

# **Division of Emergency Medical Services**



## ***2006 Annual Report to the King County Council***

**October 2006**



## **Preface**

I am pleased to present the Emergency Medical Services (EMS) Division 2006 Annual Report to the King County Council.

We are in the fifth year of the current six-year EMS Levy, and this report represents the eighth EMS Annual Report to the King County Council. The Council originally requested this report (King County Ordinance # 12849) to enable the EMS Division to update the Council on the status of the operational, program, financial, and planning aspects of the regional EMS system, and to report on the progress of EMS Strategic Initiatives identified in the plan.

Over the years, the report has not only detailed the evolution and progress of the current strategic plan, but also clearly showed the wide range of day-to-day regional activities that are carried out by fire departments, paramedic providers, and EMS Division staff. In their totality, these activities provide excellent EMS programs and services to the residents of King County.

As usual, it is difficult to select only a few themes to be highlighted here. First, and most importantly, active planning for the next EMS levy period has been underway for the past year using a staged approach. Phase I was recently completed in June 2006. Following thorough discussion and review, the technical stakeholders committee developed program and financial recommendations. They are currently being reviewed by the elected officials committee. These recommendations will form the core of the EMS Strategic Plan for 2008 and beyond.

In addition, over the past several years strategic initiatives, focused on technology enhancements, have made improvements to many areas of the EMS Division, including BLS training, dispatch, and data collection. As a result, web-based training for emergency medical technicians and dispatchers is now being offered to EMS providers nationwide. The Criteria Based Dispatch Guidelines are being integrated into dispatch center Computer-aided Dispatch (CAD) systems. And finally, electronic data collection is improving the completeness, accuracy, and utility of data with over 85% of the medical incident report forms being sent to the EMS Division electronically.

The residents of the Seattle-King County region receive excellent EMS service. This year's report – as in years past – continues to convey the excellence of that service and high commitment of the people who plan and deliver it.

The EMS Division's 2006 Annual Report is available online through the Public Health - Seattle & King County website: [www.metrokc.gov/health/ems](http://www.metrokc.gov/health/ems).

---

Dorothy Teeter, MHA, Interim Director & Health Officer  
Public Health - Seattle & King County

### **Acknowledgements:**

The Emergency Medical Services (EMS) Division would like to thank all of the individuals who contributed to the *EMS 2006 Annual Report*, including managers of the various EMS projects and programs depicted in the report, **Craig Coulsen** and the Seattle Fire Department, and the EMS Division data analysis team of **Linda Becker, Gayle Garson, Dan Henwood, and Dmitry Sharkov**.

The EMS Division would also like to thank **Dr. Leonard Cobb** and **Dr. Michael Copass** of the Seattle Medic One program and **Earl Sodeman**, Deputy Chief for the Seattle Fire Department, for their support and collaborative efforts in partnering with the EMS Division.

### **Writing Credits:**

<b>Editor:</b>	<b>Michele Plorde</b> , EMS Division
<b>EMS System Review:</b>	<b>Tom Hearne</b> , EMS Division
<b>Financial Report:</b>	<b>Cynthia Bradshaw</b> , EMS Division

<b>Photos:</b>	<b>EMS Division</b> (unless otherwise indicated)
----------------	--

## **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 .....	page 10
Part II: Status of EMS Division Programs and Activities .....	page 15
2002 - 2007 Strategic Initiative Summary Table .....	page 21
Summary of 2005 EMS Statistics .....	page 51
Part III: EMS Funding and 2006 Financial Plan .....	page 58
Appendix A: Regional Map of Total ALS Call Volumes .....	page 71
Appendix B: Regional Map of the Basic Life Support (BLS) Provider Areas .....	page 73
Appendix C: Regional Map of the Advanced Life Support (ALS) Provider Areas .....	page 75
Appendix D: Regional Map of the EMS Dispatch Center Service Areas .....	Page 77
Appendix E: Regional Map of EMS Hospitals .....	page 79
Appendix F: 2006 EMS Advisory Committee Listing .....	page 81
Appendix G: EMS Division Revenue/Expenditure Summary .....	page 83
Appendix H EMS Division Contact Information .....	page 85
Appendix I: Complete Bibliography for 2006 .....	page 87

### **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:** The theme for the EMS 2006 Annual Report to the King County Council reflects the predominant activity involving the EMS Division: preparation for the new 2008 EMS levy.

The *2002 EMS Strategic Plan Update* was written prior to placing the current EMS levy on the ballot for the 2002-2007 period and set major policy directions and initiatives for the regional EMS system. This EMS levy is set to expire December 31, 2007, and development of a new strategic plan is a critical component of the current levy planning process. The process is staged in several phases, including:

- Phase I: Development of EMS program and financial recommendations by the Technical Stakeholders Committee.
- Phase II: Review of the Phase I recommendations by the Elected Officials Committee and development of the 2008 EMS Strategic Plan.
- Phase III: Review and approval of the 2008 EMS Strategic Plan by cities over 50,000 in population and the King County Council.
- Phase IV: Placement of the EMS levy on the ballot for approval by King County voters.

Phase I of the levy planning process was completed in June 2006 and the Technical Stakeholder Committee recommendations are currently being reviewed by the Elected Officials Committee.

**Part II - EMS Division Programs and Activities:** The EMS Division is dedicated to increasing survival and reducing disability from out-of-hospital health emergencies in King County. EMS programs and activities are committed to this effort and have been developed through strong partnerships with other EMS agencies in the region. The following program highlights represent the strategic initiatives focused on technology enhancements.

- Web-based Training for Dispatchers and EMS Personnel: Development of training programs that utilize current web-based technologies allows for expedient and cost-efficient delivery of training services for dispatch and EMS personnel (page 28).
- Automated Dispatch Criteria: Development of custom software to automate the paper Criteria Based Dispatch Guidelines used by dispatchers to improve dispatch efficiencies, enhance quality improvement, and improve analysis of dispatch trending data (page 23).
- Regional Data Collection (RDC) Project: Allows EMS providers in King County to complete an electronic version of the Medical Incident Report Form (MIRF) and electronically transfer the data directly to a central EMS database, improving the

completeness, accuracy, and applicability of data. Over 85% of the medical incident report forms are being sent to the EMS Division electronically (page 25).

**Part III - EMS Funding and 2007 Financial Plan:** The EMS system in King County is funded primarily by a six-year EMS levy and is currently authorized to collect through the year 2007. 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. These assumptions have allowed the EMS system to grow as planned and accommodate paramedic needs not identified in the 2002 *EMS Strategic Plan Update*. Forecast revenues are expected to cover forecast expenditures through the end of the levy period. A thorough review of costs is currently being conducted and will form the basis for the next levy.

**Year 2005 Statistics:** In Seattle and King County, the EMS system responded to 162,510 total calls in 2005 with only a modest increase in ALS calls volumes due in large part to the success of the ALS Dispatch Criteria Revisions (page 22).



## A Brief Description of the EMS/Medic One Tiered System

The **Emergency Medical Services (EMS)/Medic One** 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 between King County, various cities, fire districts, private ambulance companies, local area hospitals, and others involved in providing 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, and they are 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. A majority of 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 six primary paramedic agencies responding to patients with more critical or life-threatening injuries and illnesses. Paramedics respond on average to about 30% of all EMS responses.
- **Transport to Hospitals:** Some patients require additional medical care and are transported to hospitals for further attention.

### Tiered EMS Response System

**Access to EMS System:  
Bystander Calls 911**

**Triage by Dispatcher:  
Use of Medical Response  
Assessment Criteria**

**First Tier of Response:  
Basic Life Support (BLS)  
by Firefighter/ EMTs**

**Second Tier of Response:  
Advanced Life Support (ALS)  
by Paramedics**

**Additional Medical Care:  
Transport to Hospital**

## **Part I: EMS System Review**

### **Planning Future Regional Medic One/EMS Services**

Thomas Hearne, Ph.D., Division Director

The subject of the 2006 Emergency Medical Services (EMS) System Review is to describe the regional process, major issues and initial recommendations related to the planning for the 2008 Medic One/EMS levy. I would also like to provide some background and characterize the collaboration undertaken by the Seattle-King County EMS stakeholders in order to ensure continued regional support of vital emergency medical services currently funded by the Medic One/EMS levy. Although not yet fully completed, this process has been characterized by the same outstanding regional effort, open cooperation and partnership that are the hallmarks of the regional EMS system. The services being planned include four major areas:

- First response Basic Life Support (BLS) services, provided by the thirty-three fire departments in King County.
- Paramedic services or Advanced Life Support (ALS) services, provided by the six primary paramedic agencies in King County.
- Regional support services provided by the EMS Division.
- Strategic initiative coordination provided by the EMS Division

The current Medic One/EMS levy will expire on December 31, 2007. Therefore, it is imperative that the region undertake a conceptual and operational system review, as well as perform the necessary program and financial planning, to ensure the residents of King County continue to enjoy the excellent patient and program services provided by the regional Medic One/EMS system. The regional review process, although not yet complete, represents the best regional process to date in terms of widespread involvement. I want to personally thank the numerous EMS stakeholders who have so far participated quite willingly in developing the technical recommendations for the next levy.

### **Background**

It has been more than thirty-five years since the framework of the Medic One emergency medical response model was first developed in the City of Seattle, led by Seattle Fire Chief Gordon Vickery and Dr. Leonard Cobb, a cardiologist with the University of Washington and director of the Coronary Care Unit at Harborview Medical Center. This approach included the now-familiar tiered response model, strong medical leadership, oversight, and direction by physicians (notably Dr. Michael K. Copass and Dr. Mickey Eisenberg), standardized training of firefighter/emergency medical technicians (EMTs), and standardized, intensive training of paramedics by Dr. Copass at Harborview Medical Center through the University of Washington Paramedic Training Program.

This model proved rather quickly to be an extremely effective and efficient method for providing emergency care to patients and soon gained national recognition. It was coupled with strong

local support, both of the Medic One/EMS program itself as well as in the willingness of regular residents of King County to assist in helping others in need, often complete strangers.

Most remarkably, perhaps, was both the strong grassroots effort and concerted political leadership during the early to mid-1970s devoted to replicating this model across the rest of King County. That effort resulted in the development of a truly regional, countywide approach to caring for patients with medical emergencies. In other areas of the United States, multi-jurisdictional metropolitan areas frequently developed 'patchwork' approaches to the provision of EMS with widely varying delivery systems, training requirements, and other factors. In the Seattle-King County region, this type of fragmented development was averted in favor of a regional approach which provided similar Medic One/EMS care to residents of King County regardless of where they lived, worked, or traveled within the county.

By the late 1970s, the basic Seattle model had been recreated across the region, and in 1979, the first six-year, countywide, Medic One/EMS levy - a property tax levy completely devoted to support of Medic One/EMS-related programs and services - was approved by voters. This funding mechanism provided full support for paramedic (ALS) services, offered small partial support for first responding Basic Life Support services (BLS remains primarily funded by local tax dollars from fire districts and cities), and full support for regional support services provided by the Seattle Fire Department and the EMS Division (i.e. medical direction, training for dispatchers and EMTs, data collection, and other important community programs and services).

Medic One/EMS levies have been approved regularly since 1979 with rates varying between \$.21 and \$.29 per \$1,000 of assessed valuation. However, in November 1997, the Medic One/EMS levy failed to gain the required 60% voter approval, the only time in the levy's long history. It was followed by a lengthy and thorough review of the EMS system by providers and elected officials. Ultimately, both the medical model and the EMS levy funding mechanism received strong regional approval by elected officials and voters resulting in the current six-year EMS levy. The strong regional system developed many years ago continues to be challenged, reviewed and improved upon as medical and service delivery innovations develop to ensure the highest level of patient care possible to the residents of King County.

### **2008 Medic One/EMS Levy Planning Process**

A three-phase regional planning process was established in October 2005 by EMS stakeholders to assist in the program, service, and financial planning for the 2008 Medic One/EMS levy. The process includes the following: 1) Phase I: development of recommendations by technical stakeholders, 2) Phase II: review and approval by elected officials from across the county, and 3) Phase III: formal approval by cities over 50,000 in population, a requirement of Washington State Law, to place the levy measure on the ballot. The planning process is aimed primarily at addressing several important regional goals:

- Maintain the strong and successful medical model that has served the residents of this region so well.

- Develop a clear and comprehensive Medic One/EMS Strategic Plan, one which builds on the directions laid out in the current strategic plan.
- Support regional participation, complete discussion and review of issues, and ensure strong regional consensus.

Phase I recommendations were completed by the technical stakeholders in June 2006. Thus far, participation in this complex regional planning process has been exceptional and has included representatives from large cities, suburban cities, and fire districts across the county. EMS stakeholders from fire departments, paramedic providers, dispatch agencies, private ambulance companies, and hospitals have joined in subcommittee discussions regarding paramedic (ALS) services, BLS services, regional programs and services, and the development of new strategic initiatives.

In addition to these program aspects, concomitant recommendations regarding financial support for services were developed and financial representatives from a variety of EMS providers participated in the process. There has been a concerted effort to ensure that principal issues are addressed and build a strong regional consensus about future directions for EMS in the Seattle-King County area.

## **Major Issues**

While completing Phase I over the past year, the regional planning process has dealt with a number of important issues. Some of the major areas of primary importance considered by the technical stakeholders include:

- Ensure continued paramedic service across the county and plan for future paramedic service in order to maintain current service levels.
- Provide full funding for paramedic service as a priority in the proposed 2008 levy.
- Continue to manage the rate of growth of paramedic services through effective and safe use of dispatch guidelines.
- Provide additional financial support for BLS to fire department and fire districts across the county to help offset the rising cost of service provision.
- Develop program recommendations for Regional Services.
- Identify new and innovative Strategic Initiatives.

## **Summary Recommendations - Phase I**

I do not intend to repeat in any detail the recommendations that have been developed as part of Phase I of the EMS levy planning process. Complete documentation of the recommendations as well as other information about the regional levy planning process can be obtained by going to the EMS Division website at [www.metrokc.gov/health/EMS/index.htm](http://www.metrokc.gov/health/EMS/index.htm). Paper copies of the recommendations can be obtained by contacting Helen Chatalas, EMS Division by e-mail at [helen.chatalas@metrokc.gov](mailto:helen.chatalas@metrokc.gov) or by phone at (206) 296-4598. Nevertheless, it is useful to characterize some of the major recommendations that have emerged from this process. These are summarized below by major funding category.

Paramedic Service (ALS): As in the past, regional paramedic services were identified as the funding priority for the upcoming levy. The Medic One/EMS levy is designed to support 100% of paramedic costs. There was considerable review and discussion among all the regional paramedic providers to ensure that there was adequate financial support to prevent paramedic cost-shifting to the paramedic providers. The technical stakeholders also recommended that the equivalent of three paramedic units be added in King County at specific times during the next six-year levy period in order to meet anticipated growth and maintain existing levels of service.

The ALS sub-committee recommended that medic units, outside the City of Seattle, be added as peak, 12-hour units and then be upgraded to full-time units as needed. The need for these additional paramedics units is based on projected growth in demand and will be implemented only after thorough regional technical analysis and approval by the EMS Advisory Committee and the King County Council. The recommendations also include guidelines for establishing service in outlying areas of King County, especially in the Skykomish/Fire District #50 area. The total amount recommended for paramedic service during the proposed six-year levy period is \$371 million.

Basic Life Support (BLS): The technical stakeholders recommended increasing the total BLS funding allocation over the next six years. As noted above, BLS costs are largely borne by local fire departments and fire districts. Currently, the Medic One/EMS levy provides approximately 12% of the estimated costs required to provide emergency medical services in the county. The remainder is provided by local fire departments and fire districts through local taxes. This recommended increase is necessary to assist fire departments in keeping pace with rising costs. However, in recognition that levy support for BLS services should be tied to circumstances where BLS most closely supports paramedic service, the technical stakeholders recommended BLS funding levels be proportional to calls that directly result in paramedic response and transport of patients. This will add a modest amount of funding for distribution among the fire departments and districts currently receiving BLS funding.

In addition, the BLS funding formula for determining how BLS funds are allocated has been improved and two strategic initiatives were recommended to continue the discussion on how to address the ongoing problem of BLS funding, especially in small, outlying and potentially vulnerable fire departments and fire districts. The total six year amount recommended by the EMS stakeholders for BLS service is \$186 million.

Regional Services: Regional support services are those core services provided by the EMS Division that support the direct service activities of EMS providers. They include such essential functions as medical control and direction, medical quality improvement, training and continuing medical education for emergency medical technicians and dispatchers, CPR training, coordinated data collection and regional planning, and levy fund administration. It is especially notable that the stakeholders recommended development of an enhanced medical quality improvement system, under the direction of the EMS medical directors, as a means of systematically evaluating and improving the medical care provided in the regional EMS system. In all, there are about twenty-five separate programs included in Regional Services and each one was carefully

reviewed during the planning process. The EMS stakeholders recommended \$41 million over the next six years for Regional Services.

Strategic Initiatives: Strategic initiatives are pilot programs designed to achieve the major EMS system strategic goals as identified in the *2002 EMS Strategic Plan Update*. These include improving EMS care, managing growth in paramedic services, and developing further system efficiencies and cost savings. In addition to supporting the transition of successful strategic initiatives implemented during the current levy, the EMS stakeholders also developed new initiatives which would continue to enhance dispatch training and call management, expand injury prevention programs, and enhance electronic data collection. The EMS Stakeholders recommended \$7 million for support of strategic initiatives over the next six-year levy period.

Summary: After careful review and evaluation, the EMS technical stakeholders completed Phase I levy process by recommending a total of \$605 million for support of EMS programs for both the City of Seattle and the balance of King County over the next six-year levy period. It is important to understand that these programmatic and service recommendations represent the first step in the review process and that additional review and decisions by elected officials are necessary before any recommendations for the future levy are finalized. This amount is summarized below by major funding category:

Paramedic (ALS) Services	\$371 million (61.3% of total)
Basic Life Support (BLS) Services	\$186 million (30.7% of total)
Regional Services	\$41 million (6.8% of total)
<u>Strategic Initiatives</u>	<u>\$7 million (1.2% of total)</u>
Total	\$605 million

## Next Steps

The first phase of the 2008 Medic One/EMS levy planning and review process has been completed. In July 2006, these recommendations were presented to the newly formed elected stakeholders committee, led by King County Executive Ron Sims. It is expected that this group will continue reviewing the Phase I recommendations into Fall 2006. Like the EMS technical stakeholders, the elected stakeholders group is a representative group consisting of EMS physicians, representatives from the King County Council, all cities over 50,000 in population, paramedic providers, other suburban cities, unincorporated fire districts, and labor.

In addition to review and final approval of the program and financial recommendations, the elected stakeholder group has additional issues to deliberate regarding levy rate, levy length, and selection of the specific ballot the levy will be on. We anticipate that these decisions will all be finalized by the end of 2006. The region will then move forward in 2007 with completion of the approvals required by each of the cities over 50,000 in population and the King County Council in order to place the levy on the ballot for approval by the residents of King County. The levy planning process so far has been thorough and effective. The EMS providers in King County can be proud of the thoughtful, cooperative, and effective approach they have taken in developing the levy recommendations. Several steps yet remain, but I feel confident that the region will continue – as it has in the past – to enthusiastically support the Medic One/EMS levy.

## 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 in the county by providing the highest quality patient care in the pre-hospital setting. EMS Division programs are committed to supporting this effort and are developed and maintained through strong partnerships with other EMS agencies in the region and innovative leadership in the emergency medical field. This section summarizes the primary programs and activities involving the EMS Division.

### A. King County Medic One Program

King County Medic One (KCM1) is the largest of the six primary Advanced Life Support (ALS) providers within King County, including the City of Seattle. The KCM1 service area in South King County includes 450 square miles and 696,000 in population. KCM1 works alongside local fire agencies in a seamless process of producing emergency medical care 24-hours a day, every day of the year. In 2005, KCM1 responded to 11,994 calls, including serious and critical patients requiring emergency medical care.



King County Medic One works in conjunction with 17 other fire departments to provide 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 B: Regional Map of the ALS Provider Areas* on page 73). Physicians provide medical direction for both the clinical care decisions and the strategic planning decisions that guide the organization. This 'medical model' is based on providing the most appropriate level of service to patients and is recognized worldwide. KCM1 is organized into functional areas of Administration, Operations, Training, and Emergency Management. The following provides a brief summary of each of these areas:

**Administration:** King County Medic One is part of Public Health - Seattle & King County. Administration works closely within the Public Health framework utilizing the existing infrastructure to realize economies of scale in areas of Human Resources, Information Technology, Risk Management and some Fleet Services.

- **Administrative Support:** Provides payroll, procurement and records management in addition to oversight of highly sophisticated software systems that manage the details of emergency operations.

- 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 uses a combination of Public Health Management Information Services (MIS) support and in-house subject matter expertise to stay current with state-of-the-art software tools.
- Medic Unit Vehicles: All frontline medic units are employee-designed vehicles from Braun Industries and will serve KCM1 needs well into the future. Each medic unit location also maintains access to a reserve fleet to provide minimal interruptions in service should any vehicle malfunctions occur.
- Quality Assurance: Quality assurance and review is conducted by hospital-based physicians who meet regularly with medics to provide feedback on patient care. Medical director oversight and review of patient care is conducted through this team of physicians, one for each of the four paramedic shifts, and the local medical director for KCM1.
- Research: KCM1 has such quality caregivers, they are often participants in research that sets the standards for emergency medicine. Each research project is approved by the Public Health institutional review board and receives continuous review and oversight during the project. Two KCM1 medics were recently published in the Annals of Internal Medicine for their research on end-of-life decisions (page 38).
- Medic Location: The location for each medic unit has been carefully analyzed to provide the maximum coverage area with the shortest response times.
- Supervision: Shift supervisors known as Medical Services Officers (MSOs) provide administrative and clinical oversight while also maintaining their skills as medics. In addition to providing administrative oversight and patient care, they serve command officer roles on large scale events under the Incident Command Structure.

**Operations:** The Operations Division ensures that daily core functions remain solvent. These functions include personnel oversight, station management, inventory control, and vehicle maintenance.

- Medic Unit Locations: King County Medic One has eight stations serving residents located south of Seattle and Bellevue. Each station will receive a planned replacement mobile intensive care unit (Medic One truck) this year. This three-year planned replacement allows for an economy of scale purchasing discount and will allow King County Medic One to have a reserve fleet of medic units to handle disasters, special events, and routine maintenance replacement.



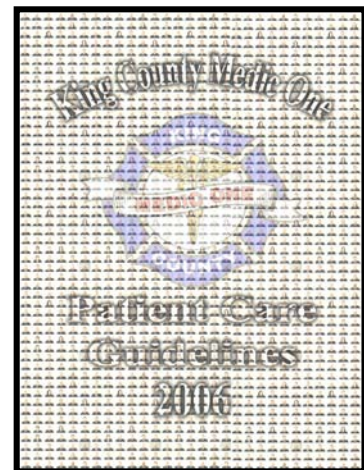


- Medic 13 Implementation: In September 2006, King County Medic One opened a new station located in Des Moines to better serve that area. This medic unit will serve the Cities of Des Moines, SeaTac, Kent and Normandy Park.
- Station Relocations: Unit relocations are reviewed on a regular basis to ensure residents are provided a timely medic unit response. Partner cities are included in the review to ensure that their future growth and special needs are considered. King County Medic One is working with the Cities of Kent, Renton, Maple Valley and Covington on potential station relocations.
- Electronic Records: King County Medic One has been a data collection national leader for years. EMIRF (Electronic Medical Incident Report Form) is an electronic data collection project to allow paramedics to directly enter critical information into a secure database. This information will be used for studies, quality assurance, and to improve patient care.
- Web-Ops: King County Medic One is working on a Web-Ops application that allows paramedics and supervisors to view critical program information related to operations. This information would include tasks, procedures, weather, road construction, special events, etc.
- Supplies and Equipment Purchasing: King County Medic One is the lead contract agency responsible for the Regional Purchasing Program contract (page 44). This contract is used by most every fire department in King County and enables economy of scale purchasing for medical supplies and equipment.
- Medical Inventory: King County Medic One must continuously replace medical inventory for all eight paramedic units located throughout South King County. Logistically this is a challenge and KCM1 will begin using a 'warehouse on wheels' to stock stations on a weekly basis.
- Station Alerting: Valley Communications Center, King County Medic One's dispatch center, is converting to alphanumeric pager alerting. This conversion will allow medics to be dispatched more rapidly.

**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 providers, the King County Regional Communication and Emergency Coordination Center (RCECC) and regional hospitals to strengthen the entire County's ability to withstand unique and challenging conditions.

- Emergency Operations Center (EOC): King County Medic One is currently updating their local EOC which coordinates responses during heavy call load, unusually large incidents, and disasters. This upgrade includes expanded video, web and communication capabilities.

- **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 have participated in simulated incidents, including terrorist attacks, earthquakes and aircraft crashes throughout the greater King County region.
- **Equipment Purchasing:** King County Medic One participates in the regional Multi-Disciplinary Equipment Purchasing Group 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 for all regional ALS providers.
- **Infectious Disease & Pandemic Preparations:** King County Medic One assumed a leadership role in preparing the Seattle - King County EMS community for infectious disease and pandemic conditions. The result has been development of a groundbreaking plan that establishes 'best practice' guidelines for managing infectious disease incidents at the BLS and ALS levels. The pandemic plan, arguably one of the first in the nation, provides directions for operational considerations during the outbreak of a pandemic pathogen, including specific guidelines affecting dispatch/communications centers, BLS providers and ALS responders.



Several of the specific topics discussed are modifications to the EMS dispatch guidelines, increased Personal Protective Equipment recommendations, new Standing Orders for treatment and transport during a pandemic, and new triage guidelines for pandemic patients. These infectious disease and pandemic guidelines provide an important new 'bridge' between the fire and EMS responders of the region and the Public Health agencies of King County and may prove critical in keeping systems functioning during a prolonged pandemic outbreak.

**Training and Quality Assurance:** The Training Division ensures that paramedic skills and techniques are practiced and maintained through out the KCM1 organization, providing consistent emergency medical care for the residents in the area.

- **Grand Rounds Training (GRT):** GRT is an ongoing, bi-monthly training activity designed to train on-duty paramedic crews. The 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 King County Medic One Training Division tests paramedics on a medication carried on the units in addition to commonly

prescribed medications taken by patients. 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 paramedics' knowledge of pharmacology and application.

Beginning in 2006, KCM1 began writing MoM quizzes that focused on medication classification, not just specific medications. For example, the term 'water pill', as described by many patients, is a diuretic. There are numerous diuretics within this classification; each potentially acting in a different manner. A broader knowledge of medication classification(s) will further paramedics' working knowledge of pharmacology.

- Quality Assurance and Improvement: King County Medic One and the EMS Division have been diligently working on new processes and procedures to streamline the Quality Assurance and Improvement program. Revisiting standing processes has been very effective in identifying the importance of asking questions relevant to patient care and outcome, measuring individual and system performance, identifying and addressing operational and training issues paramedics and physicians raise. The KCM1 Medical Program Director and the Training/Quality Improvement MSO continue to develop and refine quality management processes with the goal of assuring patient care remains 'Always Exceptional.'
- 'Doctor's Meetings': Doctor's Meetings are quarterly shift meetings with paramedics, the Associate Medical Director, Shift MSO (Medical Services Officer) and Training/Quality Improvement MSO to review specific medical cases. Paramedics receive feedback regarding patient admitting diagnosis, in-hospital care, and final disposition. Often the Associate Medical Director will provide a brief lecture on a specific illness or disease process, and answer questions regarding specific cases. The 'Doctor's Meetings' provide an invaluable opportunity for paramedics to learn from Emergency Medicine physicians.
- Case-of-the-Month: New to King County Medic One, Case-of-the-Month is a discussion of an actual response by one of the KCM1 paramedic teams. Not your ordinary type of call, Case-of-the-Month is unique because everything about the case was not typical and represented a challenge and is an opportunity for KCM1 paramedics to learn from each other. The Case-of-the-Month is designed as a single subject, disease process, or injury pattern, formatted in an overview and summary, followed by a quiz. This addition provides another source for KCM1 paramedics to gain valuable continuing medical education.



King County Medic One Donations: KCM1, like most paramedic providers, has a separate account for donations from residents of King County. These funds are used to supplement EMS levy funds and are specifically targeted to purchase equipment or support training of paramedics.

Donations are a strong expression of the community support for the services provided for KCM1. In 2005, these funds were used to purchase Mobile Data Computers (MDCs) for medic units, allowing them to communicate electronically with the 9-1-1 dispatch center. Please refer to *Appendix G: EMS Division Revenue/Expenditure Summary* (page 83) for financial details.

*King County Medic One remains one of the premier paramedic providers in the nation. Its high cardiac-arrest survival rate and superior customer service and customer satisfaction levels help maintain its reputation and define its performance standard. The personnel who provide this core service are dedicated to public service at the highest level.*

## B. 2002 - 2007 Strategic Initiatives

**IN PROGRESS**

The Emergency Medical Services system in King County provides an outstanding public service to its residents. The EMS Division coordinates development and implementation of the regional strategic plan in conjunction with EMS providers, partners in providing EMS services, and elected officials to help maintain this high quality service. The current **2002 EMS Strategic Plan Update of the 1998-2003 EMS Strategic Plan** supports both implemented programs and the development of new projects in order to meet identified objectives characterized as 'strategic directions.' The EMS strategic directions consist of the following:

- Enhance existing programs and add new programs to meet emerging community needs to maintain or improve current standards of patient care.
- Manage the rate of growth in the demand for EMS services.
- Use existing resources more efficiently to improve operations of the system to help contain costs.

The **2003 Supplemental Plan** followed up on the strategic plan effort by identifying three major areas of focus for the implementation of the strategic directions. These included:

- Dispatch Enhancements
- Advanced Technology Projects
- EMS System Efficiencies

The term 'strategic initiative' was introduced in the **1998-2003 EMS Strategic Plan** and was used almost exclusively to describe new and innovative approaches to improving the EMS system in King County, including the Review and Revision of the Criteria Based Dispatch (CBD) ALS Triage Criteria (page 22), the Regional Purchasing Program (page 44), the Alternate Destination and Patient Treatment (ADAPT) Program (page 46). These twelve strategic initiatives were allocated specific funds to ensure their successful implementation and were completed in 2002. The **2003 Supplemental Plan** continued in this manner by supporting continuation of the strategic initiatives already in progress and identifying new programs and initiatives that were thought to contribute to the successful achievement of the strategic directions.

These new programs included enhancements to the Web-based Training for EMS Personnel (page 28), Paramedic and EMT Procedure and Patient Treatment Evaluations (page 30), and Enhanced Care for Specific Populations (page 36). This current set of new strategic initiatives was approved by the EMS Advisory Committee in 2004 and allocated additional dedicated funds to ensure adequate financial support. The table below summarizes the status of each strategic initiative and is followed by brief project descriptions (a Summary Financial Report is located on page 65).

### **2002-2007 Strategic Initiative Summary Table**

<b>Strategic Initiative</b>	<b>Current Status</b>
<b>I. Dispatch Enhancements:</b>	
Review and Revision of the Criteria Based Dispatch (CBD) ALS Triage Criteria	Ongoing
EMD Quality Improvement	Ongoing
Enhanced CBD Basic Training and Continuing Education Curricula	Ongoing
<b>II. Advanced Technology Projects:</b>	
Web-based Training for EMS Personnel and Dispatchers	Ongoing
Regional Electronic Data Collection Project	Completed: 12/03
Regional EMS Tracking Resource - Online (RETRO) Project	Completed: Phase I - 12/05 Initiated: Phase II - 7/06
<b>III. EMS System Efficiencies:</b>	
Financial Review of EMS Sub-Funds	Ongoing
Paramedic and EMT Procedure and Patient Treatment Evaluations	Ongoing
Injury Prevention Programs	Ongoing
Enhanced Care for Specific EMS Patients	Ongoing
Assessment of the Impact of State Budget Cuts on the EMS System	Completed: 01/05
<b>IV. Strategic Plan</b>	Initiated: 07/05

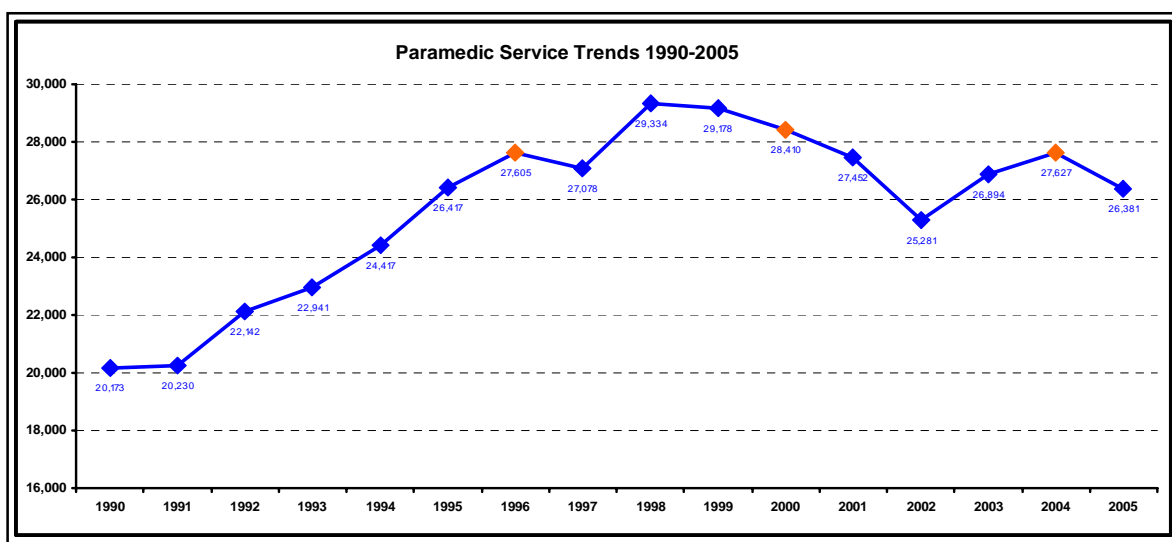
## I. Dispatch Enhancements

Communication centers that take 9-1-1 emergency calls from the public are the access point to emergency medical services and thus play a critical role in managing the use of high cost advanced life support (ALS) resources. The *2002 EMS Strategic Plan Update* identified several initiatives that invested in data-driven revisions to the King County Criteria Based Dispatch (CBD) Guidelines, enhanced quality improvement practices, and emergency medical dispatch training, including an innovative on-line training project. During this levy period, these initiatives have clearly demonstrated improved effectiveness and efficiency of ALS dispatch. The following describes the current status of the three major dispatch-related strategic initiatives.

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

**Criteria:** One of the strategic directions identified in the *1998-2003 EMS Strategic Plan* and supported in the *2002 EMS Strategic Plan Update* was to determine ways to decrease the rate of growth of ALS calls. A major component of this effort was to revise the CBD Guidelines, used by dispatchers to determine the level of ALS care required by patients. Since the CBD Guidelines were implemented in 1990, they have undergone a major revision three times, in 1996, 2000 and 2004. Another smaller component is the integration of the current paper-based guidelines into custom electronic software at dispatch centers.

**CBD Guideline Revisions:** The most recent analysis of King County paramedic service trends from 1990 - 2005 demonstrates an encouraging trend in the reduction in total ALS call volumes in years immediately following the revision of the CBD Guidelines. After revisions in 1996, ALS call volume in King County dropped from 27,605 to 27,078 in 1997 (527 fewer calls). After revisions in 2000, the ALS call volume dropped from 28,410 to 27,452 in 2001 (958 fewer calls). And finally, after revisions in 2004, the ALS call volume dropped from 27,627 to 26,381 in 2005 (1,246 fewer calls). This is an average annual reduction of 910 calls in the year immediately following revisions to the dispatch guidelines.



The orange diamond ♦ reflects a year in which CBD revisions were implemented.



The ALS call volume in succeeding years following these recurring drops in call volume tends to move upward again, likely due to population growth, however the end result of these periodic reductions in ALS call volume is a large reduction of calls when compared to previous long range predictions of ALS call volume.

**CBD Guideline Integration:** As a part of the strategic initiative to make dispatch enhancements and improve QI activities, the EMS Division has developed custom software to automate the paper-based Criteria Based Dispatch Guidelines used by dispatchers in King County, outside the city of Seattle. The objective is to:

- Improve dispatch efficiencies in call processing by creating a friendly user interface for dispatchers.
- Enhance quality improvement and dispatcher feedback activities by capturing detailed call processing data, including call processing times.
- Improve the ability for the EMS Division to analyze dispatch trending data.

Phase I of the project began in October 2005 and was completed in July 2006. Phase I developed a stand-alone version of the software that could be used by dispatch centers that were not heavily reliant upon Computer-aided Dispatch (CAD) systems. Phase I of the project was successfully implemented in two small dispatch centers in King County; Enumclaw Police and the Port of Seattle Police/Airport Operations.

The EMS Division is currently planning for a Phase II software upgrade which will integrate the existing software application with the sophisticated CAD system used by Eastside Communications in Bellevue. Phase II has been approved by the King County IT Project Review Board and is scheduled to begin in October 2006

with completion estimated in March 2007. Integration with the CAD system at Valley Communications has been postponed until sometime in the next few years when they purchase a new CAD system.



Medical Program Director, Mickey Eisenberg, MD answers student questions in an Emergency Medical Dispatch class

**Emergency Medical Dispatch (EMD) Quality Improvement:** The development of an EMD Quality Review Program is an integral part of the 2002 *EMS Strategic Plan Update*. In 2001, the EMS Division, in cooperation with King County Dispatch centers, began a formal process for review of dispatch tapes and associated EMS reports for the purpose of EMD quality improvement. The process included 1) the identification of cases meeting certain review criteria, 2) the retrieval of dispatch tapes and reports from dispatch centers, and 3) a review of these cases by a team consisting of a paramedic and a dispatcher.

As of June 2006, approximately 3,800 cases have been reviewed. When appropriate, feedback from this case review process is provided to the individual dispatcher and is also used in the development of continuing education when system-wide trends for improvement are identified. The Quality Review teams have found that using this focused training has had a positive impact on the dispatchers by improving their decision-making abilities.

**Enhanced CBD Basic Training and Continuing Education Curricula:** A priority for enhanced dispatch training included revisions to both Basic and Continuing Education training in Criteria Based Dispatch (CBD). Three major changes to this training occurred between July 2002 and June 2006.

1) *Addition of Pre-course Anatomy and Physiology Class:* Dispatch improvements continue to focus on expanding and creating enhanced training for Emergency Medical Dispatch (EMD). A pre-requisite course of Anatomy and Physiology is currently being delivered and is a requirement prior to attending the basic CBD course. This 8-hour course provides the dispatcher with a basic understanding of human anatomy and physiology. This method of delivery allows for more scenario-based discussions in the basic CBD course during which time the students can focus on the application of their knowledge of the body systems as they relate to CBD response codes and pre-arrival instructions.

Students also receive 'Anatomy and Physiology' educational materials to assist them in the learning process in the basic course as well as the continuing education they attend in their careers as emergency medical dispatchers in King County. The basic CBD course continues to provide the students with a review of anatomy, physiology, and pathophysiology. The objective is to provide the EMDs with this knowledge and enhance their good decision-making skills with the additional medical training.

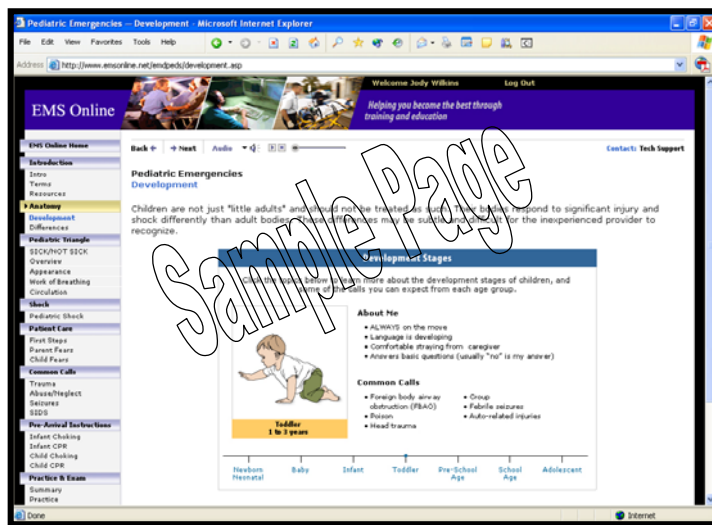
2) *Problem/Scenario-Based Method of Delivery:* One of the main projects for 2005 and 2006 is to update and revise the method of training delivery to include more student-centered learning activities such as problem-based scenarios, role-playing, and other methods that involve students in the learning process. The curriculum consists of carefully selected and designed problems that demand from the learner an acquisition of critical knowledge, problem solving proficiency, self-directed learning strategies, and team participation skills. Studies have shown that the participants in a course with this style of delivery are able to apply their knowledge and seek out information more effectively than those students receiving a lecture-based method.

3) *Online Web-based Training for Dispatchers:* In December 2003, the first module of web-based continuing education was delivered. The subject was 'Telephone CPR/Cardiac Arrest'. This module included a variety of student activities as well as audio scenarios that supported the objectives of the course. In 2005, two more courses were added. 'Decreased Level of Consciousness,' and 'Pediatric Emergencies' were well-received by the student participants. The spring of 2006 module, 'Infectious Disease' was developed and delivered online and is supplemental to the Pandemic Influenza class-room training that is being delivered throughout King County.



All of these courses have been well-received by dispatchers and there have been requests for more opportunities to participate in web-based training. Agencies outside of King County also requested to participate, and thus far, their feedback has been positive. The subject for Fall 2006 will be 'Sick/Not Sick'.

The web-based curriculum is designed to allow the participant an opportunity to use internet links and other additional tools to enhance their knowledge base. The web-based format is supplemented with in-classroom training which allows the students to ask questions of the instructor and apply the knowledge from their web-based training to specific scenarios and guided group discussions.



*Development of strategic initiatives that target enhancements to the EMS dispatch system relate directly to all three strategic directions identified in the 2002 EMS Strategic Plan Update. A multifaceted approach to improving the dispatching of EMS personnel has reduced the demand for paramedic response, used innovative teaching techniques to improve patient care, and used resources in an efficient and thoughtful manner.*

## II. Advanced Technology Projects

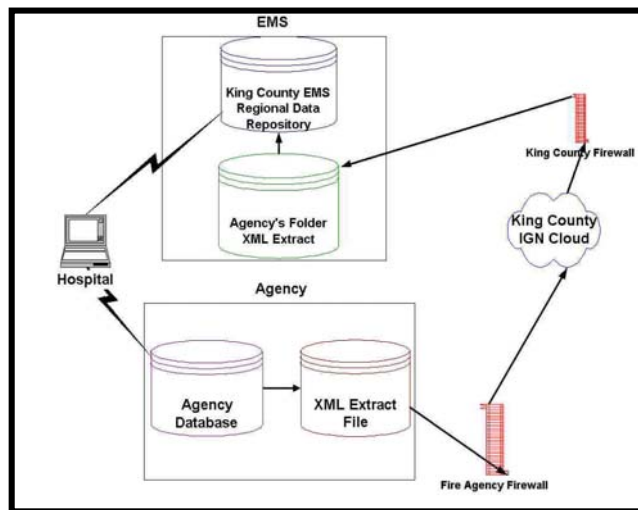
The development of projects that incorporate advancements in technology offers a variety of opportunities for improved efficiencies in the EMS system. This includes electronic data collection, on-line training of personnel, and electronic record-keeping. Current technologies allow for rapid and direct communication between EMS agencies, accurate and secure transmission of information, and simplified management and oversight of EMS activities. The following section describes the three major technology-related strategic initiatives.

**Regional Electronic Data Collection Project:** One of the strategic initiatives identified in the 1998-2003 EMS Strategic Plan and supported in the 2002 EMS Strategic Plan Update was the development of an enhanced EMS monitoring system that would allow for improved oversight of the EMS system. The **Regional Data Collection (RDC) Project** was a five-year countywide effort to implement a system that allowed all EMS providers in King County to complete an electronic version of the Medical Incident Report Form (MIRF) and electronically transfer data directly to a central EMS database. The collection and consolidation of data via electronic means improved the accuracy and completeness of the data, provided access to the aggregate data by individual service providers, allowed for more intensive analysis of the data, and facilitated the assembly of system reports.

The RDC Project was completed as a pilot project in December 2003 and was integrated into the regular programs and activities within the EMS Division. Currently, twenty-two of the thirty-three EMS agencies collect data electronically across King County, including Auburn Fire Department, Bellevue Fire Department, Black Diamond Fire Department (#17), Eastside Fire & Rescue, Fire District #40, Fire District #44, Kent Fire & Life Safety, Kirkland Fire Department, Maple Valley Fire & Life Safety, Mercer Island Fire Department, North Highline Fire District (#11), Pacific Fire Department, Port of Seattle Fire Department, Redmond Fire Department, Renton Fire Department, SeaTac Fire Department, Seattle Fire Department, Shoreline Fire Department, South King Fire & Rescue, Tukwila Fire Department, Woodinville Fire and Life Safety, and Vashon Island Fire & Rescue.

These departments represent 85% of the forms generated each year. Eight additional agencies are expected to begin electronic data collection by the end of 2006, increasing electronic reporting by EMS agencies to over 91%. King County Medic One has also started the process of

moving to electronic data collection and should have a system in place by January 2007, bringing the total number of records reported electronically to over 96%.



Another objective of the Regional Data Collection Project is to establish connectivity with local area hospitals. The immediate benefit of such a network is to allow current quality improvement activities to include patient outcome information. This is a critical element of patient care review and could affect EMS patient care protocols, policies, and procedures. A long-term benefit is the ability for EMS personnel

to provide hospitals with a medical incident report in advance of patient arrival at the facility. This is exceptionally useful to hospitals in instances where patients require mobilization of medical resources such as a catheterization lab or a specialized surgical team.

In all cases of data collection and transfer, the strictest policy of patient confidentiality is maintained. This includes utilization of secured methods for data transfer and limited access to confidential information. In accordance with the Washington State Uniform Health Care Information Act (RCW 70.02) and Health Insurance Portability and Accountability Act (HIPAA) regulations, the EMS Division is evaluating additional areas for improvement.

As a sub-set of the RDC Project, the **Alternate Input Device (AID) Project** is designed specifically to evaluate development of an electronic data collection application that could be loaded on mobile hardware devices for use in the field. The AID software was modeled after the current King County paper Medical Incident Report Form (MIRF).

Recommendations following the completion of *Phase I* included:

- Phase II** of the AID Project applied the user feedback from *Phase I* to develop a more robust electronic field data collection form. *Phase II* also included development of a full SQL backend and a way to easily extract data that matched the King County EMS data schema. The form upgrades were then tested in the field by agency participants for a five-month period.

**EMR - Electronic Incident Report Form - Administrator (00000) [New Incidents]**

File Edit View Options Help Log In All Incidents New Incident Save Incident Print Incident Print Agency Sync Data File Input Delist Actions

Incident Information | Research | Patient Treatment | Navigation | Trauma | UKE | Cardiac Arrest | Special Studies | Access Audit

**Key Incident Information**

Date of Incident <b>06/15/2006</b>	Agency Incident Number <b>45523</b>	Agency Name <b>King County Medic One (100)</b>
---------------------------------------	--	---

**Incident Address**

Street Number	Street Name	City	State	Zip	Street Suffix
7777	North (N)	Marysville	WA	98201	(Northwest (NW))
Apartment	Unit	County			
111	Renton	KING			

**Call Information**

Cell Type	Initial Level Of Provider On Scene	Grocodile Aug.	Emergency Area Type
Medical assist, assg -	ALS		Suburban (2)
Are you First EMS Responding Agency?	Local Agency on Scene ID	Location Type	Property Use
Yes (1)	Renton FD	Street (09)	Street or road in con-
Responding in Fire District	Initial Level Of Provider on Scene	Aid Type	Outside Agency Incident Number
Renton FD (17M14) - 2	ALS EMT-Paramed	Mutual aid received -	

- Again, continue with the AID Project.
- Develop *Phase III*, making additional improvements to the electronic data collection form. Revisions included the consolidation of data elements with the removal of tabs, enhanced data validation features, and improved flow-chart functionality.

Recommendations following the completion of *Phase III* included:

- The AID Oversight Committee reviewed the findings from *Phase III* and was highly supportive of the AID form and the direction of the AID Project. With the ability to send and receive data via a secure wireless network, and transfer data between units and different agencies via a web-

based wireless system, the AID Project could be greatly successful. However, additional financial support is needed to integrate the AID form with local RMS and hospital systems.

With the expected expiration of the current 2002-2007 EMS levy in December 2007, efforts to prepare for the next levy period are underway. This includes development of the *Enhanced Network Design Project*, a proposed strategic initiative that builds on the completed Regional Data Collection Project and focuses on a countywide fully integrated EMS data collection network. Based on the findings from *Phase III* of the AID Project and the anticipated new strategic initiative, the AID Oversight Committee agreed to wait until the next levy period for future AID form modifications. With the current system developed through the AID Project, allocation of additional funding, and continued advancement in field technologies, the EMS Division should be well positioned to move the AID Project forward.

**Web-based Training for Dispatchers and EMS Personnel:** Development of training programs that utilize current web-based technologies allows for expedient and cost-efficient delivery of training services for dispatch and EMS personnel. The web-based training strategic initiative (EMS Online) targets the development of new basic and continuing education modules for dispatchers and ongoing development of continuing education modules for EMTs.

This method of delivery allows project participants an opportunity to log onto the Web and access training modules during non-peak service hours and receive training in intervals that best meet the needs of the participant. Lessons are interactive with a focus on application of the objectives, and include a participant feedback mechanism built into the lesson plan allowing students immediate response on both test questions and scenario responses.

For details regarding the current status of web-based training projects for dispatchers please refer to page 24, and for EMTs, please refer to page 40.

**Regional EMS Tracking Resource - Online (RETRO) Project:** The RETRO Project, an approved strategic initiative to build a centralized database to track and store information related to EMS personnel across King County, is approaching the end of its feasibility analysis phase. The findings indicate that steps should be taken to implement an Electronic Records Management (ERM) system to replace the existing paper-based program. 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 proposed ERM system consists of a scanning solution and an electronic records database. The multi-systems database will collect and track information for each individual entering into the EMS system in King County and eliminate the intensive, time-consuming use of paper files. The records database will host information that links to the scanned images, thus ensuring that the EMS Division is better able to track the State and King County certification and recertification requirements critical to maintaining or improving current standards of patient care. Through a combination of cost savings and programmatic efficiencies, the RETRO Project was

able to hire a Records Manager to run the ERM system and help transition and coordinate the implementation of Phase II of the RETRO Project: integration of the personnel database program within King County.

*Development of strategic initiatives that incorporate advancements in technology into the fundamental design of EMS system programs supports strategic directions identified in the 2002 EMS Strategic Plan Update. Using the current standard practice of implementing electronic systems to improve data quality and efficiency, provide flexibility in training of EMS personnel, streamline record management, and reduce record retrieval demand meets both the Strategic Direction objectives of identifying innovative technologies to improve patient care and using resources in an efficient and cost-conscious manner.*

### **III. EMS System Efficiencies**

The Emergency Medical Services (EMS) system provides an internationally regarded regional service to the residents of King County. However, improvements and innovations regarding the management and financing of the four levy-supported ALS, BLS, Regional Services and strategic initiative sub-funds, review of EMS standards of practice, continuation of injury and illness prevention programs, and analysis of particular EMS sub-populations that could benefit from enhanced care are integral to the provision and maintenance of any high quality EMS system.

The following section describes four primary efficiency-related strategic initiatives:

**Financial Review of EMS Sub-Funds:** The EMS levy in King County provides full support for Advanced Life Support (ALS) services, Regional Services, and strategic initiatives, and contributes to Basic Life Support (BLS) services. As part of the 2008 EMS/Medic One Levy process, elected officials and representatives of cities and unincorporated areas are reviewing each of these sub-funds extensively. This review process is useful in educating decision-makers on how funds are being spent, identifying areas for improvement, assisting in the prioritization of projects, and providing flexibility in responding to program needs. The process will ultimately provide the direction for the EMS system in the region for the next levy period.

**ALS Sub-Fund:** As recommended in the *2002 EMS Strategic Plan Update*, ALS funding is evaluated annually to prevent any cost-shifting to ALS providers. Significant cost drivers leading to this recommendation included rising labor costs, and increased costs of pharmaceuticals and medical supplies. Each year, a subset of the EMS Advisory Committee meets to review current and projected ALS costs and compares them to the budgeted ALS allocation. If agency expenses are increasing higher than CPI and funds are available in the fund balance, the strategic plan allows for ALS allocation increases above CPI.

Based on individual agency experience, an increase above Consumer Price Index (CPI) was recommended and implemented in 2003 (5.5% above CPI for a total increase of 8%). Due to the size of this increase an additional increase was not recommended in 2004. Increases of 2.2% and 2.1% above CPI were included in the allocations for 2005 and 2006. As the 2006 ALS allocation

increase used available fund balance, no increase above CPI was recommended for 2007. A thorough review of costs is currently being conducted and will form the basis for the next levy.

**BLS Sub-Fund:** The mechanism for allocating the BLS fund to individual EMS agencies uses a complex formula reflecting agency contributions in assessed valuations, the percent of unincorporated area in the jurisdiction, and the number of EMS agency responses. The formula also incorporates a principle that no agency will receive less funding than the previous year, a concept known as ‘hold harmless.’ The BLS funding formula is evaluated on an annual basis to ensure it is operating as expected, and this year, the BLS funding formula is being reviewed in depth as part of the levy planning process.

**Regional Services Fund:** The EMS Division reviews the current Regional Services Program budget annually. Like other city and county departments, Regional Services faces challenges with expenses increasing at rates higher than CPI (particularly related to salaries, benefits, and indirect and overhead costs). Regional Services has been able to accommodate costs increasing at a rate higher than CPI by using savings from previous years (such as salary savings from positions that were temporarily vacant). As part of the planning process for the next levy, each Regional Service program is being evaluated.

**Strategic Initiative Fund:** Although the *2003 Supplemental Plan* provided adequate detail for the development and implementation of the current EMS strategic initiatives, project plans evolved to better reflect intended project objectives. In 2004, the EMS Advisory Committee approved additional funding to accommodate these changes. Nearly all of the strategic initiatives in the *2002 Strategic Plan Update* and the *2003 Supplemental Plan* will be completed by the end of this levy period in 2007. Based on emerging needs, the levy planning subcommittee is reviewing and recommending a new set of strategic initiatives for the next levy period.

**Paramedic and EMT Procedure and Patient Treatment Evaluations:** Provision of the highest level of patient care is the primary objective of the EMS program in King County. Ongoing review of paramedic and EMT procedures and patient treatment plans is essential to maintaining a quality EMS system. The following items characterize the variety of evaluations that were recently completed or are currently underway in the county:

**Completed - Pediatric Seizures:** For pediatric seizures, rectal valium can be life-saving. During an eight-month study period, there were 202 paramedic responses to seizure activity in South King County; this population was comprised of 61 (30%) children (1-17 years of age) and 141 (70%) adults (18 years and older). About 30 (14%) patients reported more than one seizure event after the initial 9-1-1 call (10 were children). The initial dispatch code of all the seizure cases treated ranged from breathing difficulty (7) and sick (unknown)/ other (9), to unconscious/ unresponsive/ syncope (20) and seizure (99). Sixty (30%) cases received paramedic-administered medication; the majority of these patients were given intravenous valium. Diastat use was reported among 10 cases – all children – either in the past, during the seizure event, or both. Overall, nine (5%) seizure patients were intubated (6 were children). Almost all (98%) of the seizure cases examined were transported to a hospital.

Analysis suggests that children – who represent one-third of all the seizure patients treated in South King County – are more likely to be intubated and to use Diastat compared to adults. The findings also indicate that roughly half of all the seizure cases treated are not identified as ‘seizure’ during the initial 9-1-1 call, and that nearly all of the paramedic-treated seizure cases are transported to a hospital. Partly because of these findings, Diastat has been added to the approved therapeutic list for South King County Paramedics. The findings will also be used to enhance future continuing education material for EMTs, paramedics, as well as dispatchers.

Ongoing - Glucometry: This minimally invasive procedure provides rapid measurement of blood glucose levels and can be helpful in the assessment of patients with an altered level of consciousness. EMT glucometry is now an approved procedure in King County. Patients treated for hypoglycemia (low blood sugar) will be evaluated to see if they can safely be left at home following appropriate response to therapy. Evaluations with patients will be conducted via telephone interviews, an expected 200 patients - 100 treated by EMTs and 100 treated by paramedics. Preliminary analysis reveals that treatment by EMTs is safe with no undue patient complications.

Ongoing - Glucagon for Low Blood Sugar: Low blood sugar (hypoglycemia) can lead to seizures or brain damage and patients with this problem need to have this situation corrected as rapidly as possible. An evaluation of the number of hypoglycemia episodes in which the patient could not swallow oral sugar will help determine whether it is appropriate to consider Glucagon (an auto-injector to treat low blood sugar) as an appropriate skill for EMTs. During a 12-month period, data will be collected where intravenous glucose was administered by paramedics for patients with low blood sugar. The evaluation will also measure the time interval between EMT and paramedic arrival to determine if this is a factor.

<p>If you have any comments or questions, please call your local Fire Department during normal business hours.</p>	
<p>For more information on low blood sugar, you can call the</p> <p><b>American Diabetes Association</b></p> <p><b>1-800-DIABETES</b> (1-800-342-2383)</p> <p>or go online to <b>www.diabetes.org</b></p>	<p><b>Low Blood Sugar</b></p> <p><i>After Care Instructions</i></p> <p>Date: _____</p> <p>EMT: _____</p>

Completed - Naloxone for Narcotic Overdoses: The number of episodes of narcotic overdoses in which paramedics administered naloxone (Narcan) to reverse the effects of the narcotic overdose was evaluated. There were 164 patients who received naloxone for suspected overdose in 2004. There were 75 (46%) patients initially unresponsive to painful stimulus. Respiratory rate was <10 in 79 (48%). Death occurred in 36 (22%) at the scene or during transport. A full or partial response to naloxone occurred in 119 (73%). Recognized adverse reactions were limited to agitation/combativeness in 25 (15%), and emesis in 6 (4%). Average EMT arrival time was 5.9 minutes. Average paramedic arrival time was 9.8 minutes in most cases, and 16.1 minutes in 46 cases (28%) in which paramedics were requested by EMTs at the scene. The EMT naloxone administration could be undertaken as a pilot program but that it should not become a county-wide program.

Ongoing - Intravenous vs. Intranasal Naloxone: The current standard of practice is for paramedics to administer intravenous naloxone. This review will compare the risks and benefits of intravenous naloxone compared to intranasal naloxone.



Ongoing - Emesis in Cardiac Arrest: Some evidence exists that excessive ventilation during cardiac arrest may lead to emesis. In order to see if this is a problem in the EMS system in King County, measurements of cardiac arrest-associated emesis is being conducted. Depending on the results, corrective steps may be made in the training of bag-valve mask ventilation. Data for 2004 and 2005 will be studied to determine the incidence of emesis, when it occurs during the resuscitation, and the relation to outcome. This data is in the final stages of being analyzed.

Ongoing - Neonatal Resuscitations: Cardiac and respiratory arrest in neonates is very challenging in the EMS setting and the ability to administer intravenous medication is crucial. All neonatal resuscitations during the past 5 years will be evaluated to determine if umbilical catheterization is an option for the administration of fluids or medications.

The following topics are in the planning stages for evaluation:

- Cardiac arrests in exercise facilities
- Cardiac arrests in schools
- The safety of central venous lines for critically ill patients
- Dialysis patients and cardiac arrest
- The incidence and significance of upper body cyanosis during cardiac arrest

### **Injury Prevention Programs:**

A report released by the Centers for Disease Control and Prevention (CDC) suggests injuries cost the United States an estimated \$117 billion in medical fees each year. The report, 'Medical Expenditures Attributable to Injuries in the United States, 2000,' published in the January 2006 issue of Morbidity and Mortality Weekly Report (MMWR), revealed that approximately 16% of the civilian, non-institutionalized population in the United States reported treatment for at least one injury in 2000. Falls accounted for at least 33% (\$38.6 billion) of the total medical cost of injuries and motor vehicle crashes accounted for at least 18% (\$21 billion).

The EMS Division has focused prevention efforts on children and older adults, including the following programs:

- **Mature Driver Program** - a computerized driver assessment program to determine any cognitive, vision or physical limitations.
- **Fall Prevention** - a cognitive and physical assessment and environmental evaluation.
- **Preschool Injury Prevention Program** - a course for teachers of 3-5 year olds on fire and injury prevention and emergency preparedness.
- **Child Passenger Safety at Public Health Centers** - a one-on-one car seat education appointment for pregnant or post partum 2 months moms as part of the Maternal Support Services (MSS) program.



Mature Driver Program: The proportion of the population over age 65 is increasing at an exponential rate. By 2030 the entire population of the US is expected to increase 29.2 percent, while the population above age 65 might rise to 104.2 percent of its current level. As age increases, the rate of fatalities per mile driven regresses to the same rates found within the youngest driving population. While those over the age of 85 have the same fatality rates as those aged 16, reasons and causes are not similar. Half of all fatal crashes involving those 80 and older occur at intersections. Conducting left turns, merging, and on-ramps are also especially risky maneuvers for this age group.



In 2004, the total economic costs and comprehensive costs associated with older (65+) driver crashes, was \$297,197,500 and \$657,042,500 respectively (WSDOT, Nat'l Safety Council). On average, 700 Washington residents are killed each year in a car collision and more than 40,000 persons injured, including at least 2,500 who suffer disabling injuries. Based on the National Safety Council estimates, each fatal car crash corresponds to \$5.4 million in direct economic costs, including medical, lost wages, property damage and other outlays. Using this model, car crashes in Washington cost the economy more than \$38 billion over the last decade (1994-2003), including more than \$7 billion in King County (Washington Transportation Fact sheet #1 - The True Cost of Car Crashes).

In 1999, National Highway Traffic Safety Association (NHTSA) published model program components for mature drivers; including a comprehensive program of screening, individual remediation, and what to do with each type of outcome. The *Maryland Pilot Older Driver Program* used this model as a foundation and examined the outcomes of screening the target population. Program evaluators were able to determine how test results correlated with the rates of crashes and traffic violations. All ten tests are available using the Driving Health with Useful Field of View (UFOV) software. For more information, visit their website at <http://www.drivinghealth.com/screening.htm>.

According to an article in the Journal of American Geriatric Society (Kantor, et. al.), the best predictors of an older adult's on-road performance is based on the combination of results from the Mini Mental State Exam (MMSE), the Trail Making Test (TMT) - Part B, grip strength, and reaction time; most of these were included in both the NHTSA and Maryland Pilot Older Driver Program. Implementation of the screening and assessment was done on a large scale at driver's licensing agencies and was determined to be effective and reliable.

The Maryland Pilot Older Driver Program has been implemented at two local churches in Seattle where pre and post assessments of the program were administered. The mean age of participants was between the ages of 70-79; 64% rated their current driving abilities as 'good'; 57% of the participants were concerned with their vision. After taking this assessment program, 92% would recommend this assessment to family and friends and 78% learned something new about their

driving abilities. However, the participants were not in favor of seeing their Primary Care Physician or Occupational/Physical Therapist to assist in improving their driving abilities, 35% and 57% respectively, but 64% said they would attend a driving rehabilitation program. In addition, the program was presented to a group of Washington State Dept of Licensing examiners to get their feedback regarding how they could administer this program to the public. The EMS Division is currently collaborating with the Washington State Department of Health to test the Maryland model in a limited number of local communities for applicability.

Fall Prevention Program: Falls are a high cost health care problem in Washington state and the public pays a very high proportion of these costs. In 1999, Medicare alone paid \$68.6 million to treat fractures among the Washington State population age 65 or older; nearly all (97%) of these fractures were due to falls. Of the total Medicare expenditure, nearly \$60.9 million was spent for inpatient treatment, including care provided in hospitals, skilled nursing facilities, home health, and hospice care. An additional \$7.7 million was spent for outpatient care, including treatment provided in physician offices, ambulatory surgical centers and rural health clinics; laboratory and diagnostic services; surgical supplies; durable medical equipment; and ambulance services (Falls Among Older Adults – Strategies for Prevention Washington State Dept of Health).

White elderly females are at highest risk for falls and fall-related injuries (Executive Summary - The Health of Washington State- WA State Dept of Health 7/25/02). A fall on the same level due to slipping, tripping or stumbling was the most common mechanism of injury for a person 65 years or older that required hospitalization – the mean costs were \$17,483 in 2004 dollars. Femur fracture was the most expensive type of injury \$18,638 (Koepsell TD; The acute medical care costs of fall-related injuries among the US older adults, Injury 2005 – Nov; 36 (11) Sept. 2002).

Following the successful completion of a pilot study assessing the feasibility of a fall prevention intervention, the EMS Division adopted this effort as a sanctioned Fall Prevention Program in 2005. Participants who are  $\geq 65$  years of age, have experienced an accidental fall that required 9-1-1 for assistance, ambulate with or without assistance of cane or walker, do not reside in a nursing home, and are residents of King County are recruited into the program. To date, 116 clients have been assessed using a variety of questionnaires, including demographic and health characteristics, gait analysis, and orientation survey.

Environmental hazards identified by the assessment are reviewed with the participant, and when indicated, home devices are installed, including bathmats, tub and wall grab bars, night lights, rug slips, shower chairs, shower transfer benches, hand held showers, toilet safety frames, tread tapes, bed assist railings and toilet raisers. The intervention visit required approximately two to three hours for each participant. For three months following an intervention, participants are asked to report to the EMS Division on a monthly basis whether they have suffered any additional falls.

Evaluation of baseline characteristics demonstrated adequate randomization. Participants returned  $>80\%$  of their monthly fall postcards and responses were similar between the intervention and control groups. In each of the three months of observation, participants in the

intervention group reported decreased incidence of fall as compared to those in the control group (0.23 vs. 0.33, 0.38 vs. 0.67 and 0.42 vs. 0.64 for the first, second and third months respectively). ***Overall, intervention group participants experienced a 36% decrease in risk reduction in fall accidents as compared to control participants (RR 0.64 95%CI 0.38-1.06).*** Due to the continued success of the Fall Prevention Program, the EMS Division is resubmitting for an NIH grant to better support the program.

Preschool Injury Prevention Program: Preschool aged children are at high risk for unintentional injuries, therefore, developing a workshop for preschool teachers in their setting is beneficial to the community. A recent workshop for preschool teachers was successfully conducted with fifty-three teachers attending a five-hour workshop located at the UW Bothell campus. Taught by fire department Public Information Officer/Educators, topics included Play Safe, Be Safe (fire prevention), Smart Kids, Safe Kids (injury prevention) and Emergency Preparedness. Preschool teachers in attendance are eligible for five hours of Washington State DOH continuing education credits. This program is sponsored by King County Fire & Life Safety Association, the EMS Division, King County Fire Marshall, and FEMA. The EMS Division will continue to support these types of workshops that have been well received over the years.



Child Passenger Safety at Public Health Centers: Unintentional childhood injuries in 1996 resulted in an estimated \$14 billion in lifetime medical spending, \$1 billion in other resource costs, and \$66 billion in present and future work losses. These injuries imposed quality-of-life losses equivalent to 92,400 child deaths. Since Medicaid and other government sources paid for 39% of the days children spent in hospitals due to unintentional injuries, the government has a financial interest in ensuring the safety of children and should the routine use of selected child safety measures such as child safety seats, bicycle helmets, and smoke detectors (Miller, TR, Romano EO, Spicer RS; The cost of childhood unintentional injuries and the value of prevention; Future Child, 2000 Spring-Summer; 10(1): 137-63). As with other health problems, it costs far less to prevent injuries than to treat them. For example, every child safety seat saves \$85 in direct medical costs and an additional \$1,275 in other costs (CDC Healthy People 2010 Injury & Violence Prevention).

Motor vehicle crashes account for nearly 42% of all unintentional childhood (0-14 years old) injury-related deaths. During 1998, 1,772 children ages 0-14 died as vehicle occupants - 61% of those were unrestrained. Major studies found that kids in adult seat belts were 3.5 times more likely to sustain a serious injury than kids in child restraints (Winston, Durbin, Kallian and Moli, 2000). According to 2000-2004 Washington State data, there were 44 traffic fatalities in children ages 0 to 4 years and 49 traffic fatalities in children ages 5 to 9 years.

Child restraint systems are 71% effective in reducing deaths for infants in passenger cars. They are 54% effective in reducing toddler deaths and they reduce the need for hospitalizations by 69% (NHTSA Traffic Safety Facts 1998 - National Center for Statistics and Analysis). National studies reflect an approximately 80% incorrect use rate of child restraint systems. Many local check-ups report misuse rates over 90%. A recent assessment of child restraint usage conducted in 2005 by Washington State University indicated that in vehicles carrying one child approximately 47% of the children weighing less than 40 lbs were observed using an infant seat, and 28% of children weighing between 40-80 lbs were observed using some type of booster seat.

Five Public Health clinics (Northshore, Eastgate, White Center, Columbia, and Federal Way) are participating in a program where two Maternity Support Services (MSS) or Infant Case Management (ICM) clients are seen every 30 minutes by a certified Child Passenger Safety (CPS) technician to educate them on the proper use and installation of a car seat. MSS clients are billable through the 'First Steps' program, reimbursable at \$30 per MSS client.



In addition, a Public Health Nurse sees each client for 15 minutes prior to seeing the CPS technician. Should the client need a car seat, one is provided at low cost. From April 05 - March 06, 187 MSS clients were seen and an additional 123 ICM clients (non-billable). A systematic review of published studies, conducted on behalf of the Task Force on Community Prevention Services by a team of experts, found that child safety seat distribution and education programs are effective

in increasing use of child safety seats by a mean of 23% (May 18, 2001/Vol 50/No. RR-7; Am J. Prev Med 2001; 21(4S): 16-22).

**Enhanced Care for Specific Populations:** Management of emergency medical services usually includes the development and implementation of programs that target a unique subset of EMS patients. Providing a focal point for these programs provides more appropriate patient care and contributes to the overall efficiency of service delivery.

**Supporting Public Health with Emergency Responders (SPHERE):** The SPHERE acronym denotes an effort to use EMS data to identify and manage patients with major public health problems. SPHERE is an innovative approach to creating an interface between the larger public health arena and the realm of emergency medical services. The EMS Division is currently conducting a SPHERE pilot study in collaboration with South King Fire & Rescue, the Port of Seattle Fire Department, Kent Fire & Life Safety, and the Auburn Fire Department. EMS patients with high blood pressure and/or high blood sugar are identified through Medical Incident Report Form (MIRF) in the South King community. The EMS Division encourages patients to seek further medical care by sending a letter to identified patients.

In contrast, the Kent and Port of Seattle EMTs distribute high blood pressure and/or high blood sugar 'alerts' to patients at the scene in an attempt to emphasize the importance of following up with a doctor. Auburn patients with high blood pressure and/or high blood sugar serve as a control population and are not given letters or alerts. Patients identified in all communities are contacted for a phone survey. At the end of 2006, the phone data will be analyzed to determine the comparable effectiveness of the letters and the alerts.

SPHERE activities have been promoted in the King County EMS community and beyond. An announcement in the March issue of the King County Medical Society Journal notified King County doctors of the SPHERE pilot study. The June issue of the Journal of Emergency Medical Services, a national EMS publication, ran a feature article that outlined the SPHERE program basics (Figure 1).

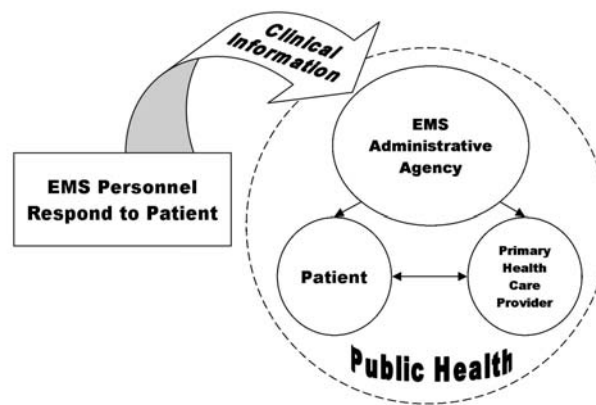


Figure 1: SPHERE

The SPHERE team was awarded a Center for Disease Control grant to identify high blood pressure patients through the EMS system and link patients to health care resources. In addition, the SPHERE team has submitted a grant to the Agency for Healthcare Research & Quality for further development of the pilot. Planning is currently underway for additional high blood sugar research and new applications for SPHERE in areas like fall prevention for the elderly.

Nursing Home/Adult Care Facilities: The EMS Division identified an opportunity in the community to educate nursing home/adult care facilities resulting in better, more efficient use of paramedic/ALS resources. Understanding the circumstances surrounding these inappropriate calls has helped focus the education efforts. Some of the reasons for calling 9-1-1 include calling after experiencing a delay in response from a private ambulance for patient transport, calling for a response despite having Physician's Orders for Do Not Resuscitate (DNR) on file for the patient, and calling when there is general confusion about what kind of care the patient requires. In addition, when calling 9-1-1 for assistance, facility staff did not often relay to dispatchers the appropriate and necessary patient medical information and/or did not understand the need for the dispatcher interrogation.

In response to this community need, the EMS Division developed a nursing home/adult care facility program intervention consisting of an educational video, a job aid card, and in some

cases, face-to-face training for health care providers. The objectives of the video were to provide facility staff with information on the EMS tiered response system and how it works, assist facility staff in getting the level of EMS response that was appropriate for the patient, and prepare facility staff about what to expect during the 9-1-1 call. The objective for the job aid card was to educate facility staff regarding what specific information they should be prepared to provide the dispatcher when calling 9-1-1 to enable the dispatcher to best help them. EMS provider agencies assist the EMS Division in providing this training to facilities in an attempt to reduce unnecessary requests for ALS from nursing homes, adult care facilities, and general medical clinics. Due to the large number of facilities it may become necessary to deploy an alternate method of delivery in 2006.

End of Life Decisions: A single policy for managing end of life decisions among patients in cardiac arrest for whom EMS is called was developed and implemented in King County, clarifying the criteria under which EMTs and paramedics can withhold or terminate resuscitative efforts. This policy, approved by the King County Medical Program Director, was incorporated into the EMT Patient Care Guidelines for all EMTs to utilize as needed. This policy has received wide recognition as indicated by publication in the *Annals of Internal Medicine* (Feder S, Matheny R, Loveless R, Rea T: *Withholding Resuscitation: A New Approach to Pre-Hospital End-of-Life Decisions* *Ann Intern Med* 2006; 144: 634-640), and NPR's *Day to Day* program interview *EMT's Given Leeway for 'Do Not Resuscitate' Patients*. The interview can be heard at the following site: <http://www.npr.org/templates/story/story.php?storyId=5447289>.

*Development of strategic initiatives that focus on efficiencies in EMS directly address the strategic directions identified in the 2002 EMS Strategic Plan Update. There are a variety of approaches to tackling this broad concept, including conducting periodic EMS fiscal reviews and analyses, evaluating EMS personnel protocols for opportunities to improve patient care, reducing injury and illness through community outreach programs, and developing innovative programs to better serve sub-populations in EMS. In aggregate, these programs have been successful in reducing unnecessary calls to 9-1-1, providing more appropriate care to patients, and using resources more efficiently.*

#### **IV. Strategic Planning for Next EMS Levy Period**

The *2002 EMS Strategic Plan Update* to the *1998-2003 EMS Strategic Plan* outlines the operational and financial recommendations for the 2002-2007 funding period. The current levy period expires December 31, 2007 and the process for discussing and developing a regional strategic plan for the next EMS levy period began in earnest in October 2005. This process requires significant coordination and collaboration with all the EMS agencies, elected officials, and other stakeholders in King County, and as such is identified as a separate strategic initiative with associated funds. The discussions are expected to include all policy, programmatic, and financial aspects of the EMS system and focus on the four separate EMS levy sub-funds of ALS services, BLS services, Regional Services and Strategic Initiatives. A final document for delivery to the King County Council is expected in early to mid-2007. For more detailed discussion of this process, please refer to Part I - EMS System Review (page 10).



## C. EMS Division Programs and Activities

### Introduction

In addition to the specific strategic initiative projects outlined in the *2002 EMS Strategic Plan Update* and *2003 Supplemental Plan*, the EMS Division plays a significant role in developing, coordinating, managing, and evaluating a variety of other EMS programs throughout King County. These programs provide a vital regional cohesion to ensure that the standards for pre-hospital patient care are met by the 9-1-1 dispatchers receiving calls for medical assistance and the EMTs and paramedics responding to the scene. The importance of developing and supporting innovative regional programs is often overlooked or underappreciated. The following section describes the many varied regional programs managed by the EMS Division.

### I. Basic Life Support (BLS) Training and Education Program

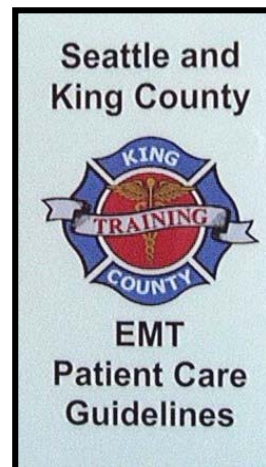
*Helping you become the best through Training and Education!*



The **Basic Life Support (BLS) Training and Education Program** provides initial training, continuing education, 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-three fire/EMS 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). 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 guidelines were last made in 2004, and are currently in review pending distribution in 2007. They are placed on the EMS online training site (see page 40 for details) so changes could be rapidly communicated to EMS personnel.





In addition, the first cooperative Seattle and King County *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/protocols. Similar to the *EMT Patient Care Guidelines*, this guidebook will be offered to each paramedic throughout King County with updates offered every two years.

Initial Training Classes for EMTs: Two initial EMT training courses are offered in the spring and fall of each year to personnel from all fire/EMS 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. To date, over 120 EMTs completed the EMT basic course in 2006.

On some occasions, the Training Section partners with fire departments to sponsor EMT classes outside the standard course structure. For example, the Training Section recently assisted Vashon Island Fire Department in conducting an EMT class on Vashon Island as a result of increased need for EMS providers on the island. A similar model is being considered for Kent Fire & Life Safety and the Seattle Fire Department in early 2007. 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 five annual modules on various emergency medical topics, a total of fifteen 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, and implements the curriculum each year. The 2006 CBT curriculum is complete and includes the following selected topics: Cardiovascular Emergencies, Stroke, Diabetic Emergencies, Head and Spine Injuries, Death and Dying, and Infectious Disease (infectious disease is a yearly requirement).

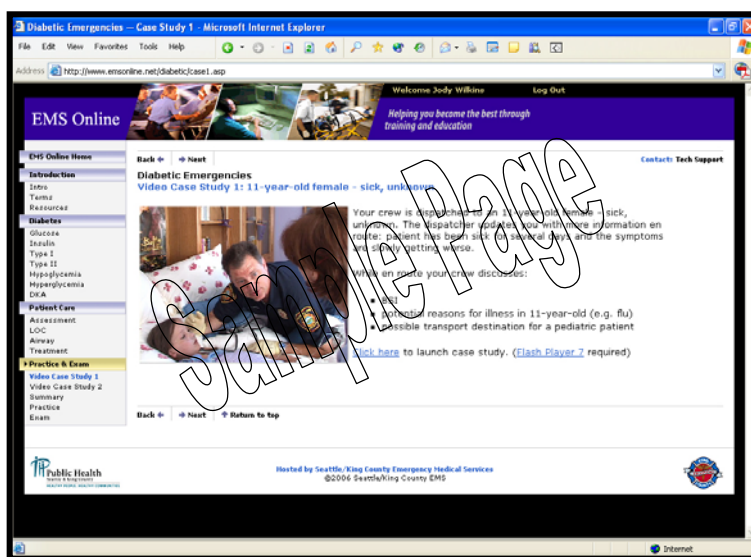
A **CBT Online Training Website** that delivers web-based CBT modules was developed for the first time in 2001 with the assistance of grant money from the Medic One Foundation. Twenty-six modules are now available online with over 8,500 EMTs enrolled in the program throughout Washington state (100% of the ~ 3,800 EMTs in King County use this program). Over 95,000 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.

The online CBT curricula are designed for EMTs to study the subject in an interactive format, including realistic video case studies with complete online evaluations, all produced by BLS



Training staff. The 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 support a full time instructor hotline for questions about the modules and treatment protocols. The website is currently being revised for the 2007 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 CBT EMS Online Website was originally presented to the Washington State EMS and Trauma Licensing and Recertification committee in June 2003 and was subsequently approved for use in EMT continuing education. As a result, the CBT Online Website was presented at both the 2005 and 2006 annual Washington State Medical Program Directors (MPD) meetings, receiving strong support for program innovation and excellence. The site has consistently earned high praise from the committee as an innovative and cost-effective method of delivering EMT continuing education and a number of county MPDs expressed a great degree of interest in expanding the King County CBT Online program into other counties and throughout the state of Washington. As a result, the on-line CBT program (EMS Online) was officially launched *statewide* on May 1, 2005 and has been well received throughout the state of Washington. To date, an additional 5,000 users outside of King County have been added, supporting this with a per-head user fee, with more EMTs/EMS agencies showing interest each day.



The goal is to have national accreditation for all EMS Online courses and ultimately national and international exposure by the first quarter 2007. The vision to offer this high quality, on-line educational tool outside the state of Washington was realized for the first time through a pilot program with Wayne Township Fire Department in Indiana. The department utilized and studied EMS Online for a three month trial period and on completion determined that this program met their educational, scheduling and financial needs. Wayne Township Fire Department, the first national client, has 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. Other national pilot projects are scheduled to begin in the fall of 2006 including Idaho and Oregon. This effort is entirely consistent with the new effort by the Office of Business Relations and Economic Development to support commercial revenue generating activities and

was published in the journal of Pre-hospital Emergency Care (Jerin JM, Rea TD, Web-Based Training for EMT Continuing Education, Prehospital Emer Care 2005; 9: 333-337).

**EMT Defibrillation Program:** The goal of the Early Defibrillation Program is to resuscitate the greatest number of people in cardiac arrest using a comprehensive plan that includes initial defibrillation training, continuing medical education, field documentation and reporting, equipment maintenance procedures, and quality improvement activities. Based on a review of over 500 cardiac arrests that received defibrillation by EMTs, the defibrillatory guidelines were revised in January 2005. Preliminary evidence suggests that these changes have led to a significant improvement in survival from ventricular fibrillation. The new guidelines specify one shock followed by two minutes of CPR. As a result of this extensive change in field protocols, the 2006 American Heart Association (AHA) guidelines for cardiac resuscitation incorporated many of the King County changes (see CPR Highlight - page 55).

Quality improvement is a high priority within the Early Defibrillation Program. 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.

## **II. EMS Advisory Committee**

The **EMS Advisory Committee** was formed in December 1997 as outlined in the *1998 - 2003 EMS Strategic Plan* and has since met on a quarterly basis to discuss the progress of the strategic plan, review the development and implementation of the strategic initiatives, and act as a judicious forum for discussion of important EMS issues. This year, the EMS Advisory Committee played a critical role in supporting Emergency Medical Services in King County by providing input regarding the 2008 Medic One/EMS Levy process, oversight of the EMS Online and Dispatch Enhancement strategic initiatives, and review of the 2007 EMS budget. The current EMS Advisory Committee membership and their respective representation can be found in *Appendix F: 2005 EMS Advisory Committee Listing* on page 81.

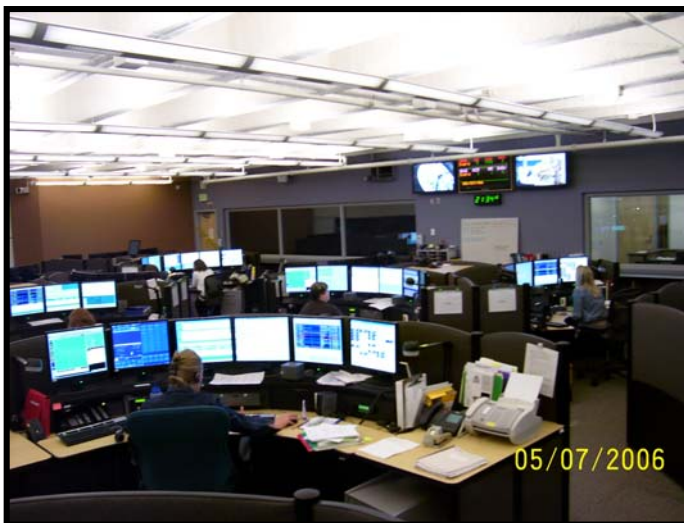
## **III. Emergency Medical Dispatch (EMD)**

The EMS Division provides **Basic and Continuing Education Training** in Emergency Medical Dispatch (EMD) to approximately 185 emergency 911 dispatchers in King County. This training allows the dispatcher to triage callers so that the appropriate level of care is sent to the patient. During the past year, 19 dispatchers from King County completed the 40-hour Basic EMD Training class. In addition, 152 dispatchers were provided 8 hours of Continuing Education in EMD related topics. The EMD Instructor Course (train-the-trainer) is still being redesigned to meet the standards of a problem-based delivery. This course will be piloted in late 2006.

The **2002 EMS Strategic Plan Update** identified a commitment to supporting a number of enhancements to emergency medical dispatch, focusing on enhanced dispatch training. Planning has begun in the following areas:

**Basic Training:** Additional training has been, and will continue to be, provided in the area of Basic Anatomy and Physiology to the dispatch students. This has been accomplished by adding one full day of training and testing prior to the existing 32-hour class. The 40-hour Basic Criteria Based Dispatch course includes more student application exercises and increases the students' participation in the learning process. This has been accomplished with role-play scenarios, simulation exercises, guided group discussions and other incorporated activities.

**Continuing Education (CE) Training:** In an effort to meet the 8 hour per year minimum requirement for continuing education, EMD training staff continue to design and develop several instructional topics for the purpose of delivery to Emergency Medical Dispatchers. The Dispatch Review Committee selects EMD CE topics based on feedback from quality improvement reviewers and data derived from evaluations of the CBD data with an emphasis on systemwide trends.



Eastside Communications Center

In the spring of 2005, a web-based course, 'Decreased Level of Consciousness' was delivered. This training was followed with an in-class delivery of tape and scenario-based instruction. The topic of instruction for Fall 2005 was 'Pediatric Emergencies'. Included in each training session are objectives pertaining to the findings of the quality improvement review. This gives the student/participant a very timely feedback process as it relates to trends found in the quality improvement review.

**Alternate Delivery Methods for Continuing Education Training:** The objective of this project was to develop and deliver the continuing education curricula in a web-based format. This method of delivery has enabled the dispatchers to log on from their own Communications Center consoles and participate in the training at their convenience when the call load volumes permit. This method of delivery has been and will continue to be used when suited to meet the desired lesson objectives.

**Telephone Referral Program:** The Telephone Referral Program continues to provide emergency medical dispatchers in King County with an alternative method for handling non-urgent calls to 911. Developed in 1998, EMS calls that meet specific dispatch criteria can be transferred to a nurse line for patient assistance in lieu of providing a BLS response to the scene. Common

examples of these low-risk, low medical need types of calls include complaints of sore throat, insomnia, sinus infection, and tooth pain.

During 2005, 685 calls were referred to the nurse line, including 396 calls from Valley Communications Center serving South King County, and 289 calls from Eastside Communications Center serving east and north King County. The Telephone Referral Program is an outstanding example of how the EMS community collaborates in the development of a cost-effective solution while improving patient care. However, the number of transferred calls to the nurseline has decreased when compared to 2004, so future efforts will need to focus on increasing the effectiveness of the program.

#### **IV. Regional Purchasing Program**

The **EMS Regional Purchasing Program** is a voluntary countywide program designed to reduce equipment and supply expenses by maximizing the joint purchasing power of EMS providers. Since its completion as a successful one-year pilot project in 1998, the program has been implemented throughout the county. The vendors for the EMS Regional Purchasing Program are selected through two competitive bid processes. One contract is established for medical supplies, and another contract is established for medications. The primary purchase orders operate through King County Medic One, and EMS agencies in King County are able to coat-tail on the contract through joint purchasing agreements.

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

#### **V. Regional Medical Control**

The Medical Program Director (MPD) is responsible under the Washington Administrative Code (WAC) and Revised Code of Washington (RCW) for medical control and direction of certified EMS personnel in King County. This is accomplished through the delegation of medical oversight to the medical directors of individual paramedic programs and emergency room-based on-line medical control for ALS personnel.

The Medical Program Director also assists in the development of policies and procedures regarding ALS and BLS services, and dispatch protocols, and provides written treatment guidelines for BLS personnel. The MPD works closely with the Trauma Council to write new policies for transport of patients to free standing emergency departments and clinics, as well as policies for allowing selected patients to be transported via taxi to local area clinics.

The Medical Directors' Committee, comprised of the medical directors from each ALS provider agency, provides general program oversight. The committee meets on a quarterly basis to address pertinent medical issues. Topics of interest often arise from discussions initiated as part of implementation of two Strategic Initiatives - 'Paramedic and EMT Procedures and Patient Treatment Evaluations' and 'Enhanced Care for Specific EMS Patients.' Specific areas of interest this past year have included a new quality assurance form for intubated patients, and consideration of cardiac enzyme markers to identify at-risk patients for myocardial infarction. In addition, the MPD is supervising evaluations of diabetic hypoglycemia (low blood sugar that can lead to coma), hypertension identification, diabetes identification, narcotic overdoses, identification of witnessed collapse by emergency dispatchers, telephone CPR, and end of life issues.

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

**Seattle-King County Community Responder AED Program:** The Community Responder AED Program is a joint effort between Seattle Fire Department and Public Health - Seattle & King County. This program was established to help businesses and private homes implement an appropriate training course, proper placement of a device or devices and to register their Automated External Defibrillator (AED) with their local EMS. 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 frame possible following collapse. The sooner a patient receives CPR and an AED is used the better the chances are for the patient to recover.

The Public Access Defibrillation (PAD) program is continually growing. As a result, there are currently more than 1,500 Automated External Defibrillator's 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 Public Health Clinics have at least one AED on site. In addition, both Jail Health locations in Seattle and Kent have numerous AEDs located on site. Many police units carry AEDs in their vehicles and all ambulances in Seattle and King County are equipped with an AED.

**King County Employee CPR/AED Training Program:** This program is designed to teach Cardio Pulmonary Resuscitation (CPR) and Automated External Defibrillator (AED) skills to King County employees during their regular workday. This program trains the employees to perform CPR and use an AED should the occasion arise. The annual number of employees trained last year was 3,800. Additionally, there are over 75 AEDs placed within King County owned facilities.

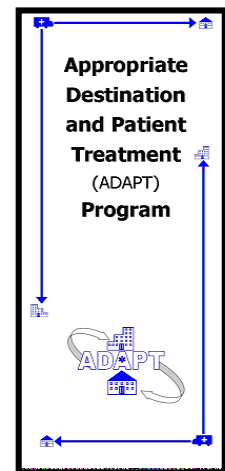
**King County Student CPR/AED Program:** In 2005, 19,878 students, grades 6-12, were trained to perform Cardiopulmonary Resuscitation (CPR) in King County. The students received nationally recognized American Heart Association (AHA) training from their teachers and local firefighters. The program provides an AHA course to the teachers to become Basic Life Support (BLS) instructors. The EMS Division contracted with nine school districts and six fire districts to provide CPR training in the schools this year. In addition, many of the teachers and fire fighters also teach an AHA First Aid course to the students. Almost all King County high schools and junior high schools have AEDs and the number of devices placed increases on a regular basis.

**Targeted CPR Program:** The Emergency Medical Services Division works closely with local cardiologists in King County to provide Cardiopulmonary Resuscitation (CPR) and Automated External Defibrillator (AED) training to patients considered high-risk for heart-related problems. This program offers in-home classes for these residents and their family and friends. CPR is taught and if an Automated External Defibrillator (AED) has been assigned, the family also receives AED training. Sixty five people were trained in CPR/AED last year in their homes through this program.

## VII. Alternate Destination and Patient Treatment (ADAPT) Program

In an effort to guide EMTs' decisions for appropriate patient transport, the EMS Division developed the Alternative Destination and Patient Treatment (ADAPT) program. Implemented in 1999, the ADAPT program provides EMS patients with minor illnesses who require minimal treatment and have minimal medical risks with appropriate, convenient, and cost-efficient care by offering treatment at a local urgent care or clinic facility as an alternative to treatment at an emergency department.

In 2005, the ADAPT program was evaluated with respect to its application regarding the Swedish free-standing emergency room in Issaquah. With the concurrence of the Central Region EMS/Trauma Council, the medical program director issued guidelines for transport to this free-standing emergency department. In addition, revised guidelines were issued for the continued transport of patients to urgent care clinics and new guidelines were developed for transport of specific patients by taxi cab. The ADAPT Program continues to provide appropriate and safe options for patients to alternate patient treatment locations by alternate transport modes, offering both improvements in the EMS system and patient satisfaction.



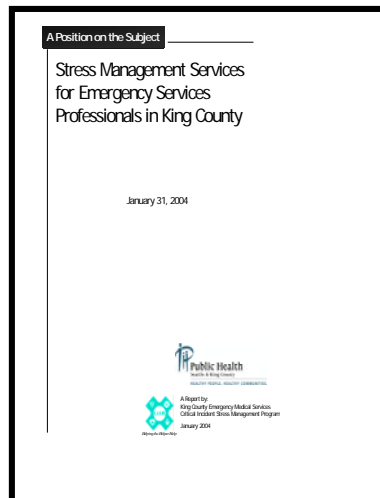
## VIII. Critical Incident Stress Management (CISM) Program

The EMS Division continues to support the mission of the CISM Program: *Helping the Helper Help*. Since 1987, the CISM program and its all-volunteer team (19 members) has provided



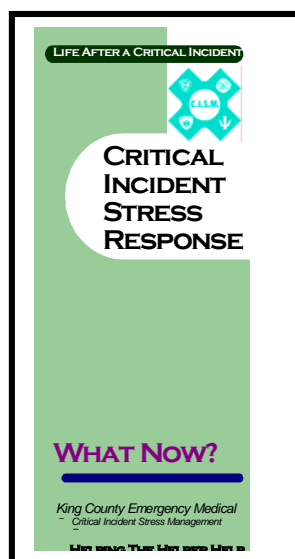
emotional and psychological services to emergency services professionals. CISM has been an age-honored acronym to critical incident stress services for the emergency services professions. It has been evolving to include a broader meaning: *Crisis Intervention, Stress Management*. Over the past year CISM service requests have increased along non-traditional stress impacts such as provider agency peer support program and grief management.

Refocusing services offered by the CISM Program was identified as a priority in the Vision Statement included in a CISM Position Statement. In 2001, the EMS Division conducted an assessment of CISM and Critical Incident Stress Debriefing (CISD) practices due to continued criticisms of CISM/ CISD effectiveness. CISM staff and consultants reviewed over 100 articles and texts on the subject of critical incident stress management and debriefings to publish the position statement. The primary focus of that effort was to identify the philosophy, strategies and goals of behavioral/wellness issues, crisis intervention techniques and stress management educational services provided by the EMS Division.



The 2004 CISM Position Statement concluded that CISM services provided by peer emergency service professionals and mental health professionals to emergency service personnel and their families are based on the following public health model:

**Primary Prevention** - Increasing resilience to extreme stressors; **Secondary Prevention** - Mitigating the impact of occupational exposure to extreme stressors by incorporating Psychological First Aid; and **Tertiary Prevention** - Follow-up referrals for treatment when a higher level of support care beyond psychological debriefing/crisis intervention is required. The 2004 CISM Position Statement is available at the following website <http://www.metrokc.gov/health/ems/stress-management.pdf>



There were approximately 32 post-incident CISM-related requests during the year which includes debriefings, defusings, one-on-one interventions, and referrals to mental health services. The King County CISM Team also participates on a Washington State and an international network of CISM teams. The CISM Program Manager serves as a Washington State CISM-Network Board Member; Zone 1 representative (NW corner of the state), and Chair of the Ethics and Standards Committee; and is the author of the Tim Ross Humanitarian Award - an award for individual(s) who serve the greater good of the emergency services professions within the mission of the Washington State CISM-Net.

The CISM program's history has supported the emergency services professions and their personnel: police officers, firefighters, EMTs, paramedics, dispatchers, and corrections officers, towards improved psychological health by coordinating pre-incident stress management

classes and providing assistance to provider agencies' Peer Support Teams who serve the immediate needs of their agency's co-workers. Future objectives are being focused on crisis intervention technique training to emergency services providers and improved means of family support services.

**Incident specific stress services (CISD/Defusings) are educational briefing sessions.**



## **X. Administrative Functions**

The EMS Division operates under the guidelines presented in the various Master Plans, Master Plan Updates, and Strategic Plans which are approved by the King County Council. Updating these directives and implementing the specific programs identified in the plans requires significant data analysis and program coordination. An integral component of this analysis is the data modeling used to identify optimal placement of paramedic units.

The EMS Division is responsible for coordination of services with Public Health - Seattle & King County and other county agencies, councils, and offices, such as the Budget Office, Human Resources, Prosecuting Attorney, King County Executive, Risk Management, and the King County Council. Responsibilities also include the coordination and delivery of strategic planning, union negotiations, personnel and payroll, diversity management, legal compliance and liability, contract administration, and the issuance and compliance of policies and procedures.

The EMS Division administers Advanced Life Support (ALS) contracts for five paramedic provider groups, and basic life support contracts for 31 Basic Life Support (BLS) agencies located in King County. The Administrative Section is responsible for monthly budget monitoring and projections, annual budget preparation, projection of long term financial planning, and management of levy funds for the EMS Division.



The EMS Division is also responsible for management of the Medical Incident Report Form (MIRF) data gathered in the field in compliance with Washington Administrative Code (WAC) 246-976-420. Duties related to the oversight of this dataset include management of the cardiac database and the entire data warehouse system, collection and processing of over 162,000 Medical Incident Report records per year, and regular review of the EMS data set and data system. The Division provides rapid response to data requests from EMS agencies and external agencies located in King County; provides data analysis and reports for pilot projects, EMS programs, and research projects; and provides network connectivity and management for EMS Division employees.

## D. Grant Funded Programs and Projects

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

The Center for the Evaluation of Emergency Medical Services undertakes research efforts in the field of pre-hospital emergency care. CEEMS is supported by grants and staffed by investigators from the University of Washington and employees of the EMS Division. Known both nationally and internationally in the field of cardiac arrest, the investigators are continuously sharing their cutting edge research through numerous articles published in EMS and scientific journals.

A summary of the primary CEEMS activities of the past year is as follows:

**The DART Study:** The Dispatcher Assisted Resuscitation Trial (DART) is an international study involving dispatch centers in King County, Thurston County, and London, England. The study will determine the best method of telephone CPR: standard CPR with chest compressions and mouth-to-mouth ventilation or chest compressions only. The study will take approximately 2 ½ years to complete and may serve to define the national standard for the delivery of telephone CPR instructions.



#### **At-Home Automated External Defibrillator (AED) Training Study:**

This study has been funded by the National Institutes of Health (NIH) and began in July 2004. The randomized study is evaluating four types of AED training (2 video-based training and 2 in-home training) in 300 high-risk heart patients and their families recruited following hospitalization at a King County hospital for a heart emergency. The study will determine the most effective training method in terms of AED skills retention and psychological adjustment for both the patient and family member(s). Participants receive an AED and lifesaving

skills training at no cost as part of study. Enrollment will continue through 2007.

**Medical Outcomes after Cardiac Arrest:** This investigation involves interviewing survivors of cardiac arrest and reviewing their hospital medical records. The goal is to evaluate the care and outcome of survivors of cardiac arrest in King County to determine whether current hospital-based care is consistent with American Heart Association and American College of Cardiology guidelines for these patients. The study will run through 2007.

**The Resuscitation Outcomes Consortium (ROC):** The Resuscitation Outcome Consortium was established in 2004 by the National Heart, Lung, and Blood Institute to evaluate important research questions involving pre-hospital care in the areas of cardiopulmonary arrest and life-threatening injury. The ROC consists of 10 communities from across North America. Seattle/King County was selected as one of the participating communities. Clinical trials will be conducted over several years to evaluate promising approaches to improving outcomes from cardiac arrests and traumatic injuries. The first trauma-based study will involve a randomized clinical trial to evaluate what resuscitation fluid produces best outcome for traumatic shock and head-injured patients. The first cardiac-based study will involve a randomized trial of an impedance threshold device that may improve circulation produced by CPR.

**Paramedic Fellowship:** Thanks to funding support from the Laerdal Foundation for Acute Medicine, CEEMS is offering paramedic fellowships for the purpose of conducting research. This is the first program of this nature in the country. The program offers special opportunities for paramedics under the guidance of a UW faculty mentor. The first paramedic fellow began the program in July 2005. The two year project is an in-depth analysis of central intravenous lines for critically ill patients.

**Graduate Student Research Assistant:** Thanks also to funding support from the Laerdal Foundation for Acute Medicine, a PhD student in epidemiology will be joining CEEMS and be spending 50% of her time assisting in projects and research studies.

**Medical Student Projects:** CEEMS sponsors approximately 10 students per year who are completing a medical school graduation requirement to conduct a research project. Each student is assigned a faculty mentor who helps the student design the project and develop the methodology. We have been fortunate in that approximately 80% of these research projects are published in peer-reviewed scientific journals.

## **E. Conclusion**

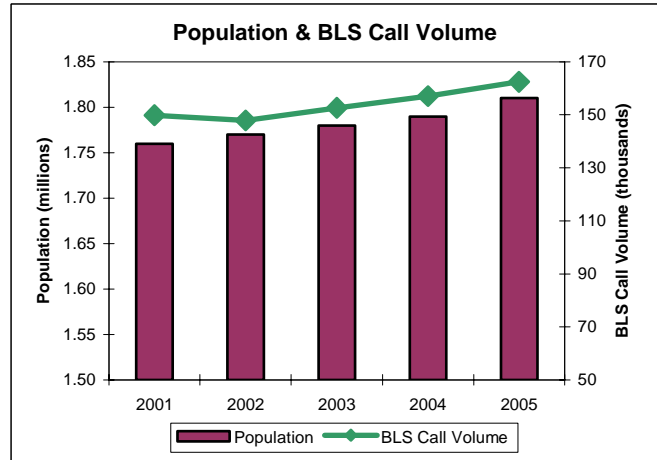
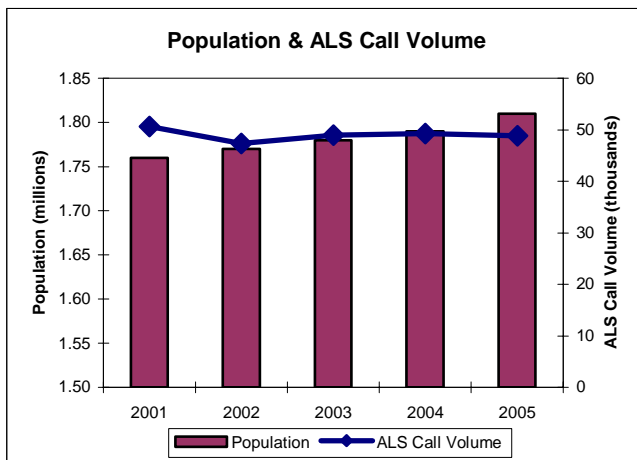
The EMS Division is committed to providing the highest level of pre-hospital care to the residents of King County. EMS programs are developed and maintained through strong partnerships with other EMS agencies in the region and innovative leadership in the emergency medical field in accordance with the strategic directions outlined in the *2002 EMS Strategic Plan Update*. An example of this effort is the development of a successful and popular web-based EMS training program that is proving to be both innovative and cost-efficient. The EMS Division is proud to encourage and support these types of contributions to the EMS system.

## Summary of 2005 EMS Statistics (Seattle and King County)\*

The following statistics are derived from the data collected on the Medical Incident Report Forms (MIRFs) and submitted by EMS agencies to the EMS Division for the year 2005.

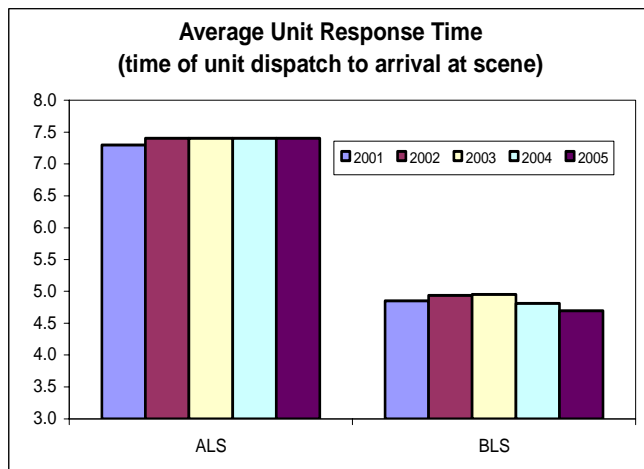
<u>Population</u>	<u>Seattle- King County</u>	<u>% Growth</u>
<b>1980</b>	1,269,898	
<b>1990</b>	1,507,305	18.7% (10 yr)
<b>2000</b>	1,737,034	15.2% (10 yr)
<b>2005</b>	1,808,300	4.1% (5 yr)

Population has often been a factor related to EMS call volume growth. Over the past two decades, the population in King County has grown well above an average rate of 1% per year. However, in 2002 the yearly rate of increase started to decline to just under 1%. The two graphs below depict the population growth relative to both BLS and ALS call volume patterns. Of interest is the continued reduction in ALS calls volume growth due largely to the success of the ALS Dispatch Criteria Revisions (page 22). Please note that the scales for population and call volumes are different.

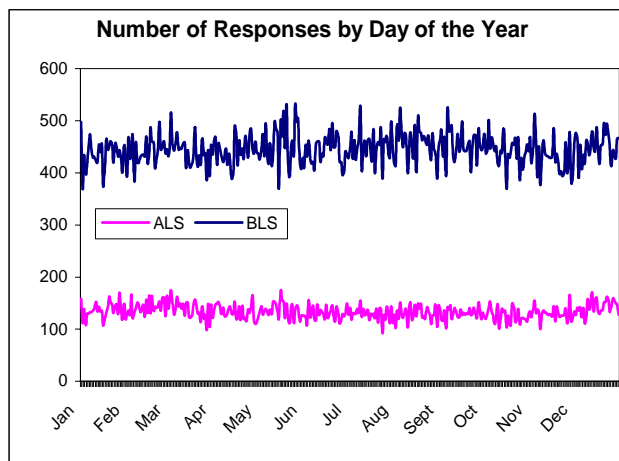
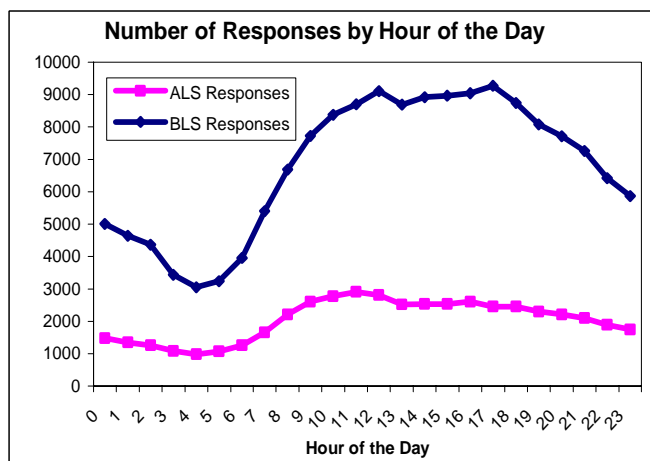


<u>Operations:</u>	<u>ALS</u>		<u>BLS</u>	
<b>Number of Responses:</b>	48,787		162,510	
<b>Average Response Times:</b>	<u>Total</u>	<u>Unit</u>	<u>Total</u>	<u>Unit</u>
(minutes)	11.3	7.4	6.0	4.7
6 Minutes or less			72.2%	84.1%
8 Minutes or less	44.0%	70.4%		
10 Minutes or less	60.0%	84.3%		
12 Minutes or less	70.4%	92.0%		
14 Minutes or less	77.5%	95.7%		
<b>Cancelled Enroute Calls</b>	18.6%		2.2%	

\*The 2005 EMS data uses a fully integrated EMS Division and Seattle dataset. 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.



Despite the continued growth in population and BLS call volumes over time, average BLS unit response times have remained stable over the past four years as reflected in the graph to the left. This may not reflect, however, local area stresses to the system and regular assessment of core ALS unit indicators are conducted to ensure adequate response. The two graphs located directly below reflect the patterns of ALS and BLS response during the day and throughout the year. Of note is the greater daily variation in BLS responses per day over time (~350-550 calls) in comparison to ALS responses (~100-180 calls).

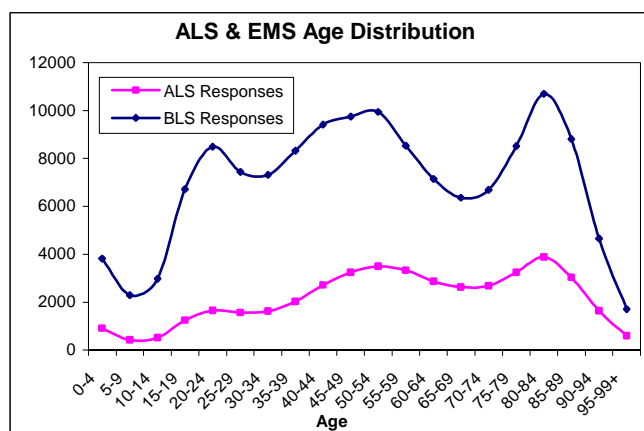


### Characteristics of Responses:

The following information reflects a variety of 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 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 will be monitoring.

### Responses by Age Group:

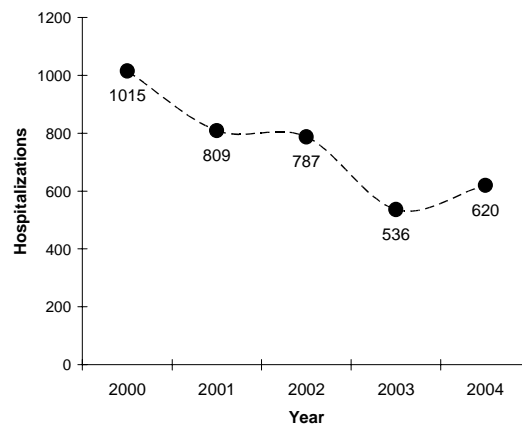
	<u>ALS</u>	<u>BLS</u>
<b>0-17 yrs</b>	2,467 (5.7%)	12,551 (9.0%)
<b>18-24 yrs</b>	2,274 (5.3%)	11,739 (8.4%)
<b>25-44 yrs</b>	7,927 (18.3%)	32,454 (23.3%)
<b>45-64 yrs</b>	12,933 (29.8%)	35,343 (25.3%)
<b>65+ yrs</b>	17,732 (40.9%)	47,373 (34.0%)
<b>Total</b>	<b>43,333</b>	<b>139,460</b>



## Public Health Highlight: Childhood Asthma

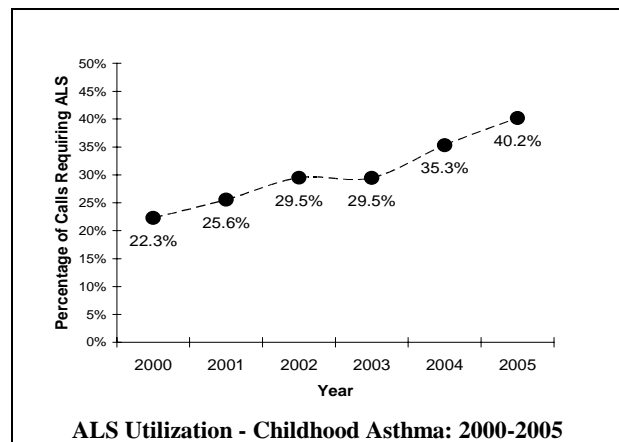
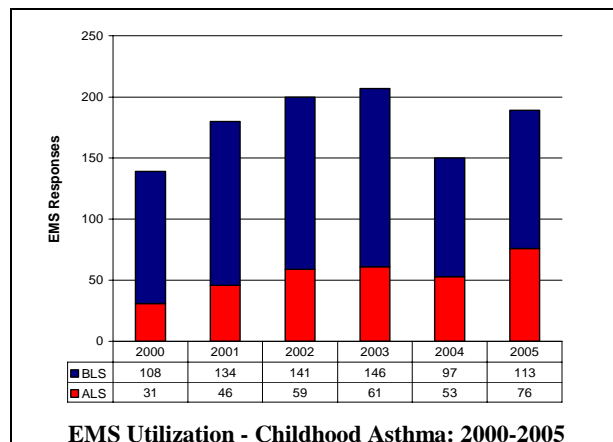
In October 2000, Public Health – Seattle & King County released ‘Childhood Asthma Hospitalizations – King County, Washington, 1987-1998’. The report noted an increase in childhood asthma, urging policymakers to strengthen outreach efforts. The EMS Division (with the exception of Seattle) began collecting asthma data in the Medical Incident Report Form (MIRF) system in response to the increased interest in tracking EMS asthma calls. Initial findings were highlighted in the EMS 2001 Annual Report.

Updates on childhood asthma were released by the health department in November 2005. The ‘Public Health Data Watch’ reported an average incidence of 5.5% for childhood asthma in King County between 2000 and 2004. Hospitalization trends for childhood asthma are shown in the figure below. A substantial drop in hospitalizations from 2002 and 2003 occurred as public health outreach and clinical care improvements were bolstered in the community.



**King County Childhood Asthma Hospitalizations: 2000-2004**

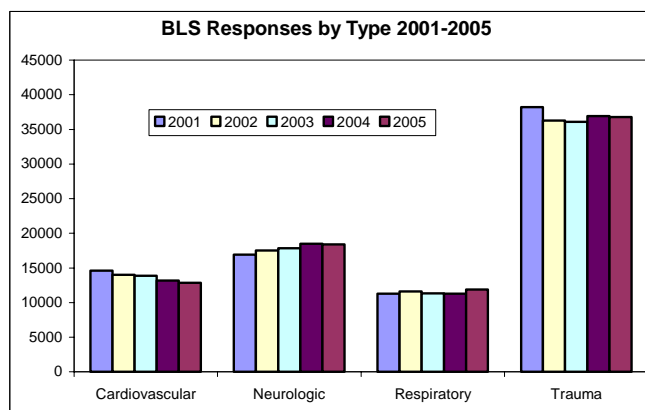
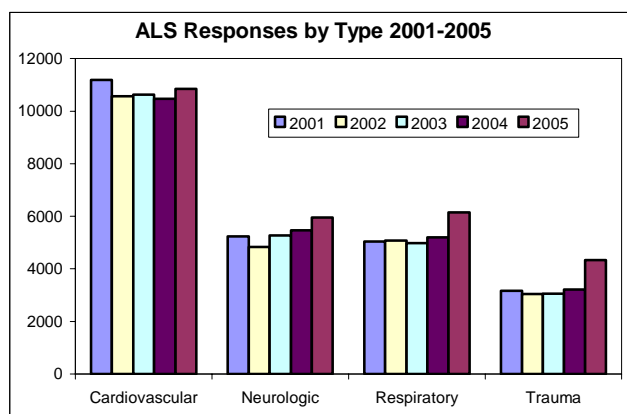
Trends in EMS utilization for childhood asthma are illustrated in the two figures below. Despite decreases in rates for asthma hospitalizations, both the number and proportion of childhood asthma calls requiring a paramedic response have risen significantly since 2000, while the proportion of calls for BLS has decreased. The relationship between EMS responses and public health efforts is not clear. The EMS Division will continue to monitor asthma trends and support public health efforts in managing childhood asthma.



**Responses by Medical Type:**

	<b><u>ALS</u></b>	<b><u>BLS</u></b>
Cardiac	10,846 (26.0%)	12,823 (9.9%)
Respiratory	6,144 (14.7%)	11,875 (9.2%)
Neurologic	5,942 (14.2%)	18,406 (14.3%)
Trauma	4,333 (10.4%)	36,855 (28.5%)
Abdominal/Genito-Urinary	2,304 (5.5%)	9,132 (7.1%)
Metabolic/Endocrine	2,105 (5.0%)	3,719 (2.9%)
Alcohol/Drug	1,607 (3.9%)	5410 (4.2%)
Psychiatric	1,403 (3.4%)	6598 (5.1%)
Anaphylaxis/Allergy	426 (1.0%)	1774 (1.4%)
Obstetric/Gynecological	420 (1.0%)	1038 (0.8%)
Other Illness	6,162 (14.8%)	21,480 (16.6%)
<b>Total Medical</b>	<b>41,692</b>	<b>129,110</b>

Although ALS and BLS personnel each respond more frequently to particular 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 above. 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.



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 security guards.

**Incident Locations:**

	<b><u>ALS</u></b>	<b><u>BLS</u></b>
Home/Residence	23,590 (57.9%)	72,844 (52.3%)
Nursing Home/Adult Family Home	3,476 (8.5%)	8,919 (6.4%)
Clinic/MD Office	2,007 (4.9%)	3,099 (2.2%)
Other/Unknown Location	11,680 (28.7%)	54,397 (39.0%)
<b>Total</b>	<b>40,753</b>	<b>139,259</b>

### ***CPR Highlight:*** Changes in CPR and Defibrillation

The new American Heart Association guidelines have re-emphasized the importance of quality CPR. These new guidelines recognize that defibrillation may be most successful when preceded and followed by good CPR. “When performed immediately after collapse from ventricular fibrillation (VF) sudden cardiac arrest, CPR can double or triple the victim’s chance of survival. After about five minutes of VF with no treatment, outcome may be better if shock delivery is preceded by a period of CPR with effective chest compressions that deliver some blood to the coronary arteries and brain. CPR is also important immediately after shock delivery; most victims demonstrate asystole or pulseless electrical activity for several minutes after defibrillation. CPR can convert these rhythms to a perfusing rhythm.”

To this end, King County and Seattle have prioritized quality CPR. In some instances, resuscitation protocols have been modified to maximize the provision of CPR while simultaneously optimizing the interface between CPR and defibrillation. The result to date has been more uninterrupted CPR for cardiac arrest patients. Importantly, survival from witnessed VF cardiac arrest increased to 45% in Seattle and King County during the year 2005. The goal is to continue to work toward approaches that enhance resuscitation by efficiently integrating scientific understanding into field care.

### **Cardiac Arrest Statistics:**

The Cardiac Arrest Surveillance System (CASS) has evaluated cardiac arrest statistics for almost thirty years (see page 49 for more details about the Center of Evaluation of EMS). The following information depicts the cardiac arrest survival rates in all of King County.

#### All Cardiac Arrests:

	<b>Year</b>				
	<b><u>2001</u></b>	<b><u>2002</u></b>	<b><u>2003</u></b>	<b><u>2004</u></b>	<b><u>2005</u></b>
Total number of cardiac arrests for <u>all causes</u> with resuscitation attempted	1,141	1,147	1,093	1,087	1,124

The following table shows cardiac arrests, for 2005, broken down by arrest before and after EMS arrival, rhythm on arrival, and survival for each category:

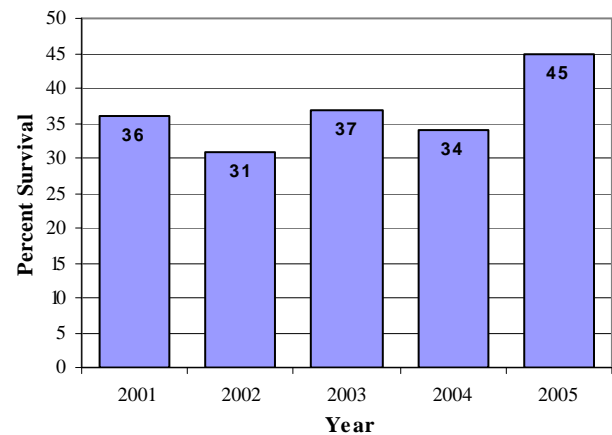
<b>Total cases treated:</b>	1,124		
		<b># survival</b>	<b>% survival</b>
<b>arrest before arrival</b>	<b>1,015</b>	<b>164</b>	<b>16%</b>
VF/VT	386	113	29%
asystole	473	6	1%
PEA	155	18	12%
unknown	1	1	100%
<b>arrest after arrival</b>	<b>108</b>	<b>26</b>	<b>24%</b>
VF/VT	50	19	38%
asystole	16	4	25%
PEA	41	3	7%
unknown	1	0	

Cardiac Arrests: The survival rate for **witnessed** cases of **cardiac etiology** with **ventricular fibrillation (VF) or ventricular tachycardia (VTach)** as collapsing rhythm, **arresting before EMS arrival** was:

Year	Rate
2005	86/193 (45%)
2001-2005	381/1,047 (36%)

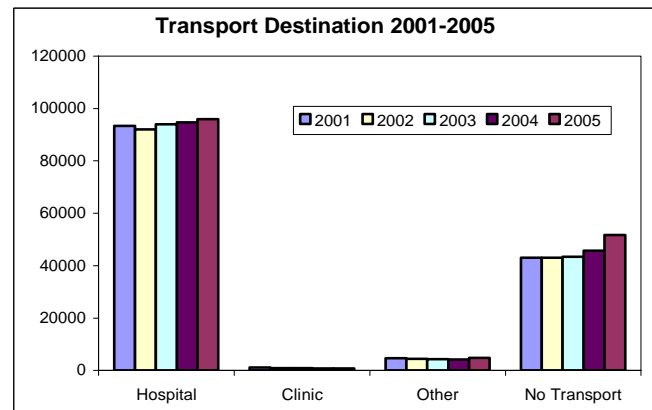
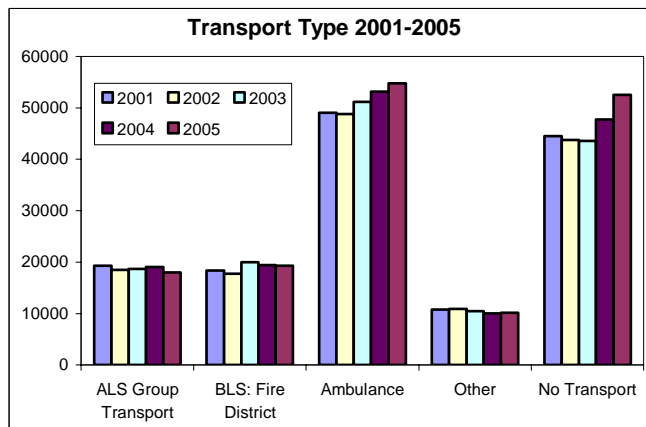
CPR initiated by Bystanders (includes all cases of CPR):

Year	Rate
2004	501/952 (53%)
2005	568/1,007 (56%)



### 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 above and below, almost 34% 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 Telephone Referral Program or another type of service could help reduce demand for EMS.

### Transport Type:

ALS Transport	17,795 (11.5%)
ALS Air	179 (0.1%)
BLS - Fire District	19,234 (12.5%)
BLS - Ambulance	54,781 (35.4%)
Other	10,123 (6.6%)
No Transport	52,512 (33.9%)

**Total 154,624**

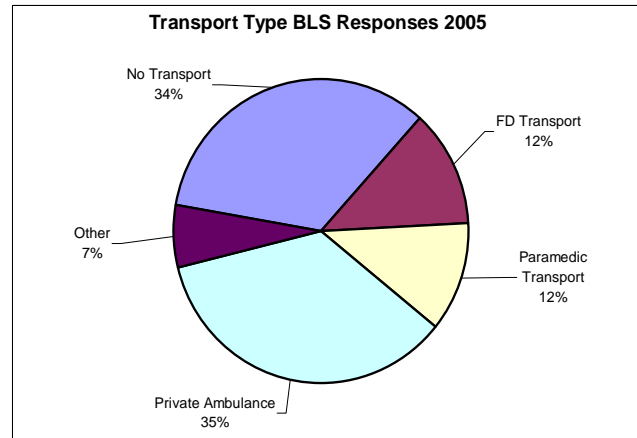
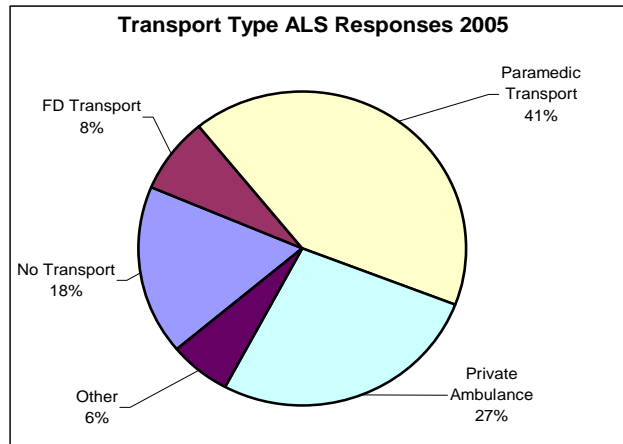
### Transport Destination:

Hospital	95,859 (65.7%)
Clinic	697 (0.5%)
Other	4,755 (3.1%)
No Transport	51,668 (33.8%)

**Total 152,979**



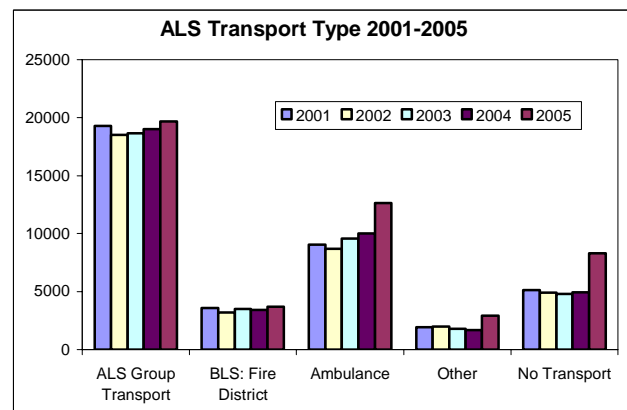
ALS transport trends are also assessed for potential system improvements. As indicated below, almost 42% of all patients are transported from the scene by ALS. However, over 8,000 patients are left at the scene with no transport. Again, this provides an opportunity to analyze whether EMS was used appropriately and if other programs could help reduce demand for services.



### ALS Transport Type:

ALS Transport	19,463 (41.2%)
ALS Air	203 (0.4%)
BLS - Fire District	3,675 (7.8%)
BLS - Ambulance	12,631 (26.8%)
Other	2,919 (6.2%)
No Transport	8,316 (17.6%)

**Total 47,207**



## Part III: EMS Funding and 2006 Financial Plan

**Introduction:** This section of the EMS 2006 Annual Report focuses on EMS revenues and expenditures for 2005 and projections for 2006. Some historical and forecast information is incorporated for context, including information on the current EMS funding mechanism and the projected status of the EMS Financial Plan through the current levy period. Components include the following:

- EMS Levy Structure
- Current EMS Revenues
- Current EMS Expenditures
- EMS Expenditure and Revenue Trends
- The 2006 Financial Plan
- Recommendations for Fund Balance and Levy Rate

Please note that under terms of an inter-local agreement between King County and the City of Seattle, EMS levy funds collected within Seattle go directly to the City. These discussions focus on the EMS fund within the remainder of King County, 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. EMS 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 the 2002-2007 period. Also passed in November 2001, Initiative 747 limits total levy funds 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 *2002 EMS Strategic Plan Update*. As noted above, funds generated within the City of Seattle are managed separately by the city. Funds are spent in four areas: Advanced Life Support (ALS), Basic Life Support (BLS), Regional Support Services (such as training, regional medical direction and community programs), and Strategic Initiatives. ALS services are provided by six primary agencies, BLS services are provided by thirty-two fire agencies, and Regional Services and Strategic Initiatives are provided by the EMS Division.

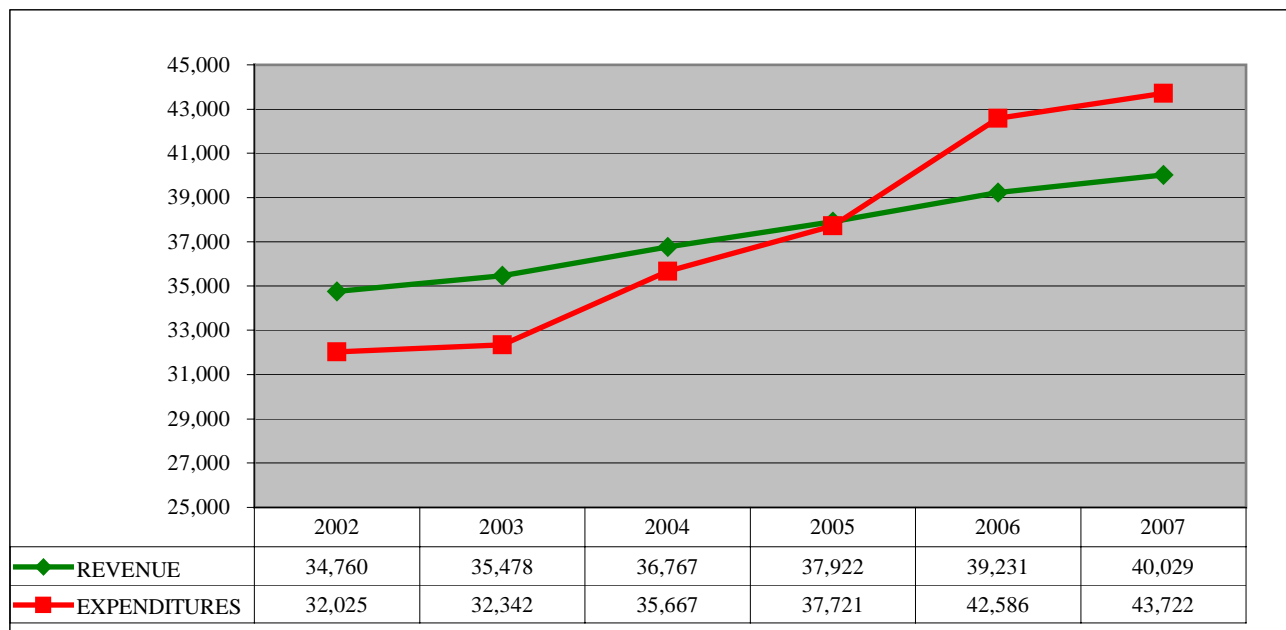
The EMS Financial Plan assumes modest growth in property values, continued low inflation, and a one-percent limit on revenues from existing properties. There is a required End Fund Balance (EFB) of 1/12 yearly expenditures. The plan also assumes that expenditures increase by local area Consumer Price Index (CPI), anticipates that ALS expenditures may increase by more than CPI, and forecasts the addition of new ALS units throughout the levy period. This results in expenses increasing at a rate higher than revenues over the duration of the levy.

With expenditures projected to increase at a rate higher than revenue growth, the levy amount is set so that funds collected in the first years of the levy can be saved and used to cover expenses in the later years of the levy (when expenditures are higher than revenues). As planned, revenues exceeded expenditures through 2004. However, due to delays in projects, revenues also exceeded expenditures by a small amount in 2005. Beginning in 2006, funds raised in the earlier years of the levy will be used to supplement revenues to cover expenditures. It is currently projected that revenues placed in the fund balance between 2002 and 2004 are sufficient to fund expenses in 2006 and 2007.

The following chart shows actual and projected revenues and expenses from 2002 to 2007:

### EMS FUND – EXPENDITURES VS. REVENUES

*All numbers in thousands (000 omitted)*



*Balance of King County only*

For more details on forecast revenues and expenditures, see *Section D: EMS Expenditure and Revenue Trends* on page 66.

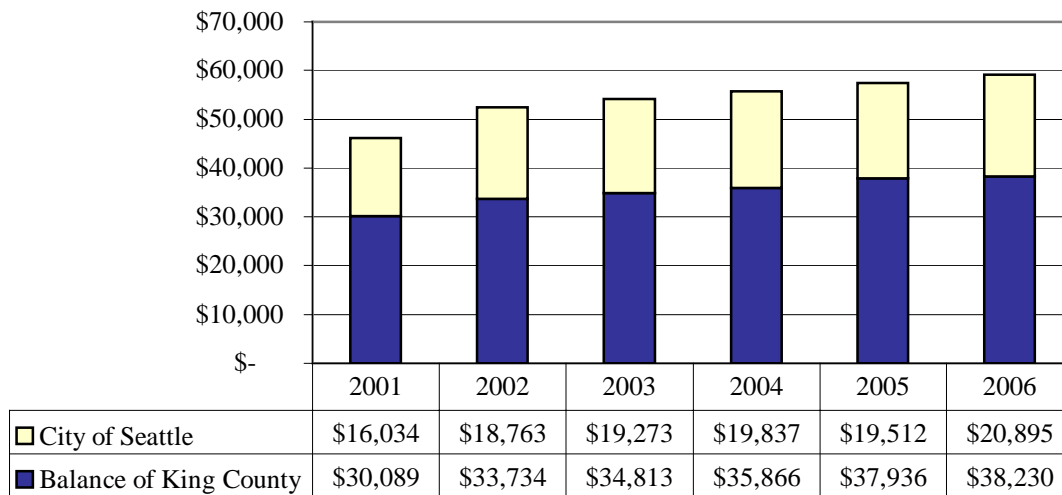
## B. EMS Revenues

The 2005 effective levy rate was \$.2319 per \$1,000 assessed value with a total assessment of \$57,448,128. The 2006 effective levy rate is .2191 per \$1,000 assessed value with a total assessment of \$59,125,467. This is 2.9% over 2005.

The total assessment for the levy is divided proportionately between the City of Seattle and the remainder of King County based on assessed property values in each area. In 2005, the City of Seattle's portion of the assessment was 35.4%; the remainder of King County's portion of the assessment was 64.6%. In 2006, the City of Seattle's portion of the assessment was 35.3%; the remainder of King County's portion of the assessment was 64.7%.

**AMOUNT ASSESSED FOR CURRENT LEVY  
ACTUAL 2001 - 2006**

*(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. King County contributes \$375,000 annually in Current Expense Fund monies to King County Medic One. Total revenues in 2005 for the balance of King County were \$37.9 million. The regional levy and associated taxes (including interest income on the fund balance) generated 98.6% of the total revenues with current expense and other income combining to generate the remaining 1.4%.

**2005 EMS Revenue (balance of King County)**

<b>Revenue Source</b>	<b>2005</b>	<b>%</b>
Property Taxes Current	\$36,208,689	95.5%
Delinquent Taxes	\$639,899	1.7%
Other Taxes	\$127,658	0.3%
Other Revenues	\$134,640	0.4%
Interest Income	\$435,674	1.1%
CX Contribution	\$375,000	1.0%
<b>Total</b>	<b>\$37,921,561</b>	<b>100.0%</b>

The 2005 beginning fund balance was \$9.3 million; the year-end fund balance was \$10.4 million. Funds in excess of the required ending fund balance of \$3.6 million were placed in a reserve to pay for planned services in 2006 and 2007 when expenses are forecast to exceed revenues.

Revenues for 2006 are estimated at \$39 million. The regional levy and associated taxes and interest income represent 98.7% of total estimated revenue. Projected end fund balance for 2006 is \$7.5 million. Funds in excess of the required fund balance are needed to cover expenditures above revenue in 2007.

**2006 Estimated EMS Revenue (balance of King County)**

<b>Revenue Source</b>	<b>2006</b>	<b>%</b>
Property Taxes Current	\$37,370,249	95.3%
Delinquent Taxes	\$ 846,289	2.2%
Other Taxes	\$ 129,080	0.3%
Other Revenues	\$ 130,814	0.3%
Interest Income	\$ 380,000	1.0%
CX Contribution	\$ 375,000	1.0%
<b>Total</b>	<b>\$39,231,431</b>	<b>100.0%</b>

Total revenue grew 3.1% from 2004 to 2005, and is projected to grow 3.5% in 2006. The increase is primarily due to property taxes on new construction. While assessed valuation increased 5.5% from 2004 to 2005, property taxes revenues increased 3.1% resulting in a levy rate of 21.9 cents/\$1,000 Assessed Value in 2006. Additional information on projected revenues through the end of the current 2002-2007 levy period is included in *Section D. EMS Revenue and Expenditure Trends* (page 66).

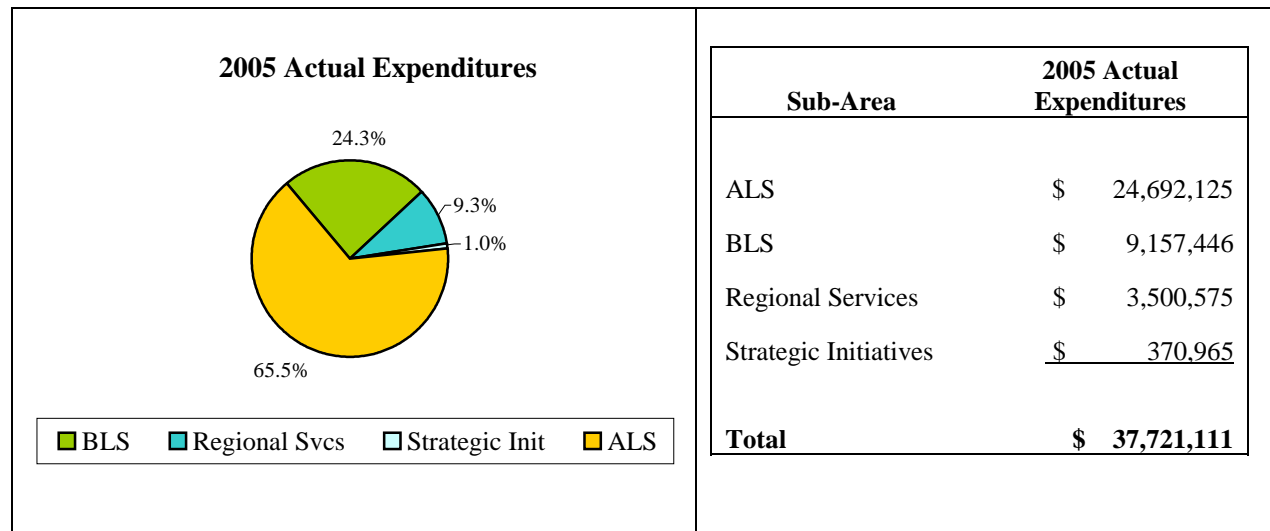
## **C. EMS Expenditures**

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

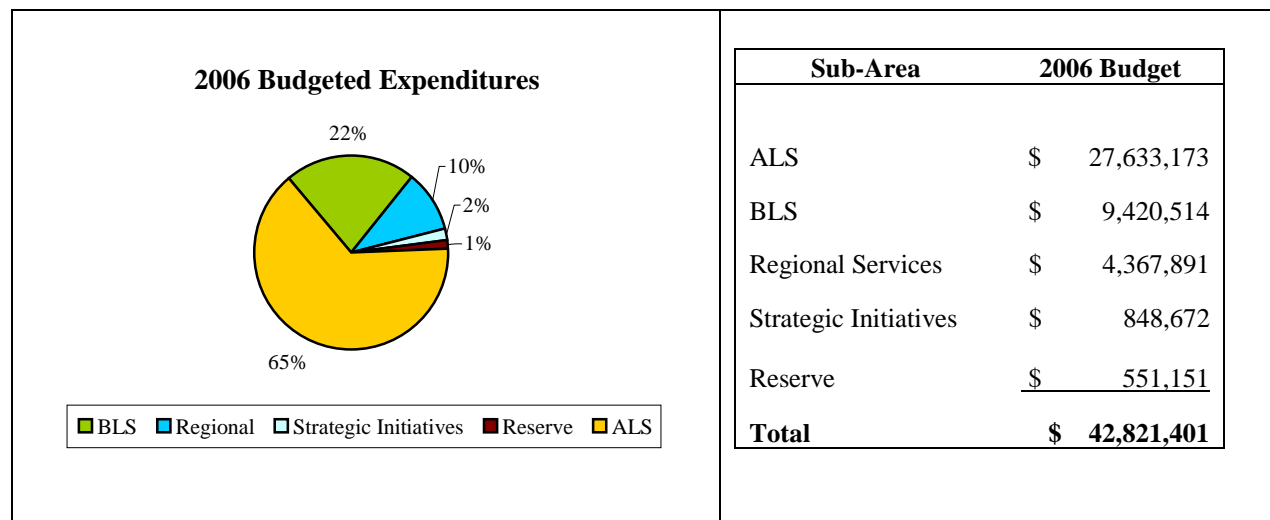
- Advanced Life Support (ALS) Services
- Basic Life Support (BLS) Services
- Regional Support Programs
- Strategic Initiatives

The 2002 *EMS Strategic Plan Update* limits expenditure increases for ALS, BLS and Regional Service to the local area Consumer Price Index (CPI). If there is sufficient funding available, increases for ALS services can be raised above CPI to avoid cost-shifting to ALS agencies.

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 Support 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. Yearly reserves to provide for unanticipated expenses are also budgeted. No reserves from fund balance were used in 2005.



Expenditures for 2005 were budgeted using a forecast CPI increase of 2.9%. Budgeted expenditures for 2006 are based on a CPI forecasted increase of 2.6%. Cash flows for Strategic Initiatives increased over 2004 based on individual project plans.



**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 five 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.

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.

The *2002 EMS Strategic Plan Update* calls for an annual review of ALS costs to minimize cost shifting of ALS expenses to provider agencies. An ALS task force comprised of representatives of the different ALS providers meets each year to review costs and provide recommendations to the EMS Advisory Committee. Since a significant increase was made in 2003, a CPI-based increase of 2.1% was recommended for 2004. Based on rising costs, an increase of 5.06% was recommended for 2005 (2.16% over CPI increase of 2.9%). This resulted in a standard unit cost allocation of \$1.4 million per paramedic unit in 2005.

Two types of paramedic units qualify for half of the standard unit cost funding. Emergency Medical Technician/Paramedic (EMT/P) units are staffed 24-hours per day with one EMT trained in defibrillation and one paramedic. Part-time (or 12-hour) paramedic units are staffed with two paramedics for twelve hours during peak workload periods. Each EMT/P and 12-hour unit received \$699,315 in 2005, although EMT/P units are additionally supported with local fire department funds. Vashon Medic One was budgeted at a 0.5 unit allocation.

Early in this levy period, the Medical Directors requested that, as funds could be found, EMT/P units be phased out of the system and replaced with 2-paramedic staffing. In 2005, a decision was made to transition the existing EMT/P units to full 2-paramedic units. Based on the transition plan, Medic 35 in the Cottage Lake area was converted in May 2005. Medic 3 in North Bend was converted in January 2006. Additional funding was also provided to Vashon ALS to prevent the agency from moving to an EMT/P type of staffing model.

The total number of ALS units as of December 2005 is shown in the following chart:

	<b>Full Units (2 paramedic / 24-hour)<sup>(1)</sup></b>	<b>Half Units (EMT-P or 12-hour)<sup>(2)</sup></b>	<b>Total Funding Units</b>
Redmond <sup>(5)</sup>	3		2.9
King Co.	7		7.0
Bellevue <sup>(4)</sup>	3	1	3.5
Shoreline	2	1	2.5
Vashon <sup>(3)</sup>		1	.5
			<b>16.0</b>

<sup>(1)</sup> Full Units are funded at 100% of the Standard Unit Cost of \$1,398,702.

<sup>(2)</sup> Half Units are funded at 50% of the Standard Unit Cost of \$699,351.

<sup>(3)</sup> Vashon funding was 0.5 of 24-hour unit; added funding in 2005; increased to 0.9 in 2006

<sup>(4)</sup> Does not include additional 0.25 unit funding for Medic 3 in 2005.

<sup>(5)</sup> Medic 35 converted to a 2-paramedic unit in May of 2005.

The total 2005 annual EMS levy allocation for *each paramedic provider* is determined by the number of units staffed with two paramedics, the number of EMT/P units, 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 are added separately. Paramedic vehicle replacement is funded separately from the standard unit cost allocation and follows a standardized paramedic vehicle replacement plan. Medic units are currently replaced every three years and then placed in a backup vehicle status for three additional years. The allocation for vehicle replacement costs in 2005 was \$129,172 per vehicle. Six replacement vehicles were funded in 2005.

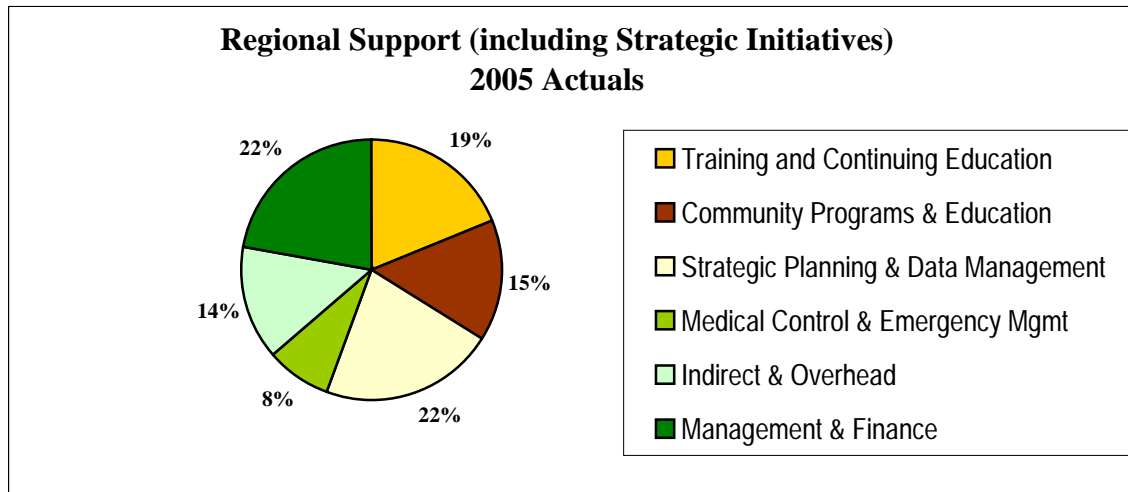
**Basic Life Support (BLS) Services:** The levy provides partial funding to BLS providers to help ensure uniform and standardized patient care and enhance BLS services. Basic Life Support services are provided, outside the City of Seattle, by thirty-two local fire departments and fire districts. Beginning in 2002, the total amount of BLS funding was increased by the local area CPI each year as noted in the *2002 EMS Strategic Plan Update*. The total annual BLS dollar allocation for 2005 was \$9.2 million; the total for 2006 is \$9.4 million.

The task force that completed the *2002 EMS Strategic Plan Update* also recommended a thorough review of the BLS funding formula, and in early 2002, a BLS Funding Formula Review Committee convened to discuss the critical issues. The group was able to attain consensus on the new criteria for allocating BLS funds and the revised formula was used to calculate the 2003 BLS allocations. The new formula was again reviewed in May 2003, May 2004, and July 2005 to monitor the impacts and validate the assumptions. The intended effects were evident and the review committee recommended continued use of the new formula. Minor improvements were recommended and implemented.

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

The *2002 EMS Strategic Plan Update* limits increases in funding for Regional Services to local CPI. Expenditures, particularly labor expenditures related to resolution of labor agreements, have increased higher than CPI. The 2005 budget for Regional Support was \$3.8 million. Approximately \$3.5 million (or 93% of the budget) was expended in 2005. Approximately \$260,000 was placed in reserves to cover future costs, particularly labor and indirect and overhead costs that are projected to increase higher than CPI. The 2005 budget for Regional Services was increased by the forecast CPI of 2.1%. In addition and as planned, \$50,000 budgeted for maintenance related to the Regional Data Collection Project (RDC) was transferred from the Strategic Initiative budget to Regional Services.





**Strategic Initiatives:** The term ‘strategic initiative’ is used to describe a handful of new and innovative programs that are thought to have significant impact on the success of the strategic directions. Strategic initiatives are funded with lifetime budgets. These are not increased each year by CPI. However, the budgeted amount by year is adjusted to reflect changing cash flows based on project needs. For program details, please see *Section B. 2002-2007 Strategic Initiatives* - page 20. Current strategic initiative budgets are shown in the following chart:

### Strategic Initiative Summary

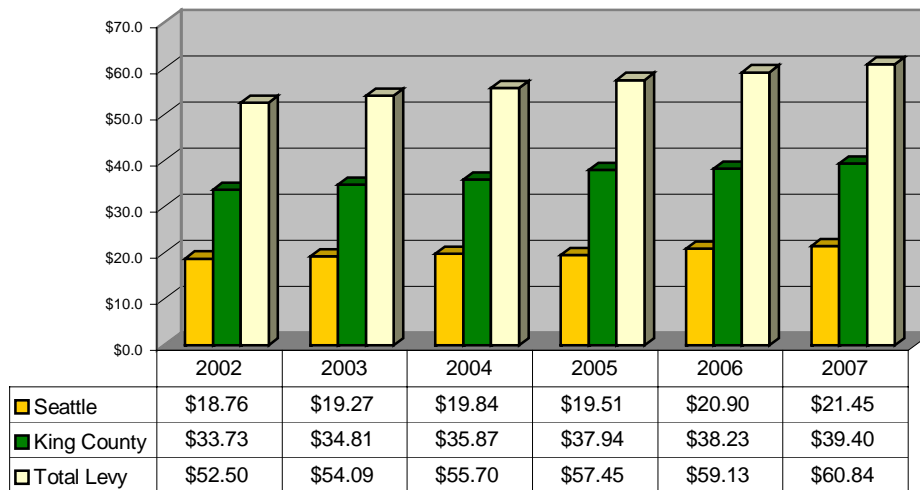
For 2007 Requested Budget

	2003	2004	2005	2006	2007	Total
<b>Dispatch Initiatives</b>						
Web Based CBD Criteria	1,152	3,750	18,456	242,177	175,575	<b>441,110</b>
EMD QI	23,863	24,171	20,069	25,831	27,490	<b>121,424</b>
Enhanced CBD	51,064	67,988	52,212	62,023	61,973	<b>295,260</b>
<b>Technology Initiatives</b>						
Web-based Training for Dispatch	1,383	12,000	11,461	7,434	16,927	<b>49,205</b>
Web-based Training for EMS (Enhanced)	25,000	50,000	100,657	168,707	282,668	<b>627,032</b>
Regional Electronic Data Collection Project		149,234				<b>149,234</b>
RETRO			60,983	119,993	88,292	<b>269,268</b>
<b>EMS System Efficiencies</b>						
Procedure & Patient Treatment Evals/ Enhanced Care	-	-	52,877	70,477	89,201	<b>212,525</b>
Injury Prevention Programs	21,089	19,004	26,744	38,000	39,000	<b>154,093</b>
<b>Levy Planning</b>			27,508	120,062	143,351	<b>290,921</b>
<b>TOTAL</b>	<b>123,551</b>	<b>326,147</b>	<b>370,967</b>	<b>854,674</b>	<b>924,478</b>	<b>2,599,817</b>

## D. EMS Revenue and Expenditure Trends

**Revenue Trends:** The primary revenue source for the EMS system in King County is the 2002-2007 EMS property tax levy. Levy revenue growth is limited by a voter-approved tax initiative (Initiative 747). This initiative limits revenue growth from existing properties to 1% per year, plus new construction. The following chart shows forecast levy assessments for both Seattle and the remainder of King County:

**Forecast Levy Assessment**  
(amount billed in millions)

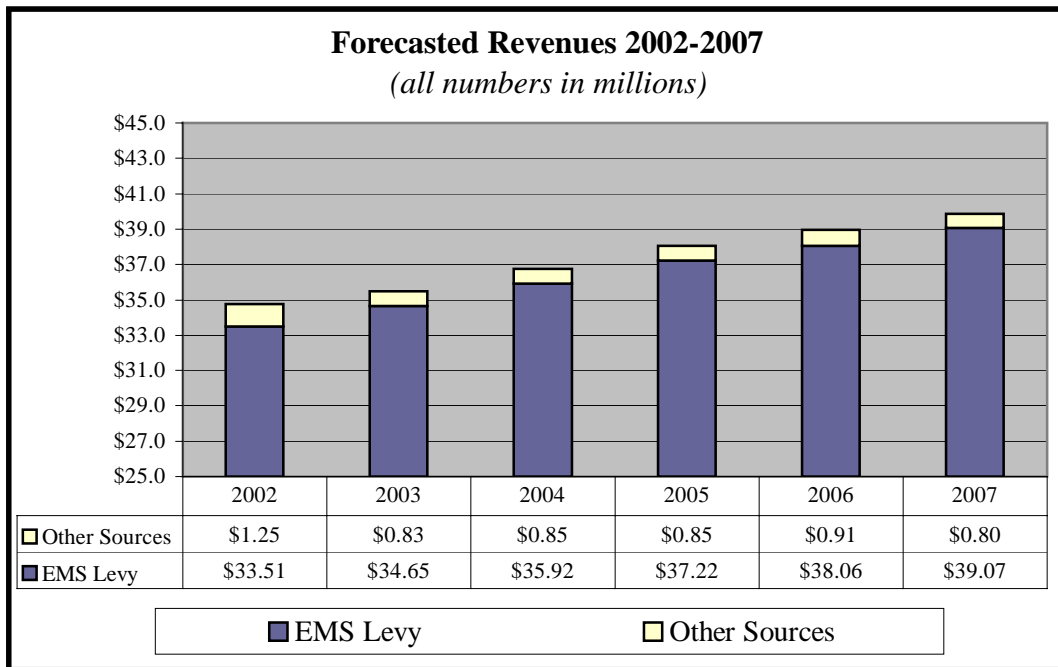


The EMS Financial Plan assumes modest growth in property values, continued low inflation, a one-percent limit on fund growth from existing properties, growth in expenditures related to anticipated regional demand for Advanced Life Support Services (ALS), and stable growth in other services at the level of local Consumer Price Index (CPI). Forecasted total levy assessment, including both the City of Seattle and the remainder of King County, is projected to increase from \$52.5 million in 2002 to \$60.8 million in 2007. This is a total increase of almost 16% or an average of 3% per year. Growth over 1% is primarily due to property taxes on new construction.

While assessed values in the City of Seattle increased 27% between 2002 and 2006 (an average of 6.7% a year), the total amount for the City has only increased 11% (an average of 2.8% a year). The proportion of the levy has decreased slightly (from 35.72% in 2002 to 35.34% in 2006). The assessed values in the balance of King County have increased 29% between 2002 and 2006 (an average of 7.2% a year), while the total amount for the balance of King County has increased 13% (an average of 3.2% per year). However, the portion of the levy attributable to the City of Seattle and the balance of King County has remained relatively stable.

Total EMS Division tax revenues are projected to increase 17% from 2002 to 2007 (an average of 3.3% per year). Total revenues are projected to increase from \$35 million in 2002 to \$40 million in 2007. Most other revenues are projected to remain stable, including current expense

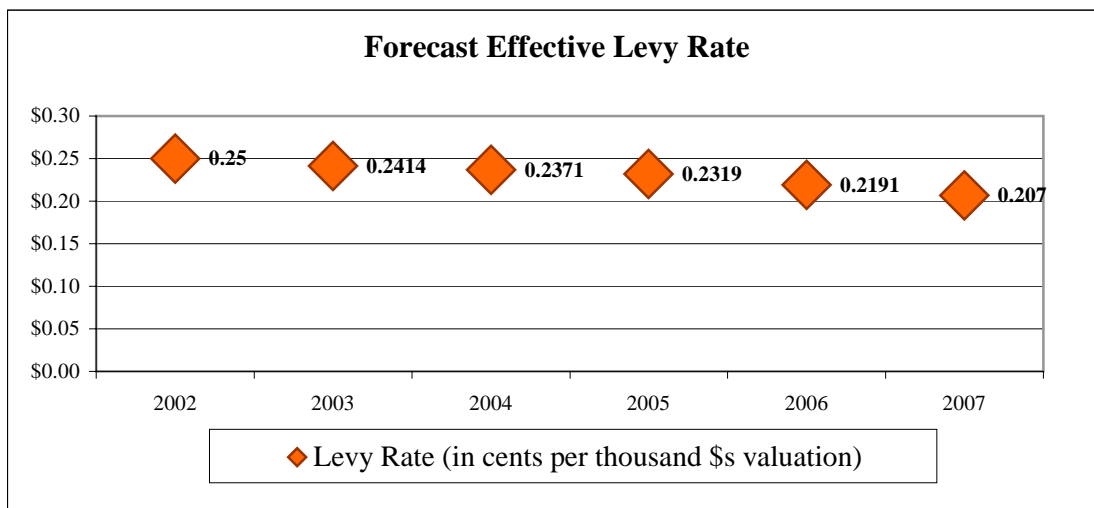
contributions of \$375,000 per year. The following chart shows actual and projected revenues for King County EMS Fund (excluding Seattle) through 2007:



*Balance of King County only*

\* In 2002, King County Contributed Additional CX funds related to the Paramedic contract for KCM1.

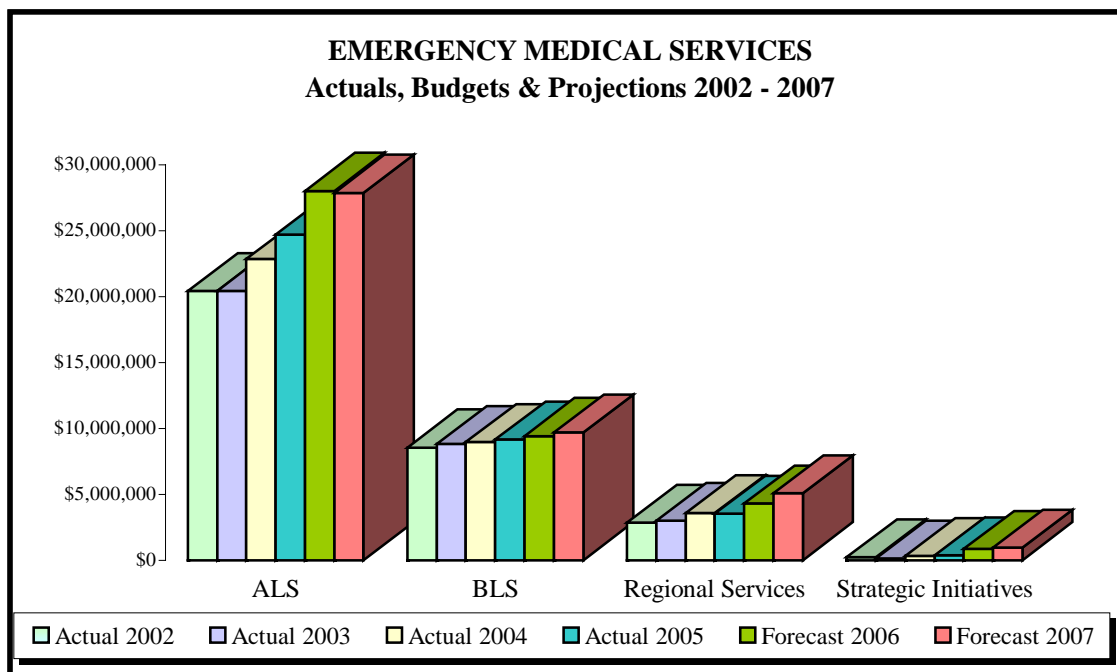
While EMS revenues are projected to increase, the effective levy rate will decrease. As described in *Section A: Levy Structure*, Initiative 747 limits the total increase in EMS levy assessment to 1% plus new construction. Even though the total assessed values of properties in King County, not including new construction, increased 6.5% from 2005 to 2006, the total EMS levy collected from these properties was limited to a 1% increase plus new construction increase of 2%. Thus, the effective levy rate is projected to decrease from \$0.25 per thousand dollars of valuation in 2002 to \$0.207 in 2007.



Forecasted new construction growth and forecasted CPI are adjusted each year based on the recommendations of the King County Economist. Forecast revenues are sufficient to cover forecast expenditures through the end of the levy period. There was sufficient fund balance to accommodate an increase in the ALS allocation over CPI in 2006 and minimize cost shifting to ALS providers. However, there is not fund balance available to cover an increase above CPI for 2007. The conversion of Medic 3 and Medic 35 from EMT/P units to fully funded 2-paramedic units and the increase in funding for Vashon have used most of the remaining available fund balance. Funds for addressing needs not included in the *2002 EMS Strategic Plan Update*, such as desired service increases to outlying areas, are limited.

**Expenditure Trends:** There are two main factors affecting expenditure trends; increased costs and the addition of new ALS service. Expenditures are projected to increase from \$32 million in 2002 to \$43.7 million in 2007 for the balance of King County. This is a 36.5% increase or an average increase of 7.3% per year. Since ALS is the largest recipient of EMS levy funds, increases in ALS due to new units and allocation increases above forecast CPI have a significant effect on expenditures. Since expenditure increases in each sub-fund area are tied to the forecast local CPI, long term changes in the CPI rate can have an impact on the projected end fund balance. Forecast CPI was increased to 2.9% in 2005, 2.6% in 2006, and to 2.7% in 2007. Lengthened start-up of Strategic Initiatives has resulted in higher cash flows for projects in the last two years of the levy period.

The following chart shows projected expenditures by sub-fund for the current levy period:

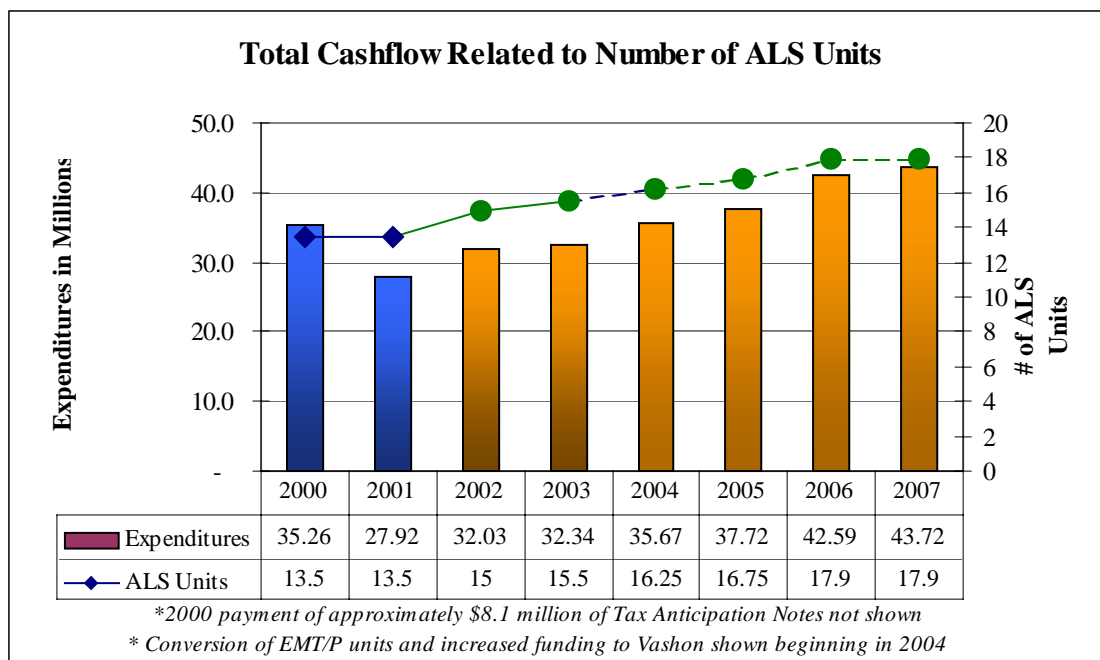


**Medic Unit Additions:** Since the beginning of the current levy period, one 0.5 unit expansion was added to the system in 2003 when Medic 14 in Issaquah was expanded from a 12-hour half-

time 2-paramedic unit to a full 24-hour unit. Medic 12 in Enumclaw was also expanded from a 12-hour half-time 2-paramedic unit to a full 24-hour unit in 2004. A new 12-hour peak unit, Medic 13, is scheduled to start in September 2006. These increases were anticipated in the 2002 *EMS Strategic Plan Update* and implemented after analyzing workloads, response times, and percent back-up provided by other medic units.

Another significant increase in ALS service was the transition of EMT-P units to 2-paramedic units. This change was at the request by the Medical Program Directors. Medic 3, located in North Bend, was transitioned to a 2-paramedic unit in July 2003 with funding for the increase split between the EMS levy and other partners. Full levy funding began in January 2006. Medic 35 was converted to a 2-paramedic unit in May 2005. In addition, funding for Vashon was increased to 90% in January 2006.

The following chart shows how expenditure growth correlates to the number of ALS units in service:



BLS funding is projected to remain steady and not exceed CPI. BLS funding is projected to increase from \$8.5 million in 2002 to \$9.7 million in 2007. Total Regional Services funding for the current levy period increased each year at CPI. Regional Support funding is projected to increase from actuals of \$2.8 million in 2002 to a projection of \$5.1 million in 2007. Expenses for Regional Services, particularly personnel, indirect and overhead charges, are increasing higher than CPI. To accommodate these increases, Regional Services is planning on using under-expenditures from 2003 through 2005 (placed in a designated reserve to cover increased expenses, including overhead in 2006 and 2007). It is anticipated there are sufficient savings to cover Regional Services expenditures through 2007.

Significant revenue trends to monitor include growth of new construction, interest rates, and delinquent taxes. Current forecast and past economic trends appear to indicate that new construction growth may increase in the remaining year of the levy. Interest rates are rising. Expenditure trends to monitor include changes (particularly increases) in the local CPI, and labor, pharmaceuticals and medical supply costs for paramedic services.

As planned, revenues have exceeded expenditures for the first three years of the levy. Beginning in 2005, expenditures were projected to exceed revenues. However, delays in expenditures resulted in revenues slightly exceeding expenditures in 2005. Sufficient revenues have been saved and placed in the EMS fund to cover the difference between planned expenditure and revenue levels in 2006 and 2007. The EMS Levy end fund balance (EFB) is projected to be \$4.0 million. As the costs of providing services continue to exceed the growth in levy revenues (primarily labor, pharmaceuticals and medical supplies), the next levy will also need to collect funds in the early years of the levy to cover expenditures in the later years of the levy.

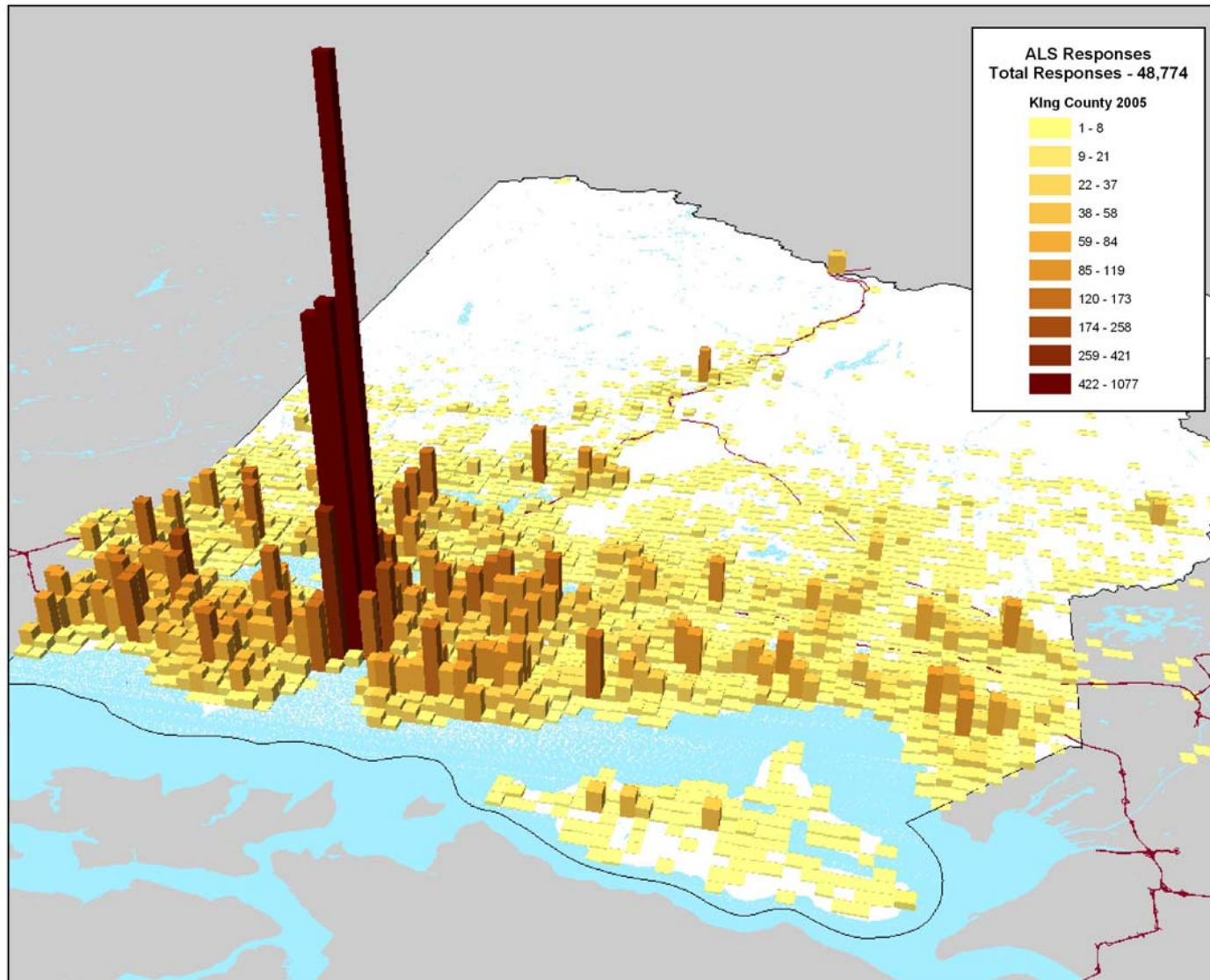
#### **E. 2006 EMS Financial Plan**

The 2005-2007 EMS Financial Plan summarizes actual and projected revenues and expenditures for core EMS Division programs and services, major strategic initiative directions, and other additions. 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 83 for details.

#### **F. Recommendations for Fund Balance**

Currently there are not sufficient funds to allow for an increase above CPI for ALS providers if needed in 2007. Since ALS providers have already forecast that expenditures will be higher than the 2007 allocation, any additional funds above those assumed in the current financial plan will be allocated to meet the ALS providers' needs and minimize cost shifting to ALS agencies.

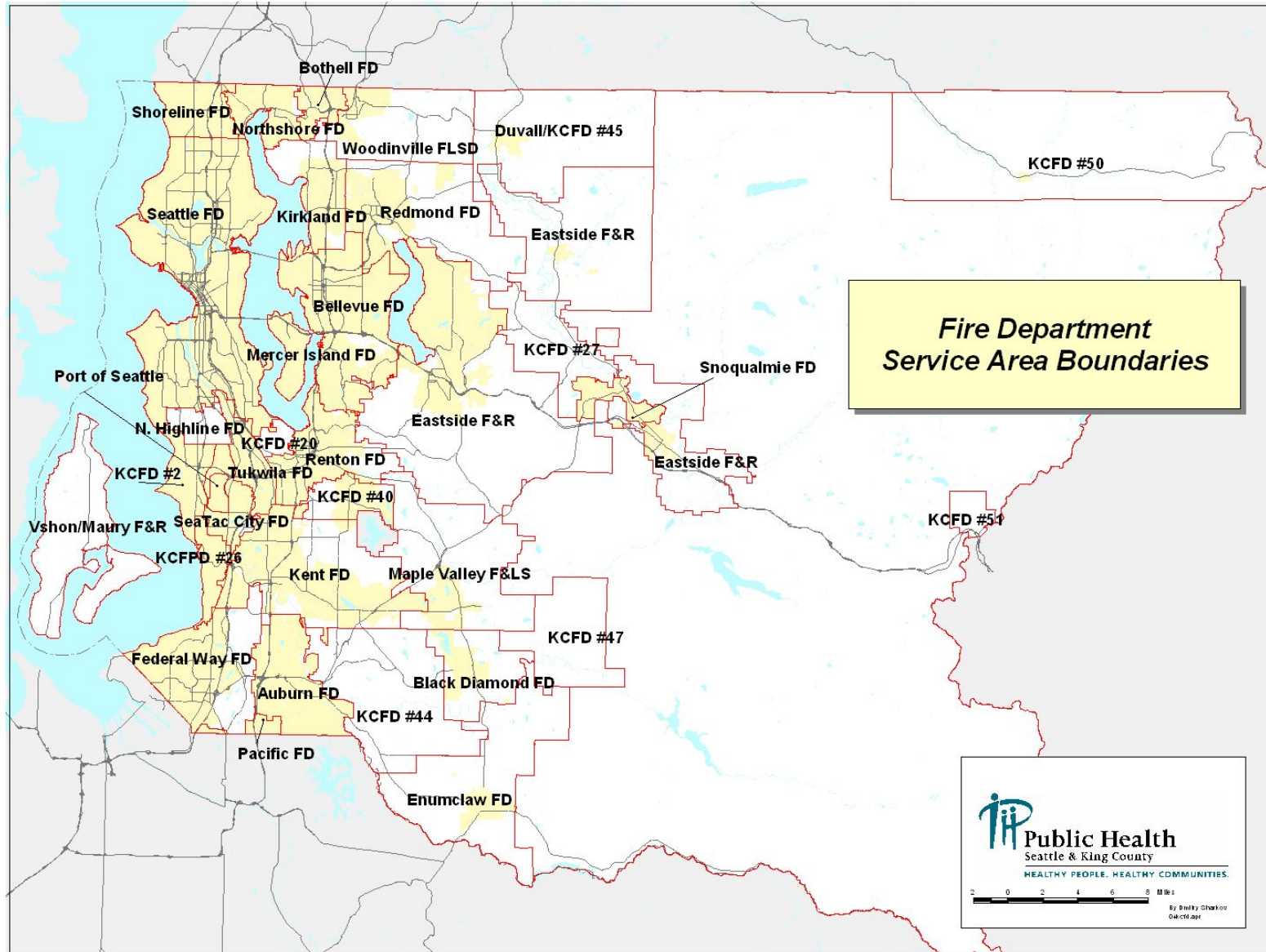
## Appendix A: Regional Map 2005 Total ALS Call Volumes





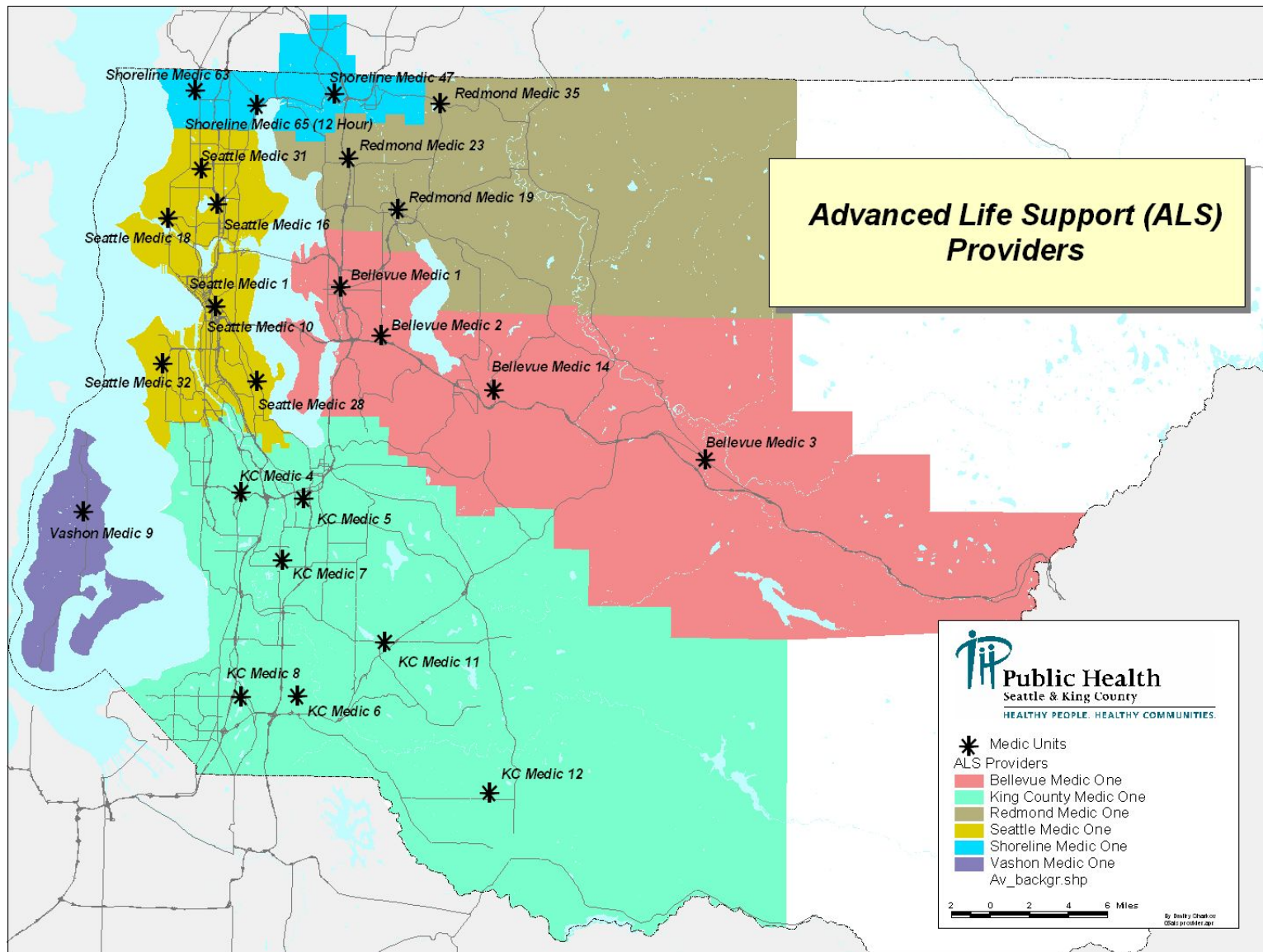


## Appendix B: Regional Map of the Basic Life Support (BLS) Provider Areas





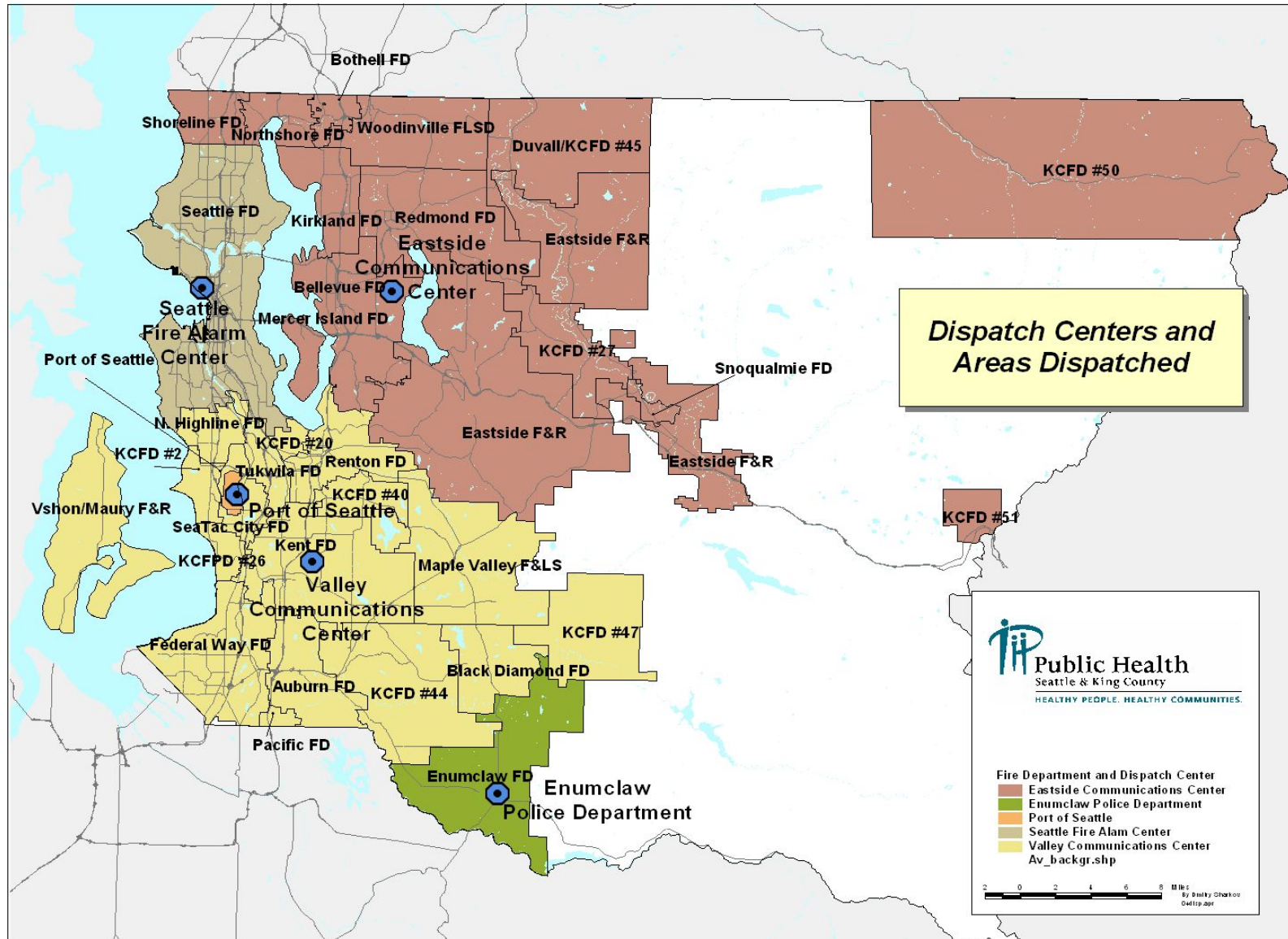
## Appendix C: Regional Map of the Advanced Life Support (ALS) Provider Areas





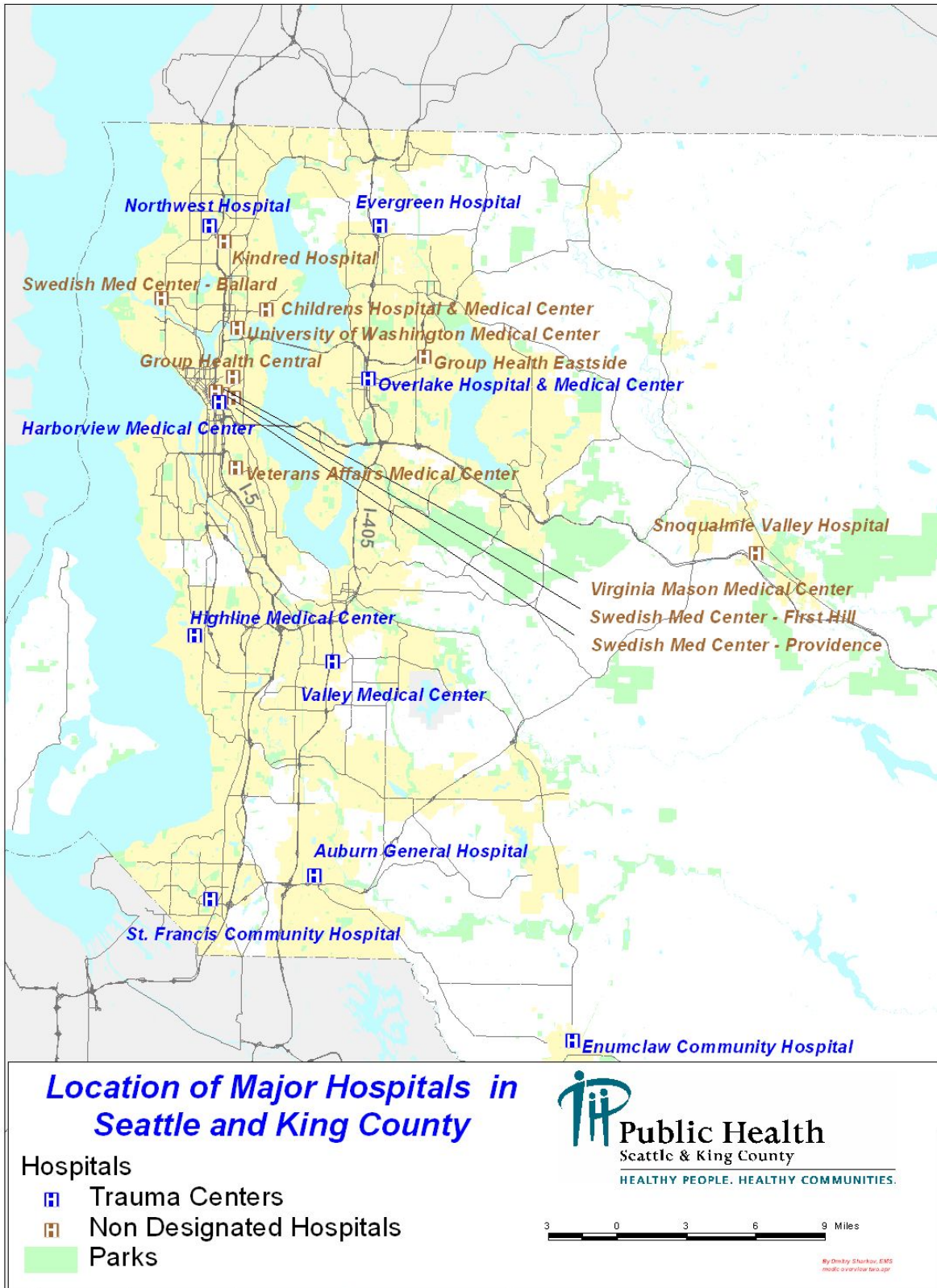


## Appendix D: Regional Map of the EMS Dispatch Center Service Areas





## Appendix E: Regional Map of EMS Hospitals







## Appendix F: 2006 EMS Advisory Committee Listing

<b>Name</b>	<b>Representation</b>	<b>Title/ Organization</b>
<b>Tom Hearne, Chair</b>	KC Emergency Medical Services	Manager, KC EMS Division
<b>Bob Berschauer</b>	Ambulance Service	Director of Operations, American Medical Response
<b>Al Church</b>	BLS in Cities > 50,000	Chief, South King Fire & Rescue
<b>Michael Copass, M.D.</b>	Seattle Medical Program Director	Medical Program Director, Seattle Medic One
<b>David Daniels</b>	BLS in Cities > 50,000	Chief, Renton Fire Department
<b>Gregory Dean</b>	ALS Providers – Seattle	Chief, Seattle Fire Department
<b>Mickey Eisenberg M.D.</b>	EMS Medical Program Director	Medical Program Director, KCEMS
<b>Chris Fischer</b>	Dispatch	Manager, Valley Communications Center
<b>Jim Fogarty</b>	ALS Providers - KC Medic One	Manager, King County Medic One
<b>Tim Fuller</b>	ALS Providers - Redmond	Chief, Redmond Fire Department
<b>Roger Hershey</b>	KC Fire Commissioner's Assn. - Urban	Fire Commissioner, South King Fire & Rescue
<b>Jon Kennison</b>	KC Fire Commissioner's Assn. - Rural	Fire Commissioner, Shoreline
<b>Marcus Kragness</b>	ALS Providers - Shoreline	Chief, Shoreline Fire Department
<b>Michael Loehr</b>	Public Health - Emergency Management	Manager
<b>Chris Merritt</b>	Labor - ALS	Paramedic, KC Medic One
<b>Alan Reed</b>	Health Care System	Manager, Medical Support Services, Group Health
<b>Jim Schneider</b>	BLS in Cities >50,000	Chief, Kent Fire & Life Safety
<b>Dorothy Teeter</b>	Public Health - Seattle & King Co.	Interim Director
<b>Mario Trevino</b>	ALS Providers - Bellevue	Chief, Bellevue Fire Department
<b>Ken Weisenbach</b>	Labor - BLS	EMT, Redmond Fire Department
<b>Adrian Whorton, M.D.</b>	Chair, Medical Directors' Committee	Medical Director, Redmond Medic One
<b>Keith Yamane</b>	ALS Providers - Vashon Medic One	Interim Chief, Vashon Island Fire & Rescue
<b>Not filled at this time</b>	Citizen Representative	



**Appendix G: EMS Division Revenue/Expenditure Summary**  
**Financial Plan 2005 through 2007**

	<u>2005</u> <u>Actual</u>	<u>2006</u> <u>Forecast</u>	<u>2007</u> <u>Requested</u>
<b>BEGINNING FUND BALANCE:</b>	<b>\$9,297,669</b>	<b>\$10,350,301</b>	<b>\$7,485,917</b>
<b>REVENUES:</b>			
Property Taxes	\$36,976,246	\$38,345,617	\$39,136,541
Other Revenue (includes Interest Income)	\$570,315	\$510,814	\$517,183
General Fund (CX)	\$375,000	\$375,000	\$375,000
<b>TOTAL REVENUES</b>	<b>\$37,921,561</b>	<b>\$39,231,431</b>	<b>\$40,028,724</b>
<b>EXPENDITURES:</b>			
<b>CORE SERVICES</b>			
Paramedic Services	(\$24,692,124)	(\$28,017,454)	(\$27,864,208)
Basic Life Support	(\$9,157,446)	(\$9,420,514)	(\$9,674,868)
EMS Division Regional Services	(\$3,500,575)	(\$4,292,891)	(\$5,073,536)
Strategic Initiatives	(\$370,965)	(\$854,676)	(\$924,478)
<b>SUBTOTAL Operating Expenditures</b>	<b>(\$37,721,111)</b>	<b>(\$42,585,536)</b>	<b>(\$43,537,090)</b>
Contingency Reserve			(\$185,000)
<b>TOTAL EXPENDITURES</b>	<b>(\$37,721,111)</b>	<b>(\$42,585,536)</b>	<b>(\$43,722,090)</b>
Encumbrance Carry Over	\$843,182	\$489,720	
<b>ENDING FUND BALANCE:</b>	<b>\$10,350,301</b>	<b>\$7,485,917</b>	<b>\$3,792,551</b>

**KING COUNTY MEDIC ONE DONATIONS**

Fund 6980; Sub-Account 06204

*2004 Account Balance*

Beginning Balance	\$ 401,427.18
Donations	\$ 318,529.16
Expenditures	\$ (228,699.47)
Ending Balance	\$ 491,256.87



## Appendix H: EMS Division Contact Information

**Mailing Address:**     Emergency Medical Services Division  
Public Health – Seattle & King County  
999 3rd Avenue, Suite 700  
Seattle, WA 98104-4039  
(206) 296-4693     (206) 296-4866 (fax)

**Web Address:**     <http://www.metrokc.gov/health/ems>

### **Specific Program Contacts:**

King County Medic One <a href="http://www.metrokc.gov/health/medicone/">http://www.metrokc.gov/health/medicone/</a>	(206) 296-8550
BLS/EMT Training and Education Program <a href="http://www.metrokc.gov/health/ems/training.htm">http://www.metrokc.gov/health/ems/training.htm</a>	(206) 296-4861
CPR/AED Training Programs <a href="http://www.metrokc.gov/health/ems/aed.htm">http://www.metrokc.gov/health/ems/aed.htm</a>	(206) 205-5582
Emergency Medical Dispatch Programs <a href="http://www.metrokc.gov/health/ems/emdprogram.htm">http://www.metrokc.gov/health/ems/emdprogram.htm</a>	(206) 296-4559
Injury Prevention and Public Education Programs <a href="http://www.metrokc.gov/health/ems/community.htm">http://www.metrokc.gov/health/ems/community.htm</a>	(206) 296-0202
Medical Control <a href="http://www.metrokc.gov/health/ems/quality.htm">http://www.metrokc.gov/health/ems/quality.htm</a>	(206) 296-4553
Strategic Initiatives <a href="http://www.metrokc.gov/health/ems/planning.htm">http://www.metrokc.gov/health/ems/planning.htm</a>	(206) 205-1056
Regional Data Collection Project <a href="http://www.metrokc.gov/health/ems/planning.htm">http://www.metrokc.gov/health/ems/planning.htm</a>	(206) 205-1056
Center for the Evaluation of EMS (CEEMS) <a href="http://www.metrokc.gov/health/ems/CEEMS.HTM">http://www.metrokc.gov/health/ems/CEEMS.HTM</a>	(206) 296-4553



## Appendix I: Complete Bibliography for 2006

1. Atwood C, Eisenberg MS, Herlitz J, Rea TD. Incidence of EMS-treated out-of-hospital cardiac arrest in Europe. Resuscitation. 2005 Oct;67(1):75-80.
2. Clarke SO, Schellenbaum GD, Rea TD. Socioeconomic status and survival from out-of-hospital cardiac arrest. Acad Emerg Med. 2005 Oct;12(10):941-7.
3. Eisenberg M: Bernard Lown and defibrillation. Resuscitation 2006; 69: 171-173.
4. Eisenberg MS. Incidence and significance of gasping or agonal respirations in cardiac arrest patients. Curr Opin Crit Care. 2006 Jun;12(3):204-6.
5. Eisenberg M, Garson G: Closing the Loop: SPHERE brings EMS & public health together. JEMS 2006; 31: 56-59.
6. Feder S, Matheny RL, Loveless RS Jr, Rea TD. Withholding resuscitation: a new approach to prehospital end-of-life decisions. Ann Intern Med. 2006 May 2;144(9):634-40.
7. Gilmore CM, Rea TD, Becker LJ, Eisenberg MS. Three-phase model of cardiac arrest: time-dependent benefit of bystander cardiopulmonary resuscitation. Am J Cardiol. 2006 Aug 15;98(4):497-9.
8. Meischke H, Diehr P, Rowe S, Cagle A, Eisenberg MS: A Community Intervention by Firefighters to Increase 911 Calls and Aspirin Use for Chest Pain. Acad Emerg Med 2006; 13: 389-395.
9. Rea TD, Shah S, Kudenchuk PJ, Copass MK, Cobb LA: Automated External Defibrillators: To what Extent Does the Algorithm Delay CPR? Ann of Emer Med August 2005; 46: 132-141.
10. Smith BT, Rea TD, Eisenberg MS. Ventricular fibrillation in pediatric cardiac arrest. Acad Emerg Med. 2006 May;13(5):525-9.