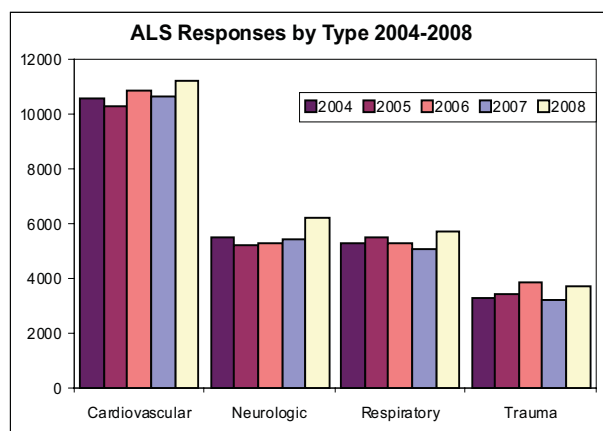
	ALS	BLS
0-4 yrs	972 (2.3%)	4,456 (3.0%)
5-9 yrs	349 (0.8%)	1,779 (1.2%)
10-17 yrs	943 (2.2%)	6,028 (4.1%)
18-24 yrs	1,994 (4.7%)	11,618 (7.9%)
25-44 yrs	7,645 (18.0%)	32,968 (22.3%)
45-64 yrs	13,414 (31.6%)	39,780 (26.9%)
65-84 yrs	11,729 (27.6%)	32,943 (22.3%)
85+ yrs	5,475 (12.9%)	18,399 (12.4%)
Total	42,521	147,971



Responses by Medical Type:

Although ALS and BLS personnel each respond more frequently to different types of calls (i.e. cardiac calls for ALS and trauma for BLS), the EMS community serves a wide variety of medical emergencies as evidenced in the table below. This requires not only an in-depth knowledge of specific invasive medical procedures for paramedics but also requires a considerable breadth of knowledge and skills for EMTs.

	ALS	BLS
Cardiovascular	11,195 (26.5%)	13,347 (9.7%)
Neurologic	6,209 (14.7%)	20,237 (14.7%)
Respiratory	5,737 (13.6%)	11,542 (8.4%)
Trauma	5,737 (13.6%)	36,403 (26.4%)
Abdominal/Genito-Urinary	2,500 (5.9%)	11,311 (8.2%)
Metabolic/Endocrine	2,050 (4.9%)	3,986 (2.9%)
Alcohol/Drug	1,693 (4.0%)	6,471 (4.7%)
Psychiatric	1,477 (3.5%)	7,335 (5.3%)
Obstetric/Gynecological	487 (1.2%)	1,387 (1.0%)
Anaphylaxis/Allergy	472 (1.1%)	1,341 (1.0%)
All Other Illnesses	6,665 (15.8%)	24,340 (17.7%)
Total Medical	42,224	137,700



Similar to the variation reflected in the types of responses EMS agencies provide, EMS personnel also respond to a variety of physical settings, again requiring a versatility of skills. For example, providers may need to interact with other medical professionals or deliver patient care on a busy street or highway. EMS personnel also respond to public settings where they deal not only with the patient but need to cooperate and collaborate with other public safety personnel such as police officers or nursing home staff.

Incident Locations:

	ALS	BLS
Home/Residence	25,610 (56.5%)	79,209 (52.4%)
Nursing Home/Adult Family Home	4,007 (8.8%)	11,154 (7.4%)
Clinic/MD Office	2,210 (4.9%)	3,669 (2.4%)
Other/Unknown Location	13,528 (29.8%)	57,117 (37.8%)
Total	45,355	151,149

Public Health Highlight: Survey of CPR Training in King County*

Background: In selecting the findings from the CPR Training Survey as a topic for the Public Health Highlight this year, the EMS Division would like to acknowledge the tremendous work being done in the region to improve cardiac arrest survival in the community. As indicated in the cardiac arrest survival statistics for 2008 (see page 70), survival from cardiac arrest in the subset of people most likely to be revived (witnessed, VF rhythm, etc) has reached almost 50%; unthinkable only a few years ago.

One of the many critical factors in survival as discussed in the CPR Highlight: The CHRONOS Study (see page 68) is the provision of bystander CPR. This simple action can offer life-saving care until help arrives. Providing CPR training in the community has been an important educational component of cardiac arrest care in King County for over 30 years. However, only one survey has been conducted (in Seattle) to evaluate how pervasive CPR training really is in the local population.

Objective: The EMS Division developed a survey to determine the percentage of people in King County who stated that they knew how to perform CPR, had received CPR training, and their reasons for choosing to be trained. Secondary objectives were to determine characteristics of individuals who have been trained in order to target training efforts toward groups who had not attended training in the past. The survey was administered in September 2008 and the following is a summary of the findings.

Findings: Of the 1,001 people who responded to the survey, 71.5% reported that they knew how to perform CPR and 79.3% reported ever having attended a CPR training class. A majority of people (52.9%) who reported having been trained in CPR attended five or more years ago, while 17.4% attended a class within the past year.

Nearly half of the people surveyed had attended one or two classes in their lifetime with 12.6% reporting having attended 10 or more classes. Over half of the respondents were trained because it was required and another quarter did because it was available to them at work or in their neighborhood.

Conclusion: The rate of CPR training found in the survey indicates that King County has had success in the percentage of people attending CPR training classes. However, there is room for improvement as only 58% of all cardiac arrests have bystander CPR as reflected in the CPR data.

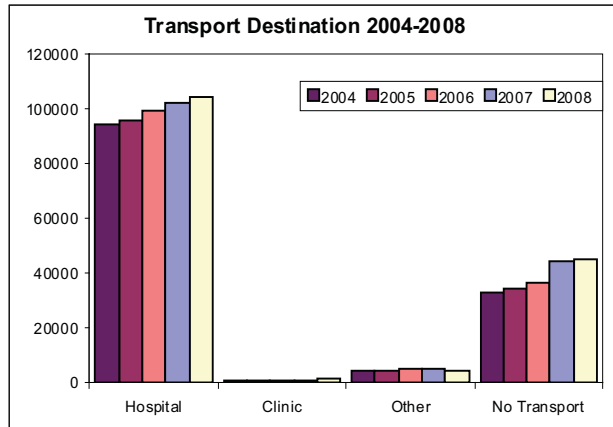
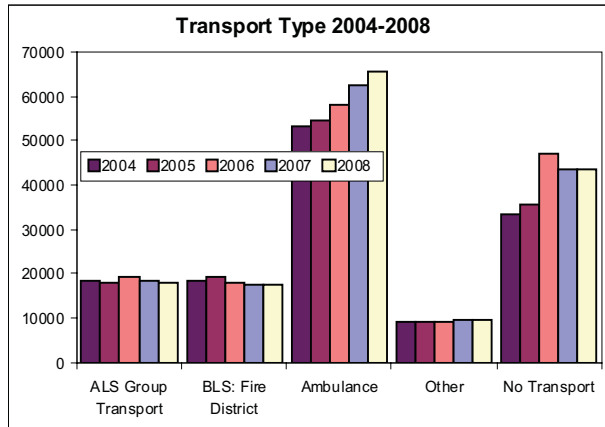
*Survey results are currently being submitted for publication by the primary author, Kristen Sipsma.

Table 1. Summary of Survey Responses

	N = 1,001	%
Do you know how to perform CPR?		
Yes	716	71.5
No	266	26.6
Don't Know	19	1.9
Refused	0	0
Have you ever attended a CPR training class?		
Yes	794	79.3
No	206	20.6
Don't Know	1	0.1
Refused	0	0
When was the most recent time you attended a CPR training class?		
< 1 yr	138	17.4
1-5 yrs	231	29.1
5+ yrs	420	52.9
Don't Know	5	0.6
Refused	0	0
Not Asked	207	NA

Transport Type and Destination:

An important component of providing EMS care is appropriate triage. EMS personnel use their skills and knowledge to match the clinical need of the patient with the most appropriate transport and destination plan. The figures below reflect the transport trends for BLS over the past five years. As indicated below, 29% of all BLS patients are not transported from the scene. This is one area of analysis in the assessment of whether EMS was used appropriately, and if the Better Management of Non-emergency Calls to 9-1-1 (see page 50), taxi vouchers, or other type of service could help reduce demand for EMS.



Transport Type:

ALS Transport	17,858 (11.6%)
ALS Air	138 (0.1%)
BLS - Fire District	17,497 (11.3%)
BLS - Ambulance	65,456 (42.4%)
Other	9,874 (6.4%)
No Transport	43,592 (28.2%)
Total	154,415

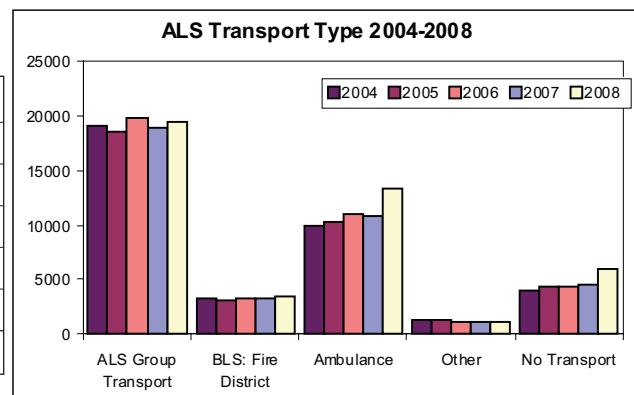
Transport Destination:

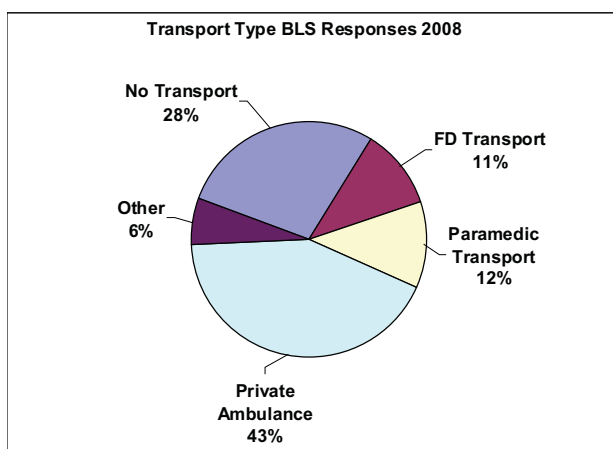
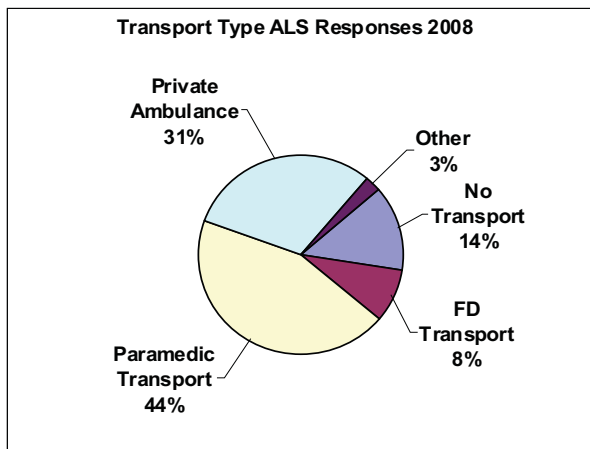
Hospital	104,150 (67.4%)
Clinic	1,362 (0.9%)
Other	4,211 (2.7%)
No Transport	44,749 (29.0%)
Total	154,472

ALS transport trends are also assessed for potential system improvements. As indicated below, over 44% of all patients are transported from the scene by ALS. However, over 6,000 patients are left at the scene with no transport. Again, this provides an opportunity to analyze whether EMS was used appropriately and if other programs could help reduce demand for services.

ALS Transport Type:

ALS Transport	19,278 (44.2%)
ALS Air	149 (0.3%)
BLS - Fire District	3,584 (8.2%)
BLS - Ambulance	13,393 (30.7%)
Other	1,142 (2.6%)
No Transport	6,067 (13.9%)
Total	43,613





CPR Highlight: *Who Survives a Cardiac Arrest? The 2008 CHRONOS Study*

Introduction: In theory, every person who has a witnessed cardiac arrest with a rhythm of ventricular fibrillation (VF) could survive the arrest. In King County, almost half the people who with witnessed cardiac arrest in VF is very high at 49%. But shouldn't it be higher? While 100% survival may be unattainable, we wanted to discover the reason(s) for every unsuccessful resuscitation and to learn if there are patient, event, or system factors which could be changed to improve survival.

Purpose: The CHRONOS Project was undertaken to examine in minute detail each cardiac arrest case in 2008 with witnessed ventricular fibrillation (VF) as rhythm causing collapse, and find which factors were associated with increased survival.

Case Eligibility: In King County, excluding the city of Seattle, a case was defined as a cardiac arrest of cardiac etiology with ventricular fibrillation as rhythm causing collapse with witnessed collapse prior to EMS arrival.

Data Collection: Information was derived from the Cardiac Arrest Surveillance database, dispatch tape review, and defibrillator transmission review. In addition, we attempted to conduct a telephone interview with each patient or relative. New information collected was in these categories:

- Expanded examination of time intervals for both ALS and BLS: Response times from: 1) call receipt to dispatch, 2) dispatch to vehicle enroute, 3) dispatch to arrival.
- Patient history and co-morbidity: Cardiac history and any significant medical history.
- Quality of CPR and amplitude of VF: Density of chest compressions and the amplitude or size of VF.
- Verification of bystander CPR: Dispatch tapes furnished verification that bystander CPR was actually being performed.

Results: Of the 138 cases in VF with arrest before EMS arrival, 67 (49%) survived to hospital discharge and 71 died. We assigned one or more 'causes of death' for the non-survivors (see Table 1). Three investigators reviewed all available information to assign cause(s) of death. All assigned causes were by consensus using a combination of explicit and implicit criteria. The causes were in three categories: patient, event, and system factors. Patient factors were assigned 45 times, event factors were assigned 43 times and system factors were assigned 24 times. A cardiac arrest could have more than one factor causing death. The most common patient factor was age over 80 years; the most common event

Continued on next page...

factor was lack of bystander CPR and the most frequent system factor was lack of or delay in dispatcher-assisted telephone CPR.

Table 1: Factors Contributing to Unsuccessful Resuscitation

Patient factors	
Age 80 +	14%
Compelling comorbidity	11%
Denial or symptom recognition	5%
Expected death or DNR	3%
Difficulty gaining access to patient	6%
Morbid obesity	6%
Event factors	
Lack of bystander CPR	27%
Compromised bystander CPR	10%
Delay in reaching 9-1-1	4%
Delay due to language barrier	1%
System factors	
Lack of or delay in Telephone CPR	9%
Delay in defibrillation	5%
Long BLS rollout time	1%
Long ALS rollout time	0%
Long BLS time to arrival	7%
Long ALS time to arrival	2%

Density of CPR had no association with survival, but amplitude of VF and number of shocks did. Survivors had an amplitude of six whereas non-survivors had an amplitude of five. Survivors had an average of four shocks and non-survivors an average of five. There were no differences between survivors and non-survivors in all the time intervals collected, with one exception: time from patient collapse to initiation of CPR. Non-survivors had a mean time to start of CPR of five minutes and survivors had a mean time to start of CPR of three minutes. The following is a summary of mean time intervals for BLS and ALS vehicles:

Call receipt to BLS dispatch	34 seconds
BLS dispatch to enroute	1 minute 20 seconds
Call receipt to BLS arrival	4 minutes 40 seconds
Call receipt to ALS dispatch	2 minutes 8 seconds
ALS dispatch to enroute	1 minute 23 seconds
Call receipt to ALS arrival	9 minutes 45 seconds

Conclusion: Reasons for unsuccessful resuscitation may be attributed to patient, event and system factors. Patient factors beyond the control of EMS account for many of the deaths of a potentially saveable group of cardiac arrest patients. Among event and system factors contributing to unsuccessful resuscitation, the lack of bystander CPR or delay in CPR are prominent. Perhaps the greatest enhancement in survival would arise from the promotion of universal bystander CPR.

Cardiac Arrest Statistics: Seattle and King County have evaluated cardiac arrest statistics for over 30 years and the following is from their combined registries. A cardiac arrest is defined as a pulseless, breathless state for which CPR is required. The data are for cardiac arrests due to all causes except trauma, and paramedic-treated patients over the age of two. Survival is defined as discharged from the hospital alive.

All Cardiac Arrests:

	<u>Year</u>				
	2004	2005	2006*	2007	2008
Total number of cardiac arrests (all causes, resuscitation attempted)	1,087	1,124	993	1,035	1,046

*modification in case definition initiated

For **2008**, the following table depicts cardiac arrests broken down by arrest before and after EMS arrival, rhythm on arrival, and survival for each category:

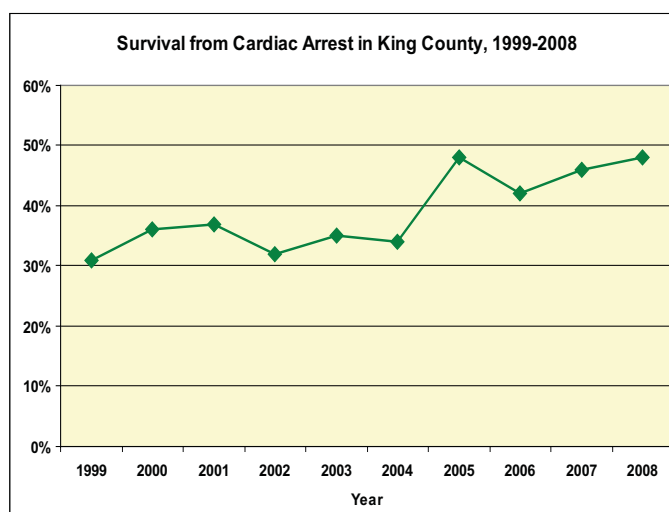
Total cases treated:		1046	
		# Survival	% Survival
Arrest before arrival	920	160	17%
Ventricular fibrillation/tachycardia (VF/VT)	286	112	39%
Asystole	354	8	2%
PEA	277	39	14%
Unknown	4	1	25%
Arrest after arrival	126	39	31%
VF/VT	37	23	62%
Asystole	12	2	16%
PEA	78	14	18%
Unknown	0	0	

Ventricular Fibrillation (VF): Survival is highest among patients with a rhythm of VF/VT and is commonly reported on a subset of VF/VT patients whose arrests are witnessed, before EMS arrival, and due to underlying heart disease. Survival is defined as discharge from the hospital alive. The following is a one-year and a five-year summary:

Year	Rate
2008	102/208 (49%)
2003-2007	429/977 (44%)

CPR initiated by Bystanders (includes all cases of CPR):

Year	Rate
2003	500/993 (50%)
2004	501/952 (53%)
2005	568/1007 (56%)
2006	496/875 (57%)
2007	502/898 (56%)
2008	530/920 (58%)



Part III: EMS Funding and 2009 Financial Plan

This section of the Annual Report focuses on 2008 financial information and 2009 projections and provides information on the current levy period. Components include the following:

- A. EMS Levy Structure
- B. Current EMS Revenues
- C. Current EMS Expenditures
- D. EMS Contingencies, Reserves and Required Fund Balance
- E. EMS Grants
- F. 2008-2013 Financial Plan and Trends
- G. Recommendations for Fund Balance and Levy Rate

Please note that under terms of an inter-local agreement between King County and the City of Seattle, EMS levy funds collected within Seattle go directly to the City. These discussions focus on the EMS fund within the remainder of King County (referred to as the KC EMS Fund), excluding the City of Seattle.

A. EMS Levy Structure

The EMS levy is a regular property tax levy subject to the limitations contained in Chapter 84.55.010 RCW. The levy funds are restricted by RCW and can only be spent on EMS-related activities. In November 2007, King County voters approved an EMS levy by 83% to provide funding for 2008-2013. The levy growth is limited to a 1% increase for existing properties, plus assessment on new construction, and is capped at 30 cents per \$1,000/Assessed Valuation (AV).

EMS Levy funds are collected throughout King County and managed by the EMS Division for the region based on RCW 84.52.069 Emergency Medical Care and Service levies and policy guidelines of the *2008-2013 Medic One/Emergency Medical Services Strategic Plan*. Funds generated within the City of Seattle are managed separately by the city.

KC EMS funds are spent in four main areas: Advanced Life Support (ALS), Basic Life Support (BLS), Regional Support Services (including training, regional medical direction, medical quality improvement, data collection and community programs), and Strategic Initiatives. ALS services, outside of the City of Seattle, are provided by six agencies, BLS services are provided by thirty fire agencies, and Regional Support Services and Strategic Initiatives are provided by the EMS Division. The 2008-2013 levy added funding for an annual audit by the KC Council Auditor's Office, contingencies and reserves.

Revenues: Developed in 2006 and 2007, the EMS Financial Plan assumed modest growth in property values, and a one-percent limit on revenues from existing properties. The plan assumed a stable division of levy revenues between the KCEMS Fund and the City of Seattle.

Expenditures: Based on the experience that expenditures actually rose at a rate higher than CPI,

the 2008-2013 plan is based on increasing expenditure costs related to the ALS by a compound inflator that reflects the differing inflationary trends of major expense components (such as salaries, benefits, contracts, vehicle costs, etc.). The plan inflates BLS and Strategic Initiatives at the rate of the local CPI. Regional Support Services are inflated by CPI + 1% to cover expenses raising at a rate higher than CPI. The plan anticipates adding new a total of 3.0 Medic Units between 2008-2013 (1.0 in the City of Seattle and 2.0 supported by the KC EMS Fund).

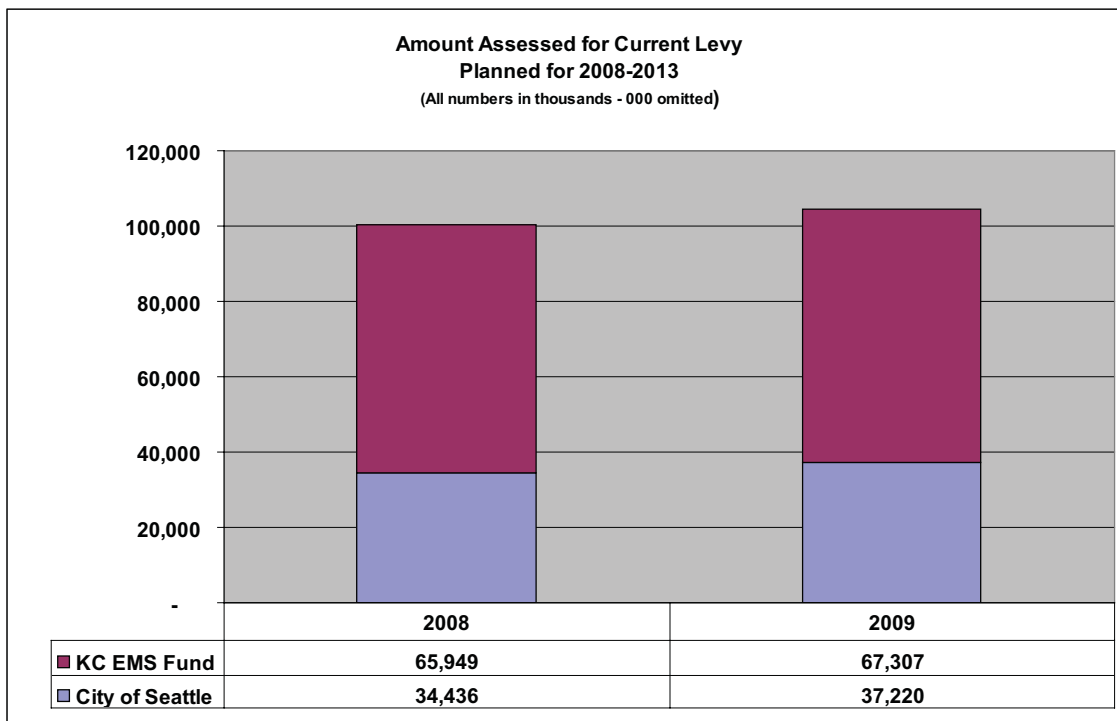
Fund Balance: The previous levy period included a required End Fund Balance (EFB) of 1/12 yearly expenditures. This was changed for the 2008-2013 levy to be more consistent with other King County funds at a minimum of 6% of revenues.

Based on these assumptions expenditures increase at a rate higher than revenues. This results in a levy structured to collect funds in the early years of the levy to cover expenses in the later years of the levy (when expenditures are higher than revenues).

Contingencies and Reserves: The 2008-2013 levy added contingencies related to ALS Wages and Disaster Relief. The levy also added reserves to cover unanticipated inflation, vehicle costs/chassis obsolescence, risk abatement, and potential millage reduction.

B. EMS Revenues

The division of revenues between the City of Seattle and King County EMS Fund remains similar to previous years. The 2008-2103 financial plan assumed a split of revenues (based on the proportional distribution of assessed valuation – AV) of 35.6% City of Seattle, and 64.4% King County EMS Fund.



In addition to real and personal property taxes, other revenues include miscellaneous taxes, interest earnings, and fees for reimbursable services, and in 2008 a contribution of \$375,000 of Current Expense funds from King County. The annual Current Expense fund contribution of \$375,000 was eliminated from the 2009 and 2010 budgets.

EMS Revenue (KC EMS Fund)

Revenue Source	2008	2009
Property Taxes	98.2%	98.8%
Charges for Services	0.3%	0.3%
Interest and Other Miscellaneous	0.9%	0.9%
King County Current Expense	0.6%	0.0%
Total	100.0%	100.0%

With the new levy in place, the 2008 Financial Plan included a significant increase in property taxes. Other income, particularly from revenue sources that can vary significantly were forecast conservatively. The following table shows 2008 actual revenues and forecast revenues for 2009:

Revenue Source	2008 Actuals	2009 Financial Plan	Increase	% Increase
Property Taxes	\$64,735,969	\$67,307,404	\$2,571,435	4%
Grants*	\$29,526	-	(\$29,526)	-100%
Charges for Services	\$196,351	\$202,208	\$5,857	3%
Interest/Misc Income	\$612,804	\$596,855	(\$15,949)	-3%
KC General Fund	\$375,000	-	(\$375,000)	-100%
TOTAL	\$65,949,651	\$68,106,467	\$2,156,816	3%

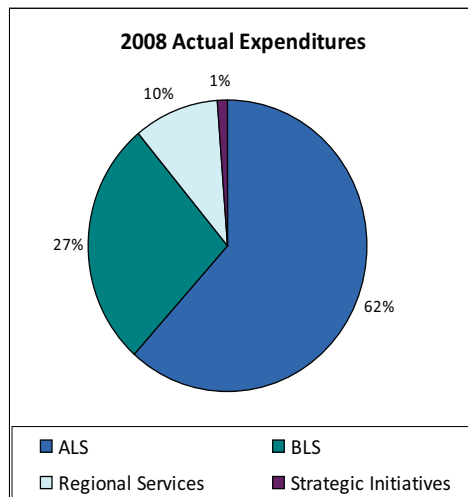
*Note: the majority of these funds were FEMA reimbursements.

C. EMS Expenditures

EMS revenues support four major EMS activities related to direct service delivery or support programs. These programs are:

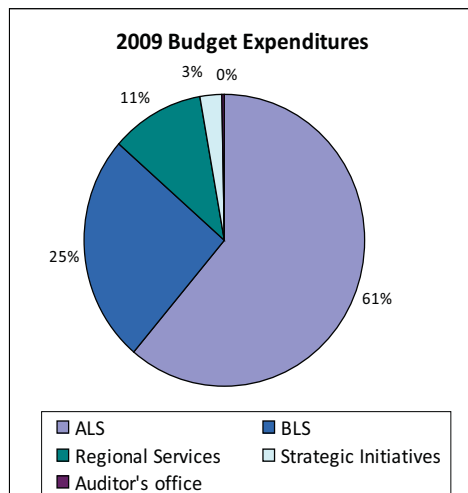
- Advanced Life Support (ALS) Services
- Basic Life Support (BLS) Services
- Regional Services Programs
- Strategic Initiatives

The main focus of the Medic One/EMS Strategic Plan continues to be ALS with over 60% of funds expended to support these services. Funding for BLS was increased in the 2008-2103 levy.



Sub-Area	2008 Actual Expenditures
ALS	\$32,585,628
BLS	\$14,256,340
Regional Services	\$5,294,071
Strategic Initiatives	\$591,206
Total	\$52,727,245

**Contingencies and Reserves not included (only planned expenditures)*



Sub-Area	2009 Budget Expenditures
ALS	\$36,504,807
BLS	\$15,147,747
Regional Services	\$6,509,211
Strategic Initiatives	\$1,535,099
Auditor's Office	\$125,759
Total	\$59,822,623

**Contingencies and Reserves not included (only planned expenditures)*

Advanced Life Support (ALS) Services

Since the first EMS levy in 1979, regional paramedic services have been the focus of the EMS levy. The EMS Division manages South King County Medic One services directly to South King County and manages contracts that provide funds directly to five paramedic provider agencies in King County: Bellevue Fire Department (Bellevue Medic One), Redmond Fire Department (Redmond Medic One), Shoreline Fire Department (Shoreline Medic One), and Vashon Island Fire & Rescue. In addition, funds are provided to Snohomish County FD 26 (SCFD 26) to provide ALS services in the Skykomish/KCFD 50 area from Baring to Stevens Pass.

The EMS levy provides funding for ALS services using a standard unit cost methodology determined by staffing paramedic units with two Harborview-trained paramedics 24-hours a day, 365 days a year. These expenditures include personnel, medical equipment and supplies, support costs for dispatch, paramedic supervision, medical direction, continuing medical education, and other ALS-related expenses. Services for the Skykomish/KCFD #50 area are provided outside of the unit cost allocation.

The ALS unit allocation includes a compound inflator to more accurately reflect the increases experienced by ALS agencies and an equipment/capital allocation. The compound inflation model for the operating allocation inflates different categories by selected economic indices. Categories include wages, medical benefits, retirement, pharmaceutical and medical supplies, vehicle costs and other costs. Each category is associated with a specific economic index.

The equipment/capital allocation includes funding for vehicles and other equipment expenses for items with multi-year life expectancies. Equipment in this allocation includes vehicles, defibrillators, mobile data computers, stretchers, radios and other needed equipment. Each agency is responsible for developing a equipment asset plan and setting up internal reserves funded by this allocation. Agencies are required to keep records of the deposits and expenditures into these accounts. Any unused funds from equipment/capital allocation, or from equipment sale, must be reported and returned to the KC EMS Fund. Since the new equipment/capital allocation replaced the previous vehicle replacement program, transitional funding was included for medic units planned for purchase in 2008 and 2009.

In 2008, after a thorough regional review process, the existing 12-hour medic unit in Shoreline was expanded to a 24-hour unit. No new or expanded units were planned for 2009. Although funding for a 0.5 medic unit was included in the financial plan as a placeholder in 2010, the recommendation following an extensive regional review process delayed implementation until 2011 (see EMS System Review for more details). The following chart shows total ALS units through 2009:

2008-2009 Paramedic Units by Agency¹

	Full Units (2 paramedic / 24-hour)	Half Units (12-hour)	Total Funding Units
Bellevue	4		4.0
King County	7	1	7.5
Redmond	3		3.0
Shoreline	3		3.0
Vashon ²	1		1.0
Total			18.5

¹Chart does not show funding for Fire District #50/Skykomish

²Vashon funding increased to 1.0 in 2009 based on recommendation of EMS Advisory Committee

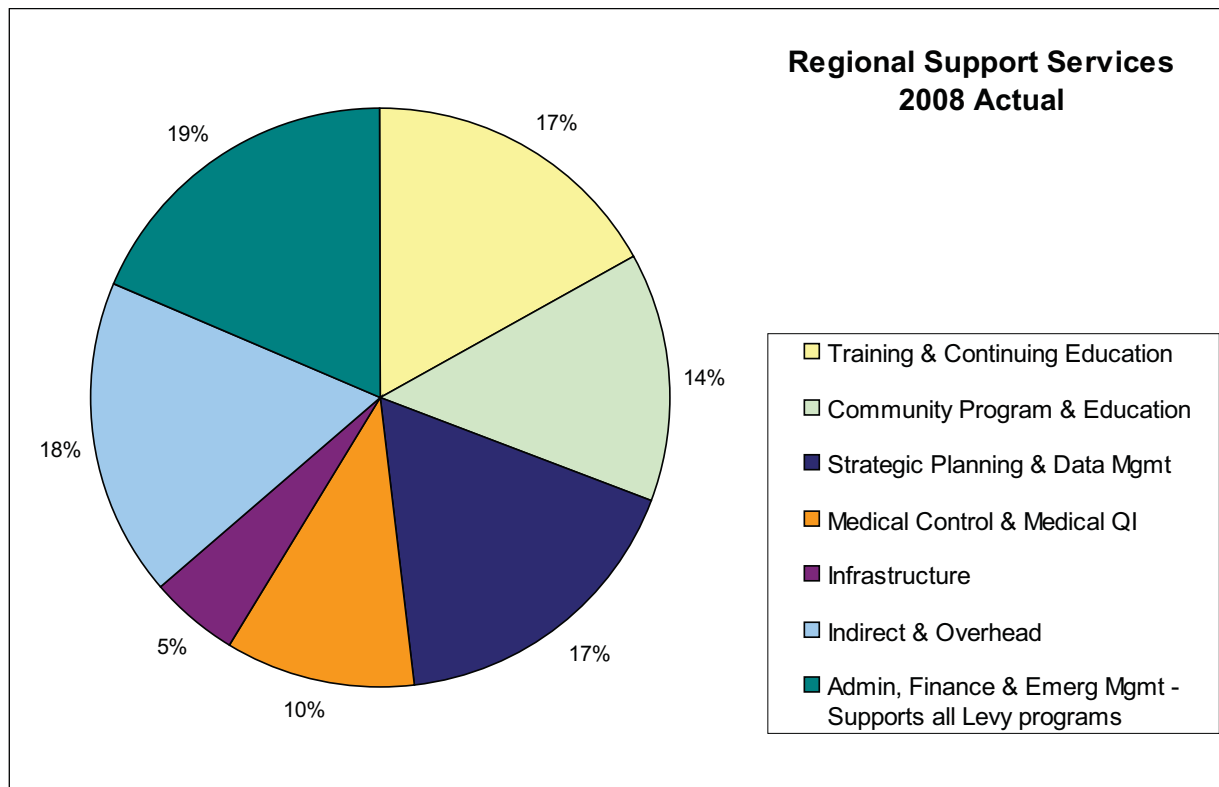
Basic Life Support (BLS) Services

The levy provides partial funding to BLS agencies to help ensure uniform and standardized patient care and enhance BLS services. Basic Life Support services are provided, outside the City of Seattle, by thirty local fire departments and fire districts. The 2009 BLS allocation is \$15.1 million, an increase of \$700,000 from the 2008 allocation. The BLS formula distributes the year's increased funding across all BLS agencies, 50% based on assessed valuations in the jurisdiction and 50% on call volume.

Regional Services

The primary purpose for regional EMS programs and services is to provide support to critical functions essential to providing the highest quality out-of-hospital emergency care available. This includes uniform training of EMTs and dispatchers, regional medical control, regional data collection and analysis, quality improvement activities, and financial and administrative management (including management of ALS and BLS contracts). Regional coordination of these various activities is important in supporting a standard delivery of pre-hospital patient care, developing regional policies and practices that reflect the diversity of needs, and maintaining the balance of local area service delivery with centralized interests.

The Regional Support Services uses a compound inflator model similar to ALS. In 2008, the Regional Support Services actual expenditure was \$5.3 million.



Strategic Initiatives

The term ‘strategic initiative’ is used to describe a handful of new and innovative programs that are thought to have significant impact on the success of the strategic plan. Strategic initiatives are funded with lifetime budgets. The budgeted amount by year is adjusted to reflect changing cash flows based on project needs. The following table shows the Strategic Initiatives selected for the 2008-2013 levy period:

	2008 Actual	2009 Estimate
Dispatch Enhancements:		
Complete CAD Integration*	\$61,361	\$166,770
Dispatch Center Performance Standards	\$406	\$300,163
Advanced EMD Training	-	\$12,623
Better Management of Non-emergency Calls to 9-1-1	\$258,446	\$269,188
Injury Prevention	\$163,061	\$234,886
Public Access Defibrillation	\$76	\$64,479
Interactive Enhancements to CBT Online	\$99,706	\$125,650
Systemwide Enhanced Network Design (SEND)	\$184,227	\$157,724
All Hazards Management Preparation	-	\$12,180
EMS Efficiencies & Evaluation Studies	-	\$170,517
Strategic Planning for Next EMS Levy Period	-	-
TOTAL	\$591,206	\$1,533,301

*Includes funding from Program Balances

D. EMS Contingencies, Reserves and Required Fund Balance

Programmed contingency funds were added into the 2008-2013 levy plan to address unanticipated expenses, including funds should inflation exceeded planned levels. The contingency funds, to be appropriated each year, include an ALS Salary and Wage Contingency and a Disaster Response.

Contingency

ALS Salary and Wage Contingency: The ALS Salary and Wage Contingency is set to equal a one percent increase over assumed paramedic COLA levels. Use of funds is linked to the consumer price index. Any unused funds can be used to replenish other reserves for unanticipated inflation or made available for millage rate reductions.

Disaster Response Contingency: The Disaster Response Contingency is phased in between years 2008 and 2009. The funding level is set to cover the cost of full mobilization of the Medic One paramedic system for a period of three weeks. The cost estimate was based on all back-up units being staffed by paramedics (in addition to the normal staffing for all regular units). These funds may be expended only with a proclamation of emergency by the county executive. The Financial Plan assumes that these funds are not expended, and reflects a credit for unexpended funds in the following year. The plan states that ‘in the event of a disaster that depletes these funds, the County Executive, EMS Advisory Committee, and County Council will work collaboratively to rebalance the financial plan for the remainder of the levy period.’

Reserves for Unanticipated Inflation: Unanticipated inflation reserves include a reserve for Diesel Cost Stabilization, Pharmaceuticals/ Medical Equipment and Call Volume/Utilization. The diesel cost stabilization reserve was designed to fund ALS operations if the cost of diesel exceeded assumptions. Expenditures of the reserve are linked to the average price of diesel fuel as reported by the US Department of Energy. In 2008, the diesel cost stabilization reserve was tapped to cover the high cost of diesel. The pharmaceutical/medical equipment reserve was designed to mitigate unanticipated medical cost inflation.

The call volume/utilization reserve provides limited funding to address unanticipated demands on the Medic One/EMS system. The funds are intended to augment service levels or otherwise mitigate the demand for emergency medical services. Expenditure of this reserve is linked to call volumes and the same criteria used for placement of new and expanded units: unit workload, unit response time, availability in primary service area and dependence on backup, and paramedic exposure to critical skills sets.

Specific restrictions on using reserves for unanticipated inflation are included in Section 10 and 11 of the Medic One EMS levy ordinance. The ALS Salary and Wage Contingency is also considered a reserve within the restrictions of this section. The restrictions require a declaration ‘only after the relevant inflation or cost index in the preceding year is more than one percent above the level anticipated in the adopted levy financial plan or the most current forecast of the relevant inflation or cost index for the upcoming one-year budget cycle exceeds one percent or more the assumptions in the adopted levy financial plan.’ All unanticipated inflation reserve funds can also be used to replenish other reserves for unanticipated inflation.

Other Reserves: Three other reserves are specifically listed in the EMS Financial Plan. They include a chassis obsolescence reserve that designates funds to partially offset potentially higher vehicle replacement costs, a risk management reserve to ensure the continuity of smaller providers in the event of significant loss (and requires consideration by the EMS Advisory Committee), and

a millage reduction reserve related to the potential to lower property tax collections. While the primary purpose of the millage reduction reserve is to receive unexpended contingency funds for potential levy reduction, these funds are also available to replenish other reserves.

Provider/Program Balances: Provider/program balance designated reserves were recommended and approved by the King County Office of Management and Budget (OMB) early in the previous levy period. They were designated to provide programs and providers the ability to balance yearly program needs with the set (prescribed) budget and cash flow. The ALS standard unit allocation was designed to provide each agency with the same amount of funds to cover the cost of a paramedic unit. This was designed to create an even playing field across all agencies while at the same time allowing each agency to manage in the way that worked best for them.

However, even in a stable program, expenses fluctuate from year to year. This is particularly true of labor costs negotiated through a collective bargaining process. The provider/program balance designated reserves allows agencies to save funds to cover expenditures in future years. They are also used by Regional Support Services and Strategic Initiatives to manage fluctuations in programs and variable program costs. While they are available for BLS, since the fund's contribution to BLS supplements fire district funds, the need has not arisen.

Fund Balance: The EMS Financial Policies currently require the undesignated fund balance to equal the 6% of revenues. This requirement 'may be temporarily suspended by council if necessary to protect the public health, safety and welfare.' Any expenditure of undesignated fund balance requires an appropriation from the council. Since the majority of EMS revenues are property taxes that are received primarily in April/May and October/November, it is important to have fund balance to manage cash flow issues.

The following chart shows Reserves and Designations included in the EMS Levy Financial Plan:

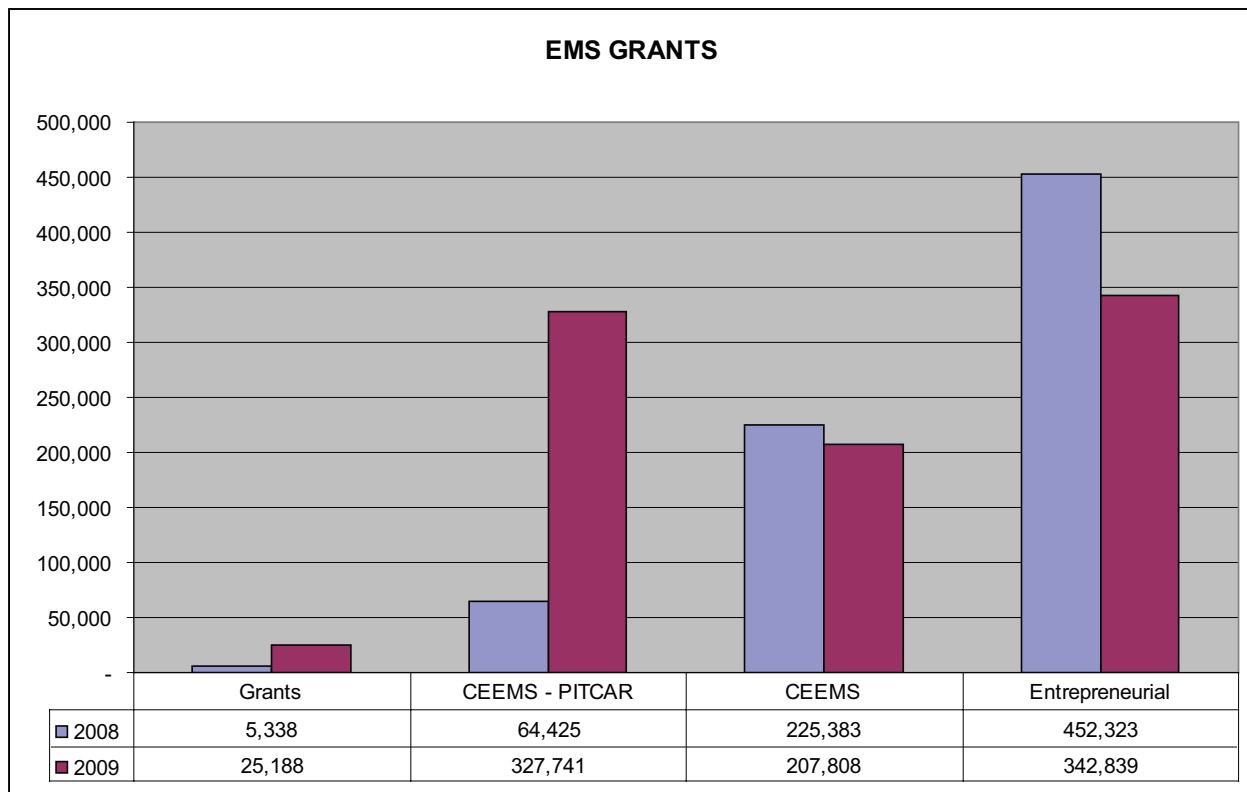
Reserves and Designations	2008 Actual	2009 Estimated
Encumbrances	\$2,138,516	\$2,138,516
Reappropriation	-	-
Designations		
Provider/Program Balances	\$1,019,732	\$1,589,417
KCM1 Equipment Replacement	\$769,910	\$769,910
Designations from 2002-2007 Levy	\$839,773	\$539,773
Reserves for Unanticipated Inflation		
Diesel Cost Stabilization	\$756,000	\$1,512,000
Pharmaceuticals/Medical Equipment	\$230,000	\$506,000
Call Volume/Utilization Reserve	\$244,000	\$488,000
Reserves		
Chassis Obsolescence	\$375,000	\$173,249
Risk Abatement	-	\$565,000
Millage Reduction	\$4,562,096	\$10,076,925
Total Reserves and Designations	\$10,935,027	\$18,358,790

E. EMS Grants

The EMS Division, through the EMS Grants group and the Center for Evaluation of Emergency Medical Services (CEEMS) located in the Public Health fund, has been very successful in competing for research grants (primarily funded by Center for Disease Control (CDC) and National Institutes of Health (NIH)). Most recently, the group was awarded a major \$2.6 million, four-year programmatic grant from the Washington State Life Sciences Discovery Fund (LSDF) for the Program to Integrate Technology and Cardiac Arrest Resuscitation (PITCAR) project.

The EMS Grants group focuses on research grants that usually do not obligate the EMS program to fund future services. The impacts of these research grants have been incorporated into the existing workload of EMS personnel or have affected interventions, protocols and standard operating procedures used in the field. The EMS Division will be evaluating any on-going continuation of activities initiated by the PITCAR grant during the planning process for the next levy period as the grant is scheduled to end just prior to the end of the current levy.

The EMS On-Line Entrepreneurial Project resulted from a union of the Criteria Based Training (CBT) and Criteria Based Dispatch (CBD) on-line training modules for King County EMTs and dispatchers with Executive Sims' Entrepreneurial Project initiative. With approval from the King County Prosecuting Attorney's Office, EMS On-line training is available to agencies outside of King County through a subscription program (for more information, see page 36). The expenses incurred in providing the service outside of King County are covered by revenue from the subscription program.

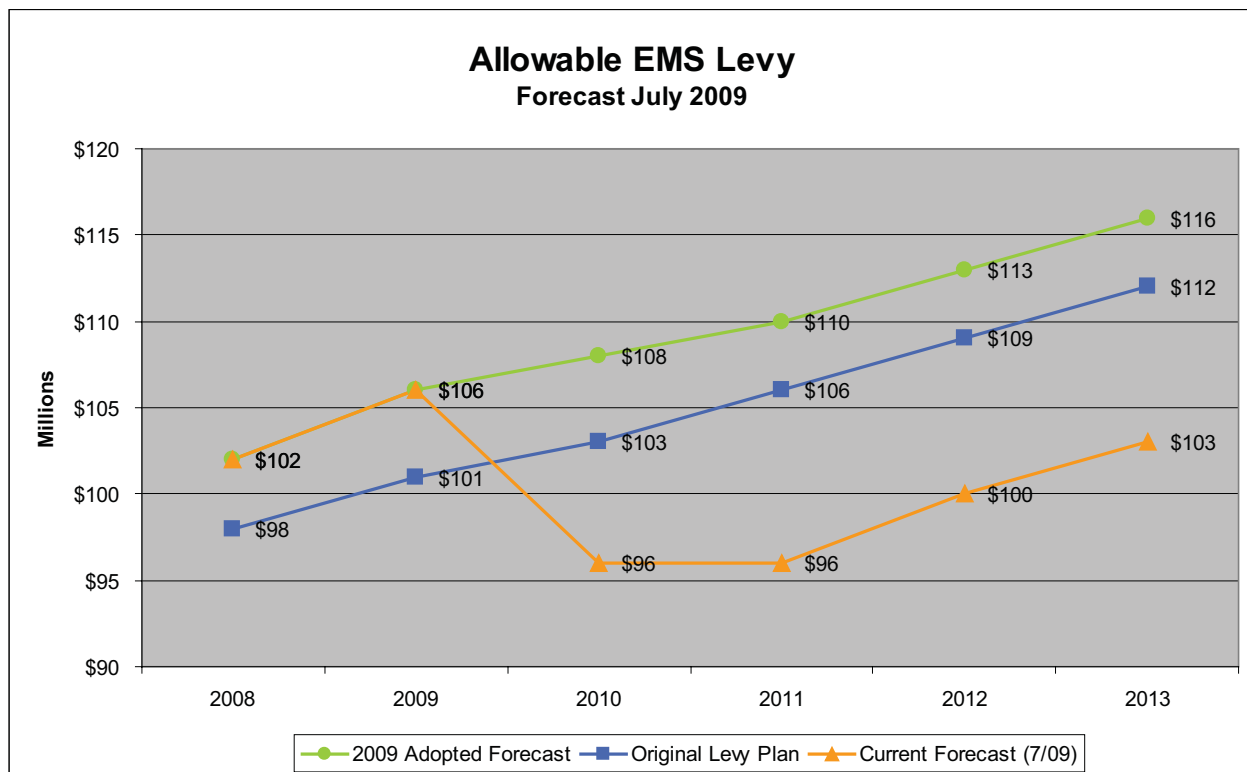


F. 2008-2013 Financial Plan Trends

Economic conditions have changed significantly since the levy was planned in 2006 and 2007. The impact of the economic downturn on the EMS levy fund is currently being reviewed and resulting financial plan numbers will not be available in time for this document.

Analysis performed in March 2009 by the King County Economist indicated that the fund could accommodate a 7% decrease in Assessed Valuations (AVs) without affecting the the financial plan. However, the current forecast by the King County Economist is for an 18% overall decrease in AV in 2010 and no growth in 2011. The King County Prosecuting Attorney's Office has indicated that the EMS levy is capped at 30 cents per \$1,000/AV. This results in a revenue forecast over the six-year levy period of \$27 million less than the original levy financial plan.

The chart below illustrates the differences between the original levy plan assumptions, assumptions from the 2009 adopted budget, and the current forecast. Please note that the current forecast is likely to be refined as updated assessed valuations are completed by the Assessor's Office.



The City of Seattle and King County EMS Fund will have different strategies to address this decrease. If the KC EMS Fund did not have reserves and contingencies, the shortfall would need to come from programmed services (ALS, BLS, RSS, SI). Fortunately the KC EMS Fund placed revenues received above the level projected in the original levy financial plan into a millage

reduction reserve with the intention that these funds could be used to lower property taxes. In addition, any unused contingencies and programmatic funds for 2008 and 2009 are also available in this reserve. The EMS Division has also proposed that levels of reserves and contingencies for unanticipated inflation will be reviewed and it is anticipated that some reserves related to unanticipated inflation can be reduced. The reserves and contingencies can accommodate the majority of the projected revenue decrease this levy period.

Current analysis concludes that while this decline in revenue will pose a challenge to the EMS fund, the fund will be able to maintain the spirit and intention of the Strategic Plan in providing essential EMS services in King County. If the proposed mitigation is accepted and approved, ALS and BLS allocations will remain fully funded based on the inflationary model outlined in Ordinance #15861 and Regional Support Services and Strategic Initiatives will remain fully funded as will the annual audit performed by King County. It is fully anticipated that the EMS fund will maintain current service levels through the life of the levy.

The reduction in forecasted property tax collections will reduce the EMS fund balance and therefore a portion of the reserves built into the EMS financial plan. There are plans to review every reserve in detail to determine their need and their appropriate level based on our experience with EMS operations over the last 30 years and the current economic climate. This may result in reducing, combining, or eliminating reserves. Levels of revenues for the remainder of the levy will be closely watched and mitigation strategies developed as new information is known in 2010.

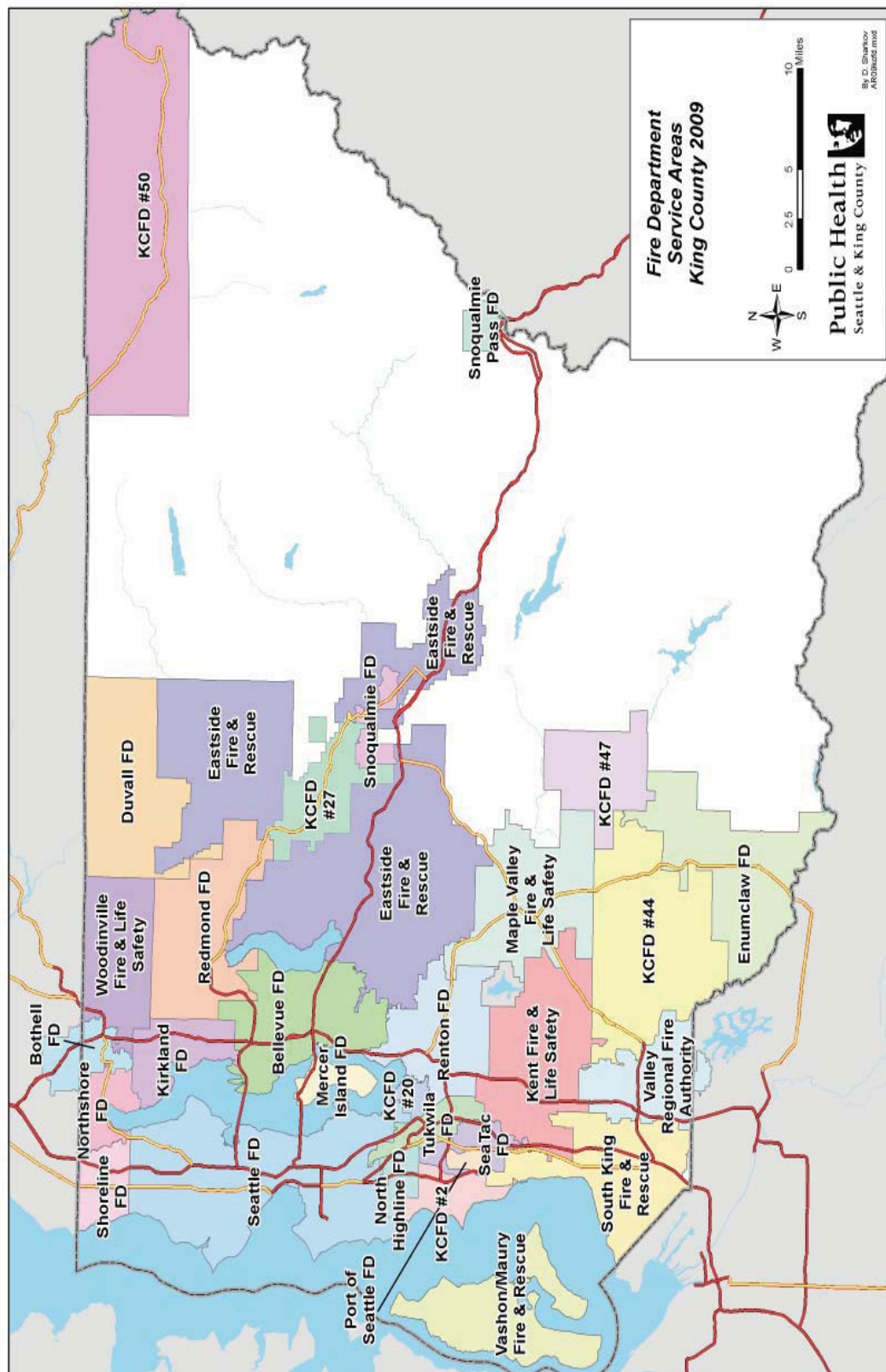
G. Recommendations for 2010 Rate

Due to the changed economic conditions, it is recommended that the 2009 levy rate remain at the statutory limit. Once the economy stabilizes, it will be a good time to reassess the needs of the fund and determine if future millage reductions are possible.

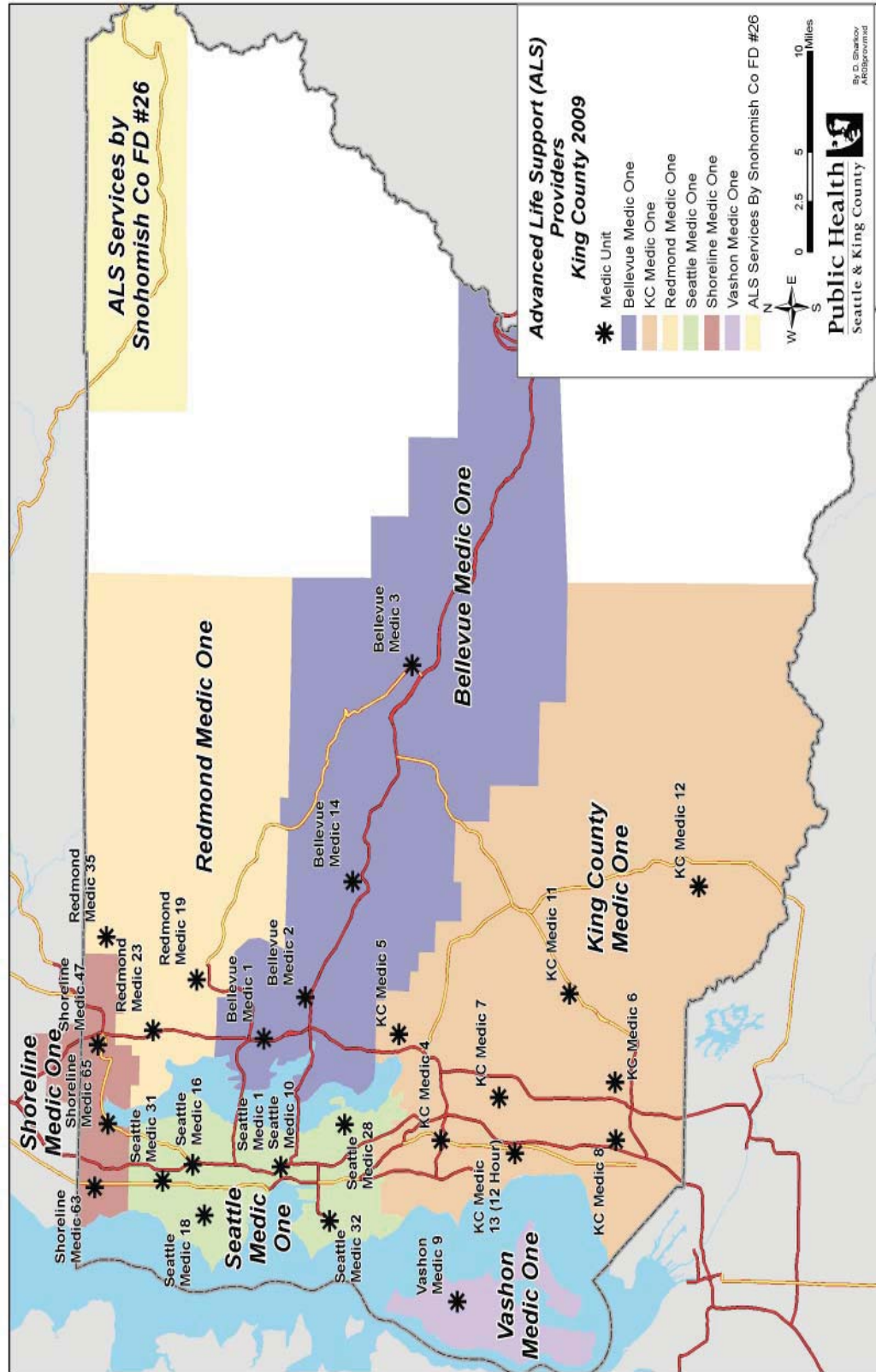
Appendix A: Regional Map 2008 Total ALS Call Volume



Appendix B: Regional Map of the Basic Life Support (BLS) Provider Areas



Appendix C: Regional Map of the Advanced Life Support (ALS) Provider Areas



Dispatch Centers & Areas Dispatched King County 2009

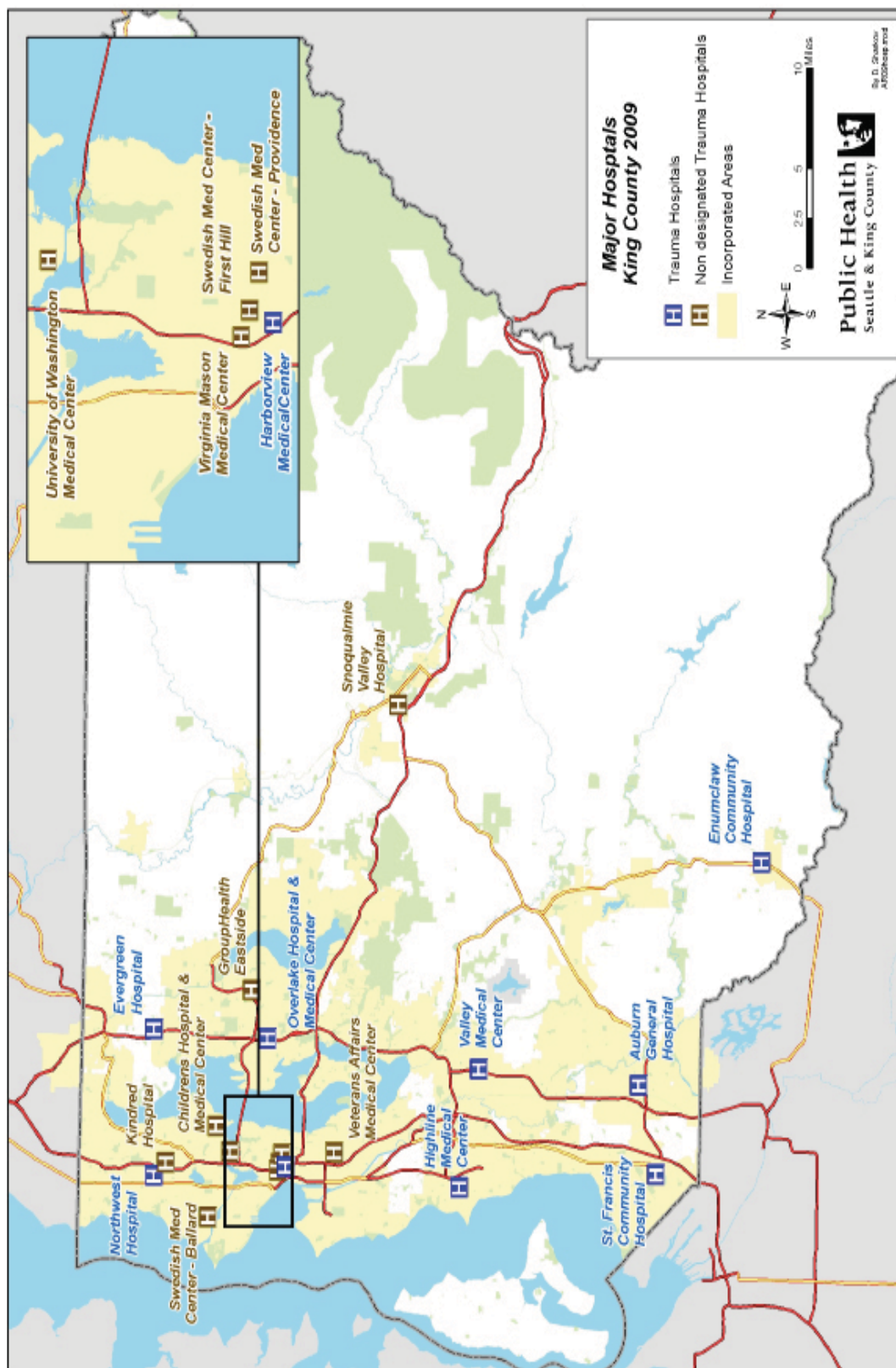
- Eastside Communications Center
- Enumclaw Police Department
- Port of Seattle
- Seattle Fire Alarm Center
- Valley Communications Center

Scale: 0 2 4 8 Miles

Public Health
Seattle & King County

By: D. Sharkey
A102586.mxd

Appendix E: Regional Map of EMS Hospitals



Appendix F: 2009 EMS Advisory Committee Listing

Name	Representation	Title/ Organization
Tom Hearne, Chair	EMS Division	Manager
Bob Berschauer	Ambulance Service	Director of Operations, American Medical Response
Al Church	BLS in Cities > 50,000	Chief, South King Fire & Rescue
Michael Copass, M.D.	Seattle Medical Program Director	Medical Program Director, Seattle Medic One
Wayne Corey	Citizen Representative	
Andrea Coulson	Labor - ALS	Paramedic, KC Medic One
David Daniels	BLS in Cities > 50,000	Chief, Renton Fire Department
Gregory Dean	ALS Providers - Seattle BLS in Cities >50,000	Chief, Seattle Fire Department
Mickey Eisenberg M.D.	King County Medical Program Director	Medical Program Director, King County
David Fleming	Public Health - Seattle & King Co.	Director and Health Officer
Jim Fogarty	ALS Providers - KC Medic One	Chief, King County Medic One
Bob Oliver	ALS Providers - Redmond BLS in Cities >50,000	Interim Chief, Redmond Fire Department
Roger Hershey	KC Fire Commissioner's Assn. - Urban	Fire Commissioner, South King Fire & Rescue
Jon Kennison	KC Fire Commissioner's Assn. - Rural	Fire Commissioner, Shoreline
Hank Lipe	ALS Providers - Vashon Medic One	Chief, Vashon Island Fire & Rescue
Marcus Kragness	ALS Providers - Shoreline BLS in Cities >50,000	Chief, Shoreline Fire Department
Michael Loehr	Public Health - Emergency Management	Manager
Doug McDonald	Labor - BLS	EMT, Renton Fire Department
Alan Reed	Health Care System	Manager, Medical Support Services, Group Health
Steve Reinke	Dispatch	Valley Communications
Jim Schneider	BLS in Cities >50,000	Chief, Kent Fire & Life Safety
Mike Eisner	ALS Providers - Bellevue BLS in Cities >50,000	Chief, Bellevue Fire Department
Adrian Whorton, M.D.	Chair, Medical Directors' Committee	Medical Director, Redmond Medic One

Appendix G: EMS FUND 1190 Revenue/Expenditure Summary
Financial Plan 2007 through 2009

	<u>2008 Actual¹</u>	<u>2009 Proposed²</u>
BEGINNING FUND BALANCE:	\$6,242,796	\$19,686,011
REVENUES:		
Property Taxes ²	\$64,735,969	\$67,307,404
Federal & State Grants	\$29,526	-
Charges for Services	\$196,351	\$202,208
Interest Earnings/Other Revenue	\$612,804	\$596,855
King County Current Expense	\$375,000	-
TOTAL REVENUES	\$65,949,651	\$68,106,467
EXPENDITURES:		
Basic Life Support	(\$14,256,340)	(\$15,281,661)
Paramedic Services	(\$32,585,628)	(\$36,221,927)
Regional Services	(\$5,294,071)	(\$6,087,931)
Strategic Initiatives	(\$591,206)	(\$1,128,505)
Budgeted Contingency	-	(\$150,000)
ALS Salary & Wage Contingency		
Disaster Response Contingency		(\$4,809,156)
King County Auditor's Office		(\$125,759)
Use of Reserves (Diesel/Chassis Obsolescence)		(\$373,654)
TOTAL EXPENDITURES	(\$52,727,245)	(\$64,178,593)
OTHER FUND TRANSACTIONS:		
GAAP Adj - Gain on Investments	\$224,200	-
GAAP Adj - Loss-Impairment on Investments	-	-
Journal Entry Error	(\$3,391)	
TOTAL OTHER FUND TRANSACTIONS	\$220,809	-
ENDING FUND BALANCE:	\$19,686,011	\$23,613,885
RESERVES & DESIGNATIONS:		
Reserve for Encumbrances	(\$2,138,516)	(\$2,138,516)
Designations	(\$1,859,505)	(\$2,129,190)
KCM1 Equipment Replacement	(\$769,910)	(\$769,910)
Reserves for Unanticipated Inflation	(\$1,230,000)	(\$2,506,000)
Reserves (Chassis, Risk, Millage)	(\$4,937,096)	(\$10,815,174)
TOTAL RESERVES & DESIGNATIONS	(\$10,935,027)	(\$18,358,790)
ENDING UNDESIGNATED FUND BALANCE:	\$8,750,984	\$5,255,095
TARGET FUND BALANCE³	\$3,956,979	\$4,086,388

¹ 2008 Actuals are from the 14th Month ARMS and include CAFR entries

² 2009 Estimated is based on 2nd Quarter Report

³ 1/12 yearly expenditures for 2002-2007 levy; 6% of yearly revenues for 2008-2013 levy period.

King County Medic One Donations Fund 6980/Account 06204	
2008 Beginning Balance*	\$92,972
Donations	\$23,265
Expenditures	(\$4,814)
2008 Ending Balance	\$111,423

*\$32,139 deposited in Fund 1190

Appendix H: EMS Division Contact Information

Mailing Address: **Emergency Medical Services Division**
Public Health – Seattle & King County
401 5th Ave, Suite 1200
Seattle, WA 98104
(206) 296-4693 (206) 296-4866 (fax)

Web Address: <http://www.kingcounty.gov/healthservices/health/ems.aspx>

Specific Program Contacts:

King County Medic One www.kingcounty.gov/healthservices/health/ems/MedicOne.aspx	(206) 296-8550
BLS Training and Education Program www.kingcounty.gov/healthservices/health/ems/training.aspx	(206) 263-8580
CPR/AED Training Programs www.kingcounty.gov/healthservices/health/ems/aed.aspx	(206) 263-8669
Emergency Medical Dispatch Programs www.kingcounty.gov/healthservices/health/ems/emdprogram.aspx	(206) 263-8636
Injury Prevention and Public Education Programs www.kingcounty.gov/healthservices/health/ems/community.aspx	(206) 263-8544
Regional Medical Control and Quality Improvement www.kingcounty.gov/healthservices/health/ems/quality.aspx	(206) 263-8659 (206) 263-8569
Regional Planning and Evaluation www.kingcounty.gov/healthservices/health/ems/planning.aspx	(206) 263-8603
Center for the Evaluation of EMS (CEEMS) www.kingcounty.gov/healthservices/health/ems/CEEMS.aspx	(206) 263-8564

Appendix I: Complete Bibliography for 2009

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