



**Division of
Emergency Medical Services**



***2008 Annual Report
to the King County Council***

September 2008

Preface

I am very pleased to present and introduce the Emergency Medical Services (EMS) Division 2008 Annual Report, as required by King County Ordinance #12849.

This is the tenth EMS Division Annual Report, and the first report for the Medic One/EMS 2008-2013 levy period. The ordinance provides annual 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. Through this report, we gain a good understanding of how the regional EMS system works and how medical care is provided to over 172,000 patients by nearly 4,000 emergency medical technicians (EMTs) and 250 paramedics.

In addition to its regional character, the EMS Annual Report also includes useful information on the many support programs that help ensure effective, standardized EMS care. These programs include medical direction and oversight, EMT training and continuing education, dispatcher training, planning for placement of paramedic units, and injury prevention efforts. The EMS Annual Report also describes the results of continuing grant-funded research and quality review efforts that help improve the delivery of patient care in the field. In addition, the report describes the status of the EMS levy fund, the services that are supported by these tax dollars, and future financial challenges.

As Director and Health Officer, I would like to highlight several aspects of this report. These include both the medical service as well as prevention activities. The regional Medic One/EMS system demonstrates strong physician direction and involvement. Although the entire report demonstrates this medical theme, this influence is shown most clearly in the new Regional Medical Quality Improvement (QI) Program. This program seeks to unify in new ways the dispatch, fire department/EMT, and paramedic services to improve patient care across the system. The regional QI Program has already started to carry out some important efforts, including paramedic safety in using subclavian and internal jugular veins in the administration of medications to patients, an approach that is a standard practice in hospital surgical units, and the effective use of aspirin by EMTs in treating Acute Coronary Syndrome (ACS). Medical quality improvement can assess the safety of the procedures utilized and develop new methods for improving EMS care to patients.

The Medic One/EMS system also encounters underlying health problems in patients who may be at risk for future health issues, and can play an important role in the larger health care environment rather than simply treating patients at the scene. For example, EMTs routinely take blood pressure readings on all their patients, and frequently find patients who were either unaware of their high blood pressure or who had not seen a health care provider for their issue. The SPHERE program (Supporting Public Health with Emergency Responders) was designed to identify patients with hypertension and connect them to community resources to effectively manage their condition.

I strongly recommend reading both the 'Public Health Highlight: Accidental Falls in King County 2000-2007' (page 60), and 'Cardiac Arrest in King County - A 30 Year Perspective: 1976-2007 (page 63).' The discussion on accidental falls shows that this is a common and potentially preventable event that results in many EMS responses. The likelihood of falls increases with age. Fall prevention programs

in fire departments across the county assist in preventing falls in the elderly through home visits, identifying potential home hazards, and providing fall safety equipment.

‘Cardiac Arrest in King County’ summarizes survival results from the King County cardiac arrest database and clearly demonstrates how survival from witnessed ventricular cardiac arrest has increased from the late 1970’s to early 80’s to 45% in 2005-2007. Most interestingly, these changes are linked to program improvements implemented in the region, including dispatch-assisted CPR, EMT-defibrillation, public access defibrillation, and the most current protocol changes regarding early defibrillation and the length of time CPR is performed.

The EMS 2008 Annual Report to the King County Council clearly shows that the Medic One/EMS regional system is strong, and continues to develop new methods of delivering quality EMS care to the residents of the King County.

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



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Acknowledgements:

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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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Table of Contents

Preface	page 3
Table of Contents	page 5
Executive Summary	page 7
A Brief Description of the EMS/Medic One Tiered System	page 9
Part I: EMS System Review - The 2008-2013 Medic One/EMS Levy and Strategic Plan	page 10
Part II: Status of EMS Division Programs and Activities	page 14
2008 - 2013 Strategic Initiative Summary Table	page 45
Summary of 2007 EMS Statistics	page 57
Part III: EMS Funding and 2008 Financial Plan	page 65
Appendix A: Regional Map of Total ALS Call Volume	page 89
Appendix B: Regional Map of the Basic Life Support (BLS) Provider Areas	page 91
Appendix C: Regional Map of the Advanced Life Support (ALS) Provider Areas	page 93
Appendix D: Regional Map of the EMS Dispatch Center Service Areas	page 95
Appendix E: Regional Map of EMS Hospitals	page 97
Appendix F: 2008 EMS Advisory Committee Listing	page 99
Appendix G: EMS Division Revenue/Expenditure Summary	page 101
Appendix H: EMS Division Contact Information	page 103
Appendix I: Complete Bibliography for 2008	page 105
Appendix J: References for Accidental Falls in King County Highlight	page 107

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

The following highlights the major Emergency Medical Services (EMS) Division activities of the past year:

Part I - EMS System Review: This year marks the first year of the new six-year Medic One/EMS levy period. The 2008-2013 EMS levy continues and strengthens themes and operational directions established in earlier years, emphasizes some new programmatic initiatives, and contains some new programmatic and financial plan aspects and oversight functions. The EMS System Review follows these continuing themes and new aspects of the Medic One/EMS using along the following topic areas: Effective regional partnerships, paramedic services, Basic Life Support Services, Regional Services and Strategic Initiatives, and unanticipated challenges. Each Medic One/EMS levy period has brought unexpected program and financial challenges with it, regardless of the extent of regional discussion and detailed planning that occurred. Two areas have already begun to emerge: medic unit facility capital costs and economic forecasting.

Part II - 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. During the process of developing the new strategic plan, many of the strategic initiatives that had proven to be successful were incorporated into Regional Services as ongoing programs, including the Dispatch Enhancements, EMS Online, and the Enhanced Care for Specific Populations. The plan also identified new programs and initiatives that would contribute to the successful achievement of the plan's policy and financial goals, most notable the new Regional Medical Quality Improvement section (see page 22).

Part III - EMS Funding and 2008 Financial Plan: The EMS system in King County is funded primarily by a six-year EMS levy that was recently renewed in the November 2007 general election, thus the financial report represents a transition year between the recently completed levy period and the newly initiated levy period, including new components and requirements. The EMS Financial Plan assumes modest growth in property values and new construction, continued low inflation, and a one-percent limit on revenues from existing properties. Forecast revenues for 2008 are \$63,087,634 (not including the City of Seattle). The 2008 budgeted expenditures are \$56,487,410, not including contingencies or reserves.

Year 2007 Statistics: In Seattle and King County, the EMS system responded to a total of 172,502 calls to 9-1-1 in 2007 and 51,151 responses for advanced life support (ALS). Despite an increase 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 remained high at 45% in 2007. The *Public Health Highlight* this year reviews Accidental Falls in King County, 2000-2006 (see page 60).

The EMS Division's 2008 Annual Report is available online through the Public Health - Seattle & King County website: <http://www.metrokc.gov/health/ems>.

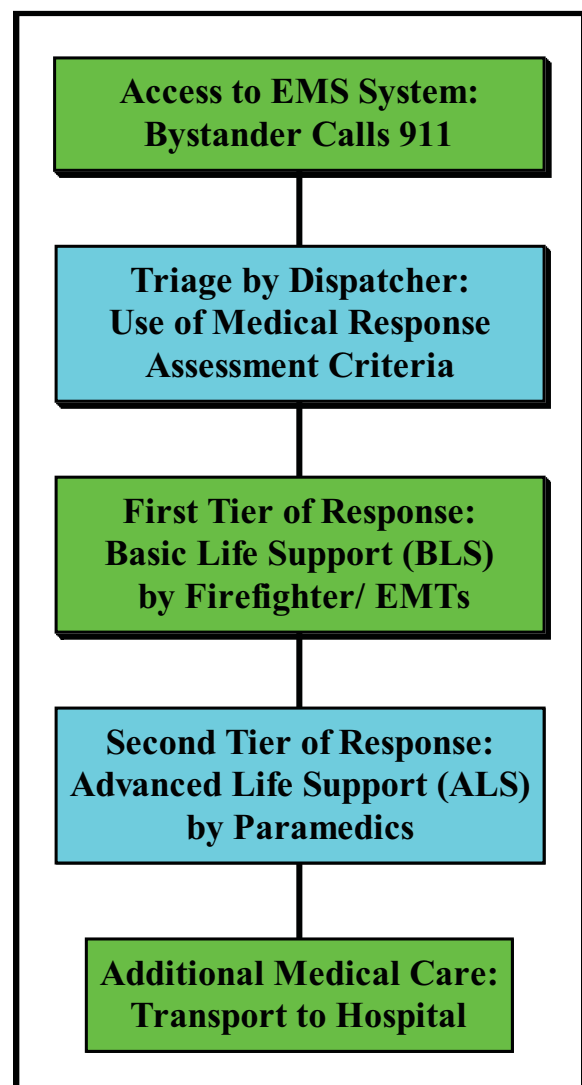
A Brief Description of the Medic One/EMS Tiered System

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

The 2008-2013 Medic One/EMS Levy and Strategic Plan

Thomas Hearne, Ph.D., EMS Division Director

This year marks the first year of the new six-year Medic One/EMS levy period, and the twenty-ninth year since the first regional Medic One/EMS levy was first passed by voters in the Seattle-King County area in 1979. Public support of the Medic One/EMS property tax levy remains exceptionally strong as demonstrated by the 83% voter approval in the November 2007 general election at a rate of \$.30 per \$1,000 of assessed valuation (AV).

The new EMS levy continues and strengthens themes and operational directions established in earlier years, emphasizes some new programmatic initiatives, and contains some new programmatic and financial plan aspects and oversight functions. It is worthwhile to review these continuing themes and new aspects of the Medic One/EMS system along the following topic areas:

- Effective regional partnerships
- Paramedic services
- Basic Life Support Services
- Regional Services and Strategic Initiatives
- Unanticipated future challenges

Effective Regional Partnerships

The **Medic One/EMS 2008-2013 Strategic Plan** fundamentally supports the strong regional medical model and layered EMS response system that originated in the City of Seattle about forty years ago and was embraced across the entire region by the late 1970's. This model has been supported by residents, elected officials, medical directors, emergency dispatchers, providers from local fire departments, fire districts, private ambulance companies, and hospitals. See page 9 for a brief discussion of the layered response system.

Over the years, the Medic One/EMS levy itself has helped to provide one of the major links which integrates this medical system and keeps it strong and viable. Survival from cardiac arrest from witnessed cases of ventricular fibrillation – used as a the standard measure of success in this system – has varied between 41% and 46% over the past three years, thanks in part to research-driven protocol changes implemented by the EMS medical directors. This resuscitation rate is one of the highest survival rates reported anywhere in the world and has been sustained over time.

A high level of service is provided to residents regardless of where they live, travel, shop, work or play within King County. The layered medical response model is underpinned by standardized medical guidelines for the 30 fire departments, seven paramedic providers, and private ambulance companies. This service is provided in both urban, suburban, and outlying areas of King County, including both Snoqualmie Pass (I-90 corridor), Steven's Pass (Route 2) areas, and Highway 12

east of Enumclaw. There were 172,502 fire department responses for emergency medical services and 51,151 paramedic responses in 2007.

Just as local EMS service providers are a critical component of the larger EMS response model, EMS funds collected across the entire county help support the regional EMS system. For example, the Medic One/EMS levy provides virtually 100% of funding necessary to support paramedic services countywide - the highest priority of the current levy strategic plan. In addition, the levy also provides most of the regional support services for medical direction and oversight, dispatch training, Emergency Medical Technician (EMT) training, data collection, and strategic planning. In contrast, a great portion of the funding for first responder Basic Life Support (BLS) is derived from local city fire department and fire district taxes with supplemental funding from the Medic One/EMS levy. These supplemental funds are distributed to fire departments and districts by means of a funding formula which incorporates both local area workload and assessed valuation into the allocation method.

Since the Medic One/EMS levy is approved by voters for a six-year period, there is considerable financial stability and flexibility provided to the EMS regional system itself. Issues regarding the regional response and funding model are reviewed on an ongoing basis by the EMS Advisory Committee, a group which provides ongoing governance and oversight, and periodically by elected officials at all levels across the region. This process allows for open and transparent system review in a very cooperative and consensus-driven manner, and offers timely discussion and resolution of emerging issues. The combination of effective working partnerships, consensus decision-making, and relatively stable local and regional financing help ensure an excellent level of EMS service to the residents of King County.

Paramedic Services

The intensive regional approach taken to strategic levy planning was used to reinforce the strong foundation of the EMS medical model that has served this region so well for so many years. The paramedic service discussions resulted in a thorough review and regional consensus by all providers of the anticipated cost of providing paramedic services as well as anticipating the number and timetable for adding new paramedic units. This detailed planning was needed to ensure that expenditures did not result in cost shifting to paramedic providers.

In addition, the elected official phase of the levy planning and final approval by the King County Council resulted in the adoption of well-controlled contingency reserves that include, for example, inflationary factors and thresholds for the Consumer Price Index (CPI), pharmacy and medication inflation, and new methods of providing capital costs for both vehicles and medical equipment. This review also included annual audits beginning in 2009 to ensure that expenditures follow the programmatic guidelines and financial rules described in the plan. Unexpected challenges and questions have emerged during each Medic One/EMS levy period over the years, and these new annual audits may provide a mechanism where these challenges can be raised and discussed with elected officials.

The Medic One/EMS levy plan forecasts the need for three additional paramedic units regionwide over the six-year levy period and provides for paramedic service in outlying areas, notably Skykomish/Fire District #50. One medic unit is identified for the City of Seattle and two units are scheduled for placement in the balance of King County. These units are typically added in twelve hour increments allowing unit additions to keep pace with rising demand in workloads, response times, and other service indicators that are utilized in unit planning. These incremental additions are projected for addition in 2008, 2009, 2010, 2012, and 2013. In 2008, a Shoreline Medic One unit that was placed early in the last levy period as a 12-hour unit was made into a full time twenty-four hour unit. Additions of projected paramedic units are not automatic and require careful regional analysis and validation of need before being recommended to the King County Executive and King County Council for addition.

Basic Life Support Services

Basic Life Support Services (BLS) provided by nearly 4,000 Emergency Medical Technicians (EMTs) from city fire departments and fire districts are the first response backbone of the regional EMS system. BLS funding and service received significant study during the levy planning and approval phase. Funding patterns for BLS revealed that call growth regularly exceeded allocation funding, and that the relative proportion of EMS levy funding received by regional fire departments was decreasing over time. Additional levy funding was included in the Medic One/EMS levy plan for distribution to fire departments to supplement the primarily local jurisdiction funding that supports BLS. Additional changes were also made to the BLS funding formula in order to simplify it, improve the ability of BLS funding to keep pace with service costs and demands, provide flexibility and ensure the allocation formula conforms to the new financial rules that are part of the levy.

Regional Services and Strategic Initiatives

Regional Services are core support functions managed by the EMS Division and designed to emphasize the uniformity and standardization of direct services provided by fire department and paramedic providers. In a sense, these programs help knit the regional medical model together by providing uniform regional medical direction, standardized EMT training and continuing medical education, standard EMS training for emergency dispatchers, centralized data collection and paramedic service planning, and administrative support and financial management for the regional EMS levy fund. A major new regional service program for this levy period is a Regional Medical Quality Improvement (QI) effort. This program, overseen by the regional EMS medical directors, will provide systemwide evaluation and QI for paramedics, EMTs, and emergency dispatchers. Regional Services, like the other programs supported by the levy, were reviewed to ensure adequate funding for the future and financial flexibility, and to incorporate some strategic initiatives from the previous levy as regular divisional efforts.

Strategic Initiatives incorporated as regular ongoing program include dispatch enhancements, advanced technology projects (including web-based EMT, paramedic and dispatcher training, electronic data collection, integration of computer-aided dispatch, online provider certification tracking), injury prevention programs and others. New strategic initiatives are also included

in the levy proposal, all intended to manage growth, improve care provided to residents, and continue to develop efficiencies. EMS dispatch continues to be recognized as a key strategic initiative direction with support for enhanced dispatch training and emergency call management. The strategic plan also contains strategic initiatives for injury prevention, enhanced electronic data collection, and a program for all-hazards emergency preparation.

Unanticipated Future Challenges

Each Medic One/EMS levy period has brought unexpected program and financial challenges with it regardless of the extent of prior regional discussion and detailed planning. The current 2008-2013 levy period will be no different as two areas have already begun to emerge: medic unit facility capital costs and economic forecasting. Since the levy planning was completed, three paramedic providers have indicated that additional, potentially significant, capital costs may be needed during the levy to support medic unit housing. At this point, we believe that we can handle these costs within allocated funding, but will need to continue to monitor this situation carefully.

The second issue relates to the recent financial changes in the economy and emerging differences from some of the planning assumptions we used for the EMS levy going forward. Some of the inflationary indicators were updated to provide greater flexibility. A good example of this flexibility is the assumption we made during our planning effort regarding the cost of diesel fuel for paramedic units. The assumptions we used were based on diesel costs of a little over \$3.00 per gallon. Currently, diesel fuel is selling for nearly \$5.00 per gallon. However, we have diesel stabilization reserve in the contingency fund that is accessible, upon county executive and King County Council approval, when costs increase higher than anticipated rates. Similar contingencies exist for paramedic salaries and benefits, pharmaceuticals and medical equipment, and other critical program costs.

Thus, due to the extensive regional planning efforts and the widespread regional support received from elected officials on the city, fire district, and county level, we have both the means to support the Medic One/EMS strategic plan through 2013, ensure continued high level service to residents, as well as some flexibility to permit reasonable adjustments when unexpected changes do occur.

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 quality patient care in the pre-hospital setting. The newly devised ***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.

With this year being the first in the new levy period, the EMS Division acknowledges the extraordinary efforts of all those involved in developing the various programs and activities identified in this new strategic plan. The time, energy and cooperative nature required to assess the needs of the regional partners, creating a programmatic and financial plan that could support the demand, and obtaining authorization to implement the plan was unprecedented. The EMS Division is committed to maintaining these strong partnerships with EMS agencies in the region 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*

I am pleased to present our annual report for King County Medic One for the published year of 2008. The following presents a brief snapshot of the results of some very talented and dedicated individuals, our paramedics and physicians, that guide our program, in addition to support staff that keeps things organized. King County Medic One's success is a collaborative effort of many people and organizations that dedicate themselves to providing emergency medical care for our residents wherever and whenever they are needed.



For over 30 years, King County Medic One has operated under a premise of medical excellence and industry leadership. Our culture is rich in history and diversity yet also paves the pathway towards our future. The following describes some of our efforts over the course of the last 12 months. Thanks to the local community that has allowed King County Medic One to provide the best possible emergency medical services every individual deserves. On behalf of all the professionals and partner agencies of 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 some 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 93). 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 most medical emergencies, a BLS agency is sent to handle the needs of the patient. For more severe medical situations, 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 calendar year 2007, KCM1 responded to 14,098 calls for this advanced care. The following provides descriptions of the six KCM1 functional areas.

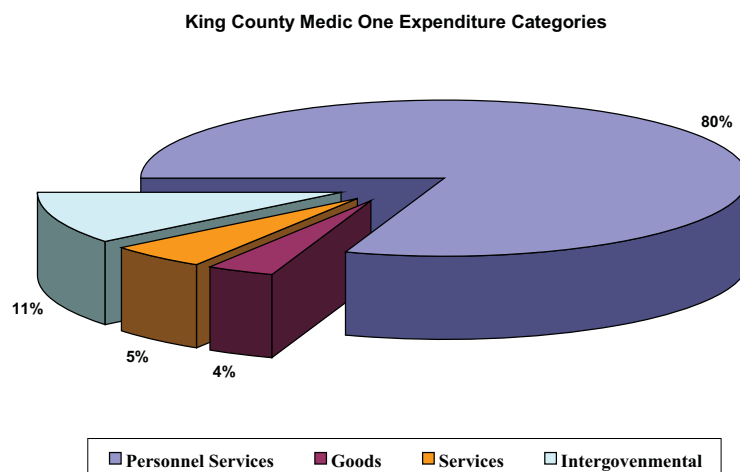
Administration

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 King County Medic One 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.

Administrative Quality Review: Quality assurance is routinely conducted on record systems and accounting and payroll systems. One such review in late 2007 found that the error rate for invoice processing measured 0.3%. Records systems are also audited every 18 months for compliance with HIPAA regulations. The most recent audit was completed with no significant findings.



Research: KCM1 is participating in several important research studies to evaluate promising approaches to improve care for life-threatening trauma and cardiac arrest as part of a collaborative effort involving all the EMS agencies of King County. These studies include an evaluation of concentrated saline intravenous fluid for the treatment of patients with brain injury or shock from traumatic injury, an evaluation of cooling to improve recovery after resuscitation from cardiac arrest, and an evaluation of the impedance threshold device - a valve designed to improve blood circulation during CPR. In some instances, the studies involve not just the EMS agencies of King County, but are performed in collaboration with other communities from across North America. The results of these efforts will hopefully provide for real improvement in pre-hospital care for these critical conditions.

Operations

Supervision: Shift supervisors known as Medical Services Officers (MSOs) provide administrative and clinical oversight while maintaining 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 Structure (ICS).

Paramedic Safety: King County Medic One has body armor for paramedics to wear on high risk calls, including stabbings, shootings, civil disturbances and SWAT incidents. Paramedics are provided with personal protective equipment, including gloves, goggles and gowns, protective fire resistant gear.

Medic Unit Locations: King County Medic One units are located in eight stations. Each station has a response mobile intensive care unit (Medic One truck) less than two years old and additional spare units available. A three-year replacement schedule allows for up to date and reliable

equipment and an economy of scale purchasing. Our King County Medic One fleet stands ready to handle daily responses as well as large scale disasters, special events, and routine maintenance replacement.

Station Relocations: King County Medic One is working with the Cities of Kent, Renton, Maple Valley and Covington on potential station relocations. This past year we temporarily relocated our Medic 5 Unit from Fire Station #14 in Renton to Fire Station #12 in Renton. As true for all medic placement, issues related to unit re-location are under review to determine regional impacts. EMS conducts relocation reviews on a regular basis to ensure residents are provided a timely medic unit response. Partner cities are included in the review to ensure their future growth and special needs are considered.

Supplies and Equipment Purchasing: King County Medic One is the lead contract agency responsible for two regional medical purchasing contracts (see page 43). These contracts are used by fire departments in King County and enable economies of scale purchasing for medical supplies and equipment and medications.

Medical Inventory: King County Medic One must replace medical inventory for all eight paramedic units located throughout South King County. Logistically a challenge, but the administrative support crew always manages to come through. A ‘warehouse on wheels’ is currently used to stock stations on a weekly basis.

Station Alerting: Valley Communications Center, King County Medic One’s dispatch center, uses alphanumeric pager alerting to advise of incoming calls. Paramedics are dispatched only seconds following a determination of need for medic services.

Electronic Records: King County Medic One implemented a fully web-based electronic data collection system (EMIRF) in April 2007, allowing paramedics to directly enter critical incident information into a secure database. This information is used for research studies, quality improvement, and patient care oversight.

Medical Direction and Quality Assurance

King County Medic One Medical Direction: Dr. Tom Rea is the Medical Program Director for King County Medic One and is assisted by Associate Medical Directors associated with area hospitals. Together they provide medical oversight for KCM1 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 King County Medic One Training Division hosts the KCM1 Medical Directors Meeting. These meetings are led by physicians from throughout the Seattle-King County area. The meetings focus on a variety of pre-hospital medical conditions and include new development in care as well as review of important core topics.

Quality Assurance: The goals of quality assurance are to evaluate and improve the pre-hospital emergency care provided by King County Medic One. To this end, KCM1 engages in a variety

of activities aimed at ensuring or improving quality patient care. These activities include systematic review of specific medical conditions, critical procedures, or case-based review and feedback. In the past year, there has been a focus on systematic review of patients with hypotension (low blood pressure) and patients with status seizure. In both clinical groups, triage, care, and documentation were systematically reviewed to provide a benchmark profile of decision-making and treatment.



In a separate, ongoing activity to systematically document and review airway management, paramedics provide a detailed and specialized report for each patient requiring endotracheal intubation. The critical skill of intubation is fundamental to successful pre-hospital management of many of the sickest patients. The intubation report reviews the process and outcome for each intubation and identifies particular challenges and trouble-shooting approaches. Collectively, these systematic assessments have demonstrated proficient care and underscored the importance of fundamental approach of clinical guidelines that require proactive paramedic implementation and involvement.

With regard to case review and feedback, hospital-based physicians review individual cases with the goal of education and feedback. This feedback may come in the form of a group discussion between physicians and paramedics or individualized written feedback. For example, paramedics may receive written feedback regarding how their clinical work-up and care matched the hospital diagnosis and treatment. The goal is to have paramedic care appropriately match the level and type of illness.

Training

Grand Rounds Training (GRT): GRT is an ongoing KCM1 training activity typically conducted five times each year to refresh the skills of paramedic crews while on duty. The content emphasis is primarily on manipulative skills, but operational updates, equipment changes, and safety awareness training are often included in GRT. 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 paramedics on a medication carried on 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 its application.

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 a patient they treated, the hospital admitting diagnosis, in-hospital care, and the patient's final disposition. Often the medical director provides a brief lecture on a specific illness or disease process and answers questions regarding specific cases. These Doctor's Meetings provide an invaluable opportunity for paramedics to learn from experienced Emergency Medicine physicians.

Case-of-the-Month: Case-of-the-Month is a discussion of an actual response by one of the KCM1 paramedic teams that was atypical, or challenging in nature providing a unique opportunity for paramedics to learn from each other. The Case of the Month is designed as a single subject, disease process, or injury pattern, formatted with an overview and summary, followed by a quiz providing another source for paramedics to gain valuable continuing medical education.

Continuing Medical Education: Each KCM1 paramedic must attend a minimum of 50 hours continuing education each year, including nine hours of 'Tuesday Series' conducted by Harborview Medical Center. Each paramedic must also attend sessions on Advance Cardiac Life Support, Pediatric Advance Life support and successfully pass a written exam every other year. This year 33 of the current 67 paramedics recertified. The remaining paramedics will recertify next year.

Emergency Preparedness

Emergency Preparedness is dedicated to maintaining the integrity of the King County Medic One 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 agencies, 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 (DOC) 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. This was demonstrated during the recent windstorm events.

Regional Drills and Exercises: King County Medic One continues to provide leadership in emergency preparedness by participating in regional fire and EMS mass casualty drills and exercises. Personnel recently assisted Port of Seattle with a simulated air crash incident, provided instructors for Incident Command System (ICS) training for other responders and have served as consultant during regional planning for events such as terrorist attacks, earthquakes and communicable outbreaks throughout the greater King County region.

Equipment Purchasing: King County Medic One participates in the regional Multi-Disciplinary Equipment Purchasing Group (MEPG) and has secured federal and state grant funding from Homeland Security sources for the purchase of medications (nerve gas auto-injectors and cyanide kits) and emergency respirators (PAPRs) for all regional ALS providers.

Infectious Disease & Pandemic Preparations: King County Medic One 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 establishes ‘best practice’ guidelines for managing infectious disease incidents continues at both the BLS and ALS levels. KCM1 is currently participating in the update and re-write of the mass casualty MCI plan for the area in conjunction with the City of Seattle.

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. During the process of developing the new strategic plan, many of the strategic initiatives that had proven to be successful were incorporated into Regional Services as ongoing programs. The crosswalk below identifies which strategic initiatives were incorporated as ongoing programs and what new strategic initiatives were developed to support the plan’s objectives. The table is followed by a description of the many varied regional programs managed by the EMS Division.

Strategic Initiative Crosswalk

2002-2007 Strategic Initiatives	Incorporated into Regional Services (Program)	2008-2013 Strategic Initiative
Dispatch Enhancements:		
Review and Revision of the Criteria Based Dispatch (CBD)	Community Programs	Complete CAD Integration
EMD Quality Improvement	Community Programs	---
Enhanced CBD Basic Training and Continuing Education Curricula	Community Programs	---
Advanced Technology Projects:		
Web-based Training for EMS Personnel, Dispatchers, and AED Users	BLS Training	Interactive Enhancements to CBT Online
Regional Electronic Data Collection Project	Strategic Planning & Data Management	---
Regional EMS Tracking Resources (RETRO)	BLS Training	---
EMS System Efficiencies:		
Financial Review of EMS Sub-Funds	Administration	---
Falls Program	---	Expanded Countywide Falls Program
Paramedic and EMT Procedure and Patient Treatment Evaluations	Regional Medical QI Section	---
Enhanced Care for Specific EMS Patients	Regional Medical QI Section	---

2002-2007 Strategic Initiatives	Incorporated into Regional Services (Program)	2008-2013 Strategic Initiative
Assessment of the Impact of State Budget Cuts on the EMS System	---	---
Strategic Plan	---	Levy Planning
---	Community Programs	Dispatch Center Standards
---	Community Programs	Advanced EMD Training
---	Community Programs	Better Management of Non-emergency Calls to 9-1-1
---	Community Programs	Injury Prevention Small Grants for BLS Agencies
---	Community Programs	Injury Prevention Community Awareness Campaign
	Community Programs	Public Access Defibrillation Awareness Campaign
---	Community Programs	Injury Prevention Grant Opportunities
---	Strategic Planning & Data Management	Systemwide Enhanced Network Design (SEND)
---	Administration	All-Hazards Management Preparation

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 the 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 recently celebrated its 10th Anniversary in September 2007 marking a decade of providing 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: 2008 EMS Advisory Committee Listing* on page 99. The committee continues to meet quarterly to discuss the progress of the current 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 supporting the successful completion of the EMS levy renewal process (approved by voters in November 2007 by over 83%), provided input regarding ongoing strategic initiatives such as EMS Online and Emergency Medical Dispatch, and reviewed the findings of medic unit analysis in the region.

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 (Jim Boehl, MD, Adrian Whorton, MD, Michael Copass, MD, Gary Somers, MD, Tom Rea, MD, and Sam Warren, MD, respectively) and Dr. Eisenberg, 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 - see page 35). Annually, 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).

III. Regional Medical Quality Improvement

The Regional Medical Quality Improvement (QI) Section of the Emergency Medical Services Division is a newly created section. 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 Regional Medical QI section is to improve the quality of EMS patient care in King County by conducting systematic and scientific studies as well as pilot projects and evaluations. These studies focus primarily on dispatch, basic life support services and transport provided by EMTs, advanced life support services and transport provided by paramedics, as well as on other aspects of the regional system as needed. The evaluation projects depend heavily on the continued excellent cooperation with dispatch centers, fire departments, paramedic providers, and other stakeholders in the regional system.

The Regional Medical QI section has a section manager, three research assistants, and a half time epidemiologist, and works under the medical direction and supervision of Dr. Eisenberg, Dr. Tom Rea, Dr. Peter Kudenchuk, and Dr. Hendrika Meischke. Many of the QI evaluations are done in collaboration with the Planning Section, the Community Programs Section, the Training Section, and the Center for the Evaluation of EMS. Although full staffing of the section didn't occur until 2008, the section began a number of activities in 2007.

QI Evaluations Completed in 2007

Safety of Central Venous Lines for Critically Ill Patients: The safety and effectiveness of the placement of central venous catheters via subclavian and internal jugular routes has been clearly demonstrated in the hospital surgical setting. Until now, there has been no known demonstration of

the effectiveness of central venous access in the critically ill patient under the care of paramedics in the pre-hospital environment despite the widespread use of the technique in this setting. This retrospective cohort study examined two years of King County paramedic incident report forms and emergency department records to identify complications ascribed to central line placement by paramedics, including pneumothorax, hemothorax and other cardiovascular injuries. The study found that central venous line placement by paramedics in the pre-hospital setting is infrequent but demonstrates a safety profile comparable to the historical hospital experience.

Aspirin Use by EMTs for Acute Coronary Syndrome: The earlier aspirin is administered during an acute coronary syndrome (ACS) event, the better the outcome. The anti-inflammatory effect of aspirin appears to reduce the amount of damage to the heart muscle during the period of ischemia. Previously, only paramedics were allowed to administer aspirin to patients. EMTs could only assist a patient in taking his or her own aspirin. A pilot study evaluating EMT administration of aspirin for acute coronary syndrome was completed in 2007. The pilot assessed the congruity between EMT and paramedic diagnosis of ACS. The study found there was 88% agreement between EMTs and paramedics in the assessment of ACS. Based on these results, we concluded that EMTs could accurately diagnose ACS in the pre-hospital setting and could effectively administer aspirin to patients suffering from ACS. EMT administration of aspirin is now authorized countywide.

Ongoing QI Evaluations

Supporting Public Health with Emergency Responders (SPHERE): The SPHERE program began in late 2006 as an innovative approach to enhancing the involvement of emergency responders in the provision of public health services to the residents of King County. The program is based on the novel concept that the role of EMS personnel need not be limited to the treatment of current medical emergencies, but may include the identification of persons at risk for future adverse health outcomes. At its inception, SPHERE was designed to identify persons with hypertension and diabetes and connect them to community resources to effectively manage these two conditions.

High blood pressure (HBP) affects over 65 million Americans. It is estimated that one-third of patients with HBP are unaware they have the condition and another third are not adequately controlling their blood pressure. In addition, over 20 million Americans have diabetes (85% have type II diabetes) and another 6-7 million Americans have undiagnosed type II diabetes. HBP and diabetes are major contributors to heart disease, stroke and kidney failure. Since EMTs almost always measure blood pressure as a part of the routine patient care protocol and frequently check blood glucose, there is a unique opportunity to identify new and/or uncontrolled cases of HBP and diabetes.

The SPHERE protocol specifies that EMTs hand out informational cards with the recorded the medical readings taken during the EMS visit. The cards also contain a listing of available community resources to

The City of Kent Fire Department took your blood pressure during your medical emergency. Your blood pressure was very high

Date: _____
EMT: _____
Your blood pressure: _____
Systolic: _____
Diastolic: _____

High blood pressure can lead to life-threatening disease such as heart disease or stroke or kidney failure. There are effective treatments for lowering high blood pressure. You need to discuss this with a doctor.

We recommend that you contact a doctor to have your blood pressure checked again as soon as possible. We may call you in a week or two to find out how you are doing.

Blood Pressure Categories

Systolic	Diastolic
180	100
140	90
120	80
	Normal

patients with HBP or high glucose. Letters with the same information are also sent to most patients one to two months after the EMS visit.

The ongoing monitoring and evaluation of the SPHERE program, carried out in part by the Regional Medical QI Section, identified several potential areas for improvement. First, while emergency responders participating in the program did an excellent job of providing information to patients, follow-up interviews found that the percentage of patients who subsequently utilized the suggested community resources was low. Second, elderly persons who were seen by emergency responders for a fall were identified as an additional target population for the project. Falls in seniors are relatively common, account for a high proportion of injury in the elderly, have a high cost to society and are potentially preventable. There are two fall prevention programs in Seattle and King County that are specially designed to help high risk seniors reduce their chance of falling.

A pilot project, conducted in partnership with South King Fire and Rescue, was initiated in early 2008 to address these findings. Called the Community Outreach Officer Program (CO-OP), the pilot project will designate one emergency medical technician to personally contact patients after an EMS incident involving hypertension, elevated blood sugar, or a fall. The Community Outreach Officer will call eligible patients within two weeks of the EMS visit to discuss the medical information collected by EMTs and recommend follow-up care. Care options will include an additional blood pressure reading at the fire station, referral to the Harborview Fall Prevention Clinic, or the EMS Fall Prevention Program (see page 47), an appointment with the patient's regular doctor, or referral to the nearest King County Public Health Clinic.

As a spin-off of the SPHERE program, the CO-OP pilot project aims to improve EMS ties to the community and more effectively refer at-risk patients to available community resources. The Regional Medical QI Section will be actively involved in the evaluation of the pilot program.

Cardiac Arrests in Exercise Facilities: An analysis of cardiac arrest data conducted by Seattle Medic One and the EMS Division of health clubs in Seattle and King County has shown that these 'high risk' locations have a particularly low adoption rate of automated external defibrillator (AED) programs. Numerous studies have demonstrated the importance of timely defibrillation in the 'chain of survival' for out-of-hospital cardiac arrest. This study seeks to evaluate the incidence of cardiac arrest at health clubs in Seattle and King County and whether existing dissemination of AEDs into exercise centers has a significant impact on patient survival rates. Data analysis for this study is ongoing.

Bystander Chest Compressions for Non-cardiac Arrest Pre-hospital Patients: According to the American Heart Association (AHA), effective bystander CPR initiated immediately after cardiac arrest can double the chance for survival. The AHA takes the position that the provision of CPR to persons not in cardiac arrest far outweighs the risk of withholding CPR to persons in cardiac arrest. Dispatchers and 9-1-1 call takers are encouraged to provide CPR instructions if it appears to them that the caller might be reporting a cardiac arrest. While it is clear that there is a benefit to prompt intervention, the associated incidence of false positive CPR is not entirely clear, nor is the incidence of adverse events well-documented. This study is reviewing EMS incident report forms and hospital records to determine how often dispatchers instruct laypersons to perform CPR

on non-cardiac arrest patients and how often injuries may result. Preliminary results show that improper administration of dispatcher-assisted CPR is infrequent and subsequent serious injury is exceedingly rare.

EMS Quality Improvement (QI) Forum: This forum is comprised of paramedic educators who meet quarterly to help undertake regional coordinated EMT QI projects. Currently most fire departments have a designated paramedic who reviews EMT run reports and provides EMS topic based lectures. A goal of this group is to establish an EMT QI agenda and help conduct QI projects that are directly relevant to EMT patient care on a regional basis.

Understanding the Relationship of Socioeconomic Status and Survival from Out-of-Hospital Cardiac Arrest: This study will assess the relationship between traditional socioeconomic status (SES) characteristics and survival from cardiac arrest. Lower SES has been related to poorer health outcomes for a number of health conditions. Efforts to better understand this relationship are important if we are to address these health disparities and improve health. This study aims to better understand the relationship between SES and survival by collecting survey information on a number of SES factors, specifically race, occupation, marital status, and education and how these variables relate to resuscitation and outcome in patients with out-of-hospital cardiac arrest who are treated by the EMS responders.

Anti-arrhythmics in the Treatment of Cardiac Arrest: Anti-arrhythmics are a class of drugs used to suppress fast rhythms of the heart, such as ventricular fibrillation. The use of anti-arrhythmics by paramedics in the treatment of cardiac arrest will be assessed, and resuscitation and hospital outcomes will be compared for patients who did and did not receive anti-arrhythmics.

Proficiency of EMTs and Paramedics in Making Disposition/Treatment Decisions for Patients with Acute Coronary Syndrome: EMTs and paramedics make pre-hospital triage decisions about patients calling 9-1-1 with symptoms that may represent acute coronary syndrome (ACS). EMTs and paramedics base patient treatment/disposition decisions on history, physical exam, and a few select diagnostic tests, such as ECGs. This decision approach has been in place since the inception of paramedic service in Seattle and King County and is similar to other EMS programs throughout the country. Accurate decisions and early treatment are important for best outcomes of ACS. Multiple studies have demonstrated that early medical and interventional therapies result in better outcomes, including survival to hospital discharge. Thus correct diagnosis of ACS by EMS can enable early treatment. However, the diagnostic accuracy of EMS to correctly identify ACS has not been evaluated. This study will evaluate EMS accuracy for the diagnosis of ACS.

Public Access Defibrillation in Out-of Hospital Cardiac Arrest: An automated external defibrillator (AED) offers an option to decrease the interval from collapse to attempted defibrillation by enabling persons outside the traditional EMS response system, who are typically not trained in rhythm recognition, to deliver life-saving therapy. In 1999, Seattle Fire Department/Medic One and the EMS Division developed a voluntary community responder AED Program and registry of Public Access Defibrillation (PAD) AEDs. This study investigates whether the proportion of cardiac arrest cases in which a PAD AED was used continued to increase since the start of the PAD program; whether increased use of PAD AEDs during resuscitation efforts translated into

increased survival from out-of-hospital cardiac arrest; and what the interaction is between PAD AEDs and traditional EMS treatment of cardiac arrest (do patients require additional shocks by EMTs and paramedics upon their arrival).

Knowledge of the impact of the PAD program on survival from out-of-hospital cardiac arrest could inform local entities about the value of investing further resources in this program. Additionally, a better understanding of the interaction between PAD use and EMS care will be important for EMS program planning and personnel training. These findings could also be instructive to other communities that are considering implementing similar PAD programs. The Regional Medical QI Section in partnership with Seattle Medic One will reassess the use of PAD and its influence on cardiac arrest survival.

Communication and Limited English Proficiency for Victims of Cardiac Arrest: Early application of cardiopulmonary resuscitation (CPR) to persons suffering from sudden cardiac arrest can improve survival. Research shows that community bystanders can improve survival of cardiac arrest by providing CPR prior to the arrival of emergency medical services (EMS). Unfortunately, many sudden cardiac arrest victims do not receive bystander CPR before the arrival of emergency medical services personnel. To address this need, King County dispatch centers provide CPR instructions over the phone prior to EMS arrival in the case of cardiac arrest when CPR is not already being provided by lay persons. To be most effective, dispatch CPR instructions require effective communication between dispatcher and bystander. Limited English Proficiency (LEP) has been associated with poor quality of medical care and increased risk of adverse events. However, little is known about the role of LEP in the care of victims of sudden cardiac arrest and specifically whether it affects the provision of bystander CPR prior to EMS arrival. This study will evaluate the association of LEP and the provision of bystander CPR to victims of cardiac arrest.

Future Evaluations

Increasing the Use of Publicly Available Automatic External Defibrillators (AEDs): Washington State law requires all AEDs placed in the community to be registered with the local EMS authority. Currently 2,100 AEDs are registered in King County. The location of each registered AED is routinely sent to the appropriate 9-1-1 dispatch center that provides service to that location. This information is entered as premise information into the Computer Aided Dispatch software at the 9-1-1 center. Dispatchers can use the premise information to inform callers and EMS responders when there is an AED at a location where a cardiac arrest is being reported. In some cases, the dispatcher can locate AEDs within a 530 ft. radius of the event. Now that this technology is in place at King County dispatch centers, the Regional Medical QI Section will be involved in evaluating the effectiveness of the AED registry. Strategies for increasing the number of AEDs in the registry, improving the process by which 9-1-1 dispatchers access premise information, maximizing public use of AEDs, and eventually improving cardiac arrest survival rates will be explored.



Exploring Dispatcher-recommended Aspirin Administration: Research has shown that the proper administration of aspirin to patients suffering an acute myocardial infarction may improve health outcomes. Additionally, earlier aspirin use may lead to fewer in-hospital complications and lower mortality rates. The Regional Medical QI Section will retrospectively review King County cardiac arrest incident records to identify cases in which early administration of aspirin may have been beneficial. These cases may be used to create a case definition that can be used by 9-1-1 dispatchers to recommend aspirin use to appropriate callers. Depending on the results of the data review, a pilot project may be recommended.

Glucagon Study: Hypoglycemia is a condition characterized by low blood sugar. The standard therapy for hypoglycemia is oral glucose and when oral glucose cannot be administered, IV dextrose or glucagon is used. In King County, EMTs can administer oral glucose and are authorized to use glucometers. Currently, only paramedics are authorized to administer IV dextrose glucagon (when an IV cannot be started). Paramedic treatment of out-of-hospital hypoglycemia is safe and effective, yet little data are available for EMT treatment of hypoglycemia. This study will consider whether a program authorizing EMTs to administer glucagon is appropriate and under what circumstances.

Chronos Study: The Chronos Study is a detailed audit of every case of witnessed cardiac arrest during the year 2008. All available sources of information will be reviewed including dispatch recordings, EMT run reports, paramedic run reports, AED digitized reports, hospital records, death certificates, and autopsy reports. The goal is to precisely measure every critical therapeutic intervention and decide how the care of cardiac arrest patients can be improved.

Differences in Patients Arresting Before or After EMS Arrival: Very little is known about outcomes among patients who arrest before or after EMS arrival. We intend to study these two groups to measure and better understand differences and determine if there are therapeutic implications.

IV. Emergency Medical Dispatch (EMD)

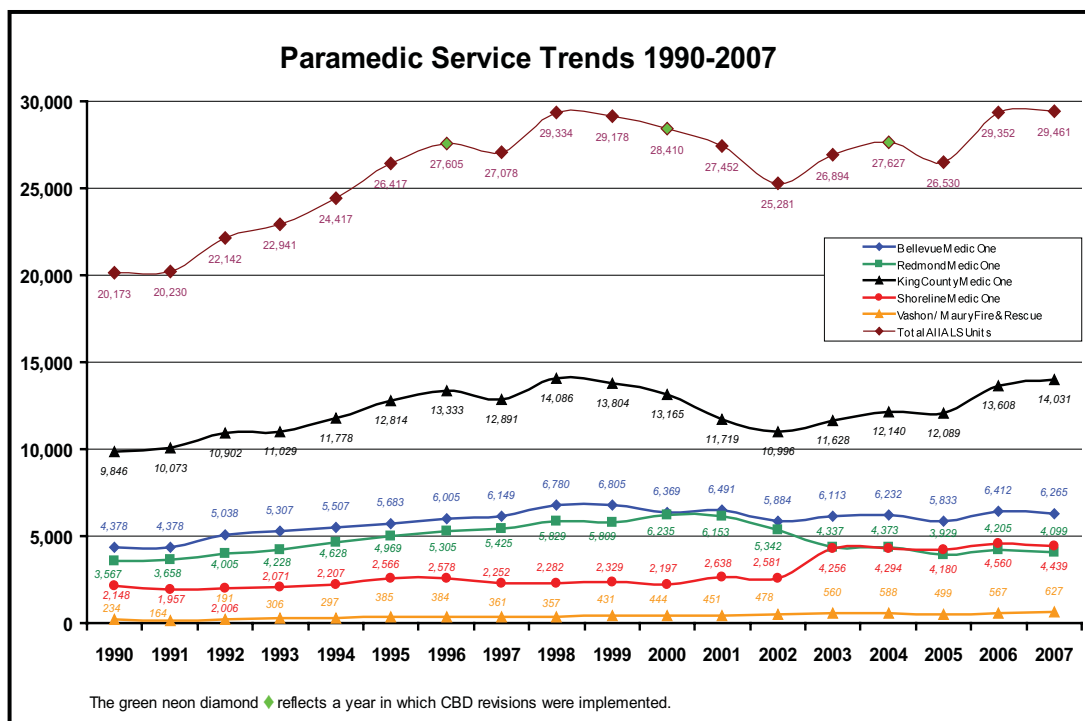
The EMS Division developed and continues to administer a comprehensive Emergency Medical Dispatch (EMD) program using Criteria Based Dispatch (CBD) in King County, not including Seattle. These services include EMD basic and continuing education training, web-based training, quality improvement, and medical oversight of the CBD Guidelines. The CBD Guidelines allow the 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 184 emergency medical dispatchers and call-receivers in King County. During the past year, 17 dispatchers from King County completed the basic EMD training class. In addition, 154 dispatchers were provided 8 hours of continuing medical education in EMD related topics.

The end of the EMS 2002-2007 levy period brought to a close several strategic initiatives related to dispatch. These initiatives included data driven revisions to the King County Criteria Based Dispatch (CBD) Guidelines, enhanced quality improvement practices for dispatch, and expanded emergency medical dispatch training, including an innovative online training project. During the previous levy period, these initiatives clearly demonstrated improved effectiveness and efficiency

of ALS dispatch. All three of these strategic initiatives were transitioned into Regional Services for the 2008-2013 levy period as ongoing programs (with the exception of a small part of the CAD integration project).

Review and Revision of the Criteria Based Dispatch (CBD) Guidelines (ALS Triage Criteria)

A major emphasis of the EMS Strategic Plan has been EMS system efficiency. One of the strategies used to decrease the rate of growth of ALS calls was a data driven approach to revising the CBD Guidelines. The CBD Guidelines were revised two times during the last levy period, in 2004 and 2007. An analysis of King County paramedic service trends from 1990 - 2007 (see graph below) demonstrates a remarkable accomplishment in the stabilization of total ALS call volumes over a ten year period. While there was evidence of call volumes decreasing and then rising again towards the end of the 2002-2007 levy period, of particular interest in this final analysis is the comparison of the ALS Call volume for 1998 and 2007. Over this ten year period, ALS call volumes increased by 127 calls. In the previous 9 years from 1990 to 1998, the ALS call volume increased by 9,161 calls. The data driven approach to revisions of the CBD Guidelines will continue as an ongoing Regional Services program. The next guidelines revisions are scheduled for 2010.



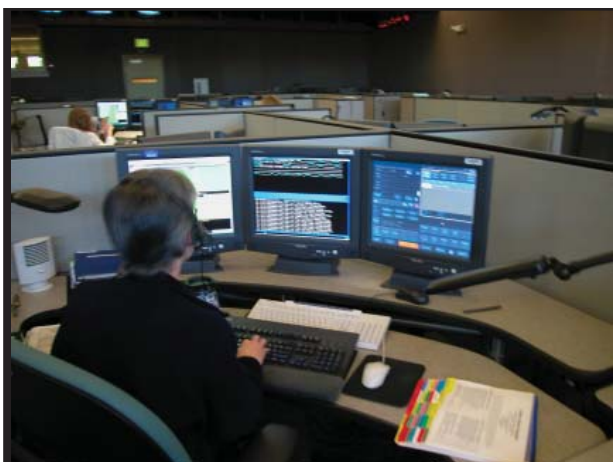
Criteria Based Dispatch (CBD) Guidelines Software

In an effort to improve the efficiency of the Criteria Based Dispatch (CBD) Guidelines, the EMS Division developed custom software to automate the paper-based CBD Guidelines. In Phase I, a stand-alone PC version of the software was developed and is now used by two small dispatch centers in King County: Enumclaw Police and the Port of Seattle Police/Airport Operations.

In 2006, Phase II was developed, integrating the CBD Guidelines with a Computer Aided Dispatch (CAD) system used by Eastside Communications in Bellevue.

Eastside Communications Center started using the software July 1, 2007, and over 35,000 calls have been entered into the system. The use of this software allows a significant amount of 9-1-1 call data to be available to supervisors and EMS administrators for quality improvement activities and planning. Phase III and IV of the project are included in the *Medic One/EMS*

2008-2013 Strategic Plan as a Strategic Initiative (see page 45) to integrate the CBD software with CAD at Port of Seattle and Valley Communications Center, respectively.



Emergency Medical Dispatch (EMD) Quality Improvement

The initial EMD Quality Improvement Program was developed in 2001 as a strategic initiative in the *EMS 2002-2007 Strategic Plan*, and included random and selected case reviews of individual 9-1-1 tapes and associated dispatch and EMS records. As of June 2008, approximately 4,900 cases have been reviewed. Reviewers have been able to identify issues and systemwide trends that have subsequently been addressed in dispatch training through continuing medical education courses delivered by paramedics and dispatchers. In developing the new *Medic One/EMS 2008-2013 Strategic Plan*, this strategic initiative was converted into the ongoing Regional Services program. The addition of a full-time QI Program Manager will allow for continued efforts toward streamlining to a paperless or electronic EMD Quality Improvement Program. The additional staff will also provide the necessary resources to support development of the 2008-2013 Strategic Initiative of providing advanced level EMD training for dispatchers by assisting in identifying objectives for this training (see page 46).

Enhanced Criteria Based Dispatch Basic Training and Continuing Education Curriculum

The basic Emergency Medical Dispatch training course and all continuing medical education courses have been revised to include a more participant-centered method of delivery and more scenario-driven content. With the addition of the pre-requisite Anatomy and Physiology course, the Basic Criteria Based Dispatch (CBD) course is now 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-

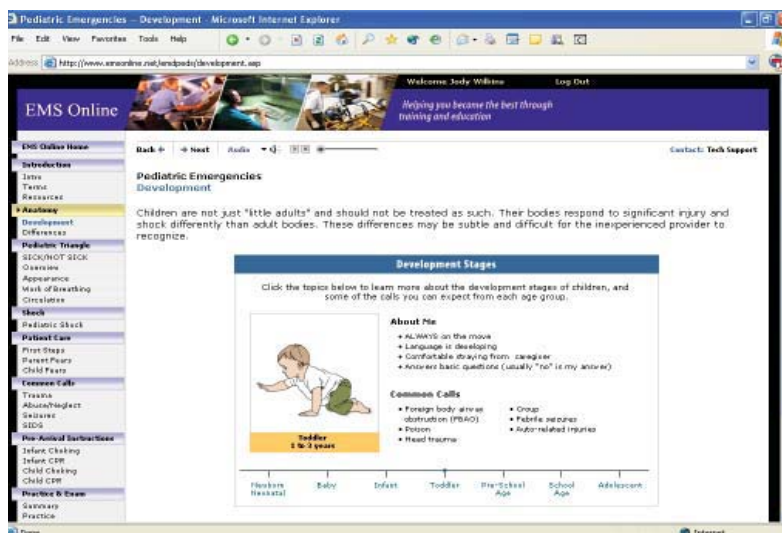


hour Basic CBD course content focuses on body system pathology (pathophysiology), signs and symptoms of 26 chief complaints, pre-arrival instructions including all emergency instructions with a primary focus on the identification and treatment of sudden cardiac arrest.

In developing the new ***Medic One/EMS 2008-2013 Strategic Plan***, this 2002-2007 strategic initiative to develop curricula for both the Basic and Continuing Medical Education courses has been converted into Regional Services as an ongoing program. There will continue to be a focus on raising the bar in medical education for dispatchers through the development of more challenging courses as well as construction and delivery of more complex scenarios. The ***Medic One/EMS 2008-2013 Strategic Plan*** includes a strategic initiative for development and delivery of advanced emergency medical training for dispatchers.

On-line Web-based Training for Dispatchers and EMS Personnel

King County Emergency Medical Dispatchers are required to attend a minimum of 8 hours of continuing medical education each year. Staffing issues usually take priority over attendance at classroom trainings making it difficult to schedule each and every emergency medical dispatcher for classroom courses each year. Online 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. The EMS Online 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 (see page 36 for more details about EMS Online).



The content of the online courses is based on issues, systemwide trends and new emerging medical standards of care. These 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 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 eight modules developed since 2003. They include: Pediatric Emergencies, Telephone CPR, Infectious Disease EMD, Anatomy and Physiology, Overdose and Poisoning, Stroke/Seizure - Decreased Loss Of Consciousness (LOC), EMD Sick/Not Sick and Decreased LOC. Every year two new modules are developed and delivered. The Spring 2008 module was Overdose & Poisoning; the Fall 2008 module will be Trauma. These courses have been very well-received by dispatchers in King County and many other counties in Washington State as noted by the following comments:

‘EMS Online is great, it allows the employee to work at a pace they are comfortable with’ Melinda Kometti, Supervisor, Valley Communications

‘King County EMS Online course have received excellent reviews from our call-takers and dispatchers. The lessons are clear, concise, and contain real life examples that are very helpful. Our staff has said thank you more than once.’ Deb Welsh, Assistant Director, Skagit County 9-1-1

‘I would highly recommend EMS Online for EMD because it is so easy to use, extremely interactive and provides the student with an in-depth view of the topic. I have received positive feedback from our employees, plus it has reduced overtime because the students can complete the modules during work time. King County has been fantastic to work with!’ Jody Borden, Communications Supervisor and CBD Instructor, Southeast Communications (Benton County, Washington)

Nursing Home/Adult Care/General Medical Clinic Facilities

After identifying a need to address issues with calls to 9-1-1 from nursing homes, adult care facilities and general medical clinics, the Community Programs Section of the EMS Division identified opportunities in the community to educate personnel in these facilities regarding the appropriate use of EMS services. 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 the 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’s Orders for Life-Sustaining Treatment (POLST) and discuss the issues faced with when dealing with requests for EMS services under these circumstances.
- Use the enclosed job aid, “Calling 9-1-1 for EMS Services”, when making a call to 9-1-1 for EMS assistance.

To enhance this training and provide a means for administrators to provide training to new employees, the EMS Division developed a video that addressed these objectives and included this video in a packet accompanied with a job aide card to serve as a reminder to employees when calling 9-1-1 as to what information the call-receiver will require in order to process the call

for service. The packet also includes stickers and magnets that can be placed near telephones and work stations to serve as reminders about information the 9-1-1 call-receiver will require in order to assist the patient and send the most appropriate response.

Since 2005, EMS provider agencies and an education specialist from the EMS Division provided this training to facilities in an attempt to reduce unnecessary requests for EMS services from 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.

Since August 2006, over 500 nursing homes, adult care facilities and boarding homes have received training and/or training materials either in-person or through a mailing. Nursing homes in Shoreline and Redmond received trainings from their respective EMS provider agencies, Shoreline Fire Department and Redmond Fire Department. South King Fire & Rescue continues to work with our education specialist to provide more training opportunities in their region. Bellevue Fire Department will begin working with the education specialist to reach out to specific facilities as a priority for this project in their jurisdiction.

 GUIDELINES FOR EMS RESPONSE AND TRANSPORT REQUESTS <small>King County Emergency Medical Services</small> 	
<p align="center">CALL 911 TO REQUEST EMS RESPONSE FOR THE FOLLOWING:</p> <ul style="list-style-type: none"> • Acute, life-threatening medical condition or complaint • Medically unstable patient • Immediate health risk 	
<p>When calling 911: Be ready to relay the following information: Your Name/Name of facility Address where help is needed Call-back number <u>Patient Information:</u></p> <ul style="list-style-type: none"> • Age • Gender • Specific medical complaint or problem, i.e. "Chest Pain", "Shortness of Breath", etc. • Medical history • Any medical treatment provided and status change <p>***Remember to call 911 again if conditions worsen</p>	<p>When EMS Arrives: They will expect to be met by a Physician, Nurse or health care provider, who can provide the following information:</p> <ul style="list-style-type: none"> • 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
<p><u>Private ambulances should be called for inter-facility transports of medically stable, non-acute patients.</u> Private Ambulance _____ Phone Number _____</p>	
<p>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!"</p>	

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 14-18, 2008. These awards, given out since 2004, recognize overall excellence as well as expert response to critical incidents. For the past two years, the EMS Division Manager has attended ceremonies at each Communication Centers in King County to relay our appreciation for their continued commitment to quality patient care through the use of the Criteria Based Dispatch Guidelines.

2008 Award Winners: This year's award winners include Roseann Mills and Don Pederson from Valley Communications Center, and Krystal McCoy and Becky Lucci from Eastside Communications Center. Ms. Mills and Ms. McCoy both received the award for sustained exemplary performance throughout the year. Mr. Pederson and Ms. Lucci both received their awards for exemplary handling of a critical Emergency Medical Services incident. Ms. Lucci received her award for her skilled and calm response to an at-home childbirth, while Mr. Pederson was honored for his expert response for a child who was critically burned.

Krystal McCoy – Recipient Emergency Medical Dispatcher of the Year – Sustained Performance: Krystal has been a Call Receiver/Dispatcher for almost ten years. She has played a significant role in the training of new employees, including co-instructing the classroom academy and providing one-on-one training as a Communications Training Officer. Krystal's positive attitude is a welcome addition to any shift she is working. She is professional, polite, and compassionate in her communication with the public.



Krystal



Becky

Becky Lucci – Recipient Emergency Medical Dispatcher of the Year – Exemplary Handling of a Critical Incident: On June 21, 2007, Becky received a call from a resident in Shoreline requesting medical help for his wife who was in labor at home. Becky quickly determined this was the woman's second child and childbirth was imminent. She calmly provided instructions to the caller using the appropriate CBD criteria; adjusting her delivery of the instructions as the situation changed. From the time that the baby's head was seen crowning, until a friend joyfully announced the arrival of a baby boy, two minutes and forty seconds had elapsed. Becky provided the help that was needed with confidence, and even though the scene was hectic, she was calm and reassuring throughout the call. Becky has been a Call Receiver/Dispatcher for over 12 years. In addition to her Dispatch duties, Becky is also a Communications Training Officer and was training a new Call Receiver at the time she answered this emergency call, setting an excellent example of professional performance under pressure for her trainee.

Roseann Mills – Recipient Emergency Medical Dispatcher of the Year – Sustained Performance: Roseann Mills has been employed with Valley Communications since August 17, 1998. She is a focused call receiver that is willing to go above and beyond her scope of responsibilities. Roseann is diligent in her drive to provide each calling party and patient with the best care possible until field units arrive. Roseann is able to consistently meet the patient's needs with a reassuring demeanor, level of medical expertise and appropriate pre-arrival instructions. Roseann deserved this honor because of her consistent performance, her willingness to learn and grow as an EMS Call Receiver and due to the high level of service she provides to the patient and the EMS system.



Roseann and Don

Don Pederson– Recipient Emergency Medical Dispatcher of the Year - Exemplary Handling of a Critical Incident: On the morning of April 10, 2007, a 5-year-old child dressed himself and went outside to play. Somewhere the child found a lighter and managed to ignite a nylon sports jersey he was wearing underneath a cotton t-shirt. This resulted in an approximate 36% 3rd degree burn to his torso (front and back) as well as his right arm. The mother picked up a cell phone and called 9-1-1. She was greeted by call-receiver Don Pederson. Mom was frantic and unable to hear Don over the screams of the injured child. Don was able to retrieve the address, calm her down and work through several obstacles to gain control of the caller, and provide proper pre-arrival instructions while directing the caller away from immersing the child in the cold water. Don's ability to take immediate and deliberate control of the call had a direct impact on the child's recovery. Don's professionalism, leadership ability and empathetic tone kept the mother focused enough to do the best thing to care for her child before the responders arrived.

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

Helping you become the best through Training and Education!



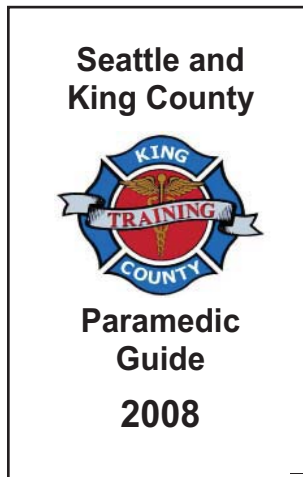
The Basic Life Support (BLS) Training and Education Program provides initial training, continuing education, instructor education and oversight of the recertification process for over 4,000 Emergency Medical Technicians (EMTs) in King County. This requires considerable coordination and communication 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 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 all pertinent information from the State regarding continuing education, certification, recertification, and regulatory and policy changes.

The following highlights current BLS Training and Education Projects:

Patient Care Guidelines

The protocols used by EMTs to direct the pre-hospital care of patients are derived from the Patient Care Guidelines (PCG), also known as the 'Blue Book'. The EMS Medical Program Director (MPD) is required by Washington Administrative Code (WAC) to draft and distribute these EMT Patient Care Guidelines to all EMTs in King County. The EMS system in King County is considered a national leader in EMS research and education, and as such, is committed to updating and distributing the PCG every two years to enable new and innovative techniques to

be incorporated into overall EMT patient care. Revisions to the EMT guidelines will again be made and distributed in January 2009. They are placed directly on the EMS Online training site (see page 36 for details) so changes can be rapidly communicated to EMS personnel.



In addition, the first Seattle and King County combined Paramedic Guide debuted in 2006. This guidebook was built in cooperation with the University of Washington/ Harborview Medical Center Paramedic Training Program and offers a countywide approach to paramedic guidelines and medications. Similar to the EMT Patient Care Guidelines, this guidebook is offered to each paramedic throughout King County

with updates every two years. The latest draft was recently approved and printed copies will be delivered to each paramedic in the summer of 2008.

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/King County Police 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. This spring over 60 EMTs completed the EMT basic course and similar numbers are expected for the fall course in September 2008. The spring course was held in partnership with the Seattle Fire Department at the Joint Training Center (JTC) in Seattle.

On some occasions, the Training Section partners with other fire departments to sponsor EMT classes outside the standard course structure. For example, the 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, Redmond Fire Department and the Seattle Fire Department in early 2008 with excellent results. This relationship demonstrates the EMS Division's commitment to community partnership and the continued efforts toward quality regional education.

Competency Based Training (CBT)

Each year, the State of Washington mandates that EMTs complete 10 hours of continuing medical education or a county-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, writes, performs instructional training, and implements the curriculum each year. The 2008 CBT curriculum is complete and includes the following selected topics: Cardiac Emergencies, Diabetic Emergencies, Stroke, Head/Spine and Thoracic Trauma, Death and Dying and Street Medicine - Drugs. Infectious Disease is offered as a yearly requirement.



An **Online Training Website (EMS Online)** that delivers web-based CBT modules was developed for the first time in 2001 with the assistance of grant money from the Medic One Foundation and later received approval as a 2002-2007 strategic initiative with designated funding. This 'tech-savvy' educational approach to mandatory training 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 13,000 EMTs enrolled throughout Washington state (100% of the approximate 4,000 EMTs in King County use this program). Over 150,000 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.

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 website and supports a full time instructor hotline for questions about the modules and treatment protocols. The website is currently being



revised for the 2009 curriculum and will add improvements to this state-of-the-art training system including improved interactivity, site customization, new and innovative testing procedures and advanced reporting features.

The EMS Online website 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 by the first quarter of

2007. 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. They pay a modest fee per head to have this program available for each of their 250 members. 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. To date, agencies in each of these states have 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. Included in the *Medic One/EMS 2008-2013 Strategic Plan* is a strategic initiative to support Interactive Enhancements to EMS Online (see page 50).

Regional EMS Tracking Resource - Online (RETRO) Project

The RETRO Project was an approved strategic initiative 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. Careful review of the Feasibility Analysis (Phase 1) and the success of the Electronic Records Management (ERM) Program (Phase 2) moved RETRO into a maintenance program for 2009 and beyond. The ERM 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. The final phase of RETRO will enable King County Fire Department Training Officers web-based access to necessary training data for their individual employees, including required training courses, instructor courses, and specialized certificates of completion.

EMT Defibrillation Program

The goal of the EMT Defibrillation Program is to ensure that 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 defibrillatory guidelines in January 2005 (see graph on page 64). 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.

VI. Cardiopulmonary Resuscitation (CPR) and Automated External Defibrillators (AED)

Cardiac arrest is the one of the most life threatening of all pre-hospital medical emergencies. Following cardiac arrest, the flow of blood to the brain and other vital organs stops. Cardiopulmonary Resuscitation (CPR) is a technique that enables continued oxygenated blood flow to the brain. CPR is easy to learn and can be performed by lay rescuers. Automated External Defibrillators

(AEDs) provide electrical stimulation to patients in cardiac arrest and are also designed to be used by the lay rescuer. Numerous clinical studies have demonstrated that patients who receive early CPR and early defibrillation have a significantly improved chance of survival from cardiac arrest. The EMS Division has a number of programs that provide CPR and AED training to residents of King County.

Seattle-King County Community Responder CPR/AED Program

The Public Access Defibrillator (PAD) Program is a joint effort between Seattle Fire Department and Public Health - Seattle & King County to help businesses and private homes implement an Automated External Defibrillator (AED) program, including appropriate training, proper placement of the device or devices, and registration of the AEDs with their local EMS system; all of which are in compliance with the Washington State Law concerning AEDs. Studies have shown that cardiac arrest outcome increases when an AED is used within the shortest time possible following collapse. The sooner a patient receives CPR, and an AED, is used the better the chances for the patient to recover. There are currently 2,081 AEDs registered in the Community Responder AED Program. The devices are in many public places as well as private homes. Both SeaTac International Airport and King County Airport have AEDs placed throughout their sites with easy access to both staff and lay responders. All but one Public Health Clinics have two AEDs on site. Both King County Jail locations in Seattle and Kent have numerous AEDs on site. Many police units carry AEDs in their vehicles and all ambulances in Seattle-King County are AED equipped. Included in the ***Medic One/EMS 2008-2013 Strategic Plan*** is a strategic initiative to support a public education campaign to encourage placement of more AEDs in public places (see page 49).

King County Employee CPR/AED Training Program

This program is designed to teach CPR and AED skills to King County employees during their regular workday and train employees to do CPR and use an AED should the occasion arise. There are currently over 200 AEDs located in King County owned facilities, and during the past year, over 1,500 King County employees have received CPR/AED training.

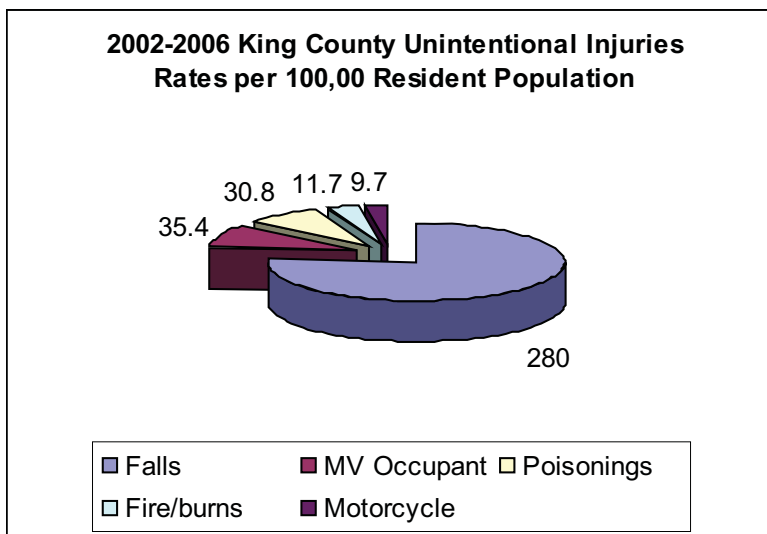
King County Student CPR/AED Program

In 2007, 15,610 students (grades 6-12) were trained to perform CPR in King County. They received nationally recognized American Heart Association (AHA) training from their teachers and local firefighters. The EMS Division contracts with seven school districts and seven fire districts to provide CPR training in the schools each year. Many teachers and firefighters also teach an AHA First Aid course to the students. There are currently 320 AEDs placed in King County high schools and middle schools and that number increases on a regular basis.

VII. Injury Prevention

Unintentional injuries were the leading cause of deaths for ages 1- 44 years old and the fifth leading cause of death overall. More than 117,000 Americans died in 2005 from unintentional injuries. In Washington State, injury deaths rose by about 10% between 1999 and 2006. Unintentional

poisonings and falls among those 65 years and older made up about 80% of the increase observed (Washington State Injury and Violence Prevention Guide Washington State Department of Health, June 2008).



Regional injury prevention programs cover a wide range of ages from the infants to older adults, including Think Again Program and Smart Kids Safe Kids (SKSK) Program, child passenger safety, and Mature Driver Program.

Think Again and Smart Kids Safe Kids

The Think Again program educates teenagers on the consequences of drinking and driving. The program focuses on seat belt use, drinking and driving, and road racing. The Think Again program has been in existence for over 10 years and was recently transitioned to a fire department managed program. The curriculum is expected to be reviewed in the near future. The Smart Kids Safe Kids (SKSK) Program educates preschool teachers on fire and life safety issues, including pedestrian, bicycle, poison, and scalds/burn safety. The curriculum was recently transferred onto a CD format so teachers have the program available via computer. In late 2008, two SKSK workshops will be offered through the King County Fire & Life Safety Association for preschool teachers and will qualify for continuing education credit.



Child Passenger Safety

It is estimated that up to 85% of children who are placed in child safety seats are improperly restrained (National Safekids). Exposure to an educational intervention provided by community health workers trained as child passenger safety technicians was associated with child safety seats being used more properly than seats of families not exposed to the intervention in an urban low-income Latino community (Child Passenger Safety for Inner City Latinos; Martin M, Holden J,

Chen Z, Quinlan K). Without an appropriate car seat, a family may face a \$124 fine per child that is not properly buckled up.

The EMS Division supports a child passenger program where pregnant mothers and mothers with infants are seen by EMS Agency/Community Health Workers that are also certified National Highway Traffic Safety Administration (NHTSA) car seat technicians. The program operates through seven Public Health clinics at Northshore, Eastgate, Columbia, White Center, Federal Way, Springwood, and Aldersquare. The technicians educate each client on the four stages of occupant protection:

- rear-facing
- forward-facing
- booster seat
- safety belts

This past year, 377 families were seen and provided a new car seat. However, the need for education and car seats clearly outweighs the resources and the program has expanded to include donated used car seats to the clients. With this addition, the number of infants at risk for injury or death has decreased. A successful used car seat model program could be implemented throughout Washington State that would further reduce childhood injuries and death due to motor vehicle collisions in this high risk audience.



Mature Driver Program - At Risk Drivers

On average, each year between 2002 and 2006, 623 people were killed and 2,946 people suffered disabling injuries on Washington's roadways (WSDOT - Transportation Data Office). The evidence collected by state agencies strongly suggests that these deaths and injuries are not randomly caused. Certain behaviors, attributes, and driver traits are associated with a greater incidence of fatalities and serious injuries.

In March 2007, Elizabeth Luce, Director of the Washington State Department of Licensing, convened the At-Risk Driver Taskforce. This action was part of a continuing effort by the Washington State government's public safety cabinet agencies to focus on reducing death and injury on the state's roadways. The purpose of this Taskforce, as presented in its charter, was to:

- Provide recommendations to the Public Safety Team members (Department of Licensing (DOL), Washington State Patrol (WSP), and Washington Traffic Safety Commission (WTSC)).
- Reduce fatalities and serious injury collisions for drivers determined to be 'At Risk'. This would include defining the term 'At Risk'.

**Washington State - All Roads
Reported Traffic Collision Fatalities and Injuries
January 1, 2002 through December 31, 2006**

Year	Fatalities	Number of Injuries		
		Disabling Injuries	Minor Injuries	Total Injuries
2002	659	3,205	64,923	68,128
2003	601	2,803	59,078	61,881
2004	570	2,814	60,092	62,906
2005	654	2,920	63,752	66,672
2006	632	2,988	60,048	63,036

Evidence reviewed by the Taskforce led it to focus on three problem areas:

- Young and aggressive drivers
- Elderly and medically impaired drivers
- Drug impaired drivers

Based on its review of data and literature and its discussion of what was needed and achievable, the Taskforce made the following six recommendations in August 2007 to the Public Safety Team agencies (in order of priority). The Taskforce recommended:

1. More action to deal with the problem of drug impaired drivers, including those who use and abuse over the counter (OTC), prescription, and non-prescription (illicit) drugs. DOL and the WSP should convene a separate group this fall to discuss developing standards for suspending drug impaired drivers.
2. The State require all physicians and primary care providers to report to the Department of Licensing whenever they believe a patient is an at-risk driver due to his or her medical or cognitive condition.
3. An increase in the consequences for specific reckless driving behaviors known to be associated with fatal and injury collisions.
4. The State develop an additional assessment tool to identify drivers who are at-risk drivers due to cognitive or physical conditions. All drivers would be required to take a 5-10 minute pre-assessment review designed to screen for cognitive and physical limitations that could effect driving. Where limitations are indicated, there would be an additional computerized screening designed to assist the Department of Licensing identify drivers who may be at risk to themselves or others.
5. DOL research and evaluation of public service campaigns that educate aging and medically at-risk drivers and their families in other states and communities. This evaluation should assess the effectiveness and results from these media campaigns and should identify how those results have been measured.
6. The State either obtain or develop information on the effectiveness of remedial training programs.

At this time, no immediate action has taken place on the Task Force recommendations.

VIII. Critical Incident Stress Management Program - 20th Anniversary



This is the 20th Anniversary year of the King County Critical Incident Stress Management (CISM) Team. The program and its 19-member all-volunteer team, specially trained to provide emotional and psychological services to emergency services professionals (ESP), was one of the first of its kind in the nation. When formed in 1988, the CISM Team's response area included all of Washington State, Pacific Northwest and the State of Alaska.

CISM has been an age-honored acronym for critical incident stress management services to the emergency services professionals. The services provided have been evolving over the years to include a broader meaning of Crisis Intervention and Stress Management. CISM service requests have been more than single-focused stress issues, such as provider agency peer support programs, emergency services provider and agency training, grief management services and an emerging behavioral wellness focus. The Helping the Helper Help motto exemplifies the mission of the Critical Incident Stress Management Program.

The objective this year was 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 relationships with EMS provider agencies. Strategic plans have focused upon mutual aid initiatives that increase efficiency and effectiveness of the regional collective. Continued focus upon this goal will occupy plans in the future.

Position Statement: Staff continue to follow the recommendations outlined in the 2004 published Position Statement (available online at <http://www.metrokc.gov/health/ems/cism/position-paper.pdf>). CISM staff and consultants researched the subject of critical incident stress management and debriefings that developed into our program's current long range planning effort. The primary focus 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 provider agencies' emergency services professionals in greater Seattle/King County.

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

2002-2008 CISM Program Review

- Total requests for CISM services: **171** (plus agency administrative support)
- Volunteer hours contributed: **2207**
- Researched and evaluated the successes/failures of the Critical Incident Stress Mgmt and CISD model.
- Published the findings and Position Statement on Critical Incident Stress.
- 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.

- 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
- Tertiary Prevention: follow-up referrals for treatment when a higher level of psychological support care, beyond debriefing/crisis intervention, is required

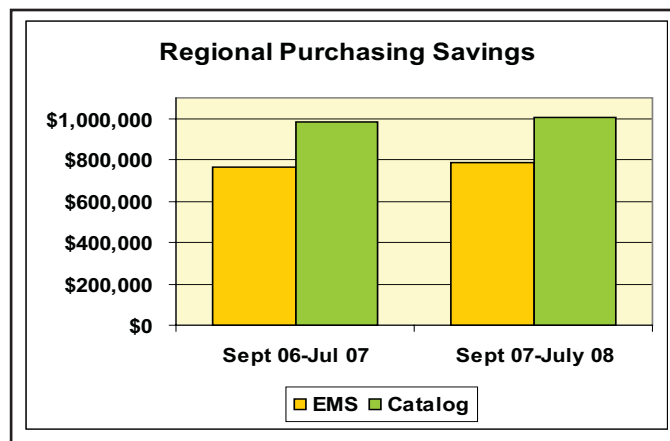
Peer Support Teams: The CISM Program has supported the emergency services provider agencies and their personnel (police officers, firefighters, EMTs, paramedics, dispatchers, and corrections officers). The CISM Program works to improve behavioral health messages by coordinating pre-incident stress management education and providing assistance to emergency services agencies' Peer Support Teams who serve the immediate needs of their co-workers. Future objectives are being focused on crisis intervention techniques, training to emergency services providers and identifying improved means of support services for the families of the emergency services workers. 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 second year of a three-year contract for supplies and equipment. Boundtree was the recipient of the recently awarded medications contract and is in the first 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 on the next page and confirm the overall cost savings to the region.



X. Administrative Functions

The EMS Administration Section has direct responsibility for the management and coordination of divisional and regional activities, such as:

- personnel and payroll
- issuance and management of policies and procedures
- legal compliance and liability issues
- budget preparation and monitoring
- contract administration and oversight
- long term financial planning
- management of levy funds
- strategic initiatives
- union negotiations
- diversity management

The division is responsible for the direct administration of paramedic provider agencies and maintains advanced life support (ALS) contracts with four paramedic provider groups and with 30 Basic Life Support (BLS) agencies. The section maintains fiscal responsibilities including budget preparation and monitoring, the projection of long term financial planning and the management of levy funds. The EMS Administration Section also coordinates services with other divisions of Public Health - Seattle & King County and other county agencies, councils, and offices such as the Prosecuting Attorney, King County Executive, Risk Management, and the King County Council. The division maintains close relationships with the University of Washington and Harborview Medical Center, and ongoing cooperation with local hospitals and medical providers. Embedded within Administration are the sections that furnish integrated regional direction. In collaboration with their county partners, these sections provide the quality direction of data collection and planning, medical oversight, basic life support training, community training and education, and research. This attention to detail by dedicated professionals provides efficient services with a nationwide reputation for excellence to the residents and visitors of King County.

C. 2008-2013 Strategic Initiatives

The *Medic One/EMS 2008-2013 Strategic Plan* contained specific strategic initiative projects designed to improve patient care, manage growth in paramedic services, and develop system efficiencies and cost savings, including the continuation of some strategic initiatives that were already in progress from the previous plan, integration of some initiatives proven to be successful as ongoing programs, and identification of new programs and initiatives that would contribute to the successful achievement of the plan's policy and financial goals. The table below summarizes the status of each current strategic initiative (a Summary Financial Report is located on page 101) and is followed by individual project descriptions.

2008-2013 Strategic Initiative Summary Table

Strategic Initiative	2008 Status
Dispatch Enhancements:	
Complete CAD Integration	In development
Dispatch Center Performance Standards	Initiated: Development of standards - 09/08
Advanced EMD Training	In development
Better Management of Non-emergency Calls to 9-1-1	In development
Injury Prevention:	
Expanded Countywide Falls Program	Initiated: 01/08
Small Grants Program for BLS Agencies	Initiated: 01/08
Community Awareness Campaign	Initiated: 09/08
Grant and Other Funding Opportunities	In development
Public Access Defibrillation	In development
Interactive Enhancements to CBT Online	Initiated: Development of enhancements - 01/08
Systemwide Enhanced Network Design (SEND)	Initiated: OMB approval of pre-planning proposal - 07/08
All Hazards Management Preparation	In development
EMS Efficiencies & Evaluation Studies	In development
Strategic Planning for Next Levy Period	Not applicable at this time

Complete CAD Integration

The EMS Division developed custom software to automate the paper-based Criteria Based Dispatch (CBD) Guidelines (see page 28 for more details). With the successful implementation of the stand-alone software at Enumclaw Police and the Port of Seattle Police/Airport Operations, and a

CAD-integrated version at Eastside Communication, the project was incorporated into Regional Services as an ongoing program. Complete integration of this software into the two remaining Computer Aided Dispatch (CAD) systems, the Port of Seattle and Valley Communications, was included in the ***Medic One/EMS 2008-2013 Strategic Plan*** as a Strategic Initiative.

Dispatch Center Performance Standards

The ***Medic One/EMS 2008-2013 Strategic Plan*** includes an initiative to strengthen the recognition program for dispatch centers and create standards that are tied to funding, including participation in required training and quality improvement activities. This model is currently used by the King County E-911 Office where funding is provided to communication centers on the basis of meeting key call answering time standards. Approximately \$1.6 million is identified in the strategic plan to be allocated to four dispatch centers over the six-year levy period. Development of the standards with EMS system stakeholders will occur in 2008 with the goal of allocating funding to communication centers in 2009. Community Programs will work closely with the new Regional Medical Quality Improvement Section (see page 22) in order to develop a plan to implement this initiative and work toward a recommendation to add a component of patient outcomes to Emergency Medical Dispatch, including feedback to dispatchers.

Advanced EMD Training

While developing the ***Medic One/EMS 2008-2013 Strategic Plan***, a strategic initiative was proposed to provide an advanced level of EMD training to call receivers in King County. This initiative is currently being reviewed by the EMS Division and the Dispatch Review Committee. Some additional alternatives to advanced training are being explored. There are no plans at this time to initiate changes in 2008.

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

The ***Medic One/EMS 2008-2013 Strategic Plan*** includes a new initiative to help EMS/Medic One better manage non-emergency calls and reduce stress on the entire EMS system. While the previous levy concentrated primarily on maximizing efficiencies by reducing the rate of growth of ALS calls, this new initiative concentrates on the other end of the spectrum of our EMS system, minor emergency BLS calls and non-emergency calls to 9-1-1. This initiative funds a full time program planner for a period of four years to evaluate existing projects and develop new projects and public awareness activities. Several projects are planned initially, including a review and evaluation of the current Telephone Referral Program (TRP) which refers approximately 800 non-emergency calls annually to a nurse consulting line. Program managers believe this program may be underutilized, and a thorough evaluation will identify concerns and help develop enhancements to increase usage.

Also under consideration is a modification of the current dispatch screening process for call receivers to allow non-emergency and minor emergency calls to be screened out as not needing an immediate dispatch, allowing call receivers more time to assess how the caller might be better served within our system before sending a BLS unit. Medical emergencies will continue to receive

a rapid dispatch. This process is currently under review by the Medical Director, the EMS Division and Valley Communications Center. In addition, a new pilot project is being developed with South King Fire and Rescue to identify an alternative response to the traditional BLS response for non-emergency calls that are also not appropriate for transfer to the consulting nurse line. The EMS Division anticipates having more details shortly. Finally, other approaches identified in the Strategic Plan will be implemented in future years, including additional referral sources for dispatchers and community awareness campaigns to educate the public on when not to call 9-1-1.

Expanded Countywide Fall Prevention Program

Falls are a major threat to the health and independence of older adults, people aged 65 and older. Each year in the United States, nearly one-third of older adults experience a fall. About one out of ten falls among older adults result in a serious injury, such as a hip fracture or head injury, that requires hospitalization. In addition to the physical and emotional pain, many people need to spend at least a year recovering in a long-term care facility. Falls are the leading cause of injury deaths among older adults. The rate of fall-related deaths among older adults in the United States has risen significantly over the past decade (CDC Falls Among Older Adults, An Overview).

The Fall Prevention Program identifies and enrolls older adults who have needed 9-1-1 services as a consequence of their fall. Past assessments have found that participants uniformly felt the program was useful, and was effectiveness in reducing repeat fall risk by about a third. The ***Medic One/EMS 2008-2013 Strategic Plan*** included expansion of the Fall Prevention Program countywide as a Strategic Initiative. Hiring a half-time career service Intervention Specialist in early 2008 has allowed this to be implemented countywide. The Falls Prevention Program has enrolled 269 persons since it began operation in February 2003. Each year, the Program has enrolled and provided services to an increasing number of older adults in King County (Table 1). As the program has matured, the process for identification and implementation has improved and become more efficient so that more persons can participate.

Table 1: Participation by Year

Year	N	(% of total enrollment)
2003	18	6.7%
2004	39	14.5%
2005	40	14.9%
2006	60	22.3%
2007	72	26.8%
2008 (six months)	40	14.9%
Total	269	100.0%

Over the course of the program, the demographic and clinical composition of participants has remained fairly stable. For example, during each of the 5 years of the program, the median age of persons who enroll in the Falls Prevention Program is about 80 years, about two-thirds are women, and approximately half are currently married. For each of the 5 years, less than 10 % smoke

or drink alcohol while most report a history of falls (prior falls) and about half live alone. Overall, the Falls Prevention Program has been able to continue to identify a consistently high-risk group of older adults while steadily increasing the availability of the program's services.

In the Falls Prevention Program, when a participant is enrolled, a personal and home safety evaluation is conducted. The assessment includes a standardized health assessment that queries about established risk factors such as prior falls, alcohol and medication use, level of daily activity, and their health function. The assessment also includes objective exam measures such as orthostatic blood pressure and the 'up and go test' or 'sit to stand test' which assesses the multiple inputs (strength, balance, coordination, vision) that are necessary to prevent falls. The Intervention Specialist also assesses home and environmental safety. Based on these assessments, Intervention Specialists provide several services. The first is a personalized summary of the results of the health and home assessment that highlights the specific risks for a participant. The Specialist works to connect participants with practical community resources designed to address particular fall risks (such as exercise and strengthening programs).



Finally, the Specialist modifies the home to reduce risk through installation of assist devices (i.e. grab bars, nonslip rug mats, bed rails and better lighting). What are the specific fall risk factors? They include use of four or more medications or any psychoactive medications, a previous fall, being 65 years or older, difficulty walking or standing, unsafe footwear or foot problems, visual problems, and home environment hazards. People with one of the above listed risk factors have a 20% chance of having a serious fall within a year, two risk factors increases the risk to 30%, three risk factors increases the risk to 60%, and four risk factors increases the risk to 78%. By learning to manage these risk factors, the elderly can learn to stay healthy, active and independent for life.

Injury Prevention Small Grant Program for BLS Agencies

Included in the ***Medic One/EMS 2008-2013 Strategic Plan*** as a Strategic Initiative, the Small Grant Program for Basic Life Support (BLS) agencies provides an opportunity for fire departments to address one of their highest unintentional injury BLS call - older adult falls. The grants are designed to provide financial assistance to BLS agencies for qualified fall prevention activities. Request for proposals (RFP) were sent out to all King County BLS agencies in early 2008.

Proposals were required to meet a specific goal: reducing death and injury as a result of unintentional falls in King County by educating older adults about fall hazards and/or reducing fall-related injuries in elderly residents residing independently in their home. The grant criteria was based on

previous fall prevention studies where multi-factorial risk assessments and management programs has shown to be the most effective intervention in reducing falls among older adults. The four main factors that are known to have the greatest impact on reducing fall risks include:

- exercise
- good vision
- medication management
- environmental modification/education

The fall mini-grant proposals could include all four risk areas or address just one component, but were required to have either a best practice or proven strategy (supported by research), or recommend a tried strategy that had a strong evaluation plan to assess the effectiveness of the project at its conclusion. All projects needed to be able to be duplicated by other EMS agencies. Eight fire departments submitted an application, including Bellevue Fire Department, Bothell Fire Department, Eastside Fire & Rescue, Northshore Fire Department, Renton Fire Department, Shoreline Fire Department, South King Fire & Rescue, and Valley Regional Fire Authority. All eight fire department grant applications were approved by a committee comprised of Boeing Fire Department, Central Region EMS and Trauma Care Council, the EMS Division of Public Health - Seattle & King County, Kent Fire Department Seattle Fire Department, Valley Regional Fire Authority, and the Washington State Department of Health.



Some fire department recipients are implementing a home safety modification program or community health screening programs, while others were thinking ‘out-of-the-box’ by looking at other ways to increase physical activity among older adults. Since there have been numerous news articles regarding the Nintendo Wii program used by older adults, several fire departments collaborated with their local community centers to implement exercise fall prevention programs around the Nintendo Wii program.

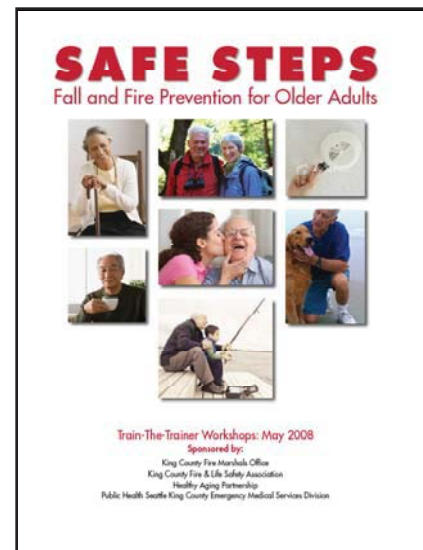
Injury Prevention Community Awareness Campaign

Collaborating with the King County Fire Life Safety Association, a non-profit organization comprised of public fire educators and other organizations interested in fire and life safety, a fall prevention program was developed to increase public awareness about the risks of falls for older adults. Included in the ***Medic One/EMS 2008-2013 Strategic Plan*** as a Strategic Initiative, the Injury Prevention Community Awareness Campaign initiated a project called SAFE STEPS. A two-phase approach of educational seminars and a regional public awareness campaign is planned for 2008. The objectives of SAFE STEPS are to increase the number of agencies providing community-based fall prevention education to older adults.

The first phase of SAFE STEPS provided two half-day fall prevention workshops for healthcare professionals or organizational representatives from Senior Services, YMCA, and local Community Centers. This training provided individuals with the knowledge and resources necessary to provide

consistent messaging and programs to older adults in their communities. The messaging and local programs empowered older adults to reduce their risk of falling and provided information on ways to prevent and survive a potential fire in their home. Over 100 people attended the two workshops in May 2008 at the Puget Sound Educational District and the North Bellevue Senior Center.

The second phase will launch an awareness campaign throughout King County in September 2008 targeting older adults, and their children and caregivers, to inform them about the dangers and the primary prevention methods necessary to reduce the risk of falling for older adults in their home. A combination of bus boards, radio ads and a public relations campaign will increase awareness of fall prevention. This education campaign will be launched in honor of Fall Prevention Day as proclaimed by Governor Gregoire on September 18, 2008.



Public Access Defibrillation

The EMS Division currently maintains a Public Access Defibrillation (PAD) program for Seattle and King County (see page 38). The purpose of this program is to encourage the placement of Automated External Defibrillators (AEDs) in the community in public places, in businesses and in residences. Included in the ***Medic One/EMS 2008-2013 Strategic Plan*** is a public awareness campaign Strategic Initiative regarding the importance of AED placement within easy access of residents in the event a cardiac arrest occurs. A secondary goal is to encourage residents to register the AEDs with the EMS Division so they can become a part of the PAD Registry, a database of all known AEDs placed in the community. The public awareness campaign is planned for development in late 2008 and will run through 2009 and 2010.

Interactive Enhancements to CBT Online

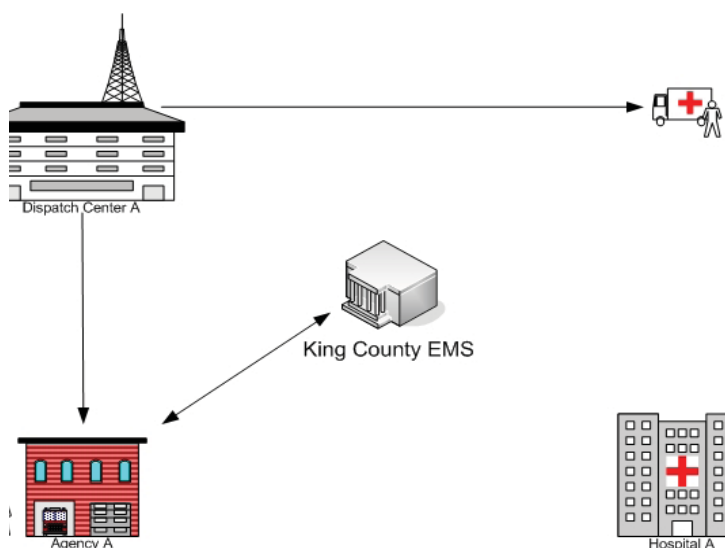
EMS Online is an interactive web-based teaching tool designed for EMTs, paramedics, and dispatchers to study subject matter in an interactive format, including realistic video case studies with complete online evaluations, all produced by BLS Training staff (for more details see page 36). Included in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

As a result of the significant increase in use, there has been a constant demand for additional content and features. Using updated software tools, EMS staff has been able to support an increased content offerings and functionality and provide quality technical support. The website soon will be able to offer customized content to address specific issues and protocols for individual fire departments and increase the interactivity of course modules. 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 to end users. 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)

Pre-hospital data generates over 200,000 records per year and is created by five separate dispatch centers and thirty-one different EMS agencies using six unique non-King County records management systems (see diagram below). 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. Acquiring patient outcomes would assist greatly in the accurate assessment of patient care protocols and development of patient care policies.



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 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. The objective of the SEND Strategic Initiative: Stage I - Pre-Project Planning is to hire a systems consultant, examine all the possible options for improvement, prioritize and select the optimal option, and create an implementation plan based on the selected option. Options for discussion will include mobile data collection and transmission methods. The pre-planning

proposal is currently being reviewed by the Project Review Board (PRB), and if approved, is expected to be completed in December 2008. The implementation plan will then be brought before the PRB in early 2009 for review.

EMS Efficiencies & Evaluation Studies

This strategic initiative provides funding for innovative studies designed to promote efficiencies and/or evaluate various aspects of the EMS system. Projects that meet this intent are currently under consideration for this initiative.

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.

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

The Center for the Evaluation of Emergency Medical Services (CEEMS) was founded in 1986 to conduct research activities aimed at evaluating pre-hospital emergency care and improving outcomes from cardiac arrest and life-threatening traumatic injury for the residents of King County, Washington. CEEMS is a multidisciplinary collaborative research program between the EMS Division and University of Washington. The research leadership for CEEMS has been provided by academic faculty from the University of Washington and assisted by research assistants and employees of the EMS Division. Mickey Eisenberg, MD, PhD, is the Medical Program Director for Emergency Medical Services in King County 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; Hendrika Meishcke, PhD, Professor of Health Services; and Peter Kudenchuk, MD, Professor of Medicine and Cardiology.

This exceptional leadership provides a depth and breadth of research and clinical experience in emergency medicine, internal medicine, cardiology, epidemiology, and health services. They have actively collaborated locally, nationally, and internationally to help advance understanding and practice of pre-hospital emergency care. Moreover, CEEMS has been supplemented with outstanding support personnel that include technical, statistical, educational, and EMS field providers. This multidisciplinary approach has contributed important pre-hospital research and programmatic progress (see *Appendix I: Complete Bibliography for 2008* on page 105).

Past accomplishments of CEEMS include the collaborative standardization of the Utstein international reporting form for cardiac arrests; and implementation of innovative methods of CPR

and AED training through development of websites, www.learnncpr.org and www.learnaed.org, a 10-minute video tape 'CPR: You Can Do It', and a citizen CPR public service announcement. In addition, improved resuscitation protocols to deliver CPR and defibrillation have been developed, early implementation of Dispatcher-Assisted Telephone CPR, and early training of EMTs in the use of a defibrillator resulting in the implementation of a county-wide EMT Defibrillation Program, and ongoing evaluation and improvement to King County criteria-based dispatch protocols.

The following are ongoing research projects in the area of pre-hospital care:

The Dispatch Assisted Resuscitation Trial (DART)

During a cardiac arrest, the best thing any layperson can do is to provide CPR until emergency medical responders can arrive. However, not all laypersons have been trained to perform CPR or feel comfortable doing CPR without professional assistance. 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. 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 Dispatch Assisted Resuscitation Trial (DART) 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. The study was initiated in April 2004 and anticipated completion of the DART project is 2009.

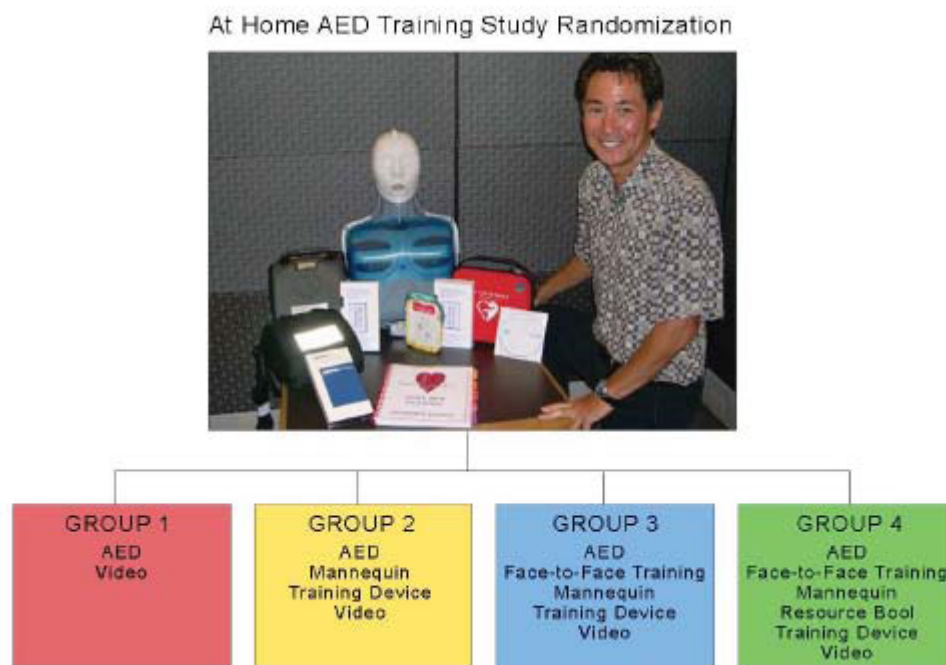
Hypertension Identification by Emergency Responders (HIER)

The EMS Division is collaborating with the University of Washington on a study aimed at motivating patients found to have high blood pressure during a 9-1-1 event to receive a follow-up hypertension assessment from an Emergency Medical Technician at a local fire station. The study involves an intervention mailing sent by the EMS Division on behalf of the four participating fire departments reminding patients of their high blood pressure and inviting them to a Bellevue, Kent, Renton, or Shoreline fire station for follow-up. Over 2,500 people have been invited to the fire stations so far. The study was initiated in September 2006 and will be completed by the end of 2009.

Home Automatic External Defibrillator Training Of High-Risk Patients

Cardiac arrest continues to be the leading cause of death in adults in the United States. Approximately 80% of cardiac arrests occur in homes or private residences (AHA Scientific Position, August 2008), often witnessed by a family member. A family responder Automated External Defibrillator (AED) program is thought to improve survival from out-of-hospital cardiac arrest by providing a home AED device and training. This study sets out to evaluate different AED training approaches for high-risk patients and their family members to determine the optimal training program for AED

skills retention and functional outcomes. Patients have been recruited following hospitalization at a King County hospital for a heart emergency. Participation is voluntary. Once a study couple completes enrollment, they are randomized to one of four AED training groups. Two training groups use video-based instruction and two use in-person training. Enrollees complete written surveys at three and nine months post-training in addition to a home visit AED skills evaluation at the nine-month milestone. Over 300 couples are currently enrolled in this study. Follow-up activities are underway and will conclude in 2009.



Resuscitation Outcome Consortium: Conducting Multi-site Clinical Trials

The Resuscitation Outcome Consortium (ROC) consists of 11 regional clinical centers in North America established to evaluate pre-hospital management and treatment of cardiac arrest and life-threatening trauma by randomized clinical trials. The trauma trial is evaluating the role of hypertonic saline in traumatic shock and brain injury. Pre-hospital Resuscitation Using an Impedance Threshold Device and Early versus Delayed Rhythm Analysis (PRIMED) is a clinical trial designed to evaluate outcomes of cardiac arrest therapy at the BLS level. King County EMTs have been randomized by fire department into Analyze Early or Analyze Late CPR protocol groups.

Analyze Early groups will perform CPR for at least 30 seconds then analyze. Analyze Late will do CPR for 3 minutes and then analyze. Separately, patients will also be randomized to the use of an impedance threshold device (ITD) while doing compressions in CPR events. (The study is double-blinded to the use of an ITD or the “sham” valve). The ITD is a one-way valve that fits between the airbag used to introduce air into a person in cardiac arrest 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. This study will continue through 2009.

Medical Outcomes After Cardiac Arrest

Thousands of people are successfully resuscitated from out-of-hospital cardiac arrest and discharged from the hospital each year. Several medical therapies may benefit these patients and improve their subsequent prognosis. However, little is known regarding the medical care of these patients. The goal of this study is to assess the medical care of out-of-hospital cardiac arrest survivors to determine whether current medical care is consistent with established guidelines for hospitalized cardiac arrest patients. Individuals from King County who survived cardiac arrest were invited to enroll in an interview and observational medical record review to assess their hospital care. The two-year study is just now being completed and results of this population-based study may improve care by identifying gaps where current care is not consistent with guidelines.

Additional Research Endeavors

CEEMS investigators are actively leading other research projects. In addition to the ROC clinical trials led by Dr. Kudenchuk, Principal Investigator of the Seattle-King County site, King County is one of two sites participating in a CPR feedback randomized trial called Increasing CPR during Cardiac Arrest Resuscitation: Effect of Real-Time Feedback. This study will determine if dynamic CPR feedback from a defibrillator compared to no feedback (the current approach) can improve CPR performance during a cardiac arrest so that CPR better meets guideline goals and thus improves survival following out-of-hospital cardiac arrest. Finally, King County is also participating in an evaluation of a promising strategy for early cooling of cardiac arrest patients. These patients will be randomized to receive the current standard interventions or IV infusion of iced saline prior to transport. This study will help determine if rapid cooling of patients improves neurological outcome following out-of-hospital cardiac arrest.

Mentorship

The CEEMS investigators are committed to providing direction and experience through mentoring UW medical and graduate students, medical fellows, junior faculty, and King County paramedics. Nearly a dozen University of Washington medical students have participated over the past three years resulting in a number of peer-review publications. One PhD epidemiology student from the University of Washington School of Public Health has published on a variety of topics related to resuscitation and continues to be actively involved in programmatic evaluation of EMS care. Paramedic personnel have also taken advantage of this program in a fellowship. Projects include an evaluation of the safety of paramedic central venous access procedures and the accuracy of EMS triage of acute coronary syndrome.

Summary

The collective work of the CEEMS investigators has shaped resuscitation science and pre-hospital

emergency care through thoughtful and diligent research. As CEEMS moves forward, there is substantial opportunity to make important new discoveries in resuscitation science as well as to improve translation of scientific understanding into better field-based, clinical care.

E. Conclusion

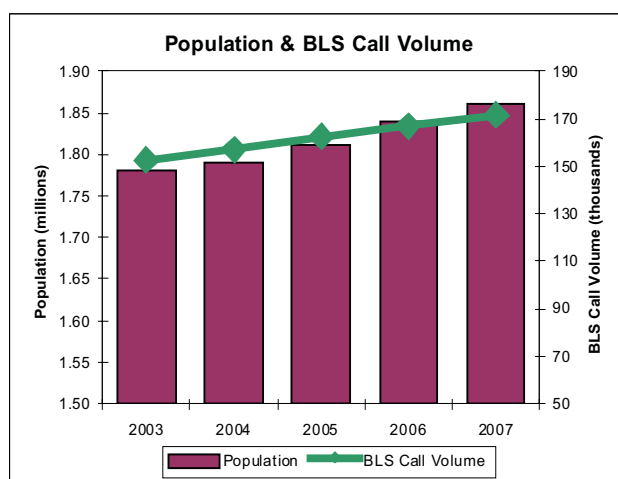
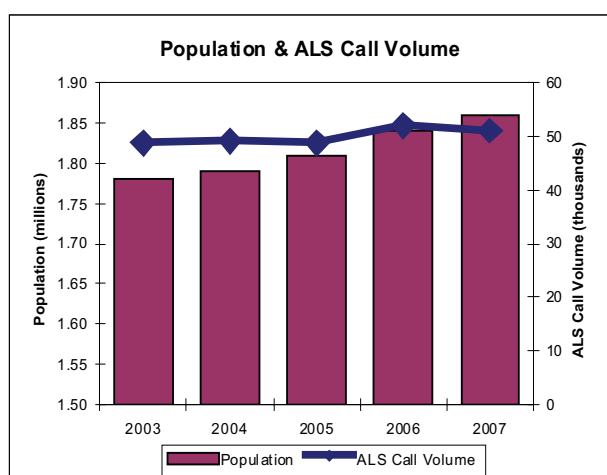
The EMS Division is committed to providing the highest level of pre-hospital care to the residents of King County. EMS programs are developed and maintained through strong partnerships with other EMS agencies in the region and innovative leadership in the emergency medical field in accordance with the 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 creation of a 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 2007 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 2007.

Population	Seattle-King County	% Growth (Annualized)
1980	1,269,898	
1990	1,507,305	1.87%
2000	1,737,034	1.52%
2007	1,861,300	1.02%

Population growth is often correlated with growth in EMS call volumes. Over the past two decades, the population in King County has grown well above an average rate of 1% per year. In 2003, the yearly rate of increase declined to 0.3% and the rate increased only slightly to 0.5% in 2004. The annualized rate of increase during this decade has declined to just 1.02% per year. The two graphs below depict the population growth relative to both BLS and ALS call volume patterns. Please note that the scales for population and call volumes are different.



Operations:

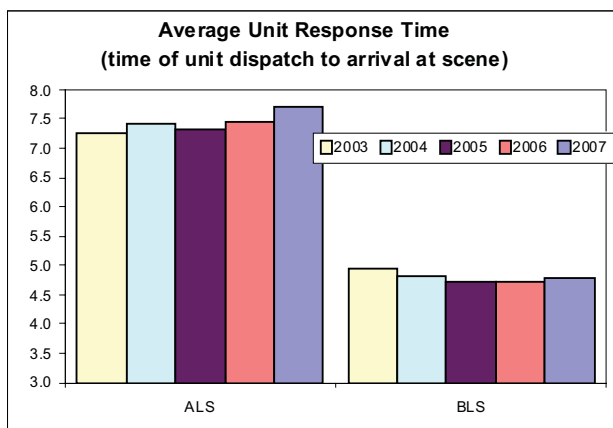
ALS

Number of Responses:	51,151	
	Total	Unit
Average Response Times (min):	11.3	7.7
8 Minutes or less	43.0%	67.6%
10 Minutes or less	59.3%	82.4%
12 Minutes or less	70.6%	90.4%
14 Minutes or less	78.0%	94.6%
Cancelled Enroute Calls	9,422 (18.4%)	

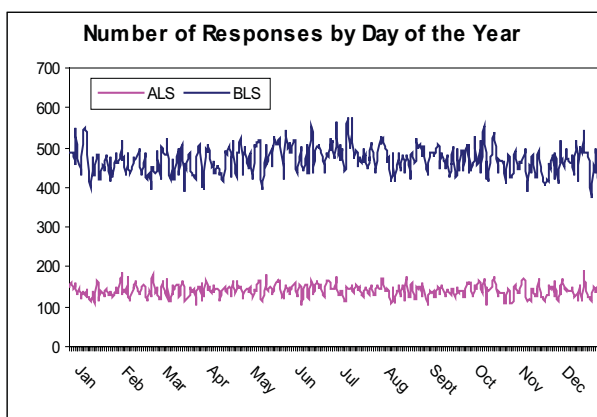
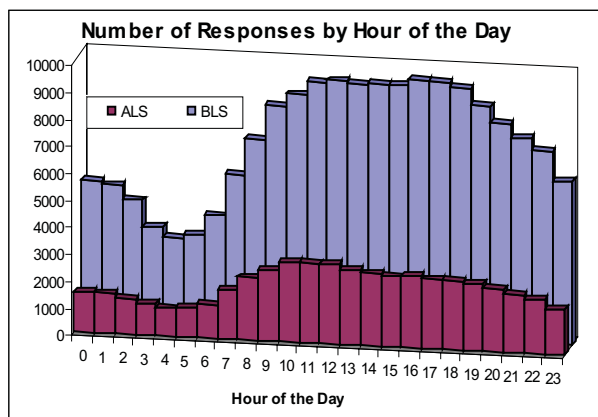
BLS

Number of Responses:	172,502	
	Total	Unit
Average Response Times (min):	5.9	4.8
6 Minutes or less	72.4%	83.0%
Cancelled Enroute Calls	3,975 (2.3%)	

*The 2007 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 over time 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 increased slightly to 7.7 minutes in 2007. 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).

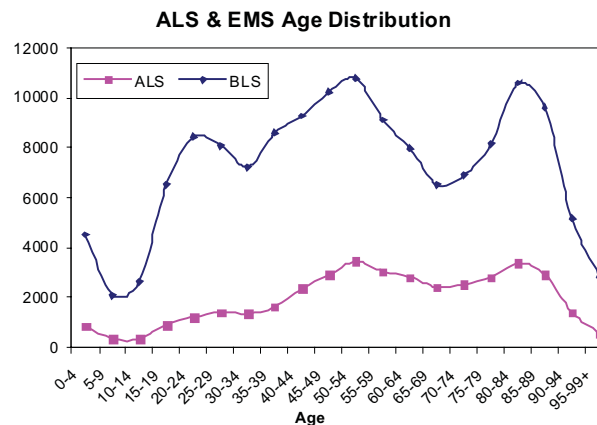


Characteristics of Responses:

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:

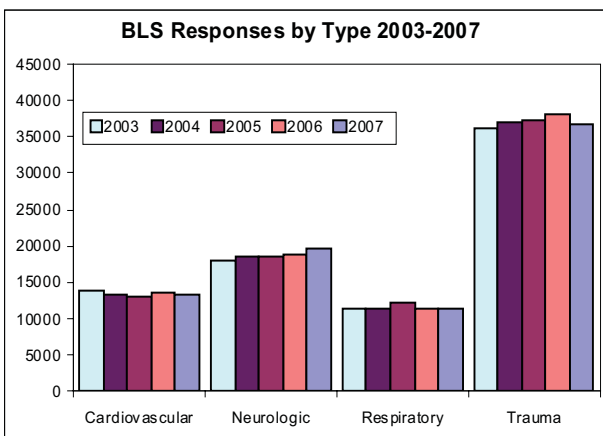
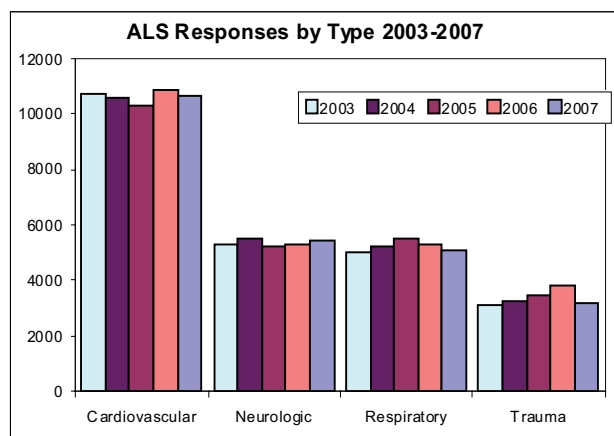
	ALS	BLS
0-4 yrs	827 (2.2%)	4499 (3.1%)
5-9 yrs	326 (0.9%)	2076 (1.4%)
10-17 yrs	756 (2.0%)	6,050 (4.2%)
18-24 yrs	1,643 (4.3%)	11,495 (7.9%)
25-44 yrs	6,680 (17.4%)	33,139 (22.8%)
45-64 yrs	12,155 (31.7%)	38,087 (26.3%)
65-84 yrs	11,071 (28.9%)	32,167 (22.2%)
85+ yrs	4,817 (12.6%)	17,557 (12.1%)
Total	38,275	145,070



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	10,647 (28.1%)	13,361 (9.8%)
Neurologic	5,459 (14.4%)	19,755 (14.6%)
Respiratory	5,071 (13.4%)	11,430 (8.4%)
Trauma	3,214 (8.5%)	36,673 (27.0%)
Abdominal/Genito-Urinary	1,981 (5.2%)	10,234 (7.5%)
Metabolic/Endocrine	1,950 (5.1%)	3,913 (2.9%)
Alcohol/Drug	1,542 (4.1%)	6,082 (4.5%)
Psychiatric	1,244 (3.3%)	7,013 (5.2%)
Anaphylaxis/Allergy	463 (1.2%)	1,877 (1.4%)
Obstetric/Gynecological	442 (1.2%)	1,367 (1.0%)
All Other Illnesses	5,895 (15.5%)	24,022 (17.7%)
Total Medical	37,908	135,727



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.

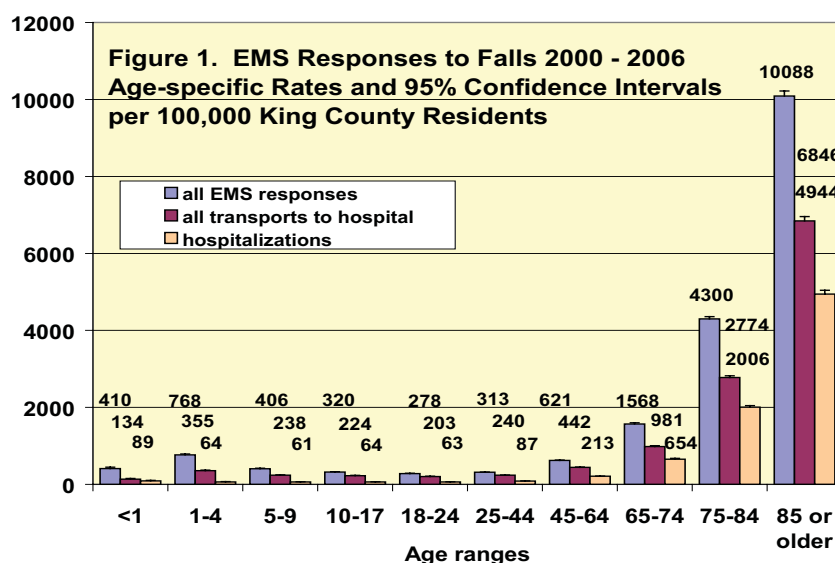
Incident Locations:

	ALS	BLS
Home/Residence	21,680 (58.6%)	75,654 (52.4%)
Nursing Home/Adult Family Home	3,237 (8.8%)	9,947 (6.9%)
Clinic/MD Office	1,879 (5.1%)	3,282 (2.3%)
Other/Unknown Location	10,178 (27.5%)	55,491 (38.4%)
Total	36,974	144,374

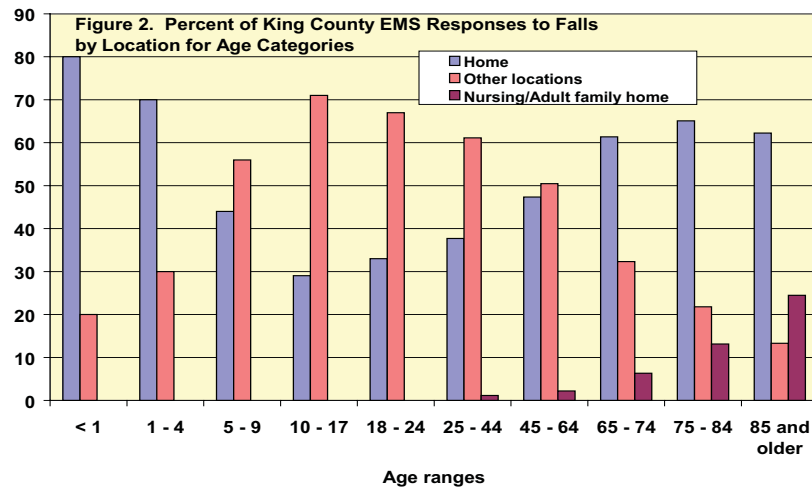
Public Health Highlight: Accidental Falls in King County, 2000 - 2006

Unintentional falls are a priority concern for emergency medical services (EMS) providers. Relatively common and potentially preventable, falls produce considerable morbidity, mortality, and related cost. The likelihood of EMS summons and transport to hospital due to a fall increases with age; among older adults, falls account for a substantial portion of EMS resources, with an estimated 15-25% of EMS responses to older ages due to a fall-related event.¹ Each year roughly one-third of those older than 65 experience a fall, most commonly at home, with 10 to 15% sustaining a serious injury.²⁻⁵ Persons who fall and summon EMS for assistance, whether they are injured or unable to get up without aid, are more likely to require future EMS services due to risk for recurrent falls and poor health.^{6,7}

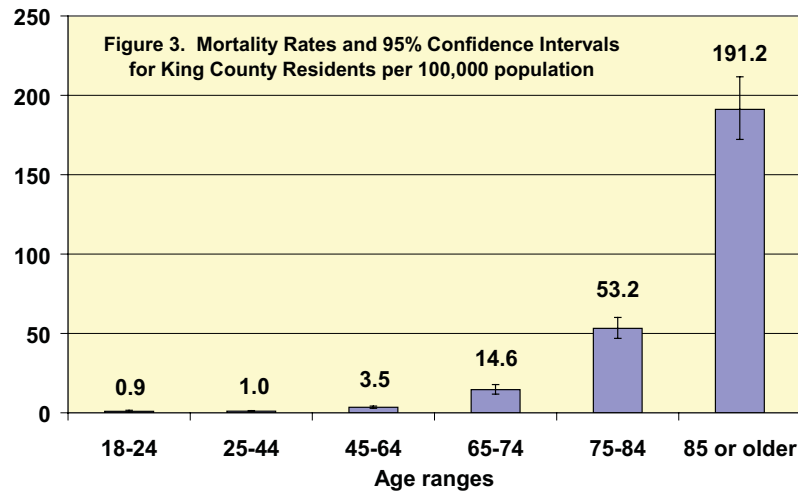
As recorded by EMS responders on their incident report, EMS was summoned for just over 100,000 patients who experienced a fall that appeared to be unintentional and not due to a medical problem. Responses to falls represented approximately 9% of the total responses to patients during the years 2000 - 2006. Age was recorded for 98,289 patients, who form the case series for this report. All patients attended by EMS personnel are included, regardless of whether they were County residents. Hospitalization and mortality rates were tabulated for County residents based on data obtained from Washington State. Similar to the reports in the literature, 16% of the King County EMS responses to patients aged 65 and older were attributed to an accidental fall. Overall, about two-thirds were transported to hospital, including 142 with a fatality recorded at the scene or at hospital arrival. Rates for EMS-attended falls, transport to hospital, and hospitalization increased with age (Figure 1). Not shown in the figure, older women had higher rates of response, transport, and hospitalization compared to older men. Hospital transport modalities included: 85% basic life support (fire department or private ambulance), 4% advanced life support (paramedic, ALS ambulance, airlift), and 11% other (private vehicle, Medical Examiner).



One-third of the patients were not transported to hospital; most remained at the scene: 56% were examined by EMS and found to have minor injuries, and 33% had no discernible injury. Of the 11% transported elsewhere, 4% were taken to a medical clinic and 7% to another location, such as home. For all patients with a known response location, 54% fell at home, 37% away from home, and 9% in a nursing home or assisted living facility. Falls at home were characteristic of the younger and older patients, while the others in age groups 5-9 through 25-44 tended to be away from home (Figure 2). Drug use or alcohol intoxication, including accidental adverse medication reactions, was implicated by EMS in 2% of patients.



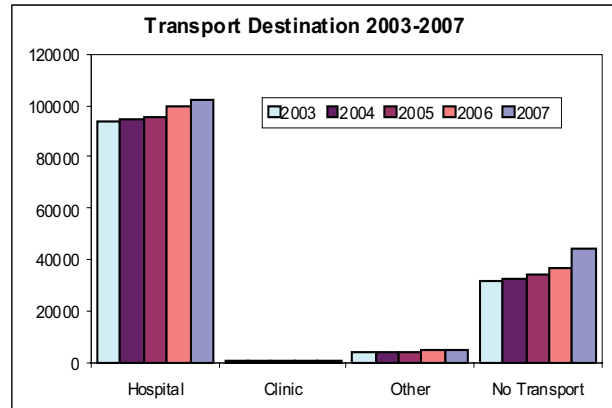
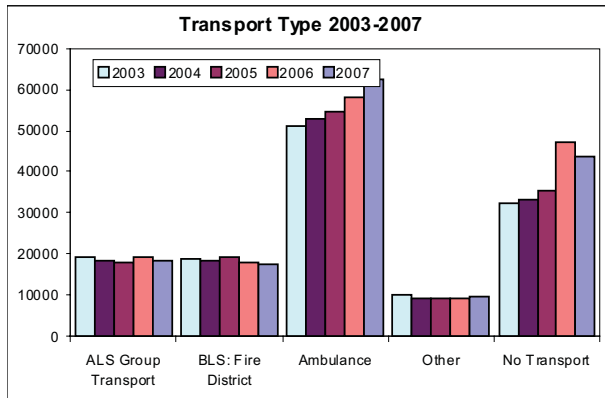
Trauma is the fifth leading cause of mortality in older adults, with over two-thirds of trauma deaths attributed to falls.⁸ Figure 3 shows the mortality rates and 95% confidence intervals for King County residents for age categories with 5 or more fatalities. However, most falls do not result directly in death; their public health impact is considerably broader than that evidenced by mortality alone. Fractures constitute approximately half of the serious resulting injuries. Among patients evaluated in emergency departments after a fall, about one-fourth are admitted to hospital, often with longer lengths of stay compared to age-matched persons hospitalized for other causes.^{9,10} Half of the older persons who fracture a hip are discharged to a nursing home, and more than 25% 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.¹¹⁻¹³



Summary: Falls represent an increasing public health risk due to the aging U.S. population.¹⁴⁻¹⁶ The economic implications of falls among seniors are considerable; in the United States in 1994, the total direct cost of all fall injuries for persons 65 and older was over \$20 billion with half of this cost attributed to hip fractures. Health care costs related to falls are expected to increase substantially as the population ages.¹⁷ The EMS Division of King County has formally engaged in a fall prevention program since 2001. Refer to the information about the King County Fall Prevention Program reported on page 47. References are listed in *Appendix J: References for Accidental Falls in King County* on page 107.

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, almost 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 46), taxi vouchers, or other type of service could help reduce demand for EMS.



Transport Type:

ALS Transport	18,358 (12.1%)
ALS Air	145 (0.1%)
BLS - Fire District	17,469 (11.5%)
BLS - Ambulance	62,279 (41.1%)
Other	9,655 (6.4%)
No Transport	43,575 (28.8%)
Total	151,481

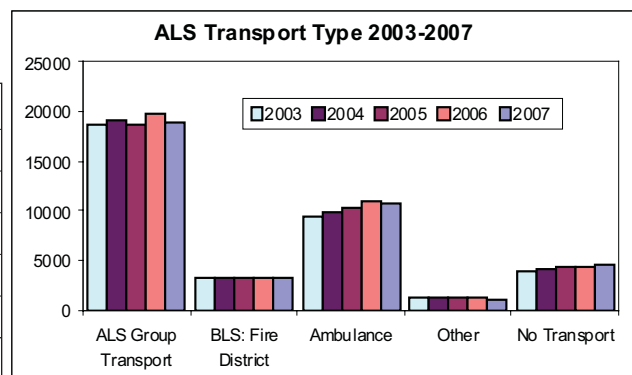
Transport Destination:

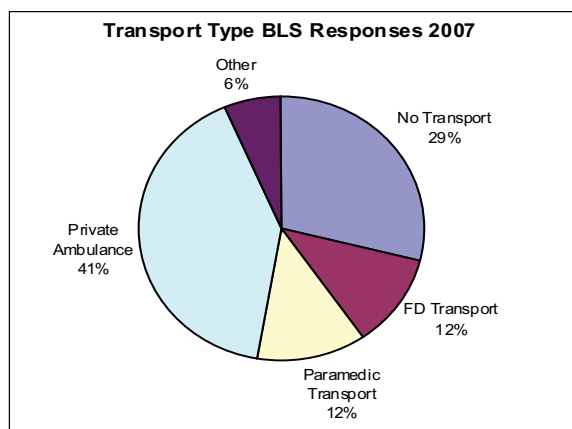
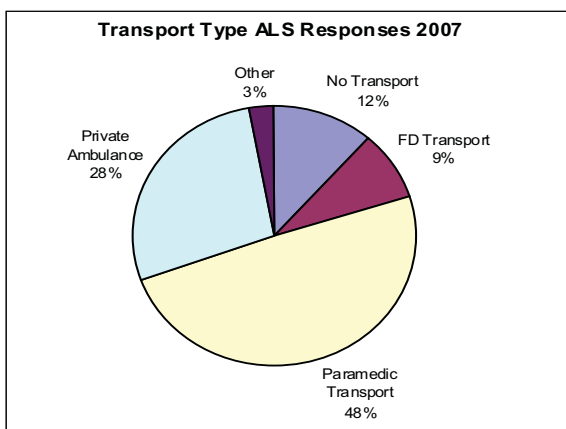
Hospital	102,149 (67.2%)
Clinic	604 (0.4%)
Other	4,990 (3.3%)
No Transport	44,353 (29.1%)
Total	152,096

ALS transport trends are also assessed for potential system improvements. As indicated below, almost 49% of all patients are transported from the scene by ALS. However, over 4,000 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	18,760 (48.5%)
ALS Air	160 (0.4%)
BLS - Fire District	3,342 (8.6%)
BLS - Ambulance	10,802 (27.9%)
Other	1,077 (2.8%)
No Transport	4,556 (11.8%)
Total	38,697





CPR Highlight: *Cardiac Arrest in King County - A 30 Year Perspective*

A study was undertaken to examine 30 years of cardiac arrest data from the King County registry. The registry was started in 1976 modeled after the Seattle registry that had been in place since 1970. These two registries have served as useful tools to document performance and important trends, identify areas for improvement, and monitor the effect of new therapies and programs. Definitions of data elements have remained relatively constant through the life of the registries. Survival from witnessed ventricular fibrillation (VF) was examined for a 30-year period, 1978-2007, with emphasis on temporal changes and the effect of four programs intended to improve survival. These programs are defibrillation by emergency medical technicians (EMT-D), dispatcher-assisted telephone cardiopulmonary resuscitation (TCPR), public access defibrillation (PAD), and a protocol change that altered the sequence of defibrillation and CPR.

Data were analyzed according to implementation of the four program changes, dividing the 30 years into four time periods based on the beginning dates of the programs (see graph on next page). The first period was baseline, 1978 through 1982, before any of the changes. The second period, 1983-1998, included two of the program changes: the EMT-D program, in which all EMTs were equipped with automated external defibrillators (AEDs), and the TCPR program. Both of these programs began in 1983. The third time period, 1999-2004, marked the widespread diffusion of public access defibrillation (PAD), a countywide program sponsored and supported by the EMS Division. The fourth period, 2005-2007, saw the beginning of a CPR/defibrillation protocol change emphasizing the role of CPR. Before, the standard protocol was to check pulse, apply the AED, analyze rhythm and deliver three consecutive shocks if indicated, and then proceed with CPR. As of 2005, all EMS personnel changed the order of events to check pulse, apply the AED, analyze rhythm, deliver one shock if indicated and then perform two minutes of CPR before another analysis.

Each of these programs added to the previous ones, creating a cumulative effect on survival from out-of-hospital cardiac arrest. These programs may have improved survival by shortening the time from collapse to CPR and to defibrillation. TCPR allowed bystanders to immediately begin CPR while waiting for the arrival of EMS. The programs that allowed EMTs, and later bystanders, to perform defibrillation shortened the time to first shock. The CPR-defibrillation protocol shift improved survival by increasing the time that CPR was given between shocks. The fact that there were increases in survival rates in each of the time periods in spite of longer response times indicates how important the development of innovative treatments and community programs are to improve survival from out of hospital cardiac arrest.

Cardiac Arrest Statistics: Seattle and King County have evaluated cardiac arrest statistics for over 30 years. The following information depicts data from the combined registries.

All Cardiac Arrests:

	<u>Year</u>				
	2003	2004	2005	2006*	2007
Total number of cardiac arrests (all causes, resuscitation attempted)	1,093	1,087	1,124	993	1,035

*modification in case definition initiated

For 2007, the following table depicts cardiac arrests broken down by arrest before and after EMS arrival, rhythm on arrival, and survival for each category (paramedic-treated cases, patients age two and over):

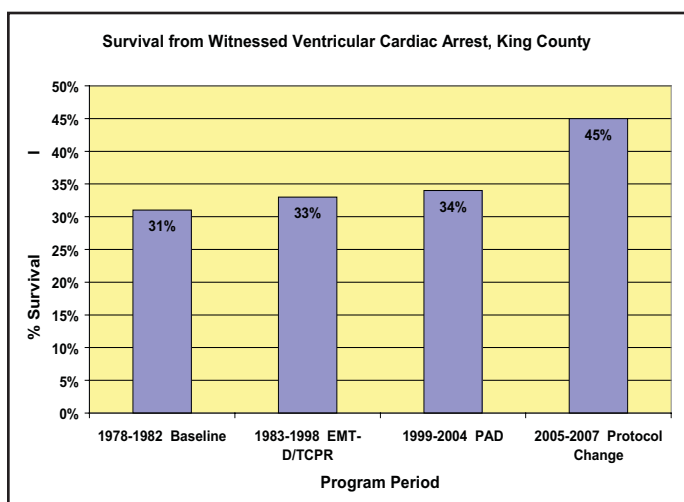
Total cases treated:		1035	
		# Survival	% Survival
Arrest before arrival	899	143	16%
Ventricular fibrillation/ tachycardia (VF/VT)	267	97	36%
Asystole	346	6	2%
PEA	281	39	14%
Unknown	3	1	33%
Arrest after arrival	136	48	35%
VF/VT	35	23	66%
Asystole	19	5	26%
PEA	82	20	24%
Unknown	0	0	

Ventricular Fibrillation (VF): The survival rate is defined as discharge from the hospital alive for witnessed cases of cardiac etiology with VF as collapsing rhythm, and arresting before EMS arrival was:

Year	Rate
2007	84/188 (45%)
2003-2007	392/943 (42%)

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%)



Part III: EMS Funding and 2008 Financial Plan

The 2008 Annual Report represents a transition year between the recently completed Medic One/Emergency Medical Services (EMS) 2002-2007 levy period and the newly initiated 2008-2013 levy period. This section includes financial information for the years 2007 and 2008, summarizes major issues in the previous levy period, and provides information on the new levy period. The differences between the two levies are discussed in the sections on revenues, expenditures and contingencies, reserves, and required fund balance. Components include the following:

- EMS Levy Structure
- EMS Revenues
- EMS Expenditures
- EMS Contingencies, Reserves and Required Fund Balance
- EMS Revenue and Expenditure Trends for 2002-2007 Levy
- Review of Challenges of the 2002-2007 Levy Period
- Summary of 2002-2007 Levy Period
- Recommendations for 2008 Levy Rate
- 2008-2013 Financial Plan Trends
- Recommendations for 2009 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 2001, King County voters approved an EMS levy to provide funding for 2002-2007 at \$0.25 per \$1,000 of assessed valuation (AV). In November 2007, King County voters approved an EMS levy by 83% to provide funding for 2008-2013 at \$0.30 per \$1,000 AV. The levy growth is limited to a 1% increase for existing properties, plus assessment on new construction. EMS Levy funds are collected throughout King County and managed by the EMS Division for the region based on policy guidelines of the *EMS 2002-2007 Strategic Plan Update* or the *Medic One/EMS 2008-2013 Strategic Plan*. Funds generated within the City of Seattle are managed separately by the city.

KC EMS funds are spent in four major areas: Advanced Life Support (ALS), Basic Life Support (BLS), Regional Services (such as training, regional medical direction 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 departments and districts, and Regional Services and Strategic Initiatives are provided by the EMS Division. The 2008-2013 levy adds funding for an

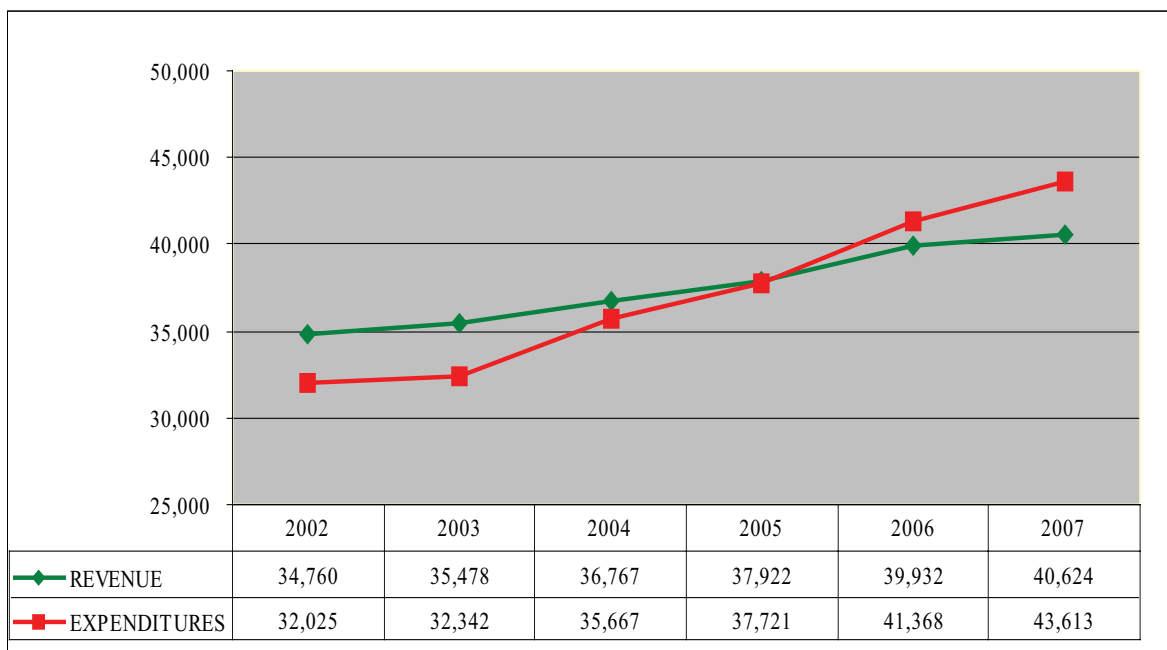
annual audit by the KC Council Auditor's Office, contingencies and reserves.

Revenues: Both the previous and current EMS financial plans assume modest growth in property values, and a one-percent limit on revenues from existing properties. The plans assume the ratio of levy revenues between the KC EMS Fund and the City of Seattle remain stable.

Expenditures: The 2002-2007 Financial Plan assumed that expenditures increased by local area Consumer Price Index (CPI), anticipated that ALS expenditures could possibly increase by more than CPI, and forecast the addition of new ALS units throughout the levy period. Based on experiences during the 2002-2007 levy period when expenditures rose at a rate higher than CPI, the 2008-2013 plan is based on increasing expenditure costs within the ALS and Regional Services funds by a compound inflator that reflects the differing inflationary trends of major components of expenses (such as salaries, benefits, contracts, vehicle costs, etc.). The plan inflates BLS and Strategic Initiatives at the rate of the local CPI.

Fund Balance: The 2002-2007 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 6% of revenues. Based on these assumptions, even assuming low inflation, 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. The following chart shows actual and projected revenues and expenses from 2002 to 2007:

EMS FUND - EXPENDITURES VS. REVENUES
2002-2007 Levy
All numbers in thousands (000 omitted)

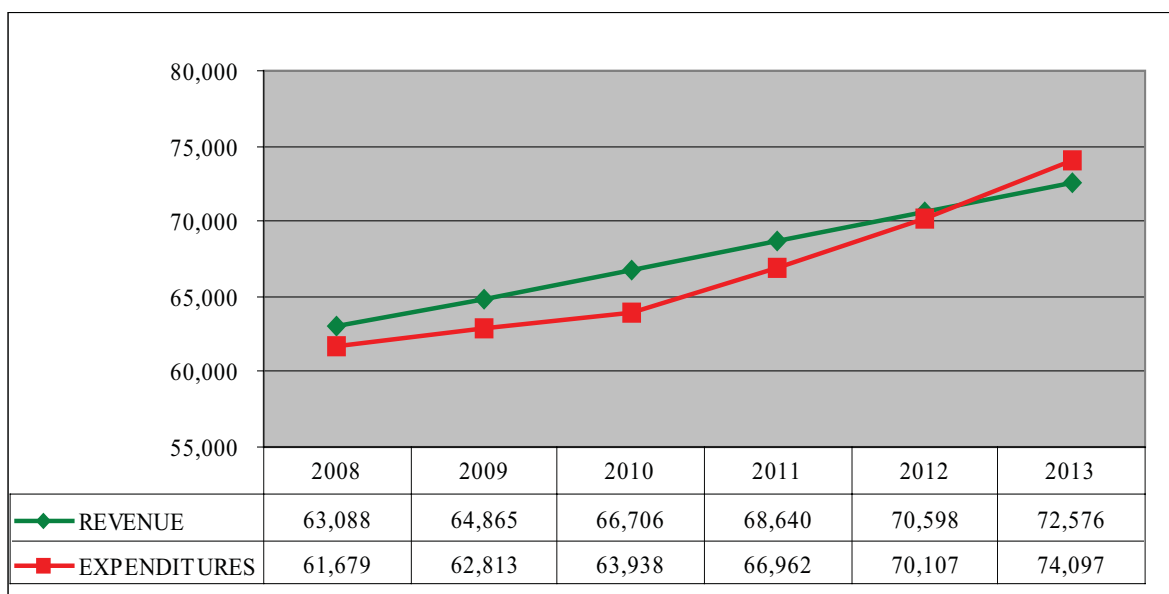


Balance of King County only

The addition of reserves to cover unanticipated inflation, vehicle costs/chassis obsolescence, risk abatement, and potential millage reduction in the 2008-2013 levy period slightly changes the structure of the levy. While the structure of savings funds in the first years of the levy remains the same, a significant amount of funds are placed into designations and reserves. In 2012, these reserves reach \$10 million before decreasing to \$8.5 million in the last year of the levy.

The baseline amount for the 2008-2013 levy was increased to cover increased costs of providing ALS services, a significant increase in the amount of levy funds supporting BLS, conversion of 2002-2007 Strategic Initiatives into ongoing Regional Services, and a new set of Strategic Initiatives. The following chart shows planned revenues and expenses from 2008 to 2013:

EMS FUND – EXPENDITURES VS. REVENUES
2008-2013 Levy
All numbers in thousands (000 omitted)



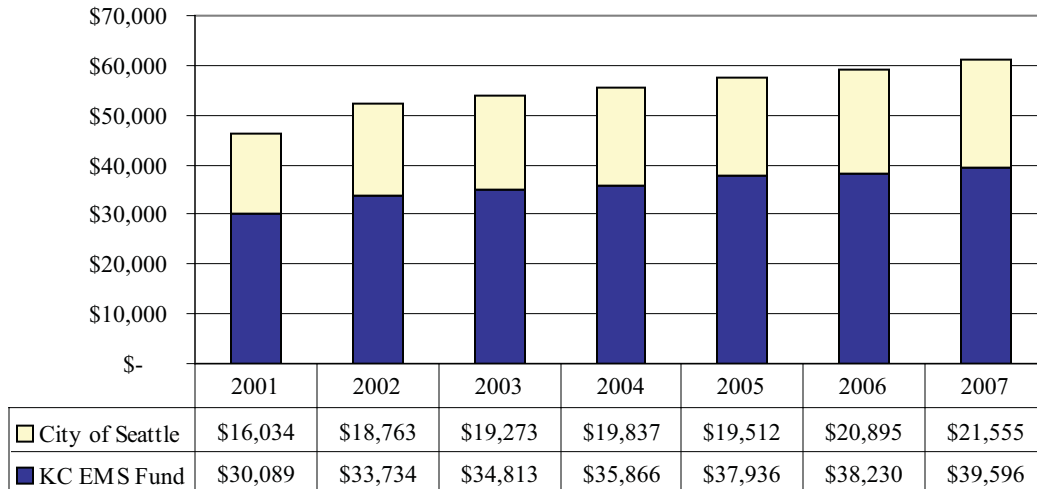
King County EMS Fund only

B. EMS Revenues

The 2007 effective levy rate was .2070 per \$1,000 assessed value (AV) with a total assessment of \$61,151,667. The total assessment for the levy is divided proportionately between the City of Seattle and the KC EMS Fund based on assessed property values in each area. In 2007, the City of Seattle's portion of the assessment was 35.3%; the KC EMS Fund's portion of the assessment was 64.7%.

**AMOUNT ASSESSED FOR CURRENT LEVY
ACTUAL 2001 - 2007**

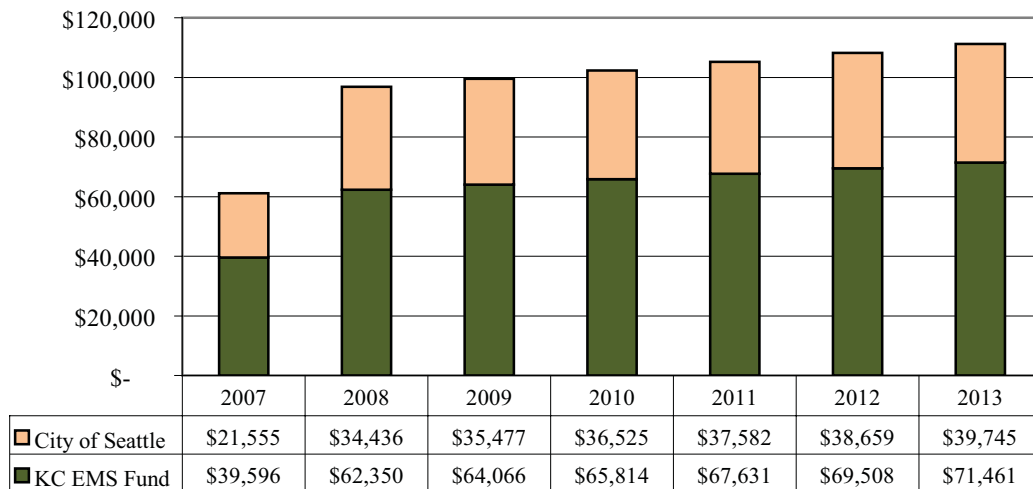
(All numbers in thousands -- 000 omitted)



While the 2008-2013 amount is based on a higher baseline beginning in 2008, the division of revenues between the City of Seattle and King County EMS Fund remains similar. The 2008-2013 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 (KC) EMS Fund. This was projected to change to 35.7% City of Seattle and 64.3% KC EMS Fund by 2013.

**AMOUNT ASSESSED FOR CURRENT LEVY
PLANNED 2008 - 2013**

(All numbers in thousands -- 000 omitted)



In addition to real and personal property taxes, other revenues include miscellaneous taxes, interest earnings, and fees for reimbursable services, and an annual contribution of \$375,000 from the King County General Fund. For the 2002-2007 levy period, property taxes were 97% of total revenues. Due to the higher baseline for the 2008-2013 levy period, property taxes are projected as 98.6% of the total revenues.

EMS Revenue (KC EMS Fund)

Revenue Source	2007	2008
Property Taxes	97.6%	98.8%
Charges for Services	0.2%	0.1%
Interest and Other Miscellaneous	1.2%	0.5%
King County General Fund	0.9%	0.6%
Total	100.0%	100.0%

The 2008 Financial Plan included a significant increase in property taxes. Other income, particularly from revenue sources that can vary significantly, were forecast conservatively. For example, one source of funds ranged from \$7,653 to \$87,077 with an average of \$45,523 throughout the levy period. To the benefit of the fund, several of these widely variable revenue sources had high years in 2007 resulting in higher than planned income for charges for services (mostly reimbursement for service provided) and interest/miscellaneous income. Unfortunately, a good year for interest income was offset with a \$212,000 loss due to an impairment on investments. The following table shows 2007 actual revenues and forecast revenues for 2008:

Revenue Source	2007 Actuals	2008 Financial Plan	Increase	% Increase
Property Taxes	\$39,505,477	\$62,349,590	\$22,844,113	58%
Charges for Services	\$137,230	\$52,000	(\$36,966)	-42%
Interest/Misc Income	\$606,455	\$311,044	(\$343,675)	-52%
KC General Fund	\$375,000	\$375,000	-	0.0%
TOTAL	\$40,624,162	\$63,087,634	\$22,463,472	55%

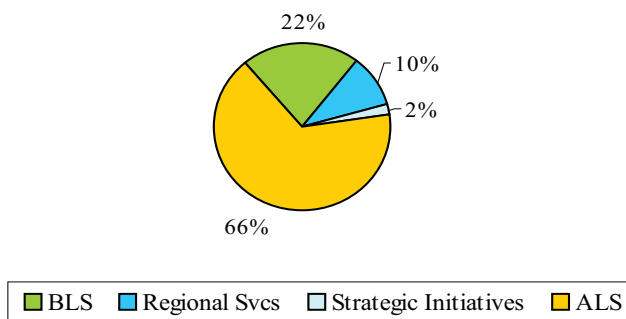
C. EMS Expenditures

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 **2002 EMS Strategic Plan Update** limited expenditure increases for ALS, BLS and Regional Services to the local area Consumer Price Index (CPI). Advanced Life Support (ALS) Services funding is based on a standard allocation per unit, BLS funding is based on an allocation formula per agency, Regional Services Programs are based on cost of services limited to increases based on forecast CPI, and Strategic Initiatives are based on approved budgets and estimated cash flow. If necessary and there was funding available, increases for ALS services could be raised above CPI.

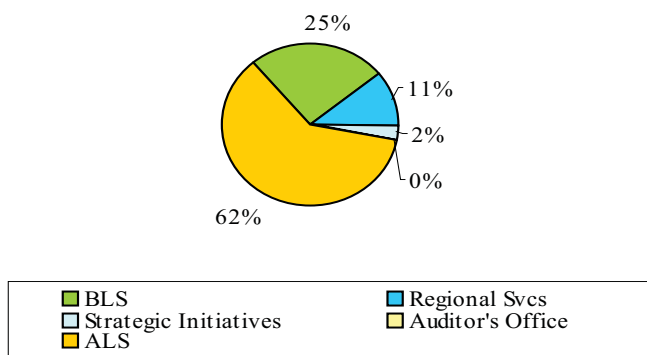
2007 Actual Expenditures



Sub-Area	2007 Actual Expenditures
ALS	\$28,736,207
BLS	\$9,674,865
Regional Services	\$4,428,467
Strategic Initiatives	\$773,500
Total	\$43,613,040

Expenditures forecasted for 2007 were based on a CPI increase of 2.7%. Cash flows for Strategic Initiatives were adjusted based on individual project plans. The changes made in the **Medic One/EMS 2008-2013 Strategic Plan** increased funding to all programs. The most significant funding increase was for BLS, which now accounts for 25% of planned spending. While ALS expenses increased 19%, the portion of the fund dedicated to ALS is now slightly less than the 2002-2007 levels.

2008 Budgeted Expenditures*



Sub-Area	2008 Budget
ALS	\$34,334,975
BLS	\$14,390,254
Regional Services	\$6,339,601
Strategic Initiatives	\$1,361,580
Auditor's Office	\$61,000
Total	\$56,487,410

*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 largely supported by the EMS levy. The EMS Division manages contracts that provide funds directly to six paramedic provider agencies in King County: Bellevue Fire Department (Bellevue Medic One), Public Health - Seattle & King County (King County 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 Fire District (SCFD) #26 to provide ALS services in the King County Fire District (KCFD) #50/Skykomish area from Baring to Stevens Pass. The EMS levy funds 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 EMS-related expenses. Services for the KCFD #50/Skykomish area are provided outside this unit cost allocation.

The **2002 EMS Strategic Plan Update** called for an annual review of ALS costs to minimize cost shifting of ALS expenses to provider agencies. An ALS task force comprised of representatives for the different ALS providers met each year to review costs and provide recommendations to the EMS Advisory Committee. Full time units that operate 24-hours a day were funded at the ALS unit allocation. Half time units, operating 12-hours per day, were funded at a 0.5 allocation. The total number of ALS units through 2007 is shown in the following table:

2007 Paramedic Units by Agency

	Full Units (2 paramedic / 24-hour) ⁽¹⁾	Half Units (EMT-P or 12-hour)⁽²⁾	Total Funding Units
Redmond	3		3.0
King County	7	1	7.5
Bellevue	4		4.0
Shoreline	2	1	2.5
Vashon	1		0.9
Total			17.9

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

The total 2007 EMS levy allocation for each paramedic provider was determined by the number of units staffed with two paramedics, the number of 12-hour 2-paramedic units, and the number of vehicles due for replacement that year. Start-up costs for any new paramedic units were added separately. Paramedic vehicle replacement was funded separately from the standard unit cost allocation and followed a standardized paramedic vehicle replacement plan. Medic units were (and continue to be) replaced every three years and then placed in a backup vehicle status for three additional years resulting in a six year life.

To address problems encountered during the 2002-2007 levy period, improvements to the ALS standard unit allocation were proposed and adopted during the 2008-2013 levy planning process. These included the use of a compound inflator to more accurately reflect the increases experienced by ALS agencies and implementation of an equipment/capital allocation. The new compound inflation model for the operating allocation inflates different categories by appropriate 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 the allocation includes vehicles, defibrillators, and radios. Each agency is responsible for developing a capital asset plan and setting up internal reserves funded by this allocation. The asset plan includes basic items and may also include other items based on agency needs. Agencies are required to keep records of the deposits and expenditures into these accounts. Any unused funds from equipment/capital allocation 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 purchase of planned medic units in 2008 and 2009. In 2008, following a detailed regional review process, the existing 12-hour medic unit in Shoreline was expanded to a 24-hour unit. No new or expanded units are planned for 2009. The following chart shows total ALS units through 2008:

2008 Paramedic Units by Agency

	Full Units (2 paramedic / 24-hour) ⁽¹⁾	Half Units(EMT-P or 12-hour)⁽²⁾	Total Funding Units
Redmond	3		3.0
King County	7	1	7.5
Bellevue	4		4.0
Shoreline	3		3.0
Vashon	1		0.9
Total			18.4

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

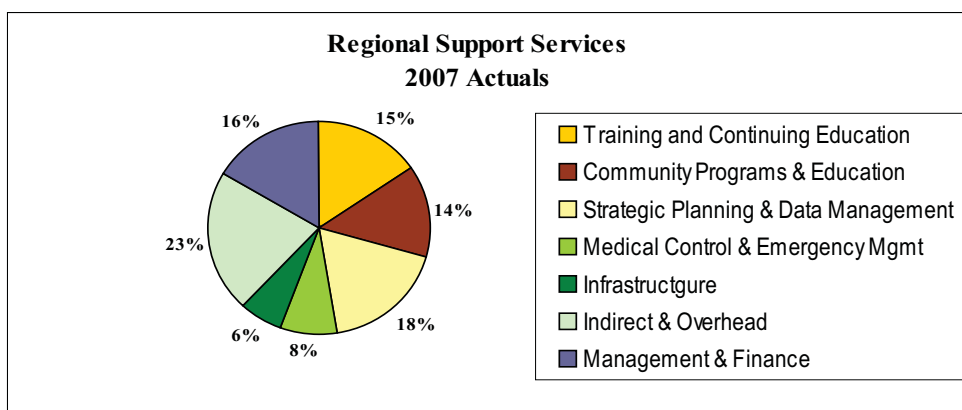
Basic Life Support (BLS) Services

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 and the Port of Seattle, by twenty-eight local fire departments and districts. Beginning in 2002, the total amount of BLS funding was increased by local area CPI each year as noted in the ***EMS 2002-2007 EMS Strategic Plan Update***. The total BLS dollar allocation for 2007 was \$9.7 million; the total for 2008 is \$14.4 million. The total BLS allocation is then distributed to individual BLS agencies based on their relative proportion of AV and call volumes.

As part of the 2008-2013 planning process a new BLS allocation formula was developed with the goal of simplifying the methodology without compromising its integrity. A formula was developed and approved that allocates each year's increased funding across all agencies based 50% on proportion of assessed valuation (AV) and 50% on proportion of call volume. The level of EMS levy contribution to BLS was also evaluated. Following extensive regional discussions, it was decided to tie the initial total BLS allocation amount to the cost of BLS responses to the most critical of calls (defined by ALS transport rates). This resulted in a 2008 allocation of \$14.4 million, an increase of almost 50%.

Regional Services

The primary goal for regional EMS programs and services is to provide support to critical functions essential to achieving 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 ***EMS 2002-2007 Strategic Plan Update*** limited increases in funding for Regional Services to local CPI. Expenditures, particularly labor expenses, have increased at a rate higher than CPI. In 2007, Regional Services were \$4.4 million. The following chart shows the distribution of these expenses by programs.



Note: vehicle, space, communications and computer costs included in infrastructure.

In developing the ***Medic One/EMS 2008-2013 Strategic Plan***, the Regional Services/Strategic Initiatives Subcommittee, reviewed Regional Support Services for inclusion in the EMS levy. After extensive review, proposed core Regional Services remained similar to those funded in the 2002-2007 levy period. Changes included the expansion of a medical quality improvement program and the addition of a 'small grants' program for Medic One/EMS providers. The 'small grants' program was designed to help offset some of the costs to Medic One/EMS agencies participating in pilot programs and/or other projects.

This subcommittee also recommended continuing most of the 2002-2007 Strategic Initiatives as part of ongoing Regional Services for the 2008-2013 levy period. During the review process, it was recommended that Regional Services funding be inflated using a compound inflator model similar to the ALS fund. The result of these recommendations was an increase in the budget for Regional Services to \$6.1 million in 2008. Use of program balances/designated reserves to cover additional emergency preparedness and information technology needs increased the Regional Services budget to \$6.3 million in 2008.

Strategic Initiatives

The term ‘strategic initiative’ is used to describe 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. As noted above, as part of the 2008-2013 levy planning process, most of the proven 2002-2007 Strategic Initiatives were converted into ongoing Medic One/EMS Regional Services.

The 2002-2007 strategic initiative expenditures are shown in the following chart:

Strategic Initiative Summary 2002-2007 Cashflow

	2003	2004	2005	2006	2007	Total
Dispatch Initiatives						
CBD Guideline Revisions/ Software Development	\$1,152	\$3,750	\$18,456	\$177,796	\$168,099	\$369,253
EMD QI	\$23,863	\$24,171	\$20,069	\$9,453	\$15,851	\$93,407
Enhanced CBD Training	\$51,064	\$67,988	\$52,212	\$55,931	\$45,305	\$272,500
Technology Initiatives						
Web-based Training for Dispatch	\$1,383	\$12,000	\$11,461	\$7,693	\$16,300	\$48,837
Web-based Training for EMS (Enhanced)	\$25,000	\$50,000	\$100,657	\$141,662	\$179,097	\$496,416
Regional Electronic Data Collection Project	-	\$149,234	-	-	-	\$149,234
RETRO	-	-	\$60,983	\$78,389	\$84,924	\$224,296
EMS System Efficiencies						
EMS Procedure & Patient Treatment/ Enhanced Care	-	-	\$52,877	\$66,229	\$92,684	\$211,790
Injury Prevention Programs	\$21,089	\$19,004	\$26,744	\$30,275	\$32,421	\$129,533
Levy Planning	-	-	\$27,506	\$107,056	\$138,819	\$273,381
TOTAL	\$123,551	\$326,147	\$370,965	\$674,484	\$773,500	\$2,268,647

Strategic Initiatives for the 2008-2013 levy period were developed to meet the directive of managing growth, improving Medic One/EMS care, and developing efficiencies. It was determined to use CPI as an inflator for Strategic Initiatives. For program details, please see *Section C. 2008-2013 Strategic Initiatives* - page 45. The following table shows the Strategic Initiatives selected for the 2008-2013 levy period:

**Strategic Initiative Summary
2008-2013 Cashflow**

	2008	2009	2010	2011	2012	2013	Total
Dispatch Enhancements:							
CBD/CAD Integration	\$127,053	-	-	-	-	-	\$127,053
Performance Standards	\$12,705	\$295,732	\$304,604	\$312,646	\$321,087	\$329,757	\$1,576,531
Advanced EMD Training	\$25,411	\$39,431	\$40,614	\$41,686	\$42,812	\$43,967	\$233,921
Non-emergency Calls to 9-1-1	\$105,892	\$166,747	\$106,557	\$181,472	-	-	\$560,668
Injury Prevention	\$236,599	\$248,507	\$247,664	\$245,713	\$245,212	\$241,574	\$1,465,269
Public Access Defibrillation	\$95,290	-	\$67,690	-	-	-	\$162,980
Enhancements to CBT Online	\$173,534	\$155,965	\$177,063	\$163,922	\$192,938	\$179,512	\$1,042,934
Enhanced Network Design	\$184,227	\$157,724	\$275,841	\$191,108	\$199,095	\$126,836	\$1,134,831
All Hazards Management	\$31,763	\$32,859	\$33,845	\$34,738	\$35,676	\$36,640	\$ 205,521
EMS Efficiencies & Evaluation	\$254,106	\$394,310	-	-	-	-	\$648,416
Planning for Next Levy				\$68,070	\$158,333	\$ 156,256	\$382,659
TOTAL	\$1,246,580	\$1,491,275	\$1,253,878	\$1,239,355	\$1,195,153	\$1,114,542	\$7,540,783

D. EMS Contingencies, Reserves and Required Fund Balance

2002-2007 Levy Period

The 2002-2007 levy period included no formal contingencies. Although the levy included a required fund balance of 1/12th yearly expenditures, the only other reserves were provider/program balances. Funds available for contingency use in the 2002-2007 levy period were limited to available fund balance, or the amount in the fund above the required fund balance. The **EMS**

2002-2007 Strategic Plan Update prioritized use of these funds for ALS. A full discussion of use of these funds is covered in *Section F: Review of Challenges of the 2002-2007 EMS Levy Period* on page 81.

The provider/program balance designated reserves were recommended and approved by the King County Office of Management and Budget (OMB) early in the 2002-2007 levy period. They were designated to provide programs and providers the ability to balance yearly program needs with the set (prescribed) budget and cashflow. 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 ALS 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 Services and Strategic Initiatives to manage fluctuations in programs and variable program costs. While they are also available to BLS agencies, since the fund's contribution supplements BLS agency funds, the need has not arisen.

2008-2013 Levy Period

Lack of programmed contingency funds in the 2002-2007 levy was identified as an issue early in the planning process for the 2008-2013 levy. While the planning group worked on costing known expenses, they also believed that needs would arise that had not been identified during the planning process. There were additional concerns about the availability of these funds if inflation exceeded planned levels. As a result, two new contingency funds and categories of reserves were created. The new 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 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 2008 and 2009. The funding level was 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.'

Designations and Reserves

Designations for the 2008-2013 levy period include the provider/program balances described above. In addition there are reserves for unanticipated inflation and reserves to cover potential vehicle/chassis obsolescence and issues, risk abatement and potential for millage reduction.

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 U.S. Department of Energy. The pharmaceutical/medical equipment reserve was designed to mitigate unanticipated medical cost inflation. It includes a buffer of 2.5% through 2010 and is reduced to 1% by 2013.

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, frequency and service impact of multiple alarms, and paramedic exposure to critical skills sets.

Specific restrictions on accessing 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 these section. The restricts 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 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 that requires consideration by the EMS Advisory Committee, and a millage reduction reserve. While the primary purpose of the millage reduction reserve is to receive unexpended contingency funds for out-year levy reduction, these funds are also available to replenish other reserves.

Fund Balance

The EMS 2008-2013 financial policies change the undesignated fund balance requirements. In the previous levy period, required fund balance was 1/12th yearly expenditures. In the 2008-2013 levy this was changed to 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 cashflow issues.

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

Reserves and Designations	2007 Estimated	2008 Proposed	2009 Proposed	2010 Proposed	2011 Proposed	2012 Proposed	2013 Proposed
Encumbrances	(\$977,521)	(\$977,521)	(\$977,521)	(\$977,521)	(\$977,521)	(\$977,521)	(\$977,521)
Reappropriation	(\$25,000)	(\$25,000)	(\$25,000)	(\$25,000)	(\$25,000)	(\$25,000)	(\$25,000)
Designations							
Prepayment	0	0	0	0	0	0	0
ALS Provider Balances	(\$1,022,900)	(\$1,022,900)	(\$1,022,900)	(\$1,022,900)	(\$1,022,900)	(\$1,022,900)	(\$1,022,900)
ALS Provider Loans	0	0	0	0	0	0	0
Reserves for Unanticipated Inflation							
Diesel Cost Stabilization	0	(\$756,000)	(\$1,512,000)	(\$2,457,000)	(\$2,897,541)	(\$2,933,280)	(\$1,613,304)
Pharmaceuticals/ Medical Equipment	0	(\$230,000)	(\$506,000)	(\$828,000)	(\$1,097,000)	(\$877,600)	(\$447,576)
Call Volume/ Utilization Reserve	0	(\$244,000)	(\$488,000)	(\$732,000)	(\$1,159,800)	(\$1,220,000)	(\$832,000)
Reserves							
Chassis Obsolescence	0	(\$375,000)	(\$375,000)	(\$562,500)	(\$562,500)	(\$562,500)	(\$562,500)
Risk Abatement	0	0	(\$565,000)	(\$565,000)	(\$565,000)	(\$565,000)	(\$565,000)
Millage Reduction	0	0	0	(\$1,000,000)	(\$1,500,000)	(\$2,000,000)	(\$2,500,000)
Total Reserves and Designations	(\$2,025,421)	(\$3,630,421)	(\$5,471,421)	(\$8,169,921)	(\$9,807,262)	(\$10,183,801)	(\$8,545,801)

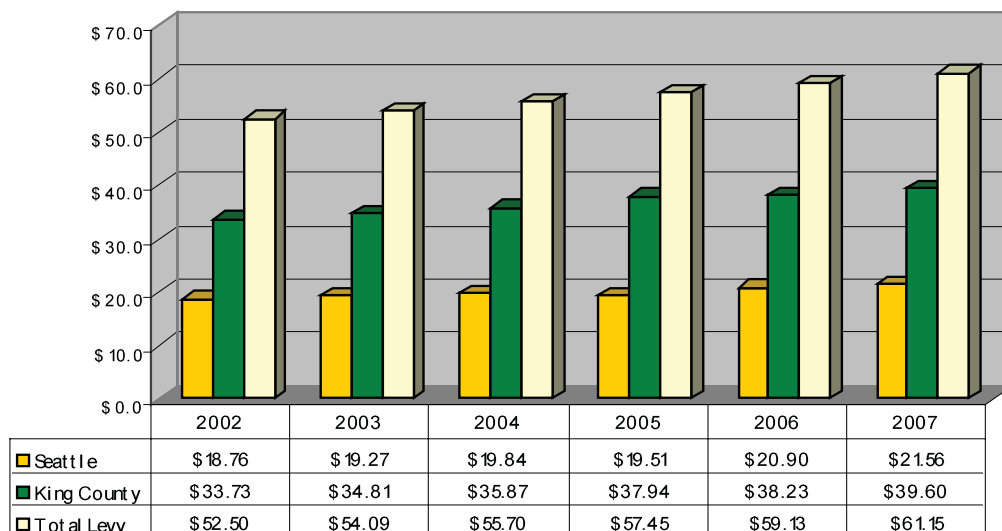
E. EMS Revenue and Expenditure Trends for 2002-2007 Levy

Revenue Trends

The primary revenue source for the EMS system in King County is EMS property tax levies. The growth of this revenue is limited to 1% a year on existing properties, plus new construction. The following chart shows forecast levy assessments for both Seattle and the KC EMS Fund for the 2002-2007 levy:

Forecast Levy Assessment

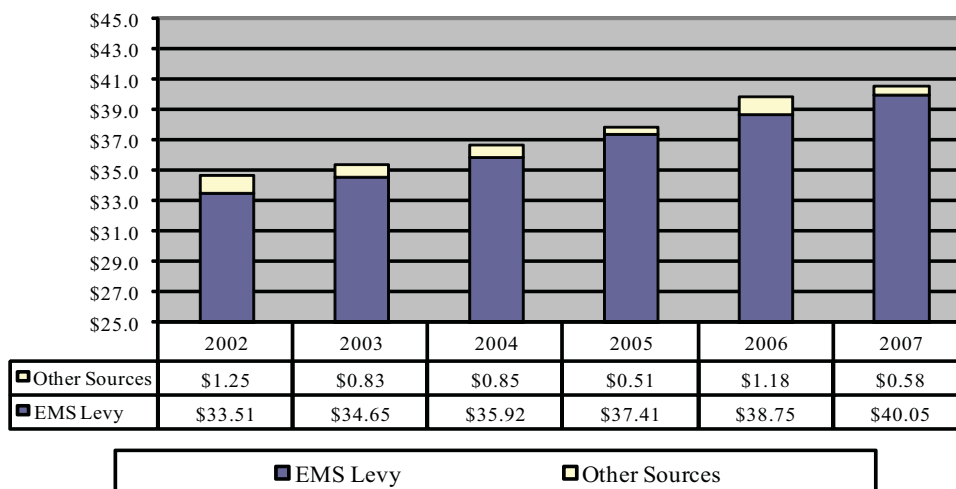
(amount billed in millions)



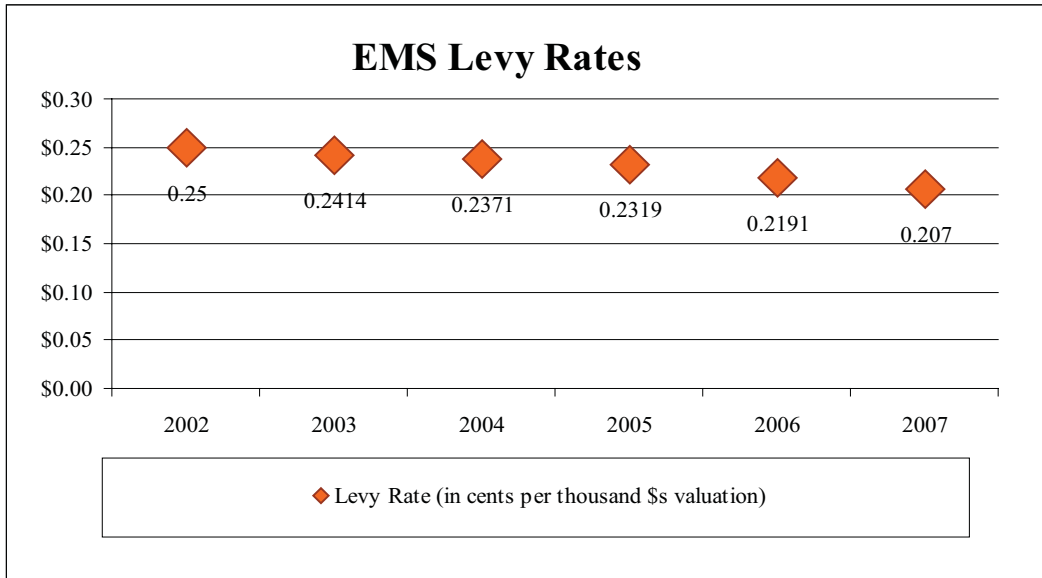
The EMS Financial Plan for the 2002-2007 levy period assumed modest growth in property values, continued low inflation, one-percent limit on fund growth from existing properties, a modest amount of growth from new construction, growth in expenditures related to anticipated increases in paramedic units, and stable growth in other services at the level of local CPI. Forecast total levy assessment, including both the City of Seattle and the KC EMS Fund, increased from \$52.5 million in 2002 to \$61.15 million in 2007. This is an average increase of approximately 3% per year. Growth over 1% is primarily due to property taxes on new construction. Between 2002 and 2007 total EMS Division tax assessments increased an average of 3% per year. Total revenues increased from \$35 million in 2002 to \$41 million in 2007, also an average increase of 3% per year. The following chart shows actual revenues for King County EMS Fund (excluding Seattle) through 2007:

Revenues 2002-2007

(all numbers in millions)

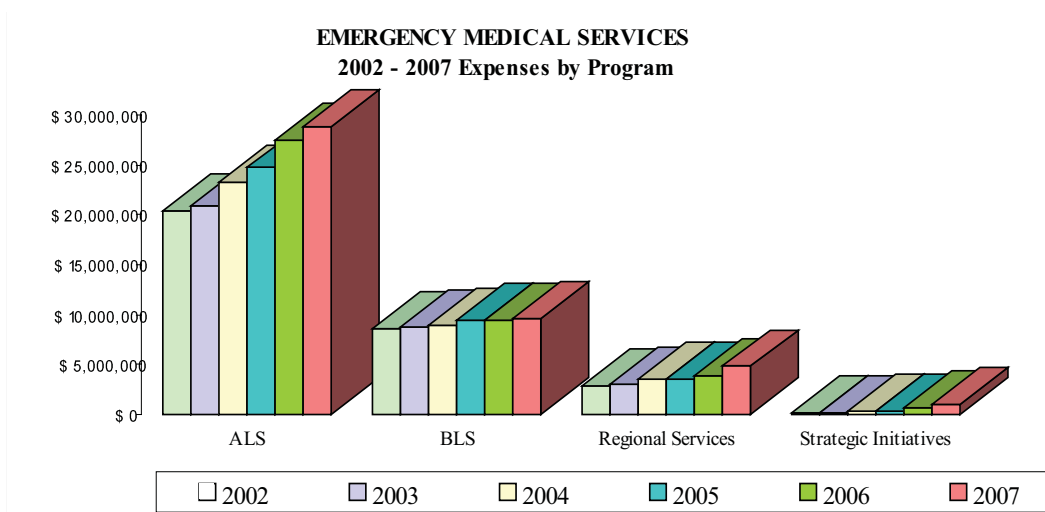


As EMS revenues increased, the effective levy rate decreased. The assessed values in the county increased by 42%, an average of 8% per year, while the total EMS Assessment increased by 17%, an average of 3% per year. Since levy growth is limited to 1% plus new construction, the effective levy rate decreased from \$0.25 per \$1,000 of assessed valuation in 2002 to \$0.207 in 2007. The portion of the levy attributable to the City of Seattle and the KC EMS Fund remained relatively stable. The following chart shows the effective levy rates for 2002-2007:

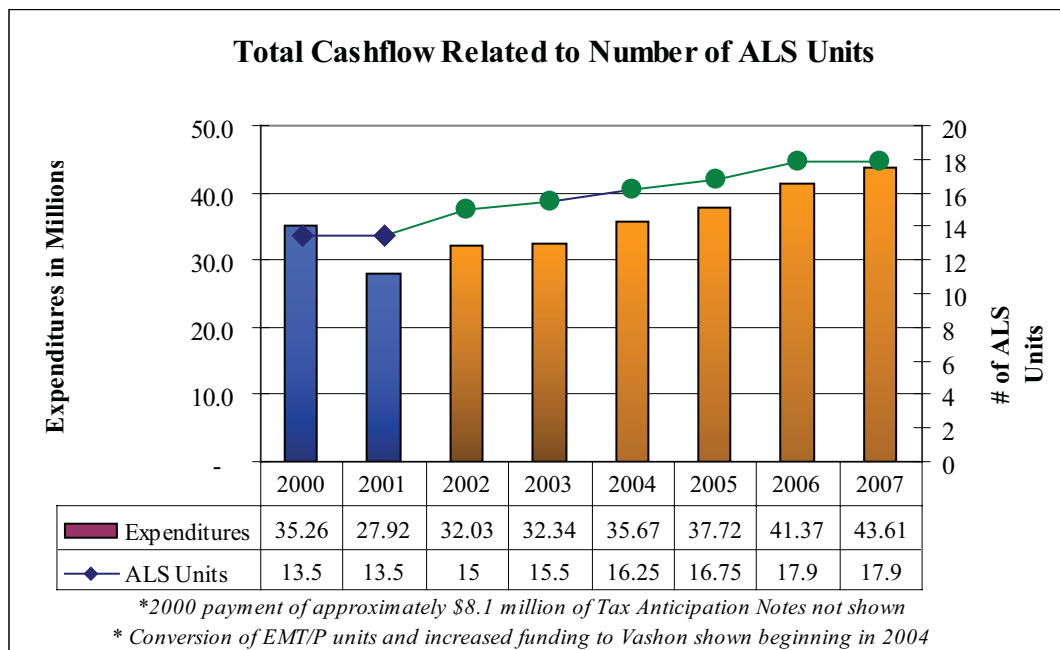


Expenditure Trends

There are two main factors affecting expenditure trends; inflationary costs and the addition of new ALS service. Including new and expanded paramedic units, expenditures increased from \$32 million in 2002 to \$44 million in 2007, an average of 7% a year. The average forecast CPI for the same period was 2.5%. The following chart shows projected expenditures by sub-fund for the 2002-2007 levy period:



Increases in expenditures are strongly correlated to the total number of existing and added ALS units. The following chart shows how expenditure growth related to the number of ALS units in service:



BLS funding was increased throughout the levy period by CPI with the 2007 total allocation at \$9.7 million. Regional Services funding increased each year at CPI. Expenses, particularly personnel, indirect and overhead charges, increased higher than CPI. To accommodate these increases, Regional Services used underspending from previous years to cover the higher expenses – particularly in 2006 and 2007. As planned, revenues exceeded expenditures in the early years of the levy, and sufficient revenues were saved to cover the difference between planned expenditure and revenue levels in 2006 and 2007.

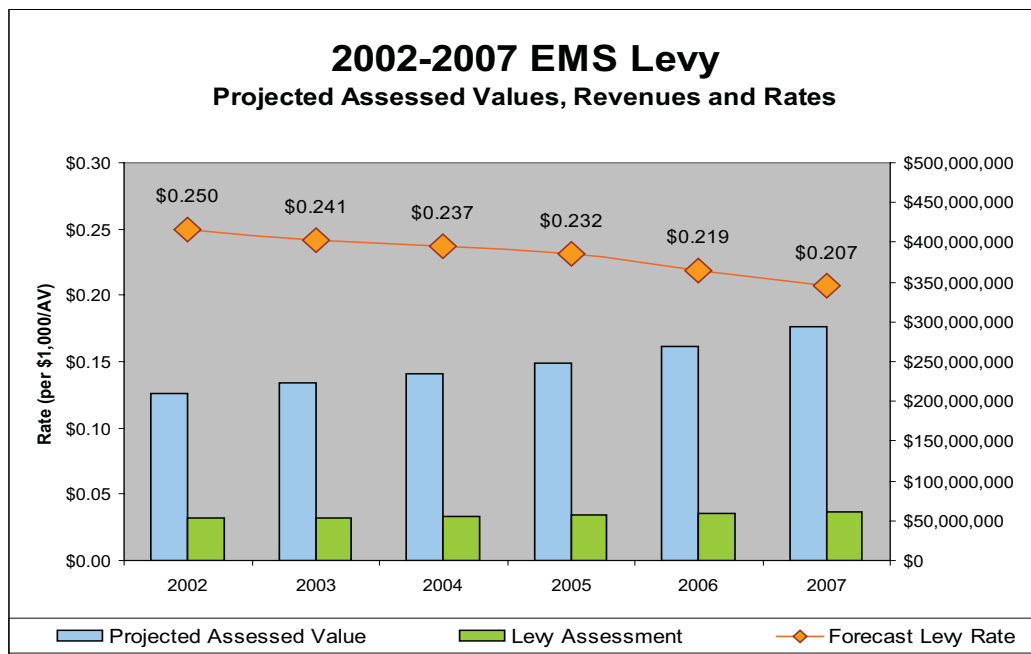
F. Review of Challenges of the 2002-2007 EMS Levy Period

The 2002-2007 levy period presented many challenges. The first challenge was preparing a financial plan based on then current RCWs and then adapting that plan to the limits of I-747 (property tax increases limited to 1% plus new construction). Other challenges included: increased costs associated with additional and changed service needs, and the cost of providing existing ALS services increasing at a rate higher than CPI. Assessed Valuations increased at a rate higher than forecast. In accordance with the 1% limit, this resulted in levy rates lower than forecast.

The following table shows the difference in forecast and actual levy rates:

	2002	2003	2004	2005	2006	2007
Forecast Levy Rate	0.250	0.245	0.241	0.236	0.232	0.227
Actual Levy Rates	0.250	0.241	0.237	0.232	0.219	0.207

The following chart illustrates the interactions of levy rate, assessed values, and actual amount levied. Since the assessed valuation grew at a rate higher than the actual levy amounts assessed property owners. This resulted in lower levy rates.



	2002	2003	2004	2005	2006	2007
Projected Assessed Value*	\$209,815,163	\$224,074,252	\$234,880,126	\$247,766,413	\$268,995,995	\$294,355,283
Levy Assessment	\$52,497,313	\$54,087,223	\$55,703,623	\$57,448,128	\$59,125,467	\$61,151,667
Forecast Levy Rate	0.2500	0.2414	0.2371	0.2319	0.2190	0.2070
Growth in AV		6.80%	4.82%	5.49%	8.57%	9.43%
Growth in Assessment		3.03%	2.99%	3.13%	2.92%	3.43%

*AV (000 omitted)

Paramedic Service Adds Not Included in the Strategic Plan

Major challenges during the 2002-2007 levy period was the request by Medical Directors to convert the two medic units staffed by one EMT and one paramedic (an EMT/P unit) to units staffed by two paramedics, need for additional resources to cover costs associated with providing services on Vashon Island, and support for paramedic service to the Fire District #50/Skykomish area in northeast King County, an area accessible by road only through Snohomish and Chelan Counties. ALS providers worked together to review service to the Skykomish area, develop options and

make recommendations to the EMS Advisory Committee. After reviewing several proposals a solution to provide ALS service for the FD #50/Skykomish area by Snohomish County FD #26 was developed and approved. The service began in late 2004.

The following chart shows the location of added units - both planned and unplanned - during the 2002-2007 levy period.

Units	2002	2003	2004	2005	2006	2007
Existing Units	13.50	15.00	15.75	16.25	17.15	17.90
Expanded Units*	1.00	0.50	0.50			
Added Units*	0.50				0.50	
Unit equivalent of outside plan adds		0.25		0.90	0.25	
Total Units (planned & unplanned)	15.00	15.75	16.25	17.15	17.90	17.90
Description of Expanded paramedic units per plan	M47-Bothell to 24-hrs; Vashon funding increased to .5	M14-Issaquah to 24-hr unit	M12 Enumclaw to 24-hr unit			
Description of Adds -- New paramedic units per plan	Add Shoreline M65 at 12-hrs				Add M13 in So KC at 12-hrs	
Description of Adds -- Modifications/changes to paramedic units outside of plan		Convert M3 (North Bend) from EMT/P to 2-PM unit	Annualize M3 (North Bend) funding from previous year	Continue adds from previous years + convert M35 EMT/P to full 2-PM + increase Vashon to avoid EMT/P conversion	Continue adds from previous years + add \$60k SCFD 26 + M3 to FT funding	Continue all adds from previous years

*planned adds (12-hour units = .5)

The total costs for adding unplanned units during the 2002-2007 levy period was \$5.7 million. The following table summarizes medic unit increases for the 2002 to 2007 levy period:

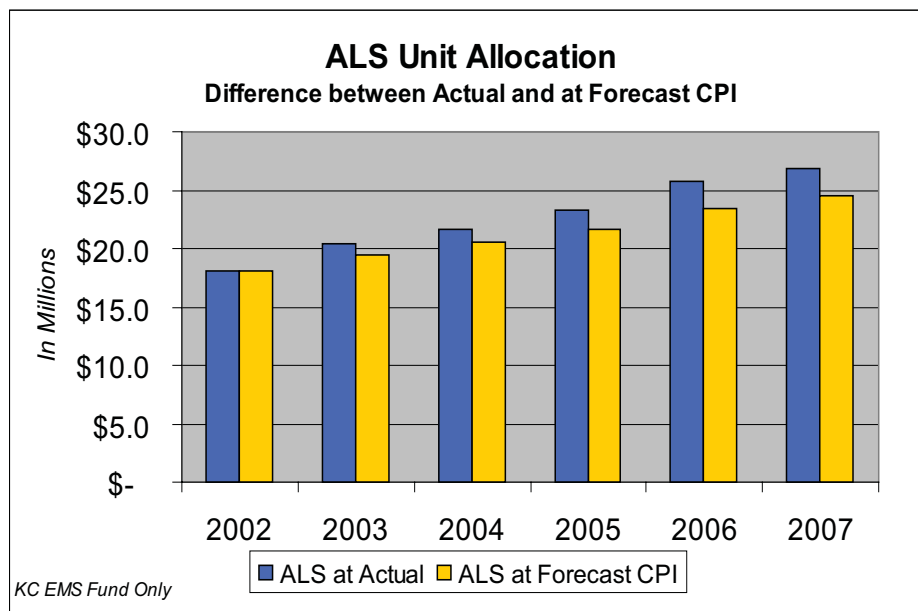
Summary of ALS units (2002-2007)	
Existing Units (2001)	13.5
Planned new and expanded units	3.0
Total planned units	16.5
Unplanned unit equivalent	1.4
Total planned & unplanned	17.9

ALS Allocation Increases

One of the themes of the *EMS 2002-2007 Strategic Plan Update* was to minimize cost shifting to ALS providers. The EMS 2002 Task Force recommendations included re-evaluating the ALS funding level periodically to determine if existing levels would result in cost shifting to ALS providers, and if funding was available ‘to alleviate any dramatic increase in provider contributions.’ While the *EMS 2002-2007 Strategic Plan Update* tied inflation increases in all programs to CPI, many of the costs associated with ALS services exceeded CPI (particularly labor costs, medical supply and service costs, and fuel costs).

Each year, an ALS Subcommittee of the EMS Advisory Committee met to review actual and projected ALS costs. Based on this review and the recommendations of the EMS Advisory Committee, increases above CPI were made four out of the six years of the 2002-2007 levy period. After resetting the allocation in 2002, increases above projected CPI were 9.8% or an average of 1.6% above the average forecast CPI of 2.6%.

The following chart shows the yearly and cumulative total of the difference between the ALS allocations during the 2002-2007 levy period and the ALS allocations if they had been made at the forecast CPI for the year.



Without these one time increases, a total of approximately \$8.5 million in costs would have been shifted to provider agencies. Funding for these increases was provided by increased revenues and the decreased baseline expenditure level due to lower inflation reflected in lower CPI forecasts. The problem with CPI as an inflator not meeting the needs of the ALS program was a lesson learned and addressed in the *Medic One/EMS 2008-2013 Strategic Plan*.

Other Increases

Another notable increase from the original strategic plan was the addition of Strategic Initiatives for enhancing Web-based Training for EMS Personnel, Tracking EMS Training (RETRO), EMT and Paramedic Procedure, and Patient Treatment Evaluations and Enhanced Care for special populations. The total increase was \$492,167 above the original financial plan.

The following chart shows increases from the original financial plan:

Adds above Original Plan (in millions)	
Unplanned ALS unit adds	\$5.7
Increases above ALS allocation	\$8.5
Subtotal ALS	\$14.2
Added Strategic Initiatives	\$0.5
TOTAL ADDS	\$14.7

Summary

Expenditure increases over the original plan were primarily in the ALS program. The addition of new Strategic Initiatives within the levy period also resulted in a small increase in expenditures over the original plan. Expenditures for both Basic Life Services and Regional Services decreased due to the lower than planned CPI forecasts. The following chart compares original and current expenditure forecasts:

Program	Original 2007 Forecast	2007 Actuals	Difference	% Change
Paramedic Services (ALS)	\$133,747,239	\$144,781,030	\$11,033,791	8.2%
Basic Life Support (FF/EMTs)	\$55,537,131	\$54,335,844	\$(1,201,287)	-2.2%
Regional Services	\$22,633,276	\$21,133,940	\$(1,499,336)	-6.6%
Strategic Initiatives	\$2,184,000	\$2,485,647	\$301,647	13.8%
TOTAL	\$214,101,646	\$222,736,461	\$8,634,815	4.0%

G. Summary of 2002-2007 Levy Period

Fortunate financial circumstances allowed the EMS fund to cover the increased expenditures above the original plan. Revenues were higher than predicted in the 2002-2007 Financial Plan (primarily due to new construction); forecast CPI was lower than projected. The following chart compares CPI forecasts between the original plan and the current plan. The total decrease in expenditures based on revised CPI forecasts was approximately \$4.3 million.

Forecast CPI	2000	2001	2002	2003	2004	2005	2006	2007
Original Financial Plan	2.5%	3.5%	3.2%	3.2%	3.2%	3.2%	3.2%	3.2%
Final Financial Plan	2.5%	3.5%	2.4%	2.5%	2.1%	2.9%	2.6%	2.7%
Difference			0.8%	0.7%	1.1%	0.3%	0.6%	0.5%

The original 2002-2007 Financial Plan forecasted revenues at \$215 million and expenditures at \$214 million. Actual total revenues were \$225 million and expenditures were \$223 million. Revenues increased by approximately 4.7% and expenditures increased by 4% over the original plan. The difference covers the increase in required fund balance (~\$400,000), a \$212,000 GAAP adjustment for loss from impaired investments and provider/program balances to be carried over into the new levy period.

Plan	Revenues	Expenditures	Difference
Final 2002-2007 Actuals	\$ 225,482,473	\$ 222,736,461	\$ 2,746,012
Original Financial Plan	\$ 215,427,239	\$ 214,101,646	\$ 1,325,594
Increase	\$ 10,055,234	\$ 8,634,815	\$ 1,420,419

The net result of the changes during the 2002-2007 levy period resulted in a lowered expenditure baseline due to a decrease in forecast CPI projections. In addition there was an increase in revenue. These actions – affecting both revenues and expenditures -- allowed the addition of unplanned ALS units, increases in the ALS allocation above CPI, and the addition of some Strategic Initiatives.

H. Recommendations for 2008 Rate

The 2007-2009 EMS Financial Plan summarizes actual and projected revenues and expenditures for core King County EMS Fund programs and services. This plan bridges the 2002-2007 levy period and the 2008-2013 levy period and illustrates financially decisions made in the 2008-2013 planning process (including the new financial policies). The EMS Financial Plan shows the current status of the undesignated fund balance in relationship to a target fund balance. The target fund balance is the equivalent of one month's operating costs for EMS activities. Please refer to *Appendix G: EMS Division Revenue/ Expenditure Summary* on page 101 for details.

I. 2008-2013 Financial Plan Trends

While the 2008-2013 Financial Plan will be covered more thoroughly in next year's annual report, several trends are already emerging. Economic conditions have changed significantly since the Financial Plan was developed in 2006 and 2007. New construction forecasts are down and the consumer price index is higher than expected. Diesel costs have also increased significantly. However, the starting assessed valuation for existing properties was higher than planned resulting in property tax projections higher than the Financial Plan.

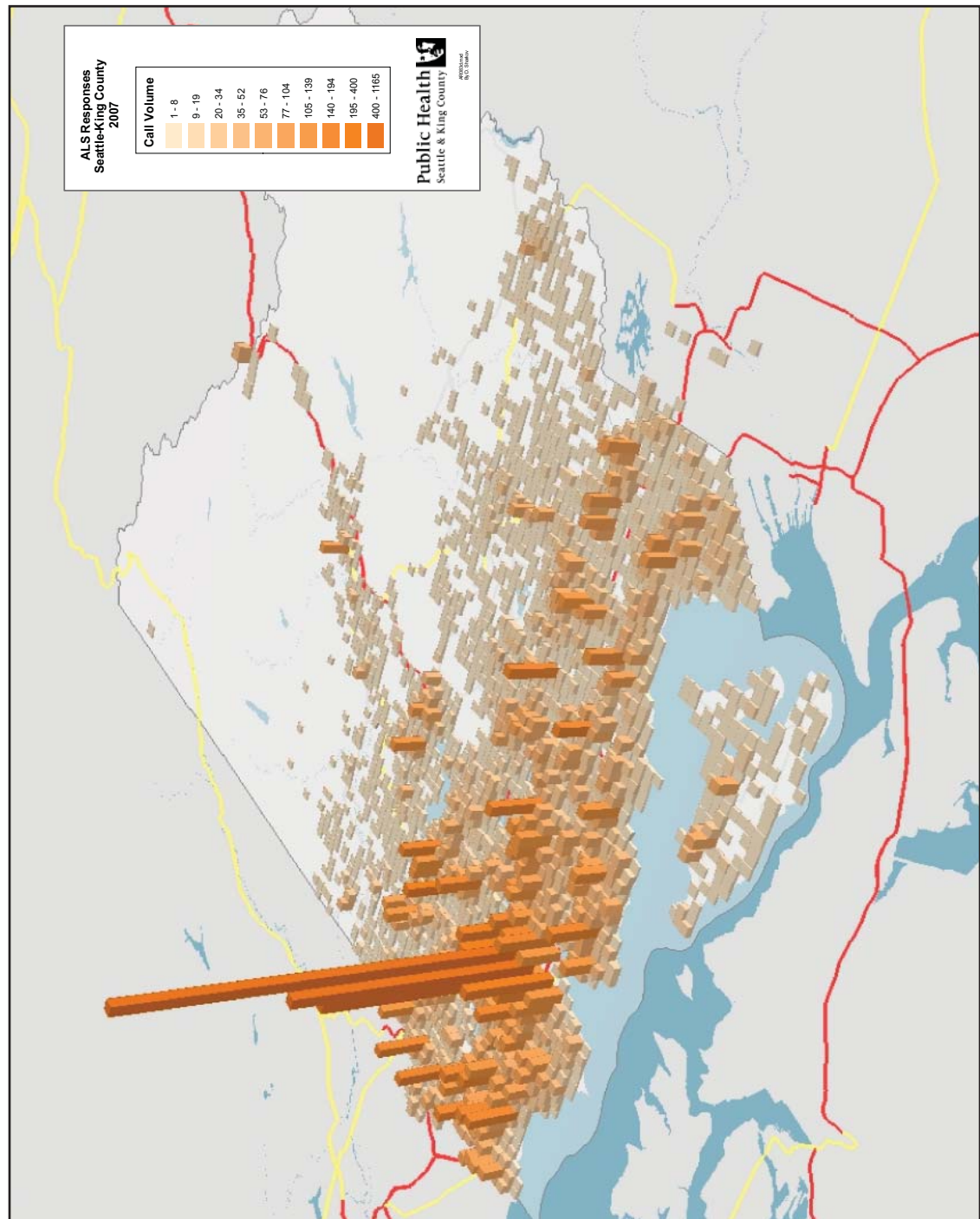
In the strategic plan, CPI assumptions ranged from 3.7% to 2.7%. Actual CPI for 2007 at 3.88% was only slightly higher than the original projection of 3.7%. However, CPI for 2008 is projected at above 6%, significantly higher than 3.45% projected in the EMS Financial Plan. The current future year inflationary assumptions are slightly more than 1% above those in the plan.

Fortunately, the inclusion of contingency for unanticipated inflation, funds held in reserve for potential millage reduction, and higher revenue projections, appear to balance the increased inflation (CPI). Use of the new revenue projections and contingency funds will allow for continued implementation of the programs as approved by voters in November 2007. If the inflationary trends continue as currently forecast, the ability to provide millage reduction will be decreased.

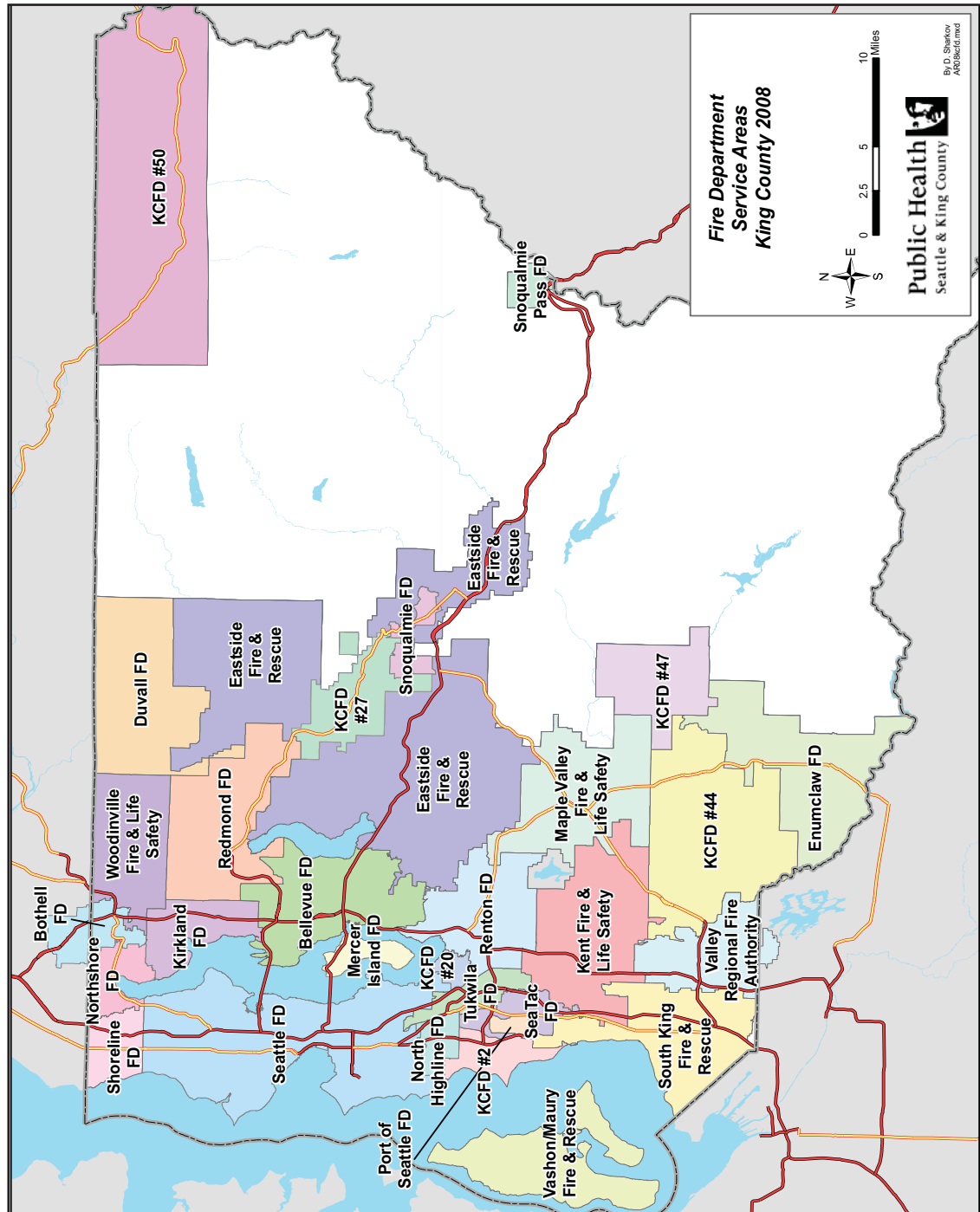
J. Recommendations for 2009 Rate

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.

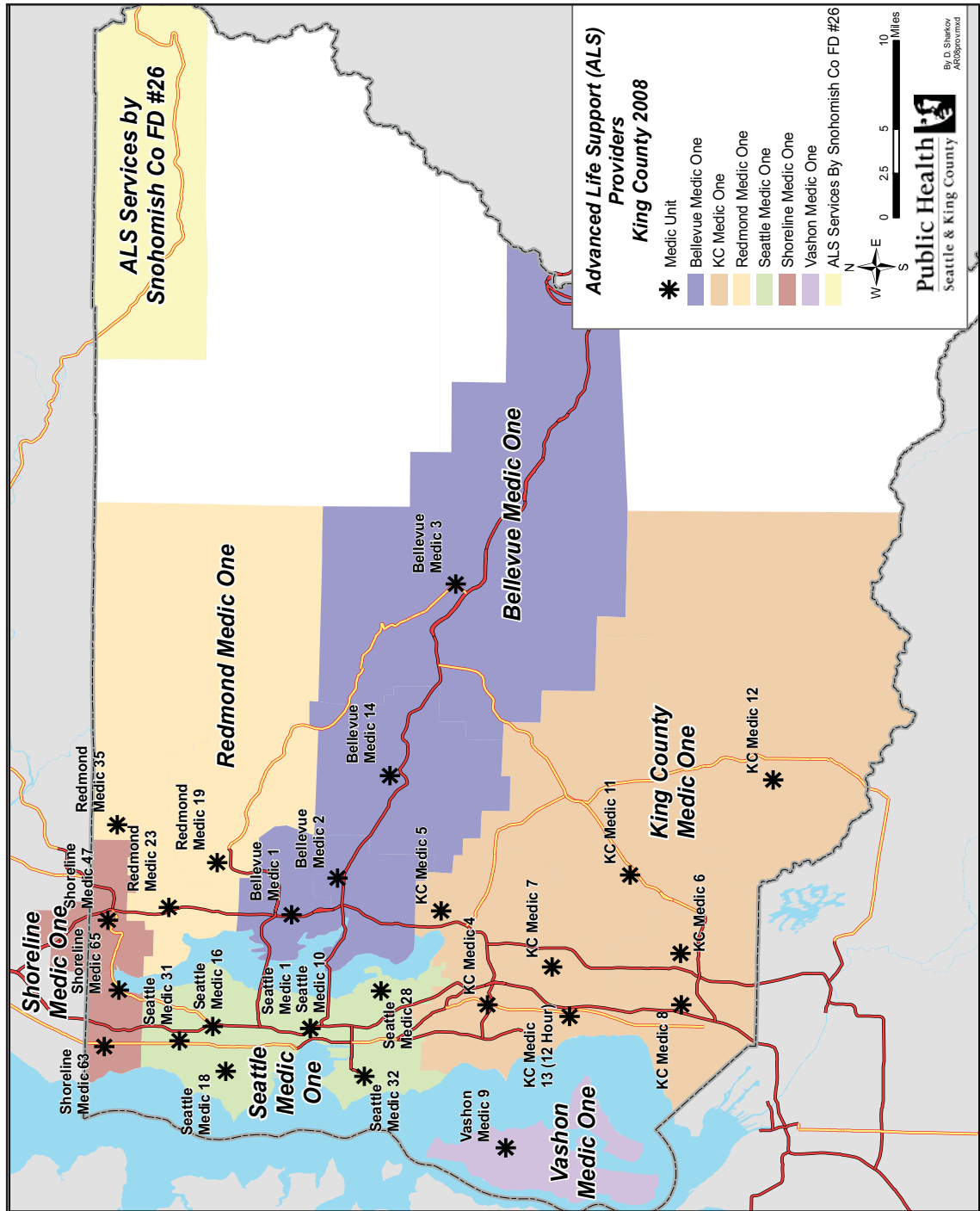
Appendix A: Regional Map 200 Total ALS Call Volume



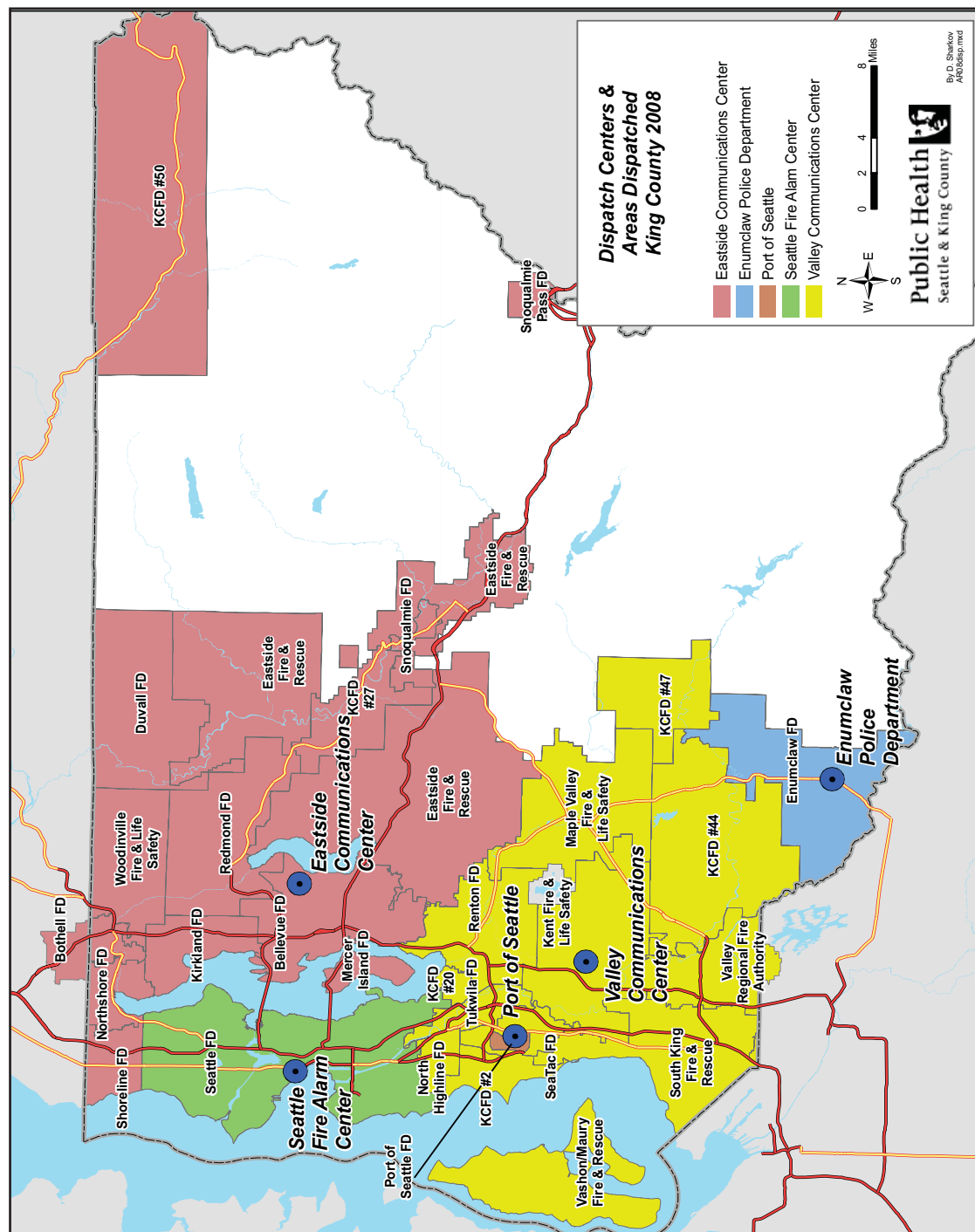
Appendix B: Regional Map of the Basic Life Support (BLS) Provider Areas



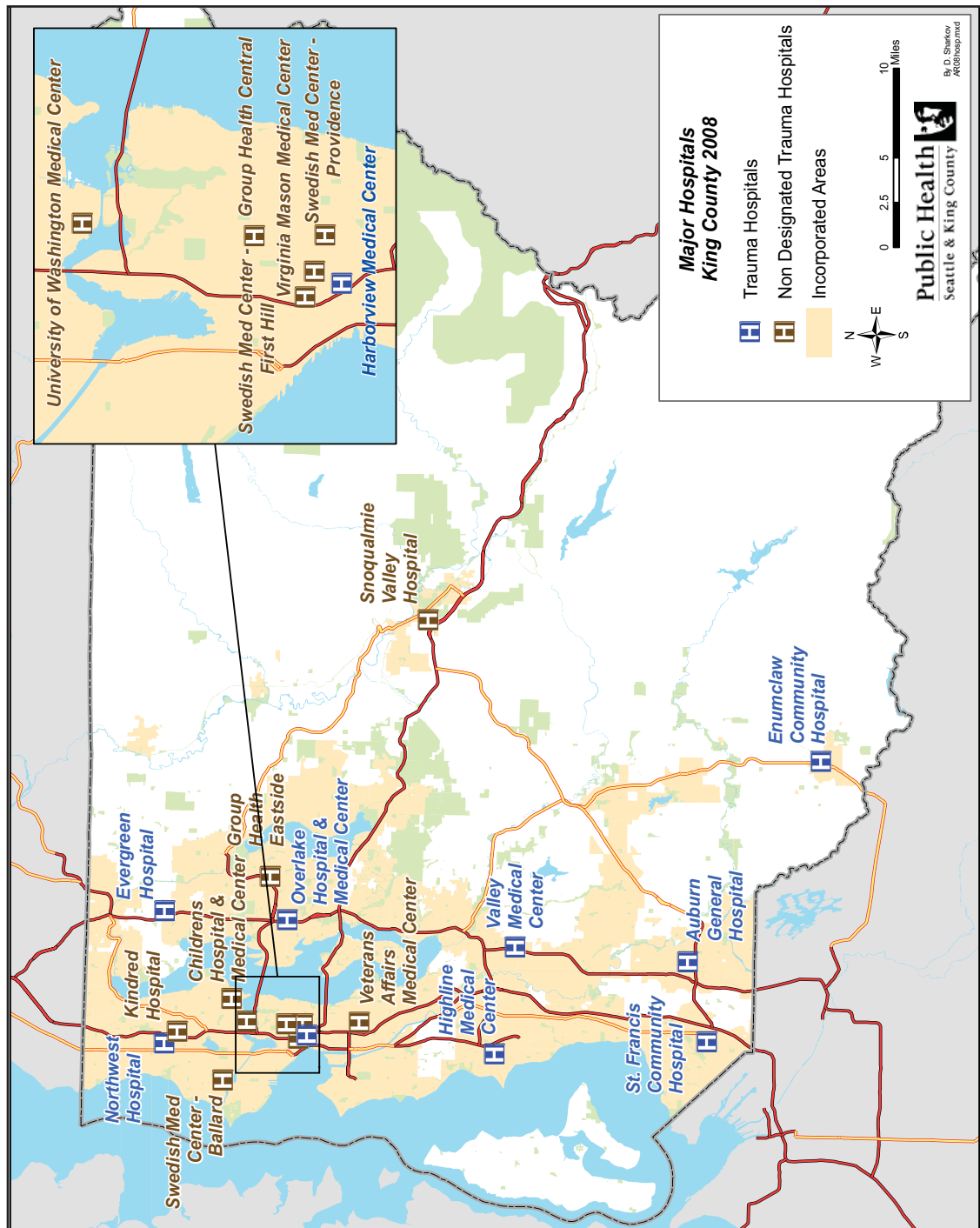
Appendix C: Regional Map of the Advanced Life Support (ALS) Provider Areas



Appendix D: Regional Map of the EMS Dispatch Center Service Areas



Appendix E: Regional Map of EMS Hospitals



Appendix F: 2008 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
Tim Fuller	ALS Providers - Redmond BLS in Cities >50,000	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
Mike Kirk	ALS Providers - Vashon Medic One	Interim 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
Mario Trevino	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 Division Revenue (Fund 1190)/Expenditure Summary
Financial Plan 2007 and 2008**

	<u>2007 Actual¹</u>	<u>2008 Forecast²</u>
BEGINNING FUND BALANCE:	\$9,403,719	\$6,243,243
REVENUES:		
Property Taxes	\$39,505,477	\$65,263,164
Federal & State Grants	\$1,439	\$27,281
Other Revenue	\$742,246	\$462,040
King County General Fund	\$375,000	\$375,000
Program Balances (Designated Reserves)		\$651,199
TOTAL REVENUES	\$40,624,162	\$66,778,684
EXPENDITURES:		
Basic Life Support	(\$9,674,865)	(\$14,390,254)
Paramedic Services	(\$28,736,207)	(\$34,322,147)
Regional Services	(\$5,201,967)	(\$5,903,766)
Strategic Initiatives		(\$951,616)
Budgeted Contingency		(\$565,000)
ALS Salary & Wage Contingency		
Disaster Response Contingency		
King County Auditor's Office		(\$61,000)
Use of Reserves (Diesel/Chassis Obsolescence)		
TOTAL EXPENDITURES	(\$43,613,039)	(\$56,193,783)
OTHER FUND TRANSACTIONS:		
GAAP Adj - Gain on Investments	\$40,400	
GAAP Adj - Loss-Impairment on Investments	(\$212,000)	
TOTAL OTHER FUND TRANSACTIONS	(\$171,600)	
ENDING FUND BALANCE:	\$6,243,243	\$16,828,144
RESERVES & DESIGNATIONS:		
Reserve for Encumbrances	(\$2,331)	(\$2,331)
Designated for 2009 Disaster Contingency		(\$3,216,379)
Designations from 2002-2007 Levy	(\$892,773)	(\$839,773)
Designations (Program Balances)	(\$1,713,719)	(\$1,104,488)
Reserves for Unanticipated Inflation		(\$1,230,000)
Reserves (Chassis, Risk, Millage)		(\$375,000)
TOTAL RESERVES & DESIGNATIONS	(\$2,608,823)	(\$6,767,971)
ENDING UNDESIGNATED FUND BALANCE:	\$3,634,420	\$10,060,173
TARGET FUND BALANCE³	\$3,634,420	\$3,742,497
¹ 2007 Actuals are from the 14th Month ARMS	³ 1/12 yearly expenditures for 2002-2007 levy; 6% of yearly revenues for 2008-2013 levy period.	
² 2008 Estimated is based on 2nd Quarter Report		

King County Medic One Donations

Fund 6980/Account 06204	
2007 Beginning Balance	\$193,384
Donations	\$5,197
Expenditures	(\$137,747)
2007 Ending Balance	\$60,833

EMS Grants, Donations & Entrepreneurial Projects

Fund 1800/Org 8040	
Research Grants	\$238,735
Entrepreneurial Projects	\$263,271
Other Miscellaneous Grants	\$1,353
King County Medic One Donations	\$137,277
TOTAL	\$640,636

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.metrokc.gov/health/ems>

Specific Program Contacts:

King County Medic One www.metrokc.gov/health/medicone	(206) 296-8550
BLS/EMT Training and Education Program www.metrokc.gov/health/ems/training	(206) 263-8580
CPR/AED Training Programs www.metrokc.gov/health/ems/aed	(206) 263-8669
Emergency Medical Dispatch Programs www.metrokc.gov/health/ems/emdprogram	(206) 263-8636
Injury Prevention and Public Education Programs www.metrokc.gov/health/ems/community	(206) 263-8544
Medical Control www.metrokc.gov/health/ems/quality	(206) 263-8569
Regional Data Collection Project www.metrokc.gov/health/ems/planning	(206) 263-8603
Center for the Evaluation of EMS (CEEMS) www.metrokc.gov/health/ems/CEEMS	(206) 263-8569

Appendix I: Complete Bibliography for 2008

1. Cagle AJ, Diehr P, Meischke H, et al; Psychological and social impacts of automated external defibrillators (AEDs) in the home. *Resuscitation* 2007; 74: 432-438.
- 2.
3. Davis TR, Young BA, Eisenberg MS, Rea TD, Copass MK, and Cobb LA: Outcome of cardiac arrests attended by emergency medical services staff at community outpatient dialysis centers. *Kidney International* 2008; 10: 1-7.
4. Gold L, Kane L, Sotoodehnia N, Rea T: Disaster Events and the Risk of Sudden Cardiac Death: A Washington State Investigation. *Pre-hospital and Disaster Medicine* July-August 2007; Volume 22 / Number 4: 313-317.
5. Lotfi K, White L, Rea T, Cobb L, Copass M, Yin L, Becker L, Eisenberg M: Cardiac Arrest in Schools. *Circulation* 2007; 116: 1374-1379.
6. Simons RW, Rea T, Becker LJ, Eisenberg MS: The Incidence and significance of emesis associated with out-of-hospital cardiac arrest. *Resuscitation* 2007; 74: 427-431.
7. Strote J, Simons R, Eisenberg MS: Emergency medical technician treatment of hypoglycemia without transport. *Am J Emerg Med* 2008; 26:291-295.

Appendix J: References for Accidental Falls in King County Highlight

1. Wofford JL, Heuser MD, Moran WP, Schwartz E, Mittelmark MB. Community surveillance of falls among the elderly using computerized EMS transport data. *Am J Emerg Med.* 1994;12:433-437.
2. Tinetti ME, Baker DI, McAvay G, et al. A multifactorial intervention to reduce the risk of falling among the elderly people living in the community. *N Engl J Med.* 1994;331:821-827.
3. Sorock GS. Falls among the elderly: Epidemiology and prevention. *Am J Prev Med.* 1988;4:282-8.
4. Rubenstein LZ, Josephson KR. Causes and prevention of falls in elderly people. In: Vellas B, Toupet M, Rubenstein L, Albarde JL, Christen Y, eds. *Falls, balance and gait disorders in the elderly.* Paris: Elsevier, 1992:21-38.
5. Hill K, Schwarz J, Flicker L, Carroll S. Falls among healthy, community-dwelling, older women: a prospective study of frequency, circumstances, consequences and predictive accuracy. *Aust N Z J Public Health.* 1999;23:41-48.
6. Tinetti ME, Williams CS. Falls, injuries due to falls, and the risk of admission to a nursing home. *N Engl J Med.* 1997;337:1279-1284.
7. Tinetti ME, Liu WL, Claus EB. Predictors and prognosis of inability to get up after falls among elderly persons. *JAMA.* 1993;269:65-70.
8. National Center for Health Statistics. *Mortality Data Tapes.* Hyattsville, MD: NCHS, 1998.
9. Burt CW, Fingerhut LA. Injury visits to hospital emergency departments: United States, 1992-1995. *Vital Health Stat.* 13 1998;131:1-76.
10. Dunn JE, Rudberg MA, Furner SE, Cassel CK. Mortality, disability, and falls in older persons: the role of underlying disease and disability. *Am J Public Health.* 1992;82:395-400.
11. Cumming RG, Salkeld G, Thomas M, Szonyi G. Prospective study of the impact of fear of falling on activities of daily living, SF-36 scores, and nursing home admission. *J Gerontol A Biol Sci Med Sci.* 2000;55:M299-305.
12. Salkeld G, Cameron ID, Cumming RG, Easter S, Seymour J, Kurrle SE, Quine S. Quality of life related to fear of falling and hip fracture in older women: a time trade off study. *BMJ.* 2000;320:341-346.
13. Tinetti ME, Williams CS. The effect of falls and fall injuries on functioning in community-dwelling older persons. *J Gerontol A Biol Sci Med Sci.* 1998;53:M112-119.
14. Kannus P, Parkkari J, Koskinen S, Niemi S, Palvanen M, Jarvinen M, Vuori I. Fall-induced injury and death among older adults. *JAMA* 1999;281:1895-1899.
15. Sattin RW. Falls among older persons: a public health perspective. *Annu Rev Public Health.* 1992;13:489-508.
16. Alexander BH, Rivara Full-P, Wolf ME. The cost and frequency of hospitalization for fall-related injuries in older adults. *Am J Public Health.* 1992;82:1020-1023.
17. Schneider EL, Guralnick JM. The aging of America: Impact on health care costs. *JAMA.* 1990;263:2335-2340.