

Public Health - Seattle & King County



Division of
Emergency
Medical Services

2011 Annual Report
to the King County Council
September 2011

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Commonly Used Acronyms

EMS - Emergency Medical Services
ALS - Advanced Life Support
BLS - Basic Life Support
EMD - Emergency Medical Dispatch
EMT - Emergency Medical Technician

INTRODUCTION

I am pleased to present to you the Emergency Medical Services (EMS) Division 2011 Annual Report, as required by King County Ordinance # 12849.

The report provides an excellent overview of the many EMS programs and activities that are occurring throughout the region. You'll find information on the EMS Division's regional support programs that help ensure effective, standardized care across our county. You'll also read about the new and innovative projects, such as the work by the Medical Quality Improvement (QI) Section, that help make this one of the best EMS systems in the world. Throughout it all, I hope you'll recognize the sense of collaboration and commitment that are the hallmarks of this renowned system.

New to this year's report is identifying how the EMS system's programs and services align with the goals of the EMS Strategic Plan and the King County Strategic Plan. Understanding how a specific project or activity ties into the general goals of the EMS system and to the objectives and strategies of King County grounds us in our direction and validates our work.

Also included in this report is the revised reporting content and format for the EMS Strategic Initiatives section. The King County Auditor's 2010 report focused specifically on EMS Strategic Initiative performance and concluded that we needed 'to establish project milestones and performance measures to better assess the performance of completed strategic initiatives.' In response to this finding, strategic initiative project managers reviewed and revised each strategic initiative to improve measurement of project milestones, efficiencies, and/or outcomes, where appropriate, in order to 'gauge the extent of EMS system improvements.'

Understanding how EMS Division activities fit within the goals of both the EMS and King County Strategic Plans and how to better measure the impacts of these programs will prepare us as we begin planning for the next EMS levy period. Although preparation for the levy planning has been in the works for over a year, the *EMS Advisory Task Force* assigned to make recommendations to the King County Council by September 2012 is expected to convene in October 2011 for the Medic One/EMS Levy Planning kickoff. The 19 member task force will review and approve a financing package that will support the various EMS programs throughout the 2014-2019 levy period.

Finally, I want to welcome and introduce you to Jim Fogarty, the new Division Director of King County EMS. Prior to joining the Division, Jim had been the King County Medic One Chief for five years, overseeing the provision of advanced life support services to much of south King County. His knowledge and skills are great assets for this department, and we are pleased to have him join us.

This year's report conveys the excellence of the EMS service and the commitment of the people who plan and deliver it. We appreciate the opportunity to share this with you.



David Fleming, MD
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 2011 Annual Report, including managers of the various EMS projects and programs included in the report, Leonard Roberts and the Seattle Fire Department, and the EMS Division data analysis team of Linda Becker, Carol Fahrenbruch, Dan Henwood, and Dmitry Sharkov.

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

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FROM THE EMS DIVISION DIRECTOR

On behalf of all the men and women of King County Emergency Medical Services (EMS), I am pleased to present our 2011 Annual Report. 2011 marks the fourth year of the current 2008-2013 Medic One/EMS Strategic Plan and levy (<http://kingcounty.gov/healthservices/health/ems.aspx>), as well as the thirteenth year of proudly reporting back to our stakeholders on the operational, programmatic and financial aspects of the regional Medic One/EMS system.

King County EMS is known worldwide for its service excellence, its leadership, and most importantly, for its medical results. For over 30 years, our system has held steadfast to its core beliefs for how pre-hospital medical care should occur: through a regionally designed, medical model based, tiered response system. Although there are many different types of EMS systems, our unique system design has proven itself time and again to maintain a resiliency and consistency of results through good times and bad. Our system is not average, or even above average, but has measurably among the finest of medical outcomes in the world.

Of course, King County residents and visitors should expect nothing less from their critical emergency services. Our elected officials and County Executive, along with the Director of Public Health and Medical Program Directors, will tolerate nothing less. The evidence is presented upon the pages of this report reflecting fiscally responsible, quality driven local and regional services for healthy, safe, and vibrant communities for all of King County.

However, you should know that our medical professionals - the paramedics, EMTs and firefighters as well as our medical doctors - do not find a need to boast of their high achievements. In fact, they take steps to humble themselves in spite of great accomplishments, and never seem complacent or satisfied with year-to-date results. Rather, most of the people I work with spend their time not reveling in accolades of accomplishments, but engaged in rigorous review of their actions in an effort to be just a bit better the next time out the door, just a little bit better prepared for their next patient.

As I review the substantial accomplishments that have occurred this past year, it is apparent that Public Health – Seattle & King County, the EMS Division and the system's partnership agencies, have much to be proud of. I want to take this opportunity to recognize and say thanks to these committed men and women of the EMS system and ask that you join me in appreciating their dedication.

To our residents, who remain willing to spend hard earned dollars to support our efforts: Your active engagement is an important component of our EMS system as you provide CPR or use an available Automated External Defibrillator before we arrive. We thank you.

To our partners:

- The Dispatch Agencies that provide criteria based dispatch and pre-arrival instructions;
- The Fire Departments that provide excellent Basic Life Support, local knowledge of their communities, transport services, education and prevention;
- The Advance Life Support (ALS) providers (including fire departments and King County Medic One) who provide highly skilled medics;
- The local Police & Sheriffs for playing a role in using AEDs;
- The Paramedic Training and Harborview Medical Center/UW with its one-of-a-kind paramedic training program;
- The Emergency Medical Services Advisory Committee and the EMS & Trauma Council that provide critical oversight;
- The Grantors and Foundations (such as the Medic One Foundation, Life Sciences and Medtronic Foundation) for the support they continue to provide our system;
- All those behind the scenes who do not happen to arrive with lights and sirens ablaze but support a complex and extremely successful system – the people who work behind the phones, and behind the audits, finances and training systems;
- The Medical Community, doctors and nurses who unselfishly involve themselves with our system; and
- The family members of all of the above - we acknowledge the sacrifice you make of loved ones and that they are gone at times they should be at home.

I offer my thanks to each and every one of you for letting our system count on their skills and now present to you the EMS 2011 Annual Report.



James G. Fogarty
EMS Division Director



EXECUTIVE SUMMARY

Over the last year, the Emergency Medical Services (EMS) Division has continued its mission of providing world renowned, high quality pre-hospital emergency care while successfully adapting to the financial constraints imposed by the lingering economic downturn. The EMS system in King County serves over 1.9 million people in over 2,134 square miles. In 2010, EMS agencies responded to over 163,000 calls for medical emergencies in an average of 5 minutes, including responses to 1,069 cardiac arrests and more than 33,000 trauma calls.

One of the hallmark measures of a quality EMS system is the survival rate from cardiac arrest. In 2010, the EMS system in King County achieved a survival rate of 49%, the highest survival rate to date in the region. As indicated in the Regional Medical Quality Improvement (QI) Section (see p.16), since most survival rates in the nation hover around 10%, this is an astounding achievement.

Also, for the second year in a row, findings from the King County Auditor's annual review of EMS in King County were largely positive. The 2010 audit report determined that EMS financial operations were consistent with the Council-adopted financial policies. In addition, most Strategic Initiatives advanced the regional system objectives. One of the major audit recommendations was to establish project milestones and measures to better assess Strategic Initiative performance. The EMS Division embraced this opportunity to improve how Strategic Initiative performance was evaluated, and subsequently revised the annual report section to reflect this effort.

Finally, 2011 marks the formal kick-off year for the planning of the next EMS levy period. As mandated by King County Council Ordinance 15862, an EMS Advisory Task Force will convene to develop "interjurisdictional agreement on an updated EMS Strategic Plan and financing package for the next levy funding period". Programmatic and financial recommendations are due to the King County Council by September 2012, and the final 2014-2019 Strategic Plan is due in January 2013. In order to meet this deadline, the EMS Advisory Task Force is expected to begin meeting in October 2011 to initiate discussions. The EMS Division will play a central role in staffing and facilitating this process.

The common thread uniting each of these components is the commitment by EMS agencies to regional partnership and consensus. Sustained cardiac arrest survival rates, innovative strategic initiatives, and development of a regional strategic plan are the direct result of these dynamic partnerships. Our EMS partners in King County should be proud of their achievements and collaborative efforts in improving the health and quality of life for our region's residents.

SYSTEM OVERVIEW

The Medic One/ EMS System Design and Operation

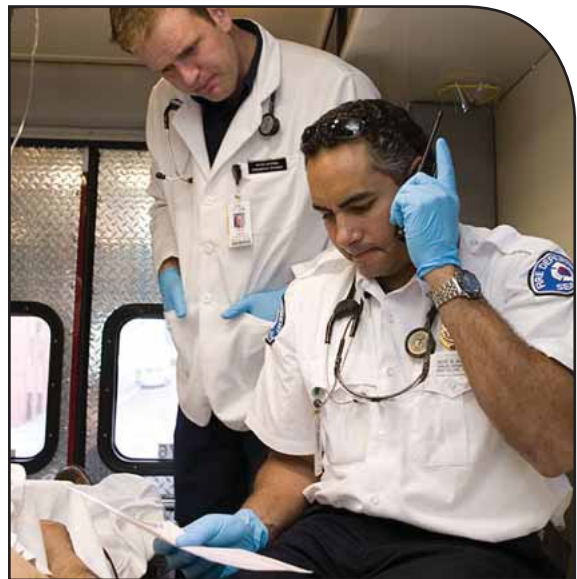
Any time you call 9-1-1 for a medical emergency, you are using the Medic One/EMS system. This internationally renowned regional system provides service to the residents of Seattle and King County, responding to an area of 2,134 square miles and serving a population of over 1.9 million. The system is managed by the King County Emergency Medical Services (EMS) Division, and relies upon complex partnerships with fire departments, paramedic agencies, EMS dispatch centers, and hospitals to make the program successful.

The core of the King County EMS program is based on the medical model, which in essence insists that direction and practice must be derived from the highest standards of medical training and medical care. Thus, the EMS Division strives for emergency medical care that is founded on the highest standards of training, best medical practices, scientific evidence, and close supervision by physicians experienced in EMS.

It is the leadership of the Medical Program Director that ensures the success and the ongoing medical quality improvement of the EMS system. Mickey Eisenberg, MD, PhD, has filled this role for the past eight years. His substantial responsibilities include writing and approving medical protocols, approving all initial EMT and continuing EMT medical education, undertaking new and ongoing medical quality improvement activities, and initiating disciplinary actions when necessary.

Dr. Eisenberg relies upon numerous partners to oversee the uniformity and consistency of the entire EMS system. He coordinates policies and procedures among the Medical Directors of the region's six paramedic programs: Dr. Michael Copass of Seattle; Dr. Jim Boehl of Bellevue; Dr. Adrian Whorton of Redmond; Dr. Gary Somers of Shoreline; Dr. Tom Rea for south King County; and Dr. Sam Warren of Vashon. Quarterly meetings are held to discuss and take action on paramedic-related matters. Dr. Eisenberg also works closely with the Central Region Trauma Council and the EMS Advisory Committee which provides key counsel to the EMS Division on regional Medic One/EMS policies and practices in King County and reviews major governance issues, the implementation of strategic plans, and other proposals.

To support the best possible outcomes of care, Dr. Eisenberg oversees medical quality improvement. A classic example is the management of cardiac arrest. The EMS Division has closely studied every cardiac arrest event for the past 35 years, which has led to constant improvement in training, practices, and programs. The result is a steadily rising cardiac arrest survival rate - currently one of the highest in the nation.



Paramedics consult with Medical Control doctors from the field.

SYSTEM OVERVIEW, continued

The response system in King County is tiered to ensure 9-1-1 calls receive medical care by the most appropriate care provider. There are five major components in the tiered regional Medic One/EMS system:

Universal Access: A patient or bystander accesses the Medic One/EMS system by calling 9-1-1 for medical assistance. Bystanders' reactions and rapid responses to the scene can greatly impact the chances of patient survival.

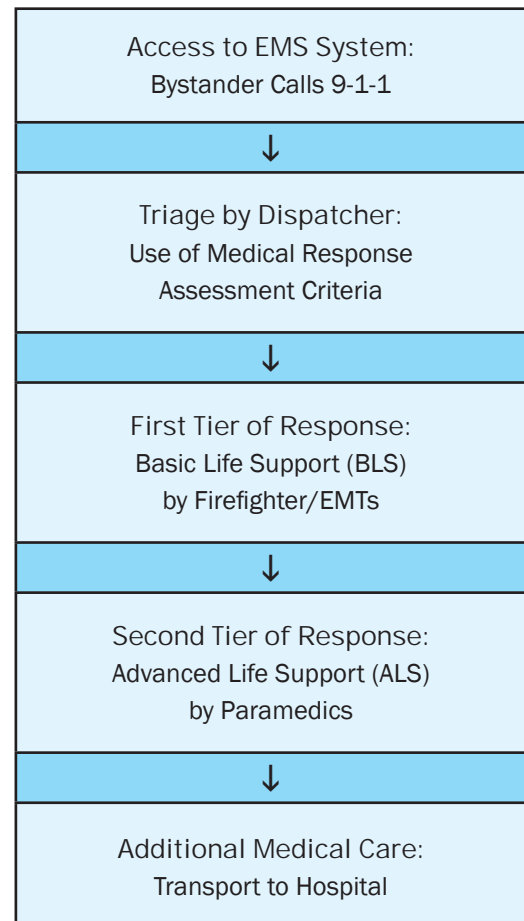
Dispatcher Triage: Calls to 9-1-1 are received and triaged by professional dispatchers who determine the most appropriate level of care needed. Dispatchers are trained to provide pre-arrival instructions for most medical emergencies, and guide the caller through life-saving steps, including Cardiopulmonary Resuscitation (CPR) and Automated External Defibrillator (AED) instructions, until the Medic One/EMS provider arrives.

Basic Life Support (BLS) Services: BLS personnel are the "first responders" to an incident, providing immediate basic life support medical care that includes advanced first aid and CPR/AED to stabilize the patient. Staffed by firefighters trained as Emergency Medical Technicians (EMTs), BLS units arrive at the scene on average in under five minutes.

Advanced Life Support (ALS) Services: Paramedics provide out-of-hospital emergency medical care for critical or life-threatening injuries and illness. Paramedics respond on average to about 30% of all Medic One/EMS calls.

Transport to Hospitals: Once a patient is stabilized, it is determined whether transport to a hospital or clinic for further medical attention is needed. Transport is most often provided by an ALS agency, BLS agency, or private ambulance.

EMS Tiered Response System



The Medic One/EMS system operates in a coordinated partnership among numerous stakeholders across King County to provide high quality pre-hospital medical care.

Dispatch 9-1-1 calls are received by one of five dispatch centers in Seattle and throughout King County. Following medically approved emergency dispatch triage guidelines, dispatchers determine the level of care needed. They are trained to provide pre-arrival instructions for most medical emergencies, and guide the caller through life-saving steps – including Cardiopulmonary Resuscitation (CPR) and Automated External Defibrillator (AED) instructions - until the Medic One/EMS provider arrives.

Basic Life Support (BLS) or rapid, first-on-scene medical care, is provided by over 4,000 Emergency Medical Technicians (EMTs) employed by 30 fire-based agencies throughout King County. EMTs receive more than 140 hours of basic training and hospital experience with additional training in cardiac defibrillation (electrical shocks) given to restore a heart rhythm. EMTs are certified by the State of Washington and are required to complete ongoing continuing education to maintain certification. As the first-on-scene provider, BLS contributes significantly to the success of the Medic One/EMS system.

Advanced Life Support (ALS) services, or regional paramedic services, are provided by six paramedic provider agencies in King County: Bellevue Fire Department (4 units), Redmond Fire Department (3 units), Seattle Fire Department (7 units), Shoreline Fire Department (3 units), King County Medic One (8 units) and Vashon Island Fire & Rescue (1 unit). In addition, a contract with Snohomish County Fire District 26 is in place to provide ALS services in the Skykomish/King County Fire District 50 area from Baring to Stevens Pass. Paramedics provide out-of-hospital emergency care for serious or life-threatening injuries and illness. As the second on scene for critically ill patients, paramedics provide airway control, heart pacing, the dispensing of medicine, and other life saving out-of-hospital procedures as expected under the medical supervision of the Medical Director. Paramedics receive over 2,500 hours of intensive training through the University of Washington/Harborview Medical Center Paramedic Training Program and are required to complete continuing medical education to maintain certification. There are currently 26 ALS units located throughout King County.

The EMS Division manages the core Regional Services that support the key elements of the system.

They are essential to providing the highest quality out-of-hospital emergency care available. Examples include:

Regional coordination of these various activities is important to support a standard delivery of pre-hospital patient care,

- Uniform training of EMTs and dispatchers
- Regional medical control and quality improvement analysis
- Injury prevention programs
- Regional data collection and analysis
- Regional planning for the EMS system
- Financial/administrative management

develop regional policies and practices that reflect the diversity of needs, and maintain the balance of local area service delivery with centralized interests.

The EMS Division also manages innovative projects and operations called Strategic Initiatives designed to improve the quality of Medic One/EMS services, and manage the growth and costs of the system. Regional Strategic Initiatives have allowed the Medic One/EMS program in King County to maintain its role as a national leader in the field, and have been key in the system's ability to manage its costs.



HOW THIS DOCUMENT WORKS

SECTION TITLES

This report is divided into sections that appear at the top of the page.

The Program Index

Each Section is organized by a Program Index listing its activities or components. Programs have an assigned number that enables readers to track individual activities from year to year. Program Sections begin with an overview to ground the readers in the subject, and proceeds with information on recent activities.

PROGRAM HIGHLIGHT

These pieces turn the spotlight on some of the Division's many successful programs. Each piece includes extra information on the key components.

EFFICIENCIES

The EMS Division is continually looking at how it can develop strategies that address the demand for services and encourage efficiencies. Throughout the report, Program Highlights showcase the Division's pursuit to improve EMS care, manage growth in paramedic services, and develop further system efficiencies and cost savings.

EMS DIVISION PROGRAMS OVERVIEW

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. To accomplish this, the Division adheres to a medical model of integrated regional Medic One/EMS services, a philosophy of cooperative decision making, and the development of innovative strategic initiatives that address the demand for services and encourage system efficiencies. All EMS Division programs are designed to enhance these efforts, and are developed through strong partnerships with other regional EMS agencies and innovative leadership in the emergency medical field.

Directing the Medic One/EMS system and the EMS Division in managing the regional system is the Medic One/EMS 2008-2013 Strategic Plan, which the King County Council approved in April 2007. The recommendations in the Medic One/EMS 2008-2013 Strategic Plan build upon the system's current successful medical model and regional approach, establish new policy directions, and present a financial plan to support the Medic One/EMS system through the span of the levy period. The Plan outlines the development of new or enhanced programs and strategic initiatives, including the development of a strategic and financial plan for the levy.

The EMS Division plays a significant role in developing, administering and evaluating critical EMS system activities. It provides the core support functions that emphasize the uniformity and standardization of direct services provided by the system's partners. These programs help tie the regional medical model together by providing uniform regional medical direction, standardized EMT training and continuing medical education, standard EMS training for emergency dispatchers, centralized data collection, paramedic service planning and analysis, and administrative support and financial management of the regional EMS levy fund. This section summarizes the EMS Division's primary programs and activities, including King County Medic One.



It is well known that the regional system depends on a complex partnership of providers, all of whom recognize the strong value for residents in maintaining the tiered response system. The EMS Division acknowledges the extraordinary efforts of all the EMS partners involved in implementing established programs and developing new programs. The time, expertise and collaborative efforts required of the EMS community demonstrate exactly why the EMS system in King County is so successful and serves as an international role model.

EMS DIVISION REGIONAL PROGRAMS

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MEDICAL QUALITY IMPROVEMENT

OVERVIEW: The Medical Quality Improvement (QI) section conducts programmatic, scientific, and case-based evaluation on the EMS system to improve the quality of EMS patient care in King County. To advance the science of resuscitation and EMS care, it partners with investigators in the EMS Division and at the University of Washington on research projects. This allows for productive and unique collaboration across the academic and operational EMS community, the results of which improve care, outcomes, and subsequently, the health of King County residents.

Throughout 2011, the Medical QI section has undertaken a range of activities to develop and expand critical evaluations of pre-hospital care. The following sections provide a brief background of the Medical QI section and detail core QI programmatic activities and research collaborations.

PROGRAM INDEX

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| <ol style="list-style-type: none">1. Cardiac Arrest Quality Assurance (HIGHLIGHT p.16)2. Dispatcher Assisted Resuscitation Trial (DART) Study3. Comprehensive Heart Attack Surveillance and Evaluation (CHASE)4. Airway Quality Assurance Report/Safety of Central Venous Lines5. SPHERE (HIGHLIGHT p.18)6. Resuscitation Academy7. EMT Advisory Council8. Limited English Proficiency (LEP) Callers: Challenges for Emergency Medical Dispatch Communication and Limited English Proficiency for Victims of Cardiac Arrest | <ol style="list-style-type: none">9. Socioeconomic Status: Understanding the Relationship of Socioeconomic Status and Survival from Out-of-Hospital Cardiac Arrest10. Long Term Outcome of Pediatric Cardiac Arrest11. Cardiac Arrest in Exercise Facilities12. Antiarrhythmics Used in Cardiac Arrest13. Police Defibrillation14. EpiPen Use by EMTs - now part of "EMT QI Audits"15. Vital Signs by EMTs - now part of "EMT QI Audits" |
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1. Cardiac Arrest Quality Assurance - [HIGHLIGHT p.16](#)

2. Dispatcher Assisted Resuscitation Trial (DART) Study

This study was completed in 2010 and published. See the EMS 2010 Annual Report or Rea TD, Fahrenbruch C, Culley L, Donohoe RT, Hambly C, et al: CPR with Chest Compression Alone or with Rescue Breathing. *New Engl J Med* 2010; 365: 423-433.

3. Comprehensive Heart Attack Surveillance and Evaluation (CHASE)

Like cardiac arrest, ST segment elevation myocardial infarction (STEMI) is regarded as a cardiovascular emergency for which time to treatment is critical. STEMI occurs when blood flow to the heart is blocked by a blood clot in a coronary artery. Up to one third of patients with a STEMI will die within 24 hours of onset of their symptoms.

The outcome, however, can be significantly improved through rapid hospital intervention. The American Heart Association has established a goal of 90 minutes from the time of first medical (EMS) contact until surgical opening of the arteries in patients with a STEMI.

PROGRAM HIGHLIGHT

1. Cardiac Arrest Quality Assurance

BACKGROUND

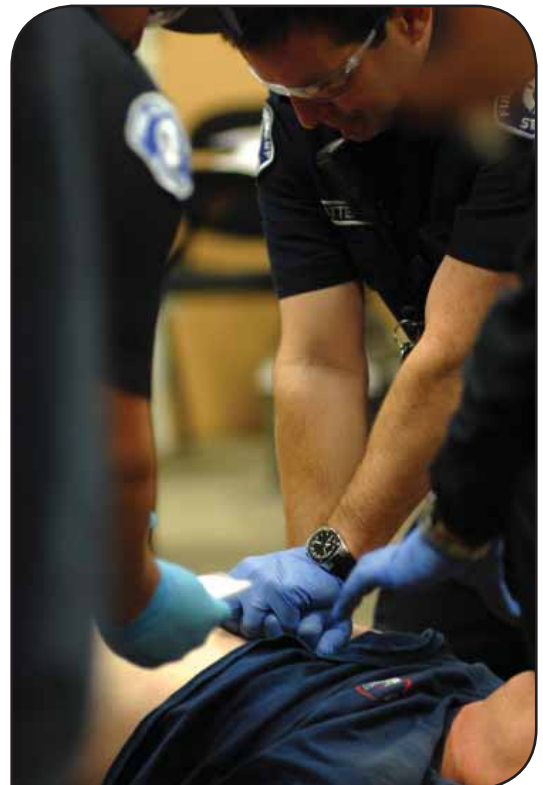
Out-of-hospital cardiac arrest, or sudden cardiac arrest, strikes upwards of 1,000 persons each year in King County and is a leading cause of death in the United States. In most communities across the United States, survival rates hover around 10%. However, In King County, the current survival rate is 49%. Successful resuscitation and survival from out-of-hospital cardiac arrest is possible if the EMS system can deliver a coordinated set of time-sensitive rescue measures.¹ Since 1976, the EMS Division has tracked every out-of-hospital cardiac arrest that occurs in the county. Dispatch, BLS, ALS, defibrillator and hospital records are reviewed for each case to ensure that appropriate, timely and quality care is provided to each person who suffers a cardiac arrest.

HOSPITAL RECORD REVIEW

A key feature of cardiac arrest case review is King County EMS's effective partnership with King County hospitals. This coordinated effort has resulted in an in-depth understanding of what happens to each patient after pre-hospital care is complete. Medical records are reviewed for all cardiac arrest patients who are transported to a hospital. A detailed medical review of records includes examination of previous medical history that may have effected pre-hospital care; procedures performed in the hospital; survival to hospital discharge; and neurologic status at discharge. These patient outcomes are critical to understanding which pre-hospital treatments are most beneficial to the long term prognosis of cardiac arrest patients.

In 2010, the Medical QI section added a full-time position responsible for hospital medical records review. This new position was created in response to the 2009 decision to begin a review of all hospital records for cardiac arrest patients transported to the hospital (approximately 425 per year), not just patients known to survive to hospital discharge (approximately 100 per year), as was the previous practice. The additional resources allow quality improvement efforts to focus not only on patients who survive cardiac arrest, but also those patients who may benefit from improved treatment protocols.

Cardiac arrest events are continually analyzed to reveal potential areas for improvement.



¹ Mickey S. Eisenberg, M.D., Resuscitate! How Your Community Can Improve Survival from Sudden Cardiac Arrest, University of Washington Press, 2009. p.6

MEDICAL QUALITY IMPROVEMENT, continued

Consistent with the objectives of the King County Strategic Plan to protect and provide the best health care for King County residents, the goal of the Comprehensive Heart Attack Surveillance and Evaluation (CHASE) project is to characterize the care provided in the field for STEMI patients and track the treatment and outcome of such patients through to hospital discharge. By identifying ways that both EMS and hospitals can improve the identification, triage and management of these patients, the EMS Division will ensure that the highest quality care is provided to King County residents. Steps taken in the field can dramatically shorten the time to surgical intervention, resulting in saved lives.



EMS crews respond quickly to improve patient outcomes.

respectively, during a pilot period). These data indicate that while King County paramedics are doing an excellent job meeting national STEMI treatment guidelines and have improved their performance in these measures since the pilot period, there is still room for improvement.

In the second half of 2011, the Medical QI section will partner with local hospitals to begin assessing patient outcomes after EMS care has been completed.

4. Airway Quality Assurance Report/Safety of Central Venous Lines
This quality assurance activity demonstrated that King County paramedics

achieve exceptional proficiency

(over 99% success) in endotracheal

intubation, a success level that is a standard for EMS systems around the world.

Achieving this high successful rate is not coincidence. Each paramedic receives intensive airway training as part of the year-long paramedic training program directed by Harborview Medical Center. Once paramedics graduate from the training program, they continue to refine this critical skill by performing at least 12 endotracheal intubations each year and participating in didactic and hands-on airway training.

QI reporting is the end result documenting the health benefit of intensive training and experience. The details behind the philosophy and operations that have helped King County achieve such a high standard of intubation success were featured this year in the *Journal of Emergency Medical Services*.²

Following an extended pilot period to establish data collection procedures and refine data collection instruments, CHASE “went live” on January 1, 2011. The Medical QI section worked with four partner paramedic agencies to collect data on every suspected myocardial infarction in the county, excluding the city of Seattle. To date, the Medical QI section has reviewed 317 paramedic-treated suspected myocardial infarctions occurring between January 1, 2011 and April 30, 2011. Incident reports and pre-hospital echocardiograms (ECGs) for each case were reviewed to identify cases in which the patient suffered a STEMI. Of the 317 cases reviewed, 115 (36%) were found to have a confirmed or suspected STEMI. Further analysis of the STEMI cases found that the mean time from the 9-1-1 call receipt at the dispatch center to patient arrival at the hospital was 43 minutes and that 91% of patients were given aspirin when not contraindicated (compared to 48 minutes and 85%,

²Grabinsky, A, Warner KJ, Damm M, Copass M, Rea T. Seattle & King County Setting the Standard in Pre-Hospital ETI. JEMS 2011; February 1, 2011.

PROGRAM HIGHLIGHT

5. SPHERE

Continuing its tradition of leadership in providing innovative and effective patient care, the EMS Division completed a pilot project in 2010 that explored the feasibility of providing on-scene counseling by EMTs to elderly residents who fell. This Falls pilot is a component of the Supporting Public Health with Emergency Responders (SPHERE) program, which uses EMS providers to identify patients with specific medical conditions, and connects them to appropriate resources.

Senior falls are relatively common, account for a high proportion of injury in the elderly, have a high cost to society, and are potentially preventable. Falls among older persons are a national concern and sparked the introduction and passage of S. 845, the Safety of Seniors Act of 2007, which authorized a national falls education campaign and set aside funds for research into effective fall prevention programs. From January 1, 2010 to September 30, 2010, EMTs in one fire district contacted those aged 65 and older who called 9-1-1 to report a fall or who experienced a past fall to discuss his or her fall history, the potential for serious injury from future falls, and the preventability of falls. EMTs referred patients to local fall prevention programs that conduct home safety assessments, install home safety devices, suggest balance and strength exercises, recommend medication changes and address postural hypotension and footwear risks that lead to falls. (For more information on such programs, please see the Fall Prevention Strategic Initiative on p.60.) Each person received a patient education form with contact information for the falls prevention programs and other community resources. The project evaluation included interviews with EMTs, fallers from the intervention fire district and four comparison fire districts who had called 9-1-1.

This program represents the EMS Division's unique approach to EMS care, supplementing the world class patient treatment already provided by EMTs with the provision of preventive care to high-risk seniors.

POSITIVE EMT FEEDBACK

Many EMTs felt that providing proactive advice to seniors whose needs were previously being met only on a purely reactive basis did not detract from their traditional duties as firefighter/EMTs.

PATIENTS BENEFITTED

The at-scene intervention was more likely to be delivered to those who did not sustain a serious injury. Among those who recalled the fall prevention discussion, 50% of those not transported to a hospital found the information extremely or very helpful compared to 25% of those who were transported.

IMPACTED PREVENTION PROGRAMS ENROLLMENT

Telephone interviews with patients showed that the project modestly increased referrals to fall prevention programs (6% of intervention subjects made an appointment compared to 3% in control districts). While the pilot project demonstrated a modest increase in appointments with a fall prevention program, the public health benefit when applied to a larger population may be substantial. This, combined with the low cost of the program and the positive feedback from EMTs, led to the decision to expand the program to the rest of King County in January 2011. An evaluation of the county-wide program is now underway.

MEDICAL QUALITY IMPROVEMENT, continued



The March 2011 Resuscitation Academy class



Dr. Leonard Cobb lectures at the Resuscitation Academy

6. Resuscitation Academy

The EMS Division and Seattle Medic One, in collaboration with the Medic One Foundation, developed the Resuscitation Academy curriculum to share local strategies for success and enable other communities to improve their cardiac arrest care and survival rates. Managers and directors of EMS systems from around the country spend an intensive three days attending lectures and participating in workshops. At the Academy's conclusion, attendees present proposals targeted at improving their own EMS systems. Academy faculty and a network of alumni provide ongoing support and mentoring as participants work to make their local projects successful. The Resuscitation Academy has been in operation for three consecutive years, and has met with tremendous enthusiasm and success. Due to a growing list of interested applicants, it now offers two yearly sessions. For more information on the Resuscitation Academy, visit www.resuscitationacademy.org.

7. EMT Advisory Council

The success of the regional EMS system relies heavily upon strong partnerships and collaboration between the EMS Division and EMS personnel. To strengthen these connections, the EMS Division created the EMT Advisory Council (EMTAC) which engages field providers in shaping policies, programs, research designs, and day-to-day

service interactions. Working together, the focus over the past year was on EMS Online strategic planning to continuously improve the care experience for all patients and providers.

8. Limited English Proficiency (LEP) Callers: Challenges for Emergency Medical Dispatch Communication and Limited English Proficiency for Victims of Cardiac Arrest

Research shows³ that community bystanders can improve survival from cardiac arrest by providing CPR prior to the arrival of EMS personnel. Clear communication is crucial to successful emergency medical dispatching – a dispatcher needs specific information from the caller to help correctly identify a potential cardiac arrest victim and communicate CPR instructions. However, the percent of the population with limited English proficiency (LEP), defined as speaking English less than “very well” has increased. Associated with poor quality of medical care and increased risk of adverse events in several clinical circumstances, LEP has not been rigorously assessed in pre-hospital emergency care, specifically in cases of cardiac arrest. When the caller has limited English proficiency, efficient and effective delivery of CPR via dispatcher telephone instruction may be challenging.

A study was begun in 2008 to evaluate the association

³Steven M. Bradley, Carol E. Fahrenbruch, Hendrika Meischke, Judith Allen, Megan Bloomingdale, Thomas D. Rea, Bystander CPR in out-of-hospital cardiac arrest: The role of limited English proficiency. *Resuscitation* 82 (2011) 680-684.

MEDICAL QUALITY IMPROVEMENT, continued

of LEP and the provision of bystander CPR to victims of cardiac arrest. The study aimed to describe the frequency and impact of LEP callers on the recognition of cardiac arrest and the timeliness of CPR instruction and bystander CPR performance.

Completed in 2010 and recently published in *Resuscitation*³, the study found that dispatchers took longer to recognize victims in cardiac arrest when the callers had limited English proficiency, and LEP callers took longer to initiate bystander CPR. In addition, a lower proportion of cases with LEP callers received bystander CPR and survived to hospital discharge.



A dispatcher is responsible for leading 9-1-1 callers through life-saving steps including CPR

These findings underscore the health challenges and potential disparities of pre-hospital care related to limited English proficiency, compelling the EMS Division to continue exploring ways to provide training or modify approaches to improve timely care for cardiac arrest patients.

9. Socioeconomic Status: Understanding the Relationship of Socioeconomic Status and Survival from Out-of-Hospital Cardiac Arrest - Completed in 2010. See the EMS 2010 Annual Report for details.

³ Steven M. Bradley, Carol E. Fahrenbruch, Hendrika Meischke, Judith Allen, Megan Bloomingdale, Thomas D. Rea, Bystander CPR in out-of-hospital cardiac arrest: The role of limited English proficiency. *Resuscitation* 82 (2011) 680-684.

⁴ Erica A Michiels, MD, Linda Quan, MD, Thomas Rea, MD, MPH, Leah Selby, BS and Michael Copass, MD. Neurologic Outcomes and Long-Term Survival after Pediatric Out-of-Hospital Arrest. Abstract presented at the Pediatric Academic Society, Denver, CO, May 2011.

10. Long Term Outcome of Pediatric Cardiac Arrest
Cardiac arrest in children is an uncommon but especially tragic event. Because of its rare occurrence, little is known about best treatments or outcomes. Introduced in the EMS 2009 Annual Report, this study aims to increase the understanding of the long term implications for children who survive to hospital discharge. In preliminary findings presented at the Pediatric Academic Society in May 2011, 75 survivors of pediatric out-of-hospital cardiac arrest in King County were reported to have a high prevalence of neurologic morbidity at hospital discharge. Neurologic status at discharge was relatively stable over time, and long-term survival was related to favorable neurologic assessment at hospital discharge.⁴ Looking ahead, the study population is being expanded to include patients from Seattle. The results will help guide care and expectations for clinicians and families whose child suffers a cardiac arrest.

11. Cardiac Arrest in Exercise Facilities
This year marks the completion of data collection and analysis for studying cardiac arrest at exercise facilities in Seattle and King County. The study, conducted in partnership with Seattle Medic One, aims to determine the frequency and characteristics of such events and includes an evaluation of the impact on-site AEDs have on survival from cardiac arrest.

A review of all non-traumatic cardiac arrests that occurred in public indoor locations from 1996 to 2008 identified 140 arrests in traditional and non-traditional exercise facilities. Preliminary results, which indicated higher survival rate from arrests in exercise facilities as compared to arrests in other public indoor locations, were shared at the Heart Rhythm Society conference in March 2011 and final results are expected to be published in the near future. The EMS Division would like the data from this study to be used to assist planning efforts for medical emergencies at exercise facilities.



A paramedic kit

12. Antiarrhythmics Used in Cardiac Arrest

A. NON-SHOCKABLE CARDIAC ARREST

Recent studies have highlighted community efforts to improve the outcome of sudden cardiac arrest (citations on p.108). Many of these reported efforts have been directed toward patients with cardiac arrest due to shockable arrhythmias, such as ventricular fibrillation (VF), on whom the impact of high performance CPR and rapid defibrillation appear to have achieved the greatest success.

However, the epidemiology of cardiac arrest is evolving, and in particular, the proportion of cardiac arrests due to shockable arrhythmias is diminishing. In fact, three-quarters of all out-of-hospital cardiac arrests are now due to non-shockable arrhythmias, such as asystole or pulseless electrical activity. Survival from these conditions is poor, and there are few, if any, interventions known to be effective. Additionally, the impact of community-wide treatment strategies, such as the recent American Heart Association (AHA) resuscitation guidelines, on survival is uncertain.

In keeping with its long tradition of measuring the effect of interventions, making changes in practice and re-measuring the resulting outcome – or “measure, change and re-measure”– the EMS Division recently embarked on a systematic evaluation of the effect of AHA guidelines

on survival from cardiac arrest specifically due to non-shockable arrhythmias. This evaluation, started in the summer of 2010 and continuing through the spring of 2011, builds upon a previously published EMS Division study that found improved survival in patients with witnessed VF cardiac arrest after guideline changes.⁵ The study will compare the outcomes of nearly 4,000 non-shockable cardiac arrest patients from a 10-year time span - five years before the King County-wide implementation of the 2005 AHA Guidelines, and five years after. This evaluation intends to determine whether the greater focus of recent guidelines on minimally interrupted, high quality CPR has the potential to benefit all patients with out-of-hospital cardiac arrest, regardless of presenting rhythm. The possible implications of this study are enormous, given the changing epidemiology of cardiac arrest. Findings are expected to be published in the near future.

B. DRUG ADMINISTRATION DURING CARDIAC ARREST

Current American Heart Association Advanced Cardiac Life Support (ACLS) Guidelines recommend the administering of cardiac arrest medications (such as epinephrine or antiarrhythmic drugs) during on-going uninterrupted CPR after defibrillation shock. The intent of this recommendation is to avoid any lapse in CPR in the aftermath of shock. However, such a practice also creates concern as to whether a medication given “blindly” during CPR after a shock is necessarily treating the “right” rhythm. To address this important question, the EMS Division has begun evaluating the evolution of rhythms during the two minute period of CPR that follows a defibrillation shock.

The study aims to characterize “after-shock” rhythms, particularly if and when ventricular fibrillation (VF) is most likely to recur. Knowledge of how rhythms evolve over time during CPR might afford insight as to precisely when CPR is best interrupted after shock for a single brief look to identify the underlying rhythm. Such knowledge would

⁵ Rea TD, Helbock M, Perry S, Garcia M, Cloyd D, Becker L, Eisenberg M. Increasing Use of cardiopulmonary resuscitation during out-of-hospital ventricular fibrillation arrest: survival implications of guideline changes. *Circulation*, 2006 Dec 19; 114(25) 2760-5. Epub 2006 Dec 11.

MEDICAL QUALITY IMPROVEMENT, continued

potentially permit drugs to be administered in a more targeted manner. The goal is to give the best drug for the right rhythm at the most optimal time when CPR can be briefly interrupted. Findings from this evaluation could be instrumental in further improving the care of patients with cardiac arrest in King County and redefining future resuscitation guidelines.

13. Police Defibrillation - see p.86

14. EMT QI Audits

In 2011, the Medical QI section initiated a series of focused EMT QI audits to assess EMT response to various critical conditions. These reviews are conducive in pointing to strengths, as well as areas needing improvement, in patient care. Results of these weekly audits are distributed to fire chiefs and training officers to provide feedback on patient care and to update EMT training topics. The following reviews have been completed:



EMTs evaluate a patient

A. USE OF EPIPEN

The EpiPen is a medical device used to deliver a measured dose of epinephrine (also known as adrenaline), most frequently for the treatment of acute allergic reactions to avoid or treat the onset of anaphylactic shock. This review indicated the need for additional EMT training on the appropriate use of EpiPens. All prospective cases of EpiPen use will continue to be reviewed.

B. SEIZURES AND FEBRILE SEIZURES IN CHILDREN

Seizures are caused by sudden, abnormal electrical activity in the brain. A review of a random sample of these cases showed appropriate adherence to patient care protocols. EMTs were reminded to practice complete documentation of patient care, including documentation

of reasons for not transporting patients to a hospital for follow-up care.

C. STROKE

Stroke is caused by an interruption in the blood flow to the brain and is a serious medical event which requires immediate treatment in an appropriate hospital. Again, a review of a random sample of cases revealed some aspects of patient care needing improvement. This audit

is being expanded into an ongoing Stroke QI program which will also incorporate hospital care data. (See Public Health Highlight section on p.80.)

D. ASTHMA IN CHILDREN

Asthma is a chronic respiratory disease which causes airways to narrow and swell. EMTs can assist patients with their medications, provide supplemental oxygen, or request paramedic assistance in more serious situations. A random sample of pediatric asthma cases showed that EMT management appeared thorough and benefited patients with this serious condition.

E. CHILDBIRTH ON SCENE

EMS-attended out-of-hospital childbirths were reviewed for appropriateness of patient care. While EMTs provided a major benefit to all patients, future EMT training sessions on this topic will emphasize standard documentation of the patient exams for both mother and newborn.

F. ALTERED LEVEL OF CONSCIOUSNESS

An altered level of consciousness can be a sign of a variety of serious conditions which have different pre-hospital and hospital patient care protocols. This review indicated that EMTs must perform thorough patient exams, including blood glucometry, to attempt to identify a cause for the altered level of consciousness.

BASIC LIFE SUPPORT (BLS) TRAINING & EDUCATION

OVERVIEW: The EMS Division provides initial training, continuing education, instructor education and oversight of the recertification process for approximately 4,000 Emergency Medical Technicians (EMTs) in King County. Through considerable coordination and communication among EMS stakeholders, the EMS Division develops the curricula that ensure the training and education programs meet agencies' needs and Washington State requirements. As the liaison between the Washington State Department of Health and the 30 EMS/fire agencies in King County, the Training Section relays continuing education, certification, and regulatory and policy changes to EMS agencies.

PROGRAM INDEX

- | | |
|------------------------------------|--|
| 1. Patient Care Guidelines | 4. EMS Online (HIGHLIGHT p.25) |
| 2. EMT Initial Training | 5. EMT Defibrillation Quality Assurance |
| 3. Competency Based Training (CBT) | 6. RETRO Database |

1. Patient Care Guidelines

Guidelines, also known as protocols, are the foundation of EMS training for EMTs and medics. The EMT Patient Care Guidelines are referred to as the “Blue Book” and outline the standards for providing pre-hospital care of patients. The Paramedic Patient Care Guidelines, written in cooperation with the University of Washington/Harborview Medical Center Paramedic Training Program, offer a standardized countywide approach to paramedic-level use of medications.

Both sets of Guidelines will be updated in late 2011 and available to EMS personnel in early 2012. Changes made in the Guidelines in 2011 emphasize high performance CPR throughout King County, reporting to dispatch when arriving on-scene and at the patient's side, and the reassessment of age limits for specific conditions.

2. EMT Initial Training

Training courses are offered in the spring and fall of every year and are open to personnel from all fire/EMS agencies in King County. Each course consists of 132 hours of classroom and practical instruction in addition to 10 hours of hospital observation time to ensure EMT certification is in accordance with Washington State regulations. In the spring of 2011, 40 EMTs completed the EMT Basic course; similar numbers are expected for the fall course.

In 2011, the Washington State Legislature adopted new EMS training and education rules which align Washington State educational programs with national trends. A result of this is the replacement of the Advanced First Aid course with the American Red Cross's equivalent known as “Emergency Medical Response.” Further changes in the educational requirements from the Washington State Department of Health are anticipated and will be incorporated into the EMT Training course curriculum.

3. Competency Based Training (CBT)

The State of Washington mandates that EMTs complete both didactic and practical skill continuing medical education and evaluation to maintain certification. 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, produced instructional training modules and implements the curriculum each year.

Every fall, the BLS Training Section hosts a number of CBT Instructor workshops to train the 500 instructor-evaluators who oversee the practical skills training. The topics for this year's CBT education include:

- Cardiovascular Emergencies
- Stroke and other Neurological Emergencies
- Head, Spine, Chest, Neck, & Face Trauma
- Endocrine Emergencies
- Death & Dying
- Sepsis

4. EMS Online: [HIGHLIGHT p.25](#)

5. EMT Defibrillation Quality Assurance

Early defibrillation remains the first-line treatment for witnessed ventricular fibrillation (VF). Used in conjunction with cardiopulmonary resuscitation (CPR), it is a key component in the treatment of individuals suffering a cardiac arrest.

All resuscitations that occur in King County are evaluated in detail, with the gathered data used for enhanced EMT resuscitation training that complements traditional hands on training. In reviewing over 200 cases in 2010 and



An EMT responds to a cardiac arrest with a defibrillator and supply kit

2011 in which at least one shock was delivered, the EMS Division learned that “hands-on” time has continued to improve as a result of fewer and fewer pauses in CPR during resuscitations.

The ultimate goal is to improve survival from cardiac arrest for the regional EMS system's end users - King County residents, work force and visitors. To help reach this target, the EMS Division will expand its quality assurance to include full ECG recordings of individual cardiac arrests to the EMTs providing resuscitation. The Division is working on an enhanced review, Cardiac Case Review, with ECG playback that will be piloted this summer in four different agencies. See p.30 for details on this exciting new project.

PROGRAM HIGHLIGHT

4. EMS Online

More than 14,600 EMS personnel across the nation are logging on to the King County EMS Online program to meet their continuing medical education (CME) requirements. This technically-savvy teaching website exposes students to the highest standards of medical training in a way that is convenient for students and instructors alike. The King County EMS Training staff provide technical support for the website and support an instructor hotline for questions about the courses and treatment protocols.

July 2011 marked the successful launch of EMS Online Version 2, providing not just a fresh new look but IT administrative functionality for EMS training officers. The program now boasts 32 current and applicable courses for EMTs and dispatchers, along with newly added paramedic content covering ECG Review, Medication Review, and a paramedic “case of the month.” Interactive enhancements are being made to the system as part of the EMS Online Strategic Initiative (see p.67).

There are numerous reasons why the King County EMS Online program is so successful:

CONTENT:

- While the state dictates the topics for the EMT CME, the King County Medical Director is deeply involved in steering the direction each course should take. This hands-on approach allows for adding relevant supplemental content and ensures the curriculum is current and applicable;
- Case studies, identified as the most compelling learning tool for students, are the focus of EMS online. 12 new case studies were developed for this year’s curriculum; and
- King County’s affiliation with topic specialists allows students the opportunity to learn from nationally acclaimed experts in their fields.

EASE:

- Unlike traditional classroom training, the website’s 24 hours a day/7 days a week access accommodates the varied schedules of EMS personnel;
- Consistent and standardized content delivery offers EMTs across King County and the state the same presentation and course work;
- Time-sensitive information (pandemic flu, recalls) can be distributed to its thousands of users easily and quickly; and
- \$18/EMT per year cost, as opposed to \$133/EMT per year standard classroom cost, yields a dramatic reduction for training expenses for the 30 EMS agencies in King County.

While originally designed for local area training, EMS Online is now being used for continuing medical education/recertification in nine states and British Columbia, generating revenue to the EMS Division to support these services outside King County. EMS Online continues to host courses and deliver instruction for agencies such as Resuscitation Outcomes Consortium and Whatcom County EMS. Additionally, content was adopted by the Navy NW (Department of Defense) and approved by the Department of Homeland Security as appropriate educational content for certified EMS providers. Such national interest in this program shows that EMS Online’s combination of eLearning and verified in-person skill checks provides an excellent model for training.

BASIC LIFE SUPPORT (BLS) TRAINING & EDUCATION, continued

6. The RETRO Database

This project allows the EMS Division to store, track and access essential information related to EMS personnel across King County. To date, RETRO contains nearly 34,500 electronic record sets documenting dates and requirements related to certification and recertification, reciprocity, practical skill set completion certification, and teaching certification requirements. RETRO has allowed such great efficiencies in the realm of data quality, management and retrieval that EMS is expanding its use to include documents associated with additional training classes held throughout the county.



EFFICIENCIES

The King County EMS Training Section continually looks at incorporating efficiencies within its line of business. To be more cost effective, BLS Training consolidated its CBT Instructor workshops so that the same number of people were trained but requires less staff time and expenses. To ensure trainer proficiency, BLS Training videotapes the workshops and reviews the participants' strengths and weaknesses to identify where additional instruction may be needed in future classes. To increase system oversight, it is building upon RETRO's capabilities, resulting in enhanced data collection and retention.



EMS personnel train continually under the careful guidance of experience instructors

For more information on BLS Training visit: <http://www.kingcounty.gov/healthservices/health/ems/training.aspx>

CENTER FOR THE EVALUATION OF EMS (CEEMS)

OVERVIEW: Established in 1987, the Center for the Evaluation of Emergency Medical Services (CEEMS) conducts research activities aimed at improving the delivery of pre-hospital emergency care and advancing the science of cardiac arrest resuscitation. CEEMS research activities is solely funded by grants from private foundations, state agencies, and federal institutions, such as the National Institutes of Health, National Institute on Aging and the Centers for Disease Control and Prevention. CEEMS is a collaborative effort between the EMS Division and academic faculty from the University of Washington who are recognized nationally and internationally for their contributions in the care and treatment of cardiac emergencies. Achievements made by this collective effort continue to improve outcomes from sudden cardiac arrest and advance evidenced-based care and treatment.

PROGRAM INDEX

1. Resuscitation Outcomes Consortium (ROC)
2. ROC – Pre-hospital Resuscitation Using an Impedance Threshold Device and Early versus Delayed Rhythm Analysis (PRIMED)
3. Home Automated External Defibrillator Training of High-Risk Patients
4. Program to Integrate Technology and Cardiac Arrest Resuscitation
5. Mentorship
6. VF Waveform Library
7. Heart Rescue Flagship Program
8. Washington CARES ([HIGHLIGHT p.30](#))

1. Resuscitation Outcomes Consortium (ROC)

The EMS Division continues to be an active participant in the National Institutes of Health supported Resuscitation Outcomes Consortium (ROC). King County EMS participated in the successful completion of five large prospective randomized ROC clinical trials which have been published or are pending publication in major medical journals (including the Journal of the American Medical Association and the New England Journal of Medicine), and have directly contributed to the improved care of citizens in King County and advanced the science of resuscitation and trauma care.



The EMS Division is embarking on the next series of ROC trials. In the realm of trauma, a trial (“BLAST”) will evaluate the feasibility and potential value of measuring serum lactate levels in the field as a potential marker of severe trauma. For studying cardiac arrest, two trials will begin in the fall of 2011. One trial will evaluate the benefit of continuous chest compression cardiopulmonary resuscitation (CPR) during which ventilation is administered without interruption of chest compressions. This form of CPR will be compared with traditional CPR in which each cycle of 30 chest compressions is briefly interrupted for two breaths. A second trial, called ALPS (Amiodarone, Lidocaine or Neither (Placebo) Study) will evaluate the value of antiarrhythmic medications in shock-refractory cardiac

CENTER FOR THE EVALUATION OF EMS (CEEMS), continued

arrest. Both trials will determine the impact of the study treatments on the all-important endpoint of survival to hospital discharge and neurological outcome.

In addition to ROC clinical trials, the EMS Division continues to participate in an ongoing registry of trauma and cardiac arrest. The ROC Cardiac Arrest Epistery, as the largest ongoing epidemiologic epistery of out-of-hospital cardiac arrest, continues to characterize the incidence, demographics, resuscitation characteristics and survival trends of patients who experience an out-of-hospital cardiac arrest in 10 communities across North America, and provide insight as to the evolving epidemiology of this condition. King County plays a vital leadership role in each of these activities that will help shape the future of resuscitation and trauma care worldwide.

2. ROC – Pre-hospital Resuscitation Using an Impedance Threshold Device and Early versus Delayed Rhythm Analysis (PRIMED) - Completed in 2010. See the EMS 2010 Annual Report for details.

3. Home Automated External Defibrillator Training of High-Risk Patients - Completed in 2010. See the EMS 2010 Annual Report for details.

4. Program to Integrate Technology and Cardiac Arrest Resuscitation (PITCAR)

Entering its third year of funding, this program is a collection of interrelated projects aimed at improving survival from out-of-hospital sudden cardiac arrest

through early activation of 9-1-1, increased bystander CPR, public access to defibrillation and delivery of basic and advanced life support services. This is a four-year grant awarded from the Life Sciences Discovery Fund Authority which was established by the Washington State Legislature.



AEDs are strategically located in public places around King County.

A. PITCAR: Improving Bystander CPR Performance

If performed promptly, bystander CPR improves the chances of surviving an out-of-hospital cardiac arrest. Focus groups have shown that current CPR instructions for the layperson can result in confusion and delays. This project

evaluates how standard language and communication can be modified to improve bystander CPR.

B. PITCAR: Limited English Proficiency

The proportion of non-native English speakers is increasing in the United States. Dispatcher recognition of cardiac arrest and delivery of CPR instructions to the 9-1-1 caller can improve survival from sudden cardiac arrest but requires effective communication between the caller and the dispatcher. This study evaluates the challenges of Limited English Proficiency and its potential impact to initiating bystander CPR in a cardiac arrest resuscitation. This information will assist in the design of an intervention aimed at improving communication with callers who have Limited English Proficiency.

5. Mentorship

The EMS Division remains actively engaged in mentoring EMS-affiliated clinicians, students, and researchers. A number of peer review publications and a wealth of analyzable data have resulted from this worthwhile program. This opportunity often advances scientific understanding, has implications for emergency care, and provides an instructive experience for all those who participate.

6. Ventricular Fibrillation (VF) Waveform Library

VF is an abnormal heart rhythm that causes the heart to stop pumping blood, resulting in sudden cardiac arrest. The most effective treatment of VF is the delivery of an electrical shock to the heart, or defibrillation. Highlighted in the EMS 2010 Annual Report, the VF Waveform Library is a collection of recorded ECGs obtained from defibrillators during a cardiac arrest resuscitation that shows the heart to be in VF. This Library provides a rich and growing repository of information that can be used to study and evaluate the relationship between ventricular fibrillation and elements of the cardiac arrest resuscitation. Following are two examples of how the VF Library is used.

A. AIRWAY MANAGEMENT

A cardiac arrest victim stops breathing normally and loses consciousness. Paramedics provide airway management through intubation, which involves passing a tube down to the trachea to provide oxygen to the lungs. By using the VF Waveform Library, the EMS Division is able to characterize interruptions in chest compression caused by intubating the patient. This will lead to better understanding the effects of intubation, which will help guide and improve future treatments for cardiac arrest resuscitation.

B. REDUCING INTERRUPTIONS IN CPR BY IMPROVING CARDIAC ARREST RHYTHM ANALYSIS

When cardiac arrest is the result of ventricular fibrillation, successful resuscitation is possible, but requires early defibrillation. However, for cardiac arrests caused by abnormal rhythms other than VF, it is immediate and uninterrupted CPR, and not necessarily a shock, that is needed. Working with VF recordings, this effort analyzes different models for identifying abnormal heart rhythms other than VF whereby the rescuer would be instructed to continue CPR until ventricular fibrillation is detected and a shock would then be administered.



7. Heart Rescue Flagship Program

The Heart Rescue Flagship Program is funded by a grant received in 2011 from the Medtronic Foundation. The program aims to improve survival from sudden cardiac arrest throughout King County and Washington state using a system-based approach to improve, strengthen and enhance the three levels of care: community response, pre-hospital response, and hospital response. The EMS Division is partnering with other Washington EMS agencies to establish an integrated state-wide cardiac arrest registry (see WACARES, p.30). Data from this registry will help these agencies evaluate their systems and implement strategies to improve the care and treatment of cardiac arrest patients in their communities.

8. Washington Cardiac Arrest Registry to Enhance Survival - [HIGHLIGHT p.30](#)

For more information on CEEMS, please visit: <http://www.kingcounty.gov/healthservices/health/ems/ceems.aspx>

PROGRAM HIGHLIGHT

8. Washington Cardiac Arrest Registry to Enhance Survival (Washington CARES)

BACKGROUND

In 1976, the EMS Division implemented the Cardiac Arrest Surveillance System to measure the care and treatment of sudden out-of-hospital cardiac arrest, and improve out-of-hospital cardiac arrest and resuscitation. For the past 10 years, the Division has worked with other regional EMS agencies to develop a standardized registry for cardiac arrests state-wide.

In 2010, the EMS Division was invited to participate in a national cardiac arrest registry called CARES, and enroll other Washington State EMS agencies into the program to collect cardiac arrest data state-wide. Expanding CARES throughout Washington state will further the development of an ongoing data collection repository for the evaluation of care and outcomes in these communities. Participation in the registry will enable comparisons among EMS systems, states and regions. This process can ultimately provide improvements in the treatment and outcomes for patients experiencing a cardiac arrest.

OBJECTIVES

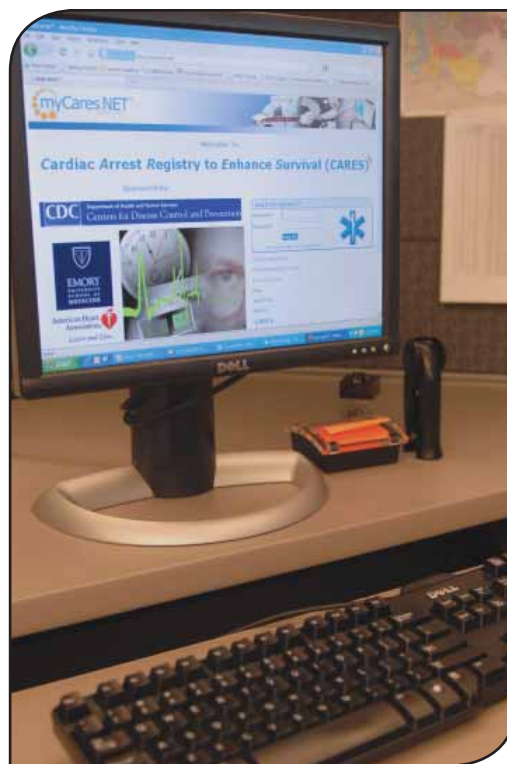
The objective is to create a standardized set of information to collect and report cardiac arrest data, and use that information to implement strategic programs that improve survival from out-of-hospital cardiac arrest throughout Washington state.

DESCRIPTION

Washington CARES (WACARES) is a state-wide registry used to benchmark care and outcomes in participating communities. This in turn will provide the basis for targeted programs to improve community, pre-hospital, and hospital response. Assisting other EMS agencies in cardiac arrest surveillance will enhance cardiac arrest quality improvement programs and initiatives created in King County that will be disseminated, implemented, and evaluated outside the county's geographic borders. Programs implemented to improve care will be monitored through the registry. Efforts will involve communities at varying stages of cardiac arrest surveillance and improvement in cardiac arrest care. The efforts directed toward the registry and programs designed to improve field care will be continuous to ensure that monitoring and evaluation is ongoing and sustainable.

EVALUATION

There are currently 10 counties representing other large metropolitan areas across Washington state participating in WACARES. The WACARES Program will be evaluated by the success of other counties in the uniform and consistent data collection and reporting, as well as programs that can be leveraged to improve care using the collected information.



The Washington CARES registry website.



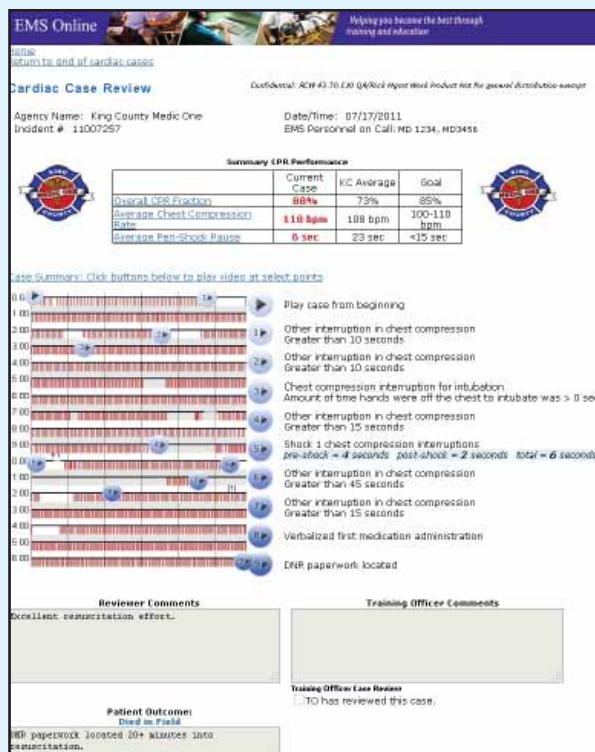
EFFICIENCIES

Cardiac Case Review

Cardiac case review is a web-based tool currently being developed and tested to provide regular and consistent performance feedback to EMTs and paramedics who participate in a cardiac arrest resuscitation. After the incident, EMTs and paramedics download electronic recordings from a defibrillator for quality assurance review. Once a physician completes the review, EMTs and paramedics would log into EMS Online and view comments, evaluation and the details of the resuscitation.

This screen shot shows a mock-up of what the EMT and paramedic might view: Summary CPR Performance – CPR Fraction (overall time hands were on the chest performing CPR), average chest compression rate (rate of chest compressions per minute), and average peri-shock pause (time CPR was interrupted for analysis and delivery of shock); Case Summary – clicking any play button will enlarge the screen and show a video recording of the heart rhythm, chest compressions, and shocks captured on the defibrillation download; and Comment Boxes – comments made during evaluation. Providers will be able to compare their times with the King County average. The ability to see and hear their ‘performance’ from the electronic download accompanied with constructive feedback will aid field providers in staying proficient and skilled.

The secure web-based platform will enable EMTs, paramedics, training officers, and physicians to access the Cardiac Case Review System through EMS Online from any location and at any hour. This tool is an ideal example of how the use of infrastructure technologies can be extended to improve care and deliver cost-efficient strategies of quality assurance.



CPR AND PUBLIC ACCESS DEFIBRILLATION

OVERVIEW: Cardiac arrest is one of the most life-threatening of all pre-hospital medical emergencies. Numerous clinical studies have demonstrated that patients who receive early cardiopulmonary resuscitation (CPR) and early defibrillation have a significantly improved chance of survival from cardiac arrest. The EMS Division runs a number of programs to provide CPR and Automated External Defibrillators (AED) training to residents of King County, along with efforts to place these devices in public locations and to encourage the public to register their AEDs.

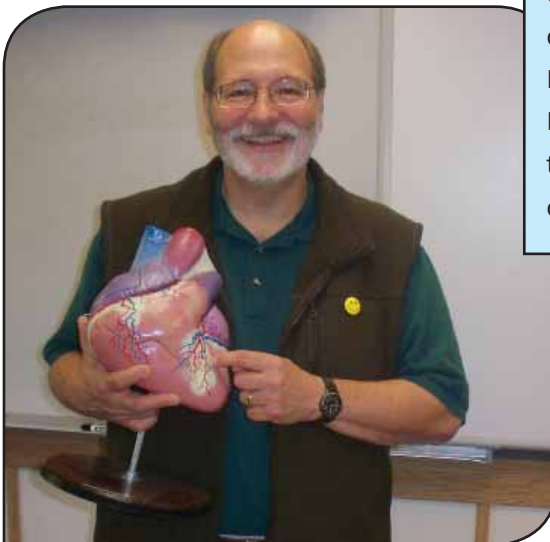
PROGRAM INDEX

1. King County Student CPR/AED Program
2. Community Responder Defibrillation Program
3. Regional Approach to Municipal Public Access AED Registry and Training (RAMPART)

1. King County Student CPR/AED program

This program trains secondary school students (grade 6-12) in King County to perform CPR and use an AED in American Heart Association approved classes taught by their teachers and local firefighters. During 2010, 17,792 students were trained to perform CPR and use an AED.

Many elementary, junior high and high schools in King County have AEDs located in the school buildings to be used by the public should the need arise. There are currently 406 AEDs located in public schools registered in the Seattle/King County Public Access Defibrillation Registry.



An outstanding example of dedication

Paul Blair teaches health and physical education at Evergreen Junior High in Redmond's Lake Washington School District. Paul has been teaching for 32 years and has been a CPR Instructor in the Student CPR Program for 30 years. He has taught CPR to over 7,000 students in his career. "I love teaching CPR, as well as the entire AHA Heartsaver course, to my junior high students. The information is so valuable and hands-on. At the end of the course we have a graduation ceremony where I pass out their AHA cards. The students are so excited and proud of receiving their card. What fantastic programs Public Health and AHA offer for our students!" states Paul. The EMS Division congratulates Paul on a successful career in teaching and for going the extra distance to ensure that all of his students receive training in this life saving skill.

Paul Blair, Evergreen Junior High, Redmond

EFFICIENCIES

A major component of the CPR/AED program is the CPR Train-the-Trainer model which instructs school teachers and fire department personnel to provide training for the school program. While local firefighters do an outstanding job teaching CPR/AED and present a very positive influence to the students, they are limited in the number of hours they can be in the classroom due to funding. Therefore, most school districts choose to use existing resources (teachers) and train them to be CPR instructors.

Teachers can incorporate CPR/AED training into the curriculum for courses they may already be teaching about healthy living, not smoking, good eating habits, or physical education. Hours are not limited, allowing them to take more time to cover the topic. This gives their students additional opportunities at “hands-on” manikin practice time and improves their skills. Because they are also First Aid Instructors, teachers may opt to include first aid in the curriculum as well, educating their students on yet another potentially life saving skill. Costs are modest, with outlays equaling the cost of a substitute for two days for the initial training, followed by one day every two years for recertification.

2. Community Responder Defibrillation Program

The Seattle Fire Department and Public Health - Seattle & King County join forces in this program to promote

Public Access Defibrillation (PAD) in the community. The EMS Division provides the AEDs, AED training, placement and registration instruction advice, and supports the PAD Registry database which links to dispatch systems and shows the availability and locations of the AEDs in Seattle and King County. There are currently 2,477 AEDs registered in this program throughout the region.

One of the Strategic Initiatives for the 2008-2013 EMS Levy is a Public Awareness Campaign for Public Access Defibrillation (see p.66).

3. Regional Approach to Municipal Public Access AED Registry and Training (RAMPART)

In 2010, the EMS Division, in partnership with the cities of Burien, Kent, Renton, Shoreline and Woodinville, initiated

RAMPART to purchase and place AEDs in public settings and train city/county employees on their use. As a result, 26 AEDs were placed and 1,343 employees were trained in CPR/AED.



2011 is the second year of this project, and the number of cities participating has increased to 12. The cities now include Bellevue, Bothell, Burien, Clyde Hill, Des Moines, Kent, Newcastle, Redmond, Renton, Sea Tac, Snoqualmie, and Tukwila. Results for 2011 will not be available until the end of the year and will be reported in the EMS 2012 Annual Report.

The EMS Division maintains the PAD Registry and encourages cities to seek out and identify unregistered AEDs in their community. For more information on this and other CPR/Public Access Defibrillation projects, please visit: <http://www.kingcounty.gov/healthservices/health/ems/community.aspx>

2,506 AEDs REGISTERED

When AEDs are registered, dispatch centers can alert callers to the nearest AED location, leading to early defibrillation and, subsequently, possibly saving a life.

CRITICAL INCIDENT STRESS MANAGEMENT

Research has shown that occupational-caused stress impacts the health and productivity of the American worker. None is more affected than the professionals who work in emergency services.

The EMS Division's Critical Incident Stress Management (CISM) Program has been a regional leader for over two decades in its mission to support the mental health of police, fire, EMS, corrections officers and emergency dispatch professionals. The 18-member all-volunteer intervention team is available 24 hours a day, 7 days a week for specific stress events and major crisis incidents. Interagency partnerships have developed through this program, with CISM teams uniting to provide services and utilize mutual aid, and working with the King County Healthcare Coalition to develop disaster preparedness and psychological first aid. Such cooperation encourages behavioral health and wellness, improves stress resilience and enhances agency-based peer support services.

FACTS

- 9 Provider Agencies Supported in Developing Peer Support Teams
- 24 Basic Crisis Intervention/Stress Management Peer Team Trained
- 18 King County EMS-CISM Team Volunteers

For more information, please visit: <http://www.kingcounty.gov/healthservices/health/ems/community/cism.aspx>

EMERGENCY MEDICAL DISPATCH

OVERVIEW: Dispatchers play a vital link in the EMS continual “Chain of Survival”, as the first point of contact with the public. They are trained by the EMS Division in Criteria Based Dispatch, which uses specific medical criteria, based on signs and symptoms, to send the proper level of care with the proper urgency. This allows patients with critical medical conditions to receive an ALS response, and those with less critical conditions to receive either a BLS response, or a transfer to the telephone nurse-line. Dispatchers also provide pre-arrival instructions for most medical emergencies, and guide the caller through life-saving steps – including Dispatcher-Assisted Cardiopulmonary Resuscitation and Automated External Defibrillator instructions – until the Medic One/EMS provider arrives.

PROGRAM INDEX

- | | |
|---|---|
| 1. Criteria Based Dispatch (CBD) Training | 3. Emergency Medical Dispatch (EMD) Quality Improvement (QI) Program (HIGHLIGHT p.36) |
| 2. CBD Continuing Education | 4. EMD Awards (HIGHLIGHT p.37) |

1. Criteria Based Dispatch (CBD) Training

The EMS Division oversees the basic training of dispatchers from four communication centers. The teaching is participant-centered with simulation exercises and enhanced scenario-driven content. The 32-hour Basic Course content focuses on body system pathology (pathophysiology), signs and symptoms of 26 chief complaints, and pre-arrival instructions, including all emergency instructions and identifying and treating sudden cardiac arrest.

2. CBD Continuing Education

King County dispatchers must complete eight hours of Continuing Medical Education to remain informed on system-wide trends and new emerging medical standards of patient care. At least half of these credits can be obtained via EMS Online, which is a web-based format accessible 24 hours a day right from dispatcher consoles. The EMS Online training is supplemented with in-classroom instruction which allows students to ask questions and apply what was learned online to specific

scenarios and guided group discussions.

The EMS Division is constantly raising the bar in dispatcher medical education by developing even more challenging online courses, and through constructing more complex scenarios. In 2010, the EMS Division developed two new EMS Online modules for Shock and Respiratory Emergencies. Its EMD Stroke module was updated with current guidelines and standards as recommended by the Washington State Department of Health EMS & Trauma Division. Used by the Northwest Regional Stroke Network, this updated module provided training for approximately 500 dispatchers in five Northwest states, generating \$10,000 in EMS Online revenue.

3. EMD Quality Improvement (QI) Program - [HIGHLIGHT p.36](#)

4. EMD Awards - [HIGHLIGHT p.37](#)

PROGRAM HIGHLIGHT

3. EMD Quality Improvement (QI) Program

Background: The Quality Improvement (QI) program allows the EMS Division to identify issues and systemwide trends that are used to develop courses for continuing education and individual feedback. By reviewing call audio and records, the EMS Division can give individual dispatchers feedback and specific training, ensuring excellent patient care, better management of ALS resources, and limited future risks.

Purpose: Quality Improvement (QI) is a key component for continuously improving the essential pre-hospital care that emergency medical dispatchers provide. Goals include reinforcing the dispatch of appropriate levels of EMS response, and enhancing EMD program and training with consistent case/audio review among King County dispatch agencies. Results are used to evaluate the quality and impact of the EMD training, and the consistency and appropriateness of the application of the CBD Guidelines. It also allows for an opportunity to conduct QI in key areas and conduct systemwide review in areas where there is suspected over-utilization of ALS resources.

Description: The EMS Division administers a regional, countywide emergency medical dispatch program, requiring coordination with four emergency dispatch centers, 29 fire departments providing BLS services (excluding Seattle), and four paramedic provider groups providing ALS services. The EMS Division oversees the development and revision of medically approved Criteria Based Dispatch Guidelines. These Guidelines determine the level of care ((ALS, BLS, or TRP/ Nurseline) that is provided to the patient.

Quality Improvement for Emergency Medical Dispatch consists of the following:

- 1) Individual case (audio) review of all cardiac arrests (excluding trauma-induced and arrests after arrival): Case review evaluates Dispatcher-Assisted CPR performance and gathers pertinent data for cardiac arrest and non-cardiac arrest patients. Call-receivers receive feedback on every reviewed cardiac arrest case. In 2010, 802 cardiac arrest cases (95% of all cardiac arrests in King County) and audios were reviewed and documented. The feedback from the case review allowed the EMS Division to improve recognition of agonal respirations, and decrease the time from call answer to delivery of emergency CPR instructions.
- 2) Random or selected review of EMD cases/audios: The EMS Division reviews and documents audios, eCBD tool data and CAD event reports, and provides a monthly data summary to the appropriate communications center. Feedback is also used by the EMS Division for inclusion in EMD training curriculum and CBD Guidelines revisions. The review of 1,390 audios in 2010 revealed an increase in ALS cancelled calls (and an unnecessary use of ALS resources). The EMS Division provided individual feedback on 25% of all audios reviewed and used this information during the most recent CBD Guideline revision process. The revised CBD Guidelines were published July 1, 2010. The proportion of all cancelled alarms to total ALS responses changed from 28.4% during the first 6 month period of 2010 to 26.6% during the second 6 month period of 2010. This represents a potential improvement in the appropriate use of ALS resources.

Evaluation: The EMS Division EMD Program Administrator, along with our ALS, BLS and 9-1-1 Communication Centers partners, consistently evaluate the Quality Improvement program using aggregate reports and continuous involvement of the Dispatch Review Committee.

PROGRAM HIGHLIGHT

4. EMD Awards

The EMS Division is honored to recognize the outstanding and critical work of its partners, the 9-1-1 emergency medical call-receivers and dispatchers in King County. The 2011 award recipients are Roky Louie and Josh Baker from NORCOM, and Alison Barlow and Melissa Johnson from Valley Communications. Mr. Louie and Ms. Barlow received their awards for sustained exemplary performance throughout the year. Mr. Baker and Ms. Johnson received their awards for exemplary handling of a critical Emergency Medical Services incident. Mr. Baker received his award for his immediate identification of a patient in cardiac arrest and his prompt and efficient delivery of Dispatcher-Assisted CPR instructions. Ms. Johnson received her award for her quick response to a baby who was not breathing.



Alison Barlow (left) and Melissa Johnson (right)

Valley Communications

Alison Barlow

Sustained Exemplary Award for
Performance in 2010

Melissa Johnson

Exemplary Handling of a
Critical Emergency Medical Services
Incident Award

NORCOM

Roky Louie

Sustained Exemplary Award for
Performance in 2010

Josh Baker

Exemplary Handling of a
Critical Emergency Medical Services
Incident Award



Roky Louie (left) and Josh Baker (right)

EMERGENCY MEDICAL DISPATCH, continued

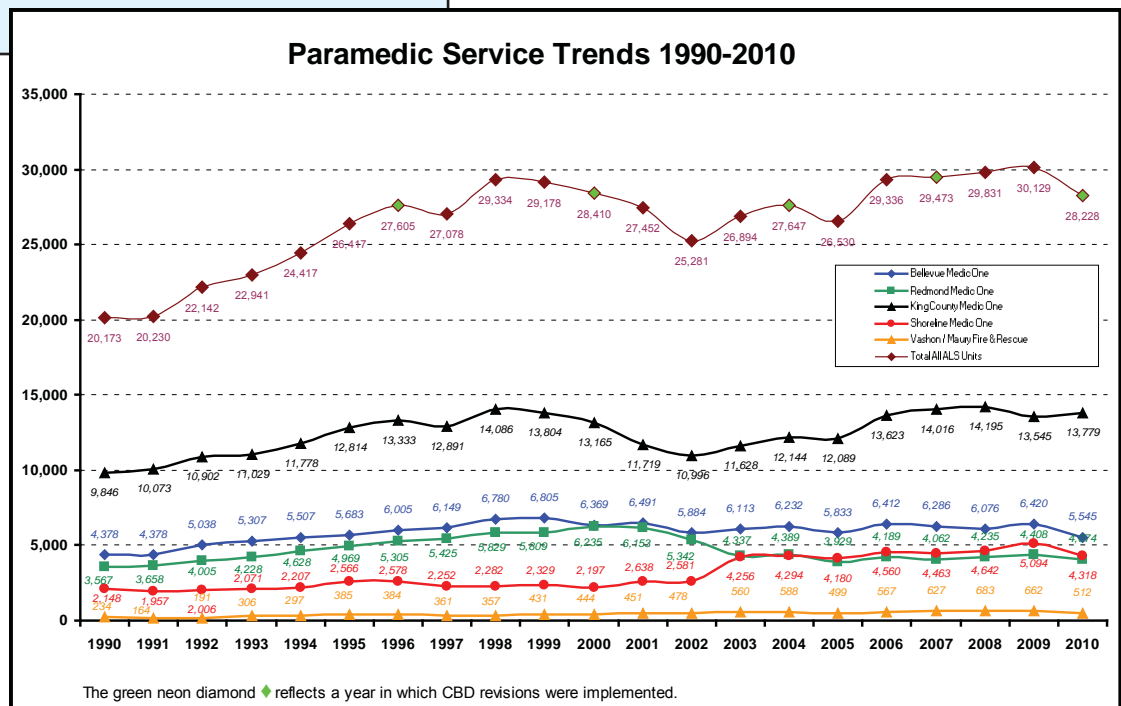
5. Revision of Criteria Based Dispatch (CBD)

Guidelines Revisions

Dispatchers at the four communications centers follow CBD Guidelines to accurately determine the level of care required by patients. Every three years, the EMS Division reviews these Guidelines to identify potential areas for revision that could safely limit the frequency with which ALS is dispatched. This data driven process includes a review of call volume, cancelled alarms, and requests for ALS from BLS crews at the scene. The ultimate objective of these revisions is to provide the most appropriate response for the patient.

The CBD Guidelines, which have been modified five times since the EMD Program began in 1990, were recently revised in July 2010. An analysis of King County paramedic service trends from 1990 – 2010 (see graph below) demonstrates a noteworthy stabilization of ALS call volume over a 12 year period from 1998 to 2010. The ALS call volume dropped in 2010 to 28,123 calls, a reduction of 2,000 ALS calls in one year, in all probability due to the 2010 CBD revisions. This 2010 total brings the ALS call volume to just over 500 calls higher than the levels recorded in 1996 (27,605). The EMS Division estimates a reduction of approximately 10,683 calls over the 12 year span of 1998-2010, resulting in total ALS cost avoidance of \$74,279,770.

King County's innovative approach to managing demand for services has garnered much attention and acclaim across Washington state, sparking fire agencies outside the region to request EMS's assistance in developing similar initiatives in their communities. As such, the EMS Division will collaborate with skilled nursing facilities, fire departments and the state with the goal of quality appropriate patient care.





KING COUNTY'S EMS DISPATCH GUIDELINES ARE IN DEMAND

- EMS has been licensing CBD Guidelines for 20 years and has 15 agreements currently in place.
- In the 90's, Norway, Sweden and the Associated Public Safety Communications Officers modeled their dispatch guidelines around Criteria Based Dispatch (CBD).
- Nearly half of the counties in Washington use the CBD Guidelines.
- The State of Montana Department of Public Health and Human Services licensed the use of the Guidelines in June 2011, which is the EMS Division's first state-wide agreement.



EMERGENCY MEDICAL DISPATCH, continued

6. Nursing Home/Adult Care/General Medical Clinic Facilities

The EMS Division developed a program with regional ALS providers to educate nursing homes and adult care facilities personnel about the appropriate use of EMS services. The training includes a presentation that explains how the EMS tiered response system works, how the most appropriate level of EMS response for the patient is decided, and prepares staff about what to expect during the 9-1-1 call. A job aid card prompts staff with specific information to be provided to the dispatcher when calling 9-1-1.

This year, EMS developed a more collaborative strategy for working with skilled nursing facilities to enhance the program's effects. This new plan brings together the administration of the specific facility, the EMS Instructor and/or Program Administrator and the corresponding Fire Department to work on the issues specific to that facility. Performance measures subsequently assess whether the contacts, meetings and trainings provided to facility staff were beneficial and met the groups' objectives.

The other aspect of this new strategy includes the services of an EMD Instructor as the contact liaison between Washington State DSHS Residential Care Services, all King County Fire Departments and individual skilled nursing facilities. This role provides a link vital to overcoming communication barriers, providing additional training and addressing unique individual circumstances as they arise.



EMTs evaluate a patient

2011
FACTS*

- 4 dispatch agencies in King County
- 210 dispatchers in King County
- 35 dispatchers completed Basic EMD Training
- 182 dispatchers were provided 8 hours of CME each
- 2,192 cases reviewed for quality improvement
 - this includes over 800 cardiac arrest calls

*excluding the City of Seattle

INJURY PREVENTION

OVERVIEW: *Injury is the leading cause of death for those under 45 years of age, while for the elderly, falls account for many hospitalizations. The EMS Division has invested considerable time and effort into building long term relationships with fire departments, community agencies and organizations that work toward the common goals of reducing injury and death through injury prevention and public education programs.*

PROGRAM INDEX

PROGRAM INDEX

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| 1. Child Passenger Safety & Used Car Seat Program | 3. Smart Kids Safe Kids |
| 2. Think Again | 4. Distracted Driving Project |

1. EMS Child Passenger Safety Program

Placing children in car seats that are size and age appropriate can reduce serious and fatal injuries by more than 50%, but only if properly installed and used. Through the Child Passenger Safety Program, Community Health Workers trained as certified car seat technicians provide free car seats and installation assistance to low income pregnant mothers at nine Public Health Centers. The program assisted more than 165 clients in the first five months of 2011, but anticipates a 30% decline in clients through the rest of the year due

to the cuts made to the First Steps program in the state budget.

2. Think Again The EMS Division no longer provides this program. For more information, please see the EMS 2010 Annual Report.

3. Smart Kids Safe Kids The EMS Division no longer provides this program. For more information, please see the EMS 2010 Annual Report.



EFFICIENCIES

The Child Passenger Safety (CPS) program is a result of a successful collaboration between EMS and the Community Health Services Division of Public Health – Seattle & King County. The program trains Community Health Workers (CHWs) already working with Maternity Support Services clients to also be child passenger safety technicians and provide car seat installation assistance. This creates a larger pool of specialists and helps the EMS Division better meet program demands. When the program started in 2004, only two EMS CPS technicians provided the program to four Public Health centers. There are now 12 CHWs trained as CPS technicians, affording EMS the opportunity to expand the program to nine Centers and better serve the community. Over the past year, CHWs educated over 270 MSS clients on proper car seat/infant fitting and provided car seats, if requested, generating over \$50,000 in revenue.

INJURY PREVENTION, continued

4. **Distracted Driving Project** Distracted driving is the “new” Driving Under the Influence (DUI), a public health crisis that is growing in scale every day. Drivers who use hand-held devices are four times as likely to get into crashes serious enough to injure themselves. With cell phone use and texting becoming the communications channel of choice among the “under 20 age group,” these drivers have been identified as the largest problem group among those causing distracted driving crashes. Left unchecked, the crash and injury potential caused by texting and driving and cell phone use threatens to undermine all progress made since the early 1980’s to promote seat belt use and battle DUI.

The EMS Division has joined forces with a conglomeration of public and private entities to educate high school students about the dangers of texting while driving. Slated to run from September through December 2011, this campaign will provide various opportunities for teens to develop messages through story ideas and video that will later be aired on KISS and KUBE radio and their websites. This program is possible thanks to the partnerships of State Farm Insurance, University of Washington Medical Center, Harborview Injury Prevention and Research Center, Washington Traffic Safety Commission, King County Fire and Life Safety Association, high schools throughout King County, and Clear Channel Radio.



ADMINISTRATION

The EMS Administration Section provides financial and administrative leadership and support to both internal and external customers. It actively engages with regional partners to implement the EMS Strategic Plans, uses best practice in the financial management of EMS levy funds, participates in countywide business improvement processes, and ensures the continuity of business in collaboration with EMS stakeholders.

The Administration Section is committed to ensuring integrity and transparency of the EMS system. Through considerable coordination and communication with EMS stakeholders, the section manages divisional and regional services in the following areas:

- Personnel
- Payroll
- Union negotiations
- Diversity management
- Mandatory training
- Implementation and management of policies and procedures
- Compliance and liability
- Contract administration and oversight
- Planning the Medic One/EMS levy
- Managing levy funds
- Budget preparation and management, including monthly monitoring and projections,
- Long term financial planning

- Overseeing the annual EMS audit
- Planning and management of levy funds
- Regional purchasing
- Strategic Initiatives
- Disaster preparedness and planning

The Administration Section reviews all divisional contracts, including those with five Advanced Life Support (ALS) provider groups, and 30 Basic Life Support (BLS) agencies. It coordinates services with other Public Health - Seattle & King County divisions, as well as other county agencies, councils and offices, including the King County Executive, Prosecuting Attorney, Risk Management, and the King County Council.

Rooted within Administration are the sections that supply integrated regional direction. Collaborating with county partners, the EMS Division provides quality data and planning, medical oversight, basic life support training, community training and education, and research. These dedicated professionals have a nationwide reputation for providing excellent service to the residents and visitors of King County.

2010 KING COUNTY AUDIT

Part of the 2007 Medic One/EMS levy approval package directs the King County Auditor's office to conduct an annual review of the EMS funds. 2010 was the second year of assessing whether the Division's financial operations were managed in accordance with the Council-adopted levy policies and financial plan. New to this year's audit was the review of EMS Strategic Initiatives to

determine whether the initiatives resulted in efficiencies and cost savings.

Like the 2009 Audit, the results were positive. The Auditor concluded that the EMS fund was managed consistent with the financial policies, and that the Strategic Initiatives were achieving the EMS objectives of improving patient care, managing the rate of growth on the system, and containing costs. The Auditor identified

a way to strengthen internal controls to increase the accuracy of financial reporting, and proposed using a different vehicle price index that might better forecast future ALS vehicle costs. It was proposed that additional performance measures, project milestones and targets be developed to more conclusively identify and determine the efficiencies that Strategic Initiatives provide the EMS system, and that the EMS Division consider benchmarking when developing future Strategic Initiatives. Finally, the Auditor recommended that the EMS

Division conduct an ALS vehicle

life cycle cost analysis, and use these results, along with remounting, to optimize vehicle replacement cycles and lower costs. For information on this Strategic Initiative, please see p.74.



The EMS Division is located in the Chinook Building in downtown Seattle.

PERFORMANCE MEASURES

The results of the audit gave the EMS Division the opportunity to review Strategic Initiative performance objectives, criteria, and outcomes. Since the conclusion of the Audit, all King County EMS program managers attended a program evaluation and performance measure training. Led by a faculty member at the University of

ADMINISTRATION, continued

Washington, the training reviewed critical components of a successful evaluation process, from program theories, goals and objectives to creating valid measures and conducting the evaluation. Subsequent workshops were scheduled to walk managers through assessing current measures and developing supplemental measures. The results of the training and renewed focus on objectives and measures are reflected in the individual Strategic Initiatives narratives beginning on p.49 of this report.

BENCHMARKING

The EMS Division made it a priority in 2011 to assess the feasibility of cross-systems benchmarking. As key interviews and a literature review revealed challenges to criteria standardization and limited national or cross-systems databases, the EMS Division changed its scope of study. After developing a qualitative tool for profiles and comparisons, the Division began a review of peer systems to provide important insights on administrative and funding differences, as well as begin a discussion about the most efficient use of resources in resource-scare times. This evaluation will be completed in late 2011.

Past & Future King County Audits:

2009 AUDIT

The 2009 King County Auditor's Report recommended clarifying EMS fiscal policies and making EMS system costs more transparent. In response to that finding, the region conducted an intensive review of paramedic funding, which has resulted in the development of many specific financial policies and procedures. While conducting this review, it became apparent that documenting both new and existing EMS Division system and financial policies and procedures would be of great benefit to the region. As a result, the EMS Division has been engaged in working with regional partners to draft policies and procedures that document practices as authorized under the Revised Code of Washington and King County Code.

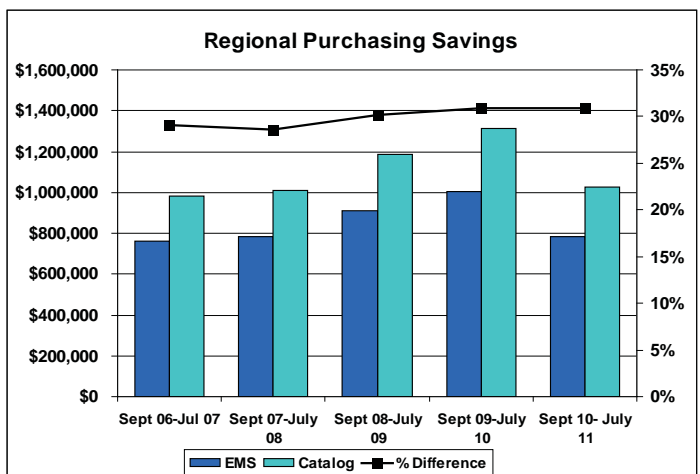
2011 AUDIT

The 2011 audit is nearing completion and will be submitted to the King County Council in September 2011.

REGIONAL PURCHASING PROGRAM

Since its development in 1998, the Regional Purchasing program has consistently provided cost savings to EMS agencies. The program relies upon interagency purchasing agreements that allow any EMS agency in King County to purchase EMS supplies, equipment and medication using the regional contract.

Opportunities for expansion exist, which will require the region to work collaboratively to take advantage of other intergovernmental contracts that already exist. Examples include vehicle purchasing, defibrillators, and pharmaceutical safes. Using such agreements will avoid the duplication of time and effort spent when individual agencies must go out to bid for the same items. The program also ensures that goods and services can be purchased at the same price during the term specified in the bid.



As reflected in the graph above, data comparing actual costs to catalog prices confirm the consistent cost savings to the region over the past five years.

KING COUNTY MEDIC ONE PROGRAM

OVERVIEW: *King County Medic One (KCM1) is one of the six Advanced Life Support (ALS) providers in the regional EMS system. It serves approximately 450 square miles of south King County, an area with a population now close to 690,000 persons. In calendar year 2010, KCM1 responded to 13,779 calls for this advanced care. These calls involved all types of circumstances and patients such as pediatric patients, mass casualty motor vehicle crashes, and cardiac emergencies.*

KCM1 works as part of a coordinated system of effective emergency care that includes 9-1-1 emergency dispatch, basic life support care by fire departments, advanced life support care by KCM1, and hospital-based care. KCM1's 70 paramedics work side-by-side with local fire department personnel to provide the highest-quality, cost-effective emergency medical care to those in need, 24 hours a day, every day of the year. To help achieve this effective and coordinated care approach, paramedic units co-locate with fire stations when possible, which promotes a team atmosphere. This cost-effective strategy also eliminates the need for additional facilities. Physicians provide medical oversight for clinical care decisions and actively participate in strategic planning decisions that guide the KCM1 organization. The "medical model" that incorporates a tiered response strategy achieves the best-trained, most-experienced paramedic providers, who in turn serve as a critical and integral component of emergency care in King County. This system of care practiced throughout King County consistently achieves the highest benchmarks of EMS care and is recognized worldwide.

PROGRAM INDEX

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| 1. King County Medic One Medical Direction | 3. Medic Unit Relocations |
| 2. Training | 4. Operations, Preparedness, and Safety |
| a. Initial Training | 5. Administration |
| b. Continuing Education | 6. Cost Structure |

1. King County Medic One Medical Direction

The Medical Program Director for KCM1 is Dr. Tom Rea, who is assisted by four Associate Medical Directors assigned to each shift to assist the Medical Program Director with quality review, guidance for procedures, new equipment and training needs for the program. Quality assurance activities undertaken include systematic review of specific medical conditions or critical procedures, or case-based review and feedback. Assessments

have demonstrated proficient care, and underscore the importance of the fundamental approach of these clinical guidelines that require proactive paramedic implementation and involvement.

2. Training

a. Initial Training

The 10-month Initial Paramedic Training program, provided by the University of Washington/Harborview

KING COUNTY MEDIC ONE PROGRAM, continued

Medical Center, is the most comprehensive and intensive program in the nation. This rigorous training fully integrates classroom experience with field care, providing an unparalleled clinical education.

b. Continuing Education

Every year, paramedics must complete over 50 hours of continuing education training that covers a broad range in topics and format:

- Harborview Medical Center Tuesday Series convenes regional and national experts to lead monthly three-hour educational seminars.

- Grand Rounds Training provides ongoing training to review critical paramedic skills and important clinical scenarios. The training emphasizes manipulative skills and critical thinking, although operational updates, equipment changes and safety awareness training are also included.

- Medication of the Month (MoM) has paramedics reviewing their knowledge about medications they encounter in the course of care.

- Medical Updates and Physician Meetings are held quarterly when KCM1 Medical Directors meet with paramedics to review specific medical cases. Paramedics receive feedback on patient admitting diagnosis, in-hospital care, and final disposition. The Medical Directors also organize twice-yearly meetings that discuss specific topics or projects pertinent to KCM1.

- Paramedic Case-of-the-Month highlights specific teaching points or clinical challenges based on actual cases.

3. EMS Medic Unit Locations

The EMS Division continues its relocation review on a regular basis to ensure residents are provided a timely medic unit response. Partner cities are included in the review to assure their future growth and special needs are considered.

4. Operations, Preparedness and Safety

KCM1 medics began using the [Physio Control Lifepak 15](#) which is the new standard in emergency ALS care and the most clinically and operationally innovative monitor/defibrillator available to date. The device helps medics detect hard-to-diagnose conditions, gives quality CPR guidance to help save more lives, and provides the most potent escalating energy available for defibrillating the difficult-to-defibrillate patients. Its ability to connect and share patient data among multiple patient care teams in the region will benefit conditions for which expedited data distribution is critical, such as STEMI patients.

Investments in innovation will help KCM1 to reach its goals of better patient outcomes.

In the first quarter of 2011, KCM1 received training on a new data management program for managing and tracking training records called [Fire Trex](#). Easy to use, this program will allow KCM1 personnel to review scheduled training, training documents, links, and other training division resources, simplifying

access to training records.

KCM1 participated in drills that tested its preparedness capabilities and how well it works in conjunction with neighboring agencies under various stressful situations when coordination is paramount.



A stretcher is ready for patient transport



Medic 5 serves the community of Renton.

The UW Hospital Evacuation Drill assessed the ability of the region's hospitals to properly triage and distribute a large volume of patients to other appropriate area facilities. The drill underscored the importance of concise directions from the hospital to the receiving facilities, as well as thorough understanding and agreement about where such patients would be transferred. KCM1 is working with its regional partners to develop protocols to address geographical logistics should such an event occur.

A July 2011 Mass Casualty Incident Drill at SeaTac Airport demonstrated that KCM1, its regional partners and Pierce County EMS are fully prepared and capable to respond an airport disaster, such as a plane crash or explosion. The drill simulated the detonation of a bomb on a plane resting on the tarmac, and required moving 132 "patients" into a "hospital" at Boeing Field. Through this joint effort, all 132 patients were successfully transferred in one hour and 15 minutes, an exemplary improvement in proficiency from past drills.

The MCI Drill was an excellent opportunity for KCM1 to pilot the recently revised County-wide Mass Casualty Incident Plan. The edited Plan eliminated the more technical and complex aspects that focused on very specific incidents, and instead based it on those actions and activities that EMS personnel conduct daily, simplifying the process. KCM1 and its partners successfully executive this revised plan, as the commendable results show.

The Active Shooter Drill, implemented with the King County SWAT team, tested public safety's ability to respond quickly to injured citizens or officers during such an event. Staged alongside King County Sheriff Office personnel, paramedics were present to tend to patients if any casualties ensued. This was the first of such type of drill conducted, and more will be held in the near future.

KCM1 was well prepared for the November 2010 snow storm that took the area by surprise. Planning entailed placing another medic unit in service to accommodate any increase in calls, along with moving the locations of medic units to avoid areas where access was difficult when en route to a call.

Potential flooding in the Green River Valley was a reality for which KCM1 was standing ready. Routes through the Valley would no longer be available to units, requiring KCM1 to reconfigure unit placement and routes to ensure it could still respond to and reach patients. Medics offered training and preparedness workshops to the communities threatened by high water, and also received specialized swift-water rescue training to ensure their own personal safety when confronted with strong currents.

KING COUNTY MEDIC ONE PROGRAM, continued

5. Administration

KCM1 Administration supports its 70 employees and 10 medic unit locations. Administrative responsibilities include managing the hundreds of vendor and venue contracts required to support the operations 24 hours a day/7 days a week, financial management of payroll, procurement of supplies, and records management. KCM1 is the lead contract agency responsible for both the Regional Medical supplies/equipment, and medications purchasing contracts (see p.44 for more details).

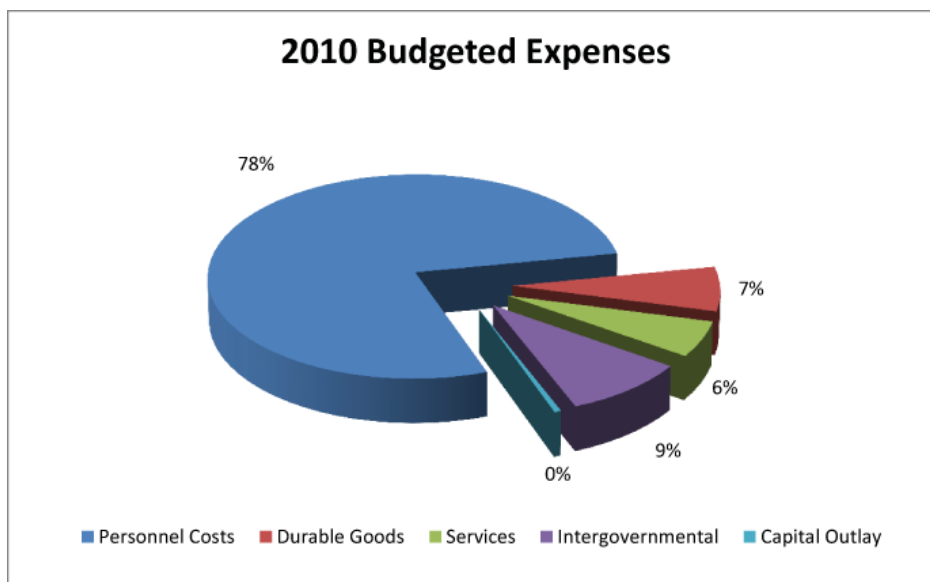
6. Cost Structure

The chart below identifies the various cost categories for KCM1 2010 budgeted expenses.



On May 8, 2010, Firefighter and EMT units were dispatched to a shortness of breath call. King County Medics Hannah Dummer and Matthew Riesenbergh, arrived on scene and immediately offered to help in ways that were well above and beyond the normal call of duty. Hannah and Matt were very considerate throughout the call, functioning seamlessly as members of our team. They took time finding ways they could help, and looked out for the well being of the firefighters as well as the patient. They truly embody what a medic should be: mentor, leader, team member, and most of all, teacher.

~ Matthew Kinnee, Firefighter - Station 31,
Valley Regional Fire Authority

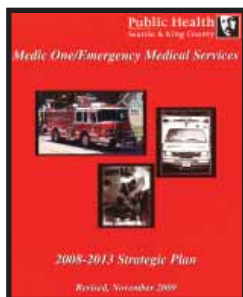


For more information on KCM1, visit: <http://www.kingcounty.gov/healthservices/health/ems/MedicOne.aspx>

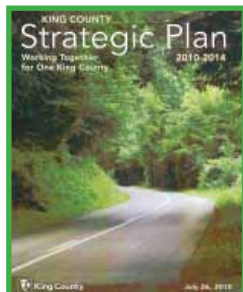
2008-2013 STRATEGIC INITIATIVES

The Medic One/EMS 2008-2013 Strategic Plan contains specific Strategic Initiative projects designed to improve EMS services, manage growth in paramedic services, and contain costs. The following section describes the Strategic Initiatives currently underway, and includes a renewed emphasis on performance measures and objectives, as recommended through the 2010 Audit. Also highlighted is how the Strategic Initiatives align with the EMS 2008-2103 Strategic Plan goals of system efficiencies, and support the King County Strategic Plan 2010-2014.

Strategic Initiatives
Emergency Medical Dispatch Enhancements
- Complete CAD Integration
- Dispatch Center Performance Standards
- Advanced EMD Training
- Better Management of Non-Emergency Calls to 9-1-1
Injury Prevention - Fall Prevention
- Community Awareness Campaign
- Small Grants Program for BLS Agencies
- Expanded Countywide Falls Program
- Grant and Other Funding Opportunities
Public Access Defibrillation Campaign
Interactive Enhancements to EMS Online
Systemwide Enhanced Network Design (SEND)
All Hazards Management Preparation
EMS Efficiencies & Evaluation Studies
Strategic Planning for Next EMS Levy Period



The Medic One/EMS 2008-2013 Strategic Plan defines the roles, responsibilities and programs for the system, and a levy rate to funds these approved functions. Innovative projects like Strategic initiatives have resulted in system effectiveness, allowing King County EMS to meet the needs and expectations of its residents and system.



The King County Strategic Plan provides overall county strategies and objectives for all services provided by the County. This framework is used for making policy decisions within King County and is a primary document for communicating with the public. It is important that EMS's own Strategic Plan, and thereby the services that EMS provides, aligns with the King County Strategic Plan and the direction the County is heading.

STRATEGIC INITIATIVES, continued

SI: Dispatch Enhancements

The following four Strategic Initiatives are dispatch projects currently in progress.

1. Criteria Based Dispatch (CBD)/Computer Aided Dispatch (CAD) Integration

Background

9-1-1 dispatchers in King County use the medically approved triage tool called CBD Guidelines to determine the appropriate level of EMS response to send. In 2006, the EMS Division developed software for the Criteria Based Dispatch Guidelines (eCBD) that Northeast King County Regional Communications Center (NORCOM), Enumclaw Police Department and Port of Seattle Airport Operations currently use. The workload demands for quick and efficient call processing at the large 9-1-1 centers in King County required an interface between eCBD and the centers' Computer Aided Dispatch (CAD) programs. All phases of this project have been approved by the King County IT Governance Project Review Board.

Description

The current phase of the project focuses on the eCBD/CAD Interface for New World Systems CAD at NORCOM. The EMS Division developed a business partnership with NORCOM/New World Systems CAD Project Team to develop an interface that provides a bi-directional communication pathway between eCBD and CAD so that dispatchers do not have to enter information twice. This functional solution provides efficiencies in call processing and provides quality improvement data to the EMS Division. Project tasks also included organizing a Dispatch User Group to ensure eCBD functionality is aligned with call processing and interface with the new CAD and training dispatchers. NORCOM processes approximately 43,650 EMS 9-1-1 calls annually using the eCBD software. The total annual EMS call volume for the communications center is 45,000. This phase also provided basic upgrades to the eCBD software.

Objectives

- Eighty percent of medical calls to 9-1-1 processed using the eCBD Tool within one year of implementation at a communications center;*
- Increased use of the eCBD Tool leads to more efficient call processing and enhanced data collection for QI activities; and
- Ninety percent of medical calls to 9-1-1 processed using the eCBD Tool within two years of implementation at a communications center.*

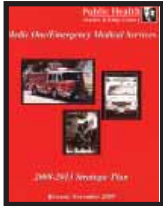
*Excludes certain 9-1-1 calls that are inappropriate for eCBD Tool use.

Results

This interface was fully developed and installed in a testing environment by March 2011. System testing and dispatcher training was completed by June 2011. The EMS 2010 Annual Report stated this project would be completed in June 2011. However, NORCOM delayed the CAD implementation until September. The project team was on task and on schedule to complete the project by June 2011, had the schedule not been revised. The percentage use of the Tri-Tech version eCBD Tool by NORCOM was 97% in June 2010.

Next Steps

Bug resolution and final testing will occur by August 2011, with implementation in late September 2011. The next phase of the project is intended to develop a CAD interface at Valley Communications Center.



The eCBD/CAD interface improves the quality of Medic One/EMS by enhancing efficient dispatching, meeting the EMS Strategic Plan Goal of efficiency.



This CBD Computer Aided Dispatch (CAD) Integration project supports the King County Strategic Plan by adopting new technologies and processes that allow agencies to work more effectively and efficiently (SE2b), improving local service delivery (SE1c), and supporting partnerships to deliver integrated and effective services to people in need (HHP4b).

2. Dispatch Center Performance Standards

Background

During the 2008-2013 EMS levy period, the EMS Division implemented methods to strengthen the recognition for the role of communication centers in managing growth of EMS resources and providing more efficient services. Proper data collection, training and quality improvement practices are essential to maximizing this function.

Description

In September 2008, the EMS Division convened EMS system representatives to develop criteria for communication center performance standards. Representation included the following:

- 1 ALS representative from each ALS provider (not including Seattle Medic 1);
- 1 BLS representative from Zone 1 and Zone 3;
- 1 (or more) representatives from each communication center;
- Regional Medical Program Director; and
- EMS Division representatives (Community Programs, Planning/Data).

Representatives established the following performance standards and compliance criteria for implementation in 2009 and the same standards were in effect for 2010 and 2011. While the EMS Division convenes the same group

STRATEGIC INITIATIVES, continued

of representatives in the third quarter of each year to review potential new standards for the following year, no new standards have yet been adopted.

Objectives

This project creates a list of performance standards for communication centers in King County, outside the City of Seattle, and specific measurable criteria that must be met for each standard. Funding is provided to meet these standards, including participation in required training, quality improvement activities and data collection.

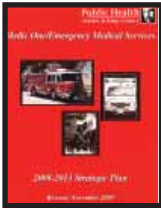
Performance Standards	Compliance Requirements
Use of CBD Guidelines Software (eCBD Tool) for Call Processing of EMS Calls	80% use of eCBD tool within 1 year of implementation
Training	100% Attendance at EMD Basic and Continuing Education courses, by all line employees/supervisors answering 9-1-1 calls
Data Completeness Standards	Incident address – 100% Initial Dispatch Codes - 98%
Data elements fully populated in CAD and downloaded to RMS	Alarm Time - 100% Aid/Medic Dispatch Times – 100% Geocode – 98%
Provide the EMS Division access to CAD reporting and audio recordings of 9-1-1 calls	100% access, unless technology or RCW restrictions apply (i.e. access to Police data)
Quality Improvement	Internal Communication Center QI Review of six EMS calls for each employee that answers 9-1-1 lines per calendar quarter

Results

Communication centers are evaluated quarterly for compliance with each standard. Performance standard funding is only available for compliance with all standards. No payment is made for partial compliance. In 2010, NORCOM, Valley Communications and Enumclaw Police Department complied with all of the standards. For the first quarter of 2011, NORCOM, Valley Communications and the Enumclaw Police Department have all met the standards.

Next Steps

In third quarter 2011, the EMS Division will reconvene the standards group to develop standards for 2012.



The Dispatch Performance Standards Initiative improves the quality of Medic One/EMS by providing accurate dispatch data, ensuring compliance with training requirements, and encouraging quality improvement case review, meeting the EMS Strategic Plan Goal of efficiency.



This Strategic Initiative supports the King County Strategic Plan by developing performance standards and compliance criteria to improve local service delivery (SE1c) and support partnerships to deliver integrated and effective services to people in need (HHP4b).

3. Emergency Medical Dispatch: Advanced Emergency Medical Dispatch (EMD) Training

Background

In this regional system, emergency medical dispatchers play a critical role in determining when paramedic units are sent, and a necessary role in referring minor, non-urgent calls to a nurse referral line. The EMS Division supports investing in the training and education of dispatchers to improve the effectiveness and efficiency of ALS dispatch and use of the nurse referral line, in support of our tiered response system.

Advanced Dispatch Training concepts include the following:

- The need to provide the dispatchers with opportunities to improve their understanding of cultural and language issues encountered in their daily operations;
- The desire to provide networking and more general exposure to public safety EMS issues;
- EMS/9-1-1 courses, training and conference opportunities that already exist; and
- Advanced training for more experienced emergency medical dispatchers and call-receivers.

Description

The EMS Division uses Strategic Initiative funding to reimburse dispatch agencies for the costs of sending emergency medical dispatchers (EMDs) to the following training courses (including salary and backfill):

ADVANCED EMD COURSE

Objective: Provide experienced EMS call-receivers and dispatchers with an opportunity to discuss advanced EMS topics to address the most current evidence-based pre-hospital treatments such as Dispatcher-Assisted CPR and other emergency pre-arrival instructions.

STRATEGIC INITIATIVES, continued

QI / FEEDBACK COURSE

Objective: Provide 9-1-1 center supervisors with guidance on developing and delivering EMD feedback to staff and dealing with Quality Improvement (QI) issues that arise; understand the QI/Feedback process that occurs at the regional level and understand the consequences of undelivered feedback.

BASIC EMD COURSE

Objective: Send dispatchers and call-receivers that have not been through the Basic EMD class in five years or more to complete the Basic class again. The focus of the course has changed drastically over the past few years and this will help those still operating with out of date material or misdirection from trainers.

CULTURAL COMPETENCE / CROSS CULTURAL COMMUNICATION COURSE

Objective: Help 9-1-1 personnel communicate more effectively with residents of diverse communities and provide them with a better understanding of the different cultures and barriers these residents may face when interacting with public safety.

EMS AND 9-1-1 CONFERENCES

Objective: Provide opportunities for 9-1-1 personnel to attend national, regional or local EMS and 9-1-1 conferences to obtain advanced continuing education for dispatchers and call-receivers.

AUDIT EMT BASIC COURSE

Objective: Dispatchers audit the didactic portions of the EMT basic course in order to give them additional knowledge of anatomy, physiology and disease process.

Objectives

This Strategic Initiative will provide dispatchers and call-receivers with additional learning opportunities in-line with improving performance of their job tasks, knowledge, skills and abilities. Specific objectives include:

- At least 15% of King County Emergency Medical Dispatchers will take advantage of at least one Advanced EMD course annually;
- A minimum of 90% of all course attendees will report via survey that the attended course will assist them in their duties as an Emergency Medical Dispatcher; and
- The EMS Division will offer a minimum of eight Advanced EMD Courses annually;

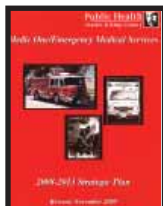
Results

Appropriate use of ALS resources is dependent on the knowledge, skills, abilities and experience of the EMDs. The efficacy of the Advanced Training courses is evaluated through the EMS Division's extensive continuous quality improvement process and by surveying the participants, trainers, supervisors and EMS Coordinator.

In 2010, nine dispatchers attended the Advanced EMD course, seven dispatchers attended the didactic portion of the Basic EMT class, and three dispatchers attended the National Association of Public-Safety Communications Officials (APCO) Conference in Houston, Texas. Six dispatchers attended the Washington State APCO Conference and four attended a two-day “Undoing Institutionalized Racism” workshop in Seattle. The percentage attendance for 2010 was 14% of all dispatchers in King County (210 dispatchers). Surveys of course attendees were not implemented in 2010 but will be implemented in 2011-2013.

Next Steps

To more clearly evaluate Advanced EMD courses King County, the EMS Division will develop more course-specific evaluation tools designed to measure how the training has improved performance and whether that improvement was sustained. Evaluations will include a variety of methods both pre and post training such as survey and focus interviews with the participants and the supervisors or Quality Improvement Coordinators.



Providing dispatchers and call-receivers with opportunities to improve their job knowledge and abilities assures more appropriate care will be sent, resulting in better EMS system effectiveness, improved quality of pre-hospital care in the delivery of appropriate pre-arrival instructions, and helps manage the rate of growth with the appropriate use of ALS resources and nurse line referral.



The Advanced EMD Training Strategic Initiative supports the King County Strategic Plan with courses that provide the dispatchers and call-receivers with the tools to deliver culturally and linguistically appropriate services (SE 4.a), establish accountability (SE 2.c), improve local service delivery (SE 1.c), and implement policies and interventions to reduce health disparities (Hhp1.d).

STRATEGIC INITIATIVES, continued

4. Better management of non-emergency calls to 9-1-1 (three programs)

Background

Managing the rate of call growth in the EMS system is a regional priority and has been an ongoing focus throughout the past three levy periods. Unmanaged growth can negatively impact fire department response times, performance standard achievement, and quality of patient care. While the EMS Division has effectively managed growth in ALS responses over the past twelve years, growth in BLS responses averaged 2.8% per year from 2000 through 2008.

Some EMS responses do not require a rapid response by BLS units, and in some cases, a response is provided because no lower level of medical aid is available in the EMS system. Recognizing potential strategies for serving non-emergency patients and callers, the EMS Division undertook the following Strategic Initiatives as alternatives to dispatching a BLS unit. Due in part to these projects, the average BLS call growth for 2009 and 2010 has been curtailed to 0.3%.

A. Telephone Referral Program/Nurseline

Background

Early in this levy period, the Telephone Referral Program (TRP), also known as Nurseline, was identified as a program with untapped potential to help manage BLS call growth. In 2007, 700 patients were transferred from 9-1-1 communication centers to the TRP, a level that is well below 1% of BLS responses. Additionally, hundreds of calls each month identified as meeting TRP criteria were dispatched to engines and aid units instead of being transferred to the Nurseline. Because the units were handling these low-acuity patients, they were potentially not available or out of position for higher acuity medical incidents and fire calls.

Project

In November 2008, the EMS Division initiated a six-month Enhanced Rapid Dispatch (ERD) pilot which included improvements in Nurseline call processing and TRP continuing education modules for 9-1-1 dispatch staff at Valley Communications and NORCOM.

Objectives

- Maintain combined TRP transfer rate of 1.50% of total BLS calls;
- Maintain "Sendback" rate of $\leq 10\%$ ("Sendbacks" are patients transferred back to 9-1-1 center for BLS or higher response); and
- Maintain $\geq 50\%$ transfer rate for calls coded with TRP Initial Dispatch Codes (T-IDC Nurseline criteria).

Results

This project resulted in significant improvement.

- A total of 1,867 patients were referred to Nurseline in 2009 and 1,759 in 2010. This is an increase of 151% over the past 3 years;
- Valley Communications (south King County), utilizing new ERD procedures, increased its rate of transfers in 2010 to 2.19% of BLS calls, a 242% increase compared to the 0.64% rate in 2007;

- NORCOM (North King County) increased its rate of transfers to 0.89%% of BLS calls, a 25% increase since 2007; and
- Service improvements were incorporated at the Nurseline and focused training was provided to 9-1-1 center personnel.

Each referral improves the efficiency of EMS delivery in King County, providing the right level of response to each patient at the right time.

Next Steps

Incorporate ERD at NORCOM to increase the rate of appropriate transfers to the Nurseline.

B. Community Medical Technician (CMT)

Background

As BLS responses have continued to increase since 2000, nearly 1/3 of the responses are for lower acuity calls that are non-emergent and do not require transport for follow-up treatment, but still need the care of an EMT at the scene. Yet the primary BLS response unit for most fire departments is a 2-EMT transport-capable unit, or costlier 3-EMT non-transport fire engines. Not only is this expensive in personnel and vehicle/apparatus costs, but it makes those units unavailable or delayed in response to patients with higher acuity, more emergent medical conditions, or to fire calls.

Description

This 2010 project was a combined effort of two Strategic Initiatives,

Better Management of Non-Emergency Calls (project staffing) and Efficiencies/Evaluation Studies (funding for CMT personnel). Kent Regional Fire Authority, South King Fire & Rescue, and Valley Communications took part. Sent on lower acuity calls in non-transport capable Sport Utility Vehicles (SUVs), the CMT units were tasked with providing basic patient evaluation, patient assistance, specified BLS treatment at the scene, and arrangement for transport

if medically necessary. This helped reserve other BLS responders and transport-capable vehicles for more serious medical emergencies. The five-month project demonstrated a “proof of concept” model and promise as a response method that could provide long term EMS efficiencies in personnel costs, apparatus operating costs, deferred apparatus replacement costs, and better management of low-acuity EMS call growth; all while still providing appropriate BLS care and a high level of patient satisfaction.

Objectives: (CMT Phase I Pilot)

- Increase availability percentage for aid units and engines. A higher percentage means the units are available more often and can provide quicker response to cardiac arrest and high-acuity patients, as well as fire and related emergency calls. It can also defer the necessity for additional response units or response changes;



STRATEGIC INITIATIVES, continued

- Reduce the percentage of engine responses to BLS calls. A reduced percentage of BLS responses can allow quicker response times to fire calls, reduces apparatus mileages, and can defer apparatus maintenance and replacement expenses;
- Reduce the number of mutual aid responses into each fire district. Reduction in mutual aid responses reduces wear and tear on neighboring fire district apparatus as well as increases their “in service” availability time for calls in their own response areas;
- Reduce transportation percentage to EDs of low-acuity patients. Reduction in patient transports can increase “in service” availability time for units as well as help reduce the impact low-acuity patients place on overcrowded hospital emergency departments; and
- Provide patient satisfaction equal to or better than non-intervention patients. Confirm patients treated by EMTs in CMT units are satisfied with EMS response.

Results

Results were mixed and inconclusive for some objectives due to station staffing and mutual aid changes between Kent and South King Fire & Rescue (SKFR) that occurred during the project period:

- Availability of Kent units during CMT hours improved by .16% (96.17% to 96.33%) and by .70% (88.51% to 89.21%) in SKFR;
- Percentage of engine response to BLS calls dropped by 3.3% in SKFR and rose by 2.2% in Kent during CMT hours.
- Mutual aid responses into Kent decreased by 25.6% and increased by 11.3% in SKFR (results inconclusive due to mutual aid/staffing changes during the pilot.);
- Transport of low-acuity CMT patients decreased by an average of 4.0% in Kent and 2.6% in SKFR;
- 97.7% of patients were satisfied or very satisfied with the CMT response; and
- 79.6% of EMTs staffing the CMT support alternative response units in the future; 91.8%, depending on program specifics.

Next Steps

The “proof of concept” demonstrated by the CMT project and potential to provide increased BLS system efficiencies has led to planning for a second phase project to begin in late 2011. The new project will add a patient engagement component, allowing EMTs to refer patients with unmanaged medical or other needs to agencies and resources that can provide assistance, potentially reducing a patient’s reliance on 9-1-1 and EMS response. Several fire departments have expressed interest in participating in the project.

C. Taxi Transport Voucher (TTV) Project

Background

When a low-acuity patient treated by EMS requires follow-up non-emergent treatment, options for transport include the BLS unit at the scene, a private ambulance, or a privately operated vehicle. If the patient does not have access to private transportation or cannot wait for it to become available, the default option often becomes a BLS unit or private ambulance. BLS units transporting low-acuity patients are delayed or unavailable for other calls, and ambulance transport fees can be several hundred dollars with significant co-pays for patients. Although taxi transport is authorized

by EMT patient care protocols as an alternative transportation method, it is rarely used.

Description

This project, in progress since January 1, 2011, allows EMTs to provide pre-paid round trip taxi vouchers to patients with low-acuity transport needs. Redmond Fire and Renton Fire are participating, as is Evergreen Nurseline which operates a telephone nurse triage service for patients transferred from 9-1-1 communications centers. Project funding derives from two Strategic Initiatives, Better Management of Non-Emergency Calls (project staffing) and Efficiencies/Evaluation Studies (funding for 300 pre-paid round-trip vouchers).

Objectives

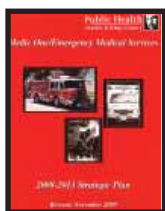
- For patients transported by taxi, reduce BLS unit time on-scene by five minutes;
- Reduce the number of “transport” sendbacks from Nurseline to 9-1-1 centers by 75%; and
- Decrease the private ambulance transport percentage for BLS low-acuity responses by 20%.

Results

This project is currently in progress and results are pending.

Next Steps

At the conclusion of the pilot period, the project will be evaluated to determine its effectiveness as well as the potential for a permanent program involving partnerships with EMS and other health care provider agencies.



By providing effective alternatives to standard approaches for BLS-level patient care, the projects comprising this Strategic Initiative address all three EMS Strategic Plan goals: improving the quality of Medic One/EMS, helping to contain costs, and helping to manage the rate of BLS call growth.



These projects help the EMS Division achieve close alignment with the King County Strategic Plan by supporting partnerships to deliver integrated and effective services to people in need (HHP4b); working with cities to identify opportunities to provide services more efficiently (FS1b); and implementing policies and interventions to reduce health disparities (HHP1d).

STRATEGIC INITIATIVES, continued

SI: Injury Prevention - Fall Prevention

Falls are the leading cause of injury deaths for adults 65 years and older – among this age group, there are more accidental deaths annually in King County due to falls than there are deaths due to motor vehicle accidents. Approximately 18% of EMS responses in King County are fall-related among persons 65 year and older, and in 2009, emergency departments treated 2.2 million nonfatal fall injuries among older adults, of which more than 581,000 required hospitalization.

By collaborating with various community and public organizations, the EMS Division administers three Strategic Initiatives to eliminate or reduce unintentional fall injuries through group exercise programs to seniors, fire department-based fall prevention programs, and providing home/patient intervention and educational programs.

The following three fall prevention Strategic Initiatives are currently underway.

1. Community Awareness SHAPE UP campaign

Background

The chances of falling and of being seriously injured in a fall increase with age. Falls among adults 65 and older are relatively common, produce considerable morbidity and mortality and have a high cost to society. Yet, they are potentially preventable. Exercise is the one intervention that, by itself, reduces fall risks among older adults. Activity programs that build strength help senior reduce their chances of experiencing a fall.

Description

Shape Up enrolls seniors (50+ in years) in physical activity programs at eight regional community/senior centers. The program provides seniors with either a \$10 discount coupon or a free class, with the intent that the seniors will continue to participate in other exercise classes after their initial participation. Tai Chi, Matter of Balance (MOB), Enhance Fitness programs are offered due to their proven results in reducing fall risks in older adults.

Objectives

1. Enroll 500 seniors (50+ in years) in group exercise classes at the selected community/senior centers during 2011;
2. Engage eight community/senior centers selected to participate based on such specific criteria as 1) located in areas that have a high number of EMS fall responses; 2) co-located near senior public housing facilities; and 3) have the capacity to increase participation, and willing to market the program to their clientele; and
3. Provide one free class resulting in 50% participant re-enrollment in similar or the same classes for the duration of the project.

Results

2010: 417 seniors participated in the Shape Up program from January 2010 to December 31, 2010, compared to 151 in 2009, this is a 176% increase in participation.

2011 (first trimester): 163 seniors participated in the program from January – April 1, 2011, compared to 70 from January – April 2010, this is a 132% increase in participation.

One hundred percent of the participants continued exercise classes. All of the 76 participants who took the free exercise classes at either the Northshore Senior Center or Burien Community Center in 2010 continued to take exercise classes after completing their initial session.

Recognition gained

In May 2010, the Shape Up campaign received the “Senior Program/Activity of the Year Award” from the Washington State Association of Senior Centers.



Next Steps

The EMS Division will develop innovative methods to market to older adults, such as:

- Provide possible free transportation opportunities to classes;
- Offer more introductory free classes; and
- increase community outreach to older adult group organizations.

2. Fire Department Small Grant program

Background

The role of local fire departments has changed dramatically over the years, and they now respond to more medical calls than fire related incidents. Recognizing that limited financial resources restrict their ability to provide community programs that serve older adults, the EMS Division gives fire departments an opportunity to apply for funds to run fall prevention programs.

Program Description

Proposed fall prevention programs must incorporate one or more of the four fall risk factors: exercise, vision, medication management, and environmental modification/education. Grant requests must be either a best practice or proven strategy supported by research, or a recommended and tried strategy with a strong evaluation plan that assesses the effectiveness of the project at its conclusion. All projects should be able to be duplicated by other fire departments. All grant applications are scored by a committee comprised of personnel from the EMS Division, Central Region EMS Trauma Council, Washington State Department of Health and a non participating fire department.

Objectives

1. Increase fire department participation by 60% in 2011.
2. Provide fall prevention programs to over 250 older adults throughout the county.

STRATEGIC INITIATIVES, continued

2010 Grants & Results:

In 2010, the following three fire departments were awarded grants.

1. Maple Valley Fire & Life Safety

Program Description: Maple Valley Fire & Life Safety (Maple Valley) collaborated with the Greater Maple Valley Community Center and Pinnacle Physical Therapy to provide exercise classes and educational fall prevention workshops to older adults.

In addition, the agency assessed older adult's homes who called 9-1-1 for a fall related incident by providing the necessary fall safety equipment.

Results: Three out of seven fire department stations reported a decrease in fall responses. Those three stations are located closest to the community center. There were 482 visits to exercise classes and workshops, and four home visits during which fall safety devices were provided.



"The mother of a resident at a local Residential Treatment Facility (group home for developmentally disabled adults) visited us today. She told us that prior to this class her son was uncommunicative with other residents, lethargic, and showed little interest in anything. He has participated in the class for the last two months and is now active (the benefits of exercising), showing interest in others, and constantly talking about the Sitting Fit class. He has expressed how nice and friendly everyone is, the beautiful facility, and how much he enjoys coming to class. A few more residents from the same facility have started participating and they are all saying the same thing. Mom is so grateful and excited that a program like this is available to the Burien community that she has made a substantial donation to our senior scholarship program to ensure that others like her son or those very low income seniors who could not afford the class fees would benefit. Wow! What a great day!"

- Staff, Burien Community Center

2. Mercer Island Fire Department

Program Description: Mercer Island Fire proposed to host at least eight fall prevention community presentations and three Matter of Balance exercise classes. Each participant would receive fall prevention educational materials along with a pre/post assessments.

Results: The resignation of Mercer Island Public Educator created multiple challenges implementing both programs. Despite this setback, 40 participants attended four community fall prevention presentations.

3. Shoreline Fire Department

Description: Shoreline Fire provided three Matter of Balance and Wii programs and at the Shoreline Lake Forest Park Senior Center, recruiting residents who have fallen or who are at risk into the classes. Shoreline Fire has participated in, and shared the cost of, fall prevention programs since 2000.

Results: Over 96 seniors participated in the Matter of Balance and Wii programs. The pre and post class

evaluations show that fall awareness is increased immensely in these classes, and that the introduction of simple, fun and easily accessible moves help those people over the age of 65. Over 90% of the Wii participants felt stronger after taking the program. While solid statistics on falls among this group are not available, anecdotal evidence seems to point to the concept that awareness alone is worth the expense. Many of the MOB students tell the instructors that they have changed their habits around the house, and that the MOB classes are a high point in their day.

2011 Grants

Bothell, Mercer Island, Redmond, Shoreline, and South King were award grants to fund their projects that address fall prevention.

1. Bothell Fire and EMS

Provide 12 in-home safety assessments to older adults and install appropriate fall safety devices. Follow-up participants with a phone survey to evaluate seniors three to five months after their initial assessment.

2. Mercer Island Fire Department

Offer eight fall prevention community presentations and provide home safety checklists to all participants and provide three Matter of Balance classes. Pre/post evaluation and follow participants for three to six months.

3. Redmond Fire Department

Collaborate with Redmond Senior Center to provide four “Stay Active and Independent for Life” (SAIL) class with the necessary equipment for the class. Provide in-home fall safety assessments to 24 homes and install the necessary safety equipment. Develop various marketing materials promoting SAIL program and free home.

4. Shoreline Fire Department

Collaborate with the Shoreline/Lake Forest Park Senior Center to offer a minimum of three “A Matter of Balance” (MOB) programs and the Wii exercise program, recruiting residents who have fallen or who are at risk. Prior to the class, each participant will be given a gait test, and Up and Go test or similar assessment test. At the end of the MOB class those tests are re-administered to gauge whether scores improved.



“The Wii Bowling class is a new way for me to get exercise and it’s fun! I’d like to be able to continue to do this.”

“I noticed I don’t need my cane as much,
I feel more agile.”

“I noticed my legs are firmer and I also enjoy
meeting others with similar concerns.”
- Wii Bowling participants



A Senior Wii bowling program in Tukwila

STRATEGIC INITIATIVES, continued

5. South King Fire and Rescue

Conduct 12 home safety assessments to independent living older adults (age 60 years and up) and install the necessary fall safety devices along with the Up and Go test.

Next Steps

EMS will continue offering the program through 2013, which is the end of the current levy cycle.

3. Expansion of the One Step Ahead Fall Prevention Program

Background

Falls occur in older persons often because of a combination of risk factors. These risk factors include individual specific conditions such as muscle poor balance, decreased vision, complications of medication treatment, unsafe footwear, and muscle weakness especially of the lower limbs. Fall risks also include environmental hazards such as uneven or slippery walking surfaces, poor lighting, or lack of wall bars in showers.

Program Description

The One Step Ahead Fall Prevention program offers a multi-pronged no cost approach to reduce an individual's risk of falling. It is practical and effective, and if it were adopted across many communities, it could produce a real improvement in the personal and public health of older adults.

A Fall Prevention specialist meets with each participant in their home to identify the exact set of risk factors, and design a prevention action plan. These participants have been identified through 9-1-1 calls and by healthcare professionals who refer patients to the program. The specialist then works with the individual to help coordinate fall prevention care, which can include installing grab bars, bed assist handles, toilet seat safety frames, or non-skid bath mats in the home. The prevention action plan may include contacting the participant's personal doctor to discuss the potential need for preventive care, and connecting the participant with other community resources such as Senior Services.



Jean Corr, Fall Prevention Specialist (left) implements a fall prevention action plan

Objectives

- Increase participation by 3% in 2011;
- Expand the program to four retirement and assisted living facilities;
- Reduce participants reoccurring falls by 10%; and
- Reduce clients perceived risk of falling in 75% of the participants, based on a customer survey.

Results

In 2010, 142 persons participated in the King County One Step Ahead Program. Participants come from throughout King County and represent a wide spectrum of social and demographic backgrounds.

Participation increased by 20% for the span of January 2011– May 2011, compared to span of January 2010 – May 2010.



“Thanks to King County’s Fall Prevention program. This well-thought-out program raises awareness and education not just to its recipients but also to family members.

Jean Corr’s compassionate demeanor and previous experience as a physical therapist are the perfect blend for this position. Her unwavering patience, keen observations and intuition are vital in reassuring the recipients that changing one’s environment is necessary and can help create a better quality of life. We applaud King County and its employees like Jean who strive in continuing to make our community and its residents a great place to live.”

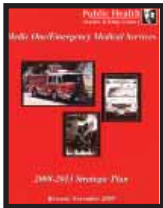
90% of patients who completed their post-program survey stated in the positive that the fall prevention program helped reduce the risk of falling.

49% of the 330 participants who completed their post-program survey fell again after the intervention. This is a 17% reduction from previous studies that showed that 66% of people who fall will fall again.

8.5% of possible participants have enrolled in the program since its inception in 2003.

Next Steps

The EMS Division will offer the program to patients released from hospital emergency departments.



These three Strategic Initiatives align with the Medic One/EMS Strategic Plan through managing the rate of growth of Medic One/EMS by reducing reoccurring falls among older adults through mitigation of home fall hazards and offering opportunities for older adults to exercise in various senior/community centers at a low cost.



These three Strategic Initiatives align with the King County Strategic Plan by addressing falls which is the leading cause of injury to people 65 and older (HHP1a); reduce involvement in the emergency medical services systems (HHP4a); and also develops partnerships with community organizations to deliver an effective program to people in need (HHP4b).

4. Grant and Other Funding Opportunities

This Strategic Initiative was eliminated from the proposed 2011 budget due to lack of revenue generated.

STRATEGIC INITIATIVES, continued

SI – Public Access Defibrillation (PAD) Community Awareness Campaign

Background

Out-of-hospital cardiac arrest is one of the leading causes of death and is experienced by 235,000 to 325,000 people each year in the United States. Recent studies have shown a wide survival rate variance in different parts of the country, believed to be related in part to the local EMS “system of care.” A key component to the system of care during cardiac arrest is early CPR and application of an Automated External Defibrillator (AED) to restore proper heart rhythm. These two life-saving tasks can be performed by citizens, prior to EMT arrival, increasing the chances for patient survival.

Description

The Public Access Defibrillation (PAD) Community Awareness Campaign supplements the EMS Division’s efforts to increase the number and availability of AEDs in the community and improve the ability to locate and use them for cases of cardiac arrest. Specifically, the campaign seeks to increase the public’s awareness about the life saving potential of AEDs. It also promotes the benefits of purchasing AEDs, placing them in accessible locations, and registering them in the King County EMS PAD registry. The registry enables the EMS Division to determine an approximate total and dispersion of AEDs in King County, develop AED mapping applications, contact AED owners if necessary, and assist them in complying with state law requiring AED registration.

Objectives

Performance objectives for this initiative are currently under development.

Results

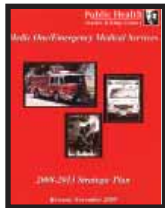
- Development of a six-minute DVD presentation to improve PAD awareness; and
- Simplified AED registration process.

Next Steps

- Engage a communications firm to assist in development of an outreach campaign to increase public awareness and AED registrations;
- Identify public and business sites in King County at high risk for cardiac arrest;
- Updated and improved PAD website featuring online AED registration; and
- Targeted public awareness marketing campaign scheduled to begin all 2011.

It is critically important to register AEDs and place them in accessible locations





This Strategic Initiative addresses the EMS Strategic Plan goal of improving the quality of Medic One/EMS services, specifically the care of patients in cardiac arrest.



This Strategic Initiative aligns with King County Strategic Plan goals to implement and coordinate programs that prevent the leading causes of poor health and premature death (HHP1a); strengthen King County's collaborative role with cities and communities (SE3d); and use public outreach to better communicate who we are and what we do (PE3c).

SI: Interactive Enhancements to EMS Online



Background

When the EMS Division recognized that EMS personnel needed an alternative method for completing the cognitive pieces of on-going training and evaluation (OTEP) courses, it developed the EMS Online website. This interactive web-based teaching tool was originally intended to serve only a small number of EMS providers and deliver only a limited number of courses. However, its offerings have expanded immensely due to its effectiveness in delivering quality training at a low cost, and users are now requesting additional content and expanded features.

Description

The 2008-2013 Strategic Plan includes an initiative to develop additional content and expanded features to EMS Online over the span of the current levy period. For 2010 and 2011, these interactive enhancements include additional video to the course offerings (such as, question and answer sessions with prominent experts in both EMT and paramedic level material), creating an avenue for Quality Assurance/Quality Improvement activities, and supplementing paramedic content with continuing medical education courses. In 2011, the EMS Division in collaboration with Seattle Medic One developed two courses: Stroke and Sepsis. In 2012, six more courses will be added at the paramedic level.

STRATEGIC INITIATIVES, continued

Objectives

- Incorporate tools for training officers into the website;
- Produce 10 new interactive case studies;
- Produce a new course on Sepsis;
- Design and develop two continuing medical education courses at the paramedic level;
- Incorporate interviews with experts into existing courses; and
- Create learning activities that track to the course outcomes.

Results

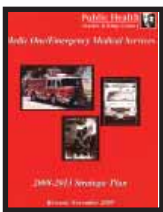
Success of the Strategic Initiative efforts will be determined by surveying the BLS and ALS audience in 2013. Another indicator will be to track number of agencies using EMS Online for their continuing medical education beyond King County agencies.



“Thank you for creating such a great training site. I have used what I learned time and again, and we have used the training information to make improvements to our EMS system here in Oregon. Please keep up the fantastic work you folks do in King County.”
~Petar Hossick, Bend Fire and Rescue, OR

Next Steps

- Add six courses at the paramedic level to EMS Online;
- Incorporate ‘Video Ask-the-Doc’ – addressing questions from the field with Dr. Mickey Eisenberg;
- Deliver EMT Patient Care Protocol Book in mobile learning format (available for smart phones and tablet devices); and
- Develop interactive games for two of the 2013 courses.



EMS Online provides an effective, efficient web-based platform for production and distribution of training courses, information, and tracking tools necessary for the continuing education of King County and other EMS providers. The efficiencies inherent in providing this content in an online format address the EMS Strategic Plan goals of improving the quality of Medic One/EMS and containing costs.



This Strategic Initiative also aligns with the King County Strategic Plan in several significant ways: adopting new technologies and processes that allow county agencies to work more effectively and efficiently (SE2b); creating a Web site that is easy to navigate and provides needed services (SE4c); pursuing technologies that improve service while reducing the cost of delivery (FS1d); and implementing training and development programs to help achieve county goals (QW2e).

SI: Systemwide Enhanced Network Design (SEND)

Background

Complete, accurate, and timely information is integral to the management of all aspects of the EMS system in King County. Creating a network that supports the collection of quality EMS data and allows rapid access to the data using an efficient system design is of great importance in delivering high quality emergency medical care to the residents of King County.

Description

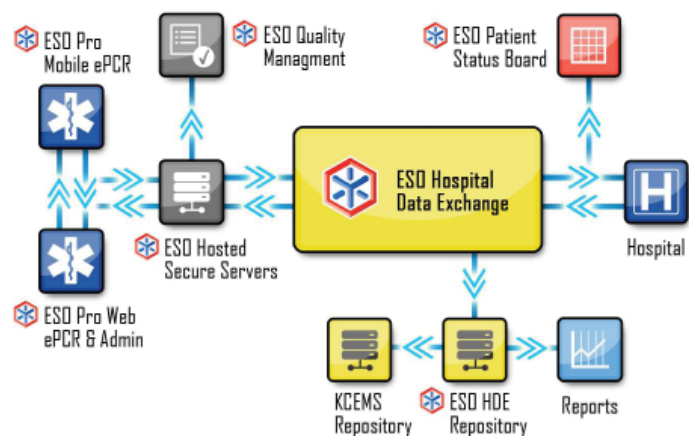
The Systemwide Enhanced Network Design (SEND) Project enhances the existing EMS data network to improve the quality and timeliness of EMS data, thus improving patient care. Developed in partnership with regional EMS agencies, this five-year project works in coordination with concurrent efforts in the region to allow SEND to be implemented in a much more effective manner. This includes Computer Aided Dispatch (CAD) upgrades at two major dispatch centers, implementation of a web-based regional record management system (RMS) in the north and east parts of King County, and multiple hospital electronic medical record system upgrades.

Objectives

Broad SEND objectives include the following:

- Improved access to complete and timely EMS patient data, specifically patient outcomes; improved oversight of EMS protocols and procedures; and patient care (e.g. management of stroke patients). Currently, the process for processing EMS data may take up to two to three months;
- Communication of critical and timely patient information to hospitals in digital format prior to patient arrival at emergency departments (e.g. chest pain patients requiring catheterization). This information is not currently available to hospitals in digital form prior to patient arrival;
- Assist in early identification of syndromic (the occurrence of disease in the community) trends allowing for proactive public health response (e.g. flu symptoms). Currently, EMS data is not easily available for regional syndromic surveillance; and
- Improved EMS data processing, including automatic uploads to the regional central repository, reduction of administrative staff workloads and reduced errors in data.

ESD Data Bus Systems Flow



STRATEGIC INITIATIVES, continued

2010 Milestones:

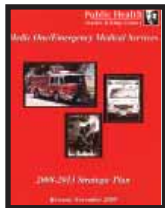
Milestone	Complete Date	Status
2010 Work Plan	Dec 2010	Completed
a. Procure/implement data hub	Oct 2010	Completed
b. Identify field/outcome datasets	Aug 2010	Completed
c. Develop individual agency work plans	Aug 2010	Completed
d. Develop/test interfaces with 1-2 EMS agencies	Dec 2010	Completed

Results

The SEND Project 2010 Work Plan was completed as planned with the successful procurement of the regional data hub (ESO Solutions), finalization of the field and outcome datasets, development of the EMS agency work plans, and initiation of interface development. The broad SEND objective assessment will be measured following completion of the project.

Next Steps (as of May 2011):

Milestone	Completion Date	Status
2011 Plan	Dec 2011	40%
a. Develop ESO 2011 Project Plan	Jan 2011	100%
b. Purchase initial pilot hardware	Feb 2011	100%
c. Base system configuration	Jul 2011	80%
i. Develop data hub		100%
ii. Develop data flow process to data hub		90%
iii. Develop EMS repository and data flow from data hub		50%
iv. Develop data extract and flow to KC repository		15%
d. Complete hospital outcome component	Oct 2011	60%
e. Complete external reporting component	Dec 2011	0%



The SEND Project meets the Strategic Plan goals by improving the quality of the Medic One/EMS system through improved completeness, access and timeliness of EMS data and containing costs through streamlined EMS data collection.



The SEND Project is designed to adopt new technologies to allow King County to work more efficiently (SE2.b), pursue technologies that improve service while reducing costs (FS1.d), and strengthen collaboration with cities and communities (SE3.d).

SI: All Hazards Management Preparation

Background

Recent natural disasters and emergencies at home and abroad have emphasized the need for ongoing coordinated hazard planning and preparation among regional response partners. The EMS system is just one element of King County's elaborate emergency response system, which encompasses law enforcement, fire service, hospitals, public works, utilities, and the local, state and the federal governments. Through its programs and activities, the EMS Division has established relationships with the emergency response community, and as a result, is well positioned to promote and participate in regional emergency planning and preparedness.

Description

Through this Strategic Initiative, the EMS Division provides the regional leadership and coordination needed for disaster and emergency planning and preparedness activities.

Objectives

Internal: The EMS Division's internal preparedness efforts target maintaining functional leadership, sustaining critical business functions, and providing support and direction to its employees during a disaster or emergency.

STRATEGIC INITIATIVES, continued

External: When an emergency impacts the regional delivery of emergency medical services, the EMS Division assists the King County EMS Medical Program Director as needed with policy development, dispatch, treatment and transport protocol revisions, and the communication of information to the public and private EMS provider agencies. EMS Division staff also serves at the Public Health Area Command Center or the King County Emergency Coordination Center, when such centers are activated.

Results

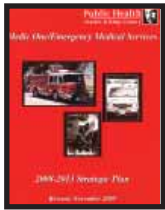
Internal: The EMS Division updated its Business Continuity Plan to reflect change in delegation of authority. It developed and published EMS Employee Emergency Communications Policies and Procedures that include the development of a shared e-mail account for all employees to report absences during an emergency, an Emergency Procedures chart highlighting what to do in the case of numerous emergencies, and periodic preparedness information transmittal.

External: The EMS Division assisted the EMS Medical Program Director with distributing health and medical information to EMS agencies, meeting its goal to be viewed as an authoritative and credible source of information for EMS providers. The EMS Division participated in planning and preparedness activities with Public Health – Seattle & King County, and the King County Office of Emergency Management. The EMS Division also partnered with regional and national agencies in planning for the arrival (via plane) of a passenger with a communicable illness. In April 2011, the EMS Division served as the evaluator for a tabletop exercise held at Sea-Tac Airport assessing the Sea-Tac Airport/CDC Global Migration and Quarantine Station plan for responding to the report of an illness aboard an arriving international flight.

Next steps

The EMS Division will develop additional preparedness information for employees. Training, drills and exercises will be conducted to assure the continuous improvement of the EMS Division's response during an emergency or disaster. EMS will participate in future exercises scheduled by response partners, including the 2012 King County Soundshake Exercise, and will augment its cooperation, collaboration and support of all hazards emergency preparedness of local, state, and federal response partners.





By focusing on improved coordination, response and delivery of patient care during a regional emergency or disaster, this Strategic Initiative directly supports improving the quality of EMS services.



This Strategic Initiative meets the King County Strategic Plan goals of undertaking regional emergency planning and preparedness activities (JS4a), coordinating and providing direct response to crises (JS4b), and joining with local and state partners to help stabilize people's lives by assisting all residents of King county including unincorporated area residents (HHP4d).

SI: EMS Efficiencies & Evaluation Studies

The following three projects fall under this Strategic Initiative heading:

1. Community Medical Technician (CMT)
2. Taxi Transport Voucher (TTV) Project
3. EMS Vehicle Replacement Policies

Background

The emphasis behind all Strategic Initiative projects is to improve EMS patient care, manage growth in paramedic services, and develop system efficiencies and cost savings/avoidance. This Strategic Initiative provides additional funding to further pursue areas identified by other strategic initiatives and to also review the existing system.

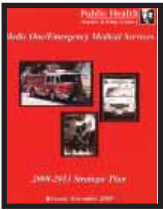
1. Community Medical Technician (CMT)

The Community Medical Technician project, summarized more fully on p.57 of this report, allowed KCEMS to pilot-test and demonstrate a “proof of concept” for an alternative low-acuity EMS response model: two EMTs in a non-transport light-duty Sports Utility Vehicle (SUV).

2. Taxi Transport Voucher (TTV) Project

The current Taxi Transport Voucher project, outlined on p.58 of this report, provides pre-paid taxi vouchers to EMTs in Renton and Redmond fire departments. EMTs issue vouchers to patients who require non-emergent transport for follow-up treatment but do not have the means to obtain it themselves. Issuance of vouchers can allow EMTs to return to service more quickly and also help patients avoid significant fees or co-pays for unnecessary ambulance transports.

STRATEGIC INITIATIVES, continued



All three KCEMS Strategic Plan goals are addressed by this Strategic Initiative:
Improving the quality of Medic One/EMS, containing costs (efficiencies), and managing the rate of EMS growth.



This Strategic Initiative supports the overall King County Strategic Plan in several areas, primarily by funding projects that work with cities to identify opportunities to provide services more efficiently (FS1b); pursuing technologies that improve service while reducing the cost of delivery (FS1d); and supporting partnerships to deliver integrated and effective services to people in need (HHP4b).

3. EMS Vehicle Replacement Policies

Background

At the conclusion of its 2010 audit, the King County Auditor's Office indicated that the EMS Division could achieve significant cost efficiencies if ALS vehicle replacement were based on a life cycle cost analysis rather than current methods. The Auditor recommended implementation of a Strategic Initiative to determine optimum vehicle use and to manage vehicle costs in a more effective manner.

Description

Currently, ALS vehicles are scheduled to be replaced at six-year intervals, three years as primary, three years as back up. In practice, the schedule varies among ALS provider agencies, is not consistently followed due to various operational requirements, and is not based on any specific performance metrics. Some agencies use vehicles for six years, while others average nearly ten. The Auditor also found that mileage on vehicles replaced by ALS agencies is significantly lower than peer agencies, averaging approximately 83,000 miles compared to the averages of 125,000 to 300,000 miles elsewhere in the country. Meanwhile, the cost for replacement ALS vehicles has been increasing about 5% each year between 2002 and 2010.

The purpose of this Strategic Initiative is to develop a standardized, consistent, and cost-effective vehicle replacement policy based on life cycle analysis. It will determine optimum use, after evaluating initial purchase costs, mileage, engine hours, operational and maintenance costs, patient safety and comfort, downtime, and salvage values. Replacement criteria may also include remounting ambulance modules to new vehicle chassis and development of a standardized ALS vehicle design.

Next Steps

- Assign project manager; and
- Collaborate with ALS provider agencies in development of a new vehicle replacement policy based on a life cycle cost analysis.



This Strategic Initiative will address the EMS Strategic Plan goal of containing costs.



This Strategic Initiative aligns with King County Strategic Plan goal to manage the county's assets and capital investments in a way that maximizes their productivity and value (FS2a).

SI: Strategic Planning for the Next Levy Period

The current six-year Medic One/Emergency Medical Services levy is scheduled to expire December 31, 2013. To continue providing this vital service in 2014 and beyond, a new Strategic Plan, defining the roles and responsibility and programs for the system, and a levy rate to fund these approved functions must be crafted. The King County Executive will propose putting the reauthorization of the Medic One levy before the voters in 2013.

King County Ordinance #15862 created an EMS Advisory Task Force to develop "interjurisdictional agreement on an updated EMS strategic plan and financing package for the next levy funding period." Comprised of leaders and decision makers from throughout the region, the Task Force will convene to review and approve both the strategic plan and the proposed levy rate to put before the voters of King County. The composition of the Task Force was reformulated by the

King County Council in July of 2011 to create a more manageable size, and consists of 19 members representing cities with more than 50,000 in population, suburban cities, the King County Council and fire districts.

EMS Advisory Task Force responsibilities include reviewing and endorsing recommendations regarding:

- Current and projected EMS system needs;
- The Financial Plan based on those needs; and
- The levy rate, levy length, and when to run the levy measure.

Task Force financial and programmatic recommendations are due to the King County Council no later than September 15, 2012, and the Medic One/EMS 2014-2019 Strategic Plan is due January 1, 2013.

An Advisory Task Force Work Plan, detailing a plan for managing and coordinating the Task Force during the next levy planning process, was submitted the King County Council on September 15, 2010. The Work Plan recommends that the Task Force meet four (4) times, starting in October 2011 and concluding in July 2012. It develops four subcommittees, representing the Advanced Life Support (ALS), Basic Life Support (BLS), Regional Services (RS) and Finance program areas, to complete the bulk of the system program and cost analysis. The Subcommittees will generate and subsequently present the Strategic Plan recommendations regarding current and projected program needs to the EMS Advisory Task Force. The EMS Division will provide the staff support in organizing, preparing for, and facilitating the EMS Advisory Task Force and Subcommittee meetings.

The table below reflects the timeline for accomplishing the EMS Advisory Task Force objectives:

Meeting #1: October 2011	Meeting #2: January 2012	Meeting #3: May 2012	Meeting #4: July 2012
EMS Orientation	Preliminary Review	Full Draft Review	Final Review
<p>Review: 1. Task Force (TF) duties and expectations; TF timeline</p> <p>Overview: 2. EMS System Review</p> <p>Develop: 3. Subcommittee Chairs</p>	<p>Overview: 1. EMS Levy Review</p> <ul style="list-style-type: none"> ▪ Length ▪ Rate ▪ Ballot timing <p>Follow Up: 2. Subcommittees to report back preliminary programmatic and financial findings</p> <p>Other: 3. Other follow up items</p>	<p>Follow-up: 1. Subcommittees to report back full draft program and financial recommendations</p> <p>2. Discuss EMS Levy components</p> <ul style="list-style-type: none"> ▪ Length ▪ Rate ▪ Ballot timing <p>Other: 3. Other follow up items</p>	<p>Take Action: 1. Approve programmatic recommendations and Financial Plan</p> <p>2. Finalize EMS levy components</p> <ul style="list-style-type: none"> ▪ Length ▪ Rate ▪ Ballot timing

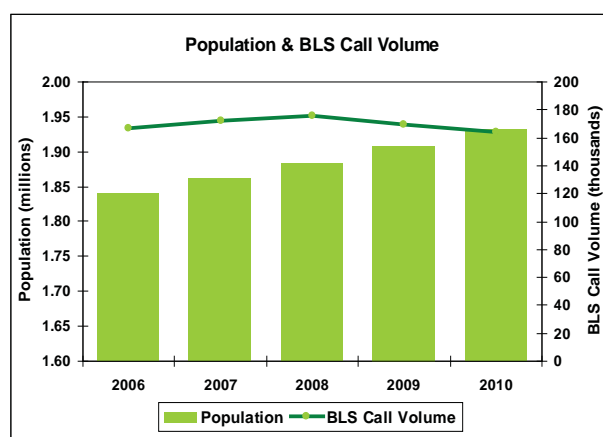
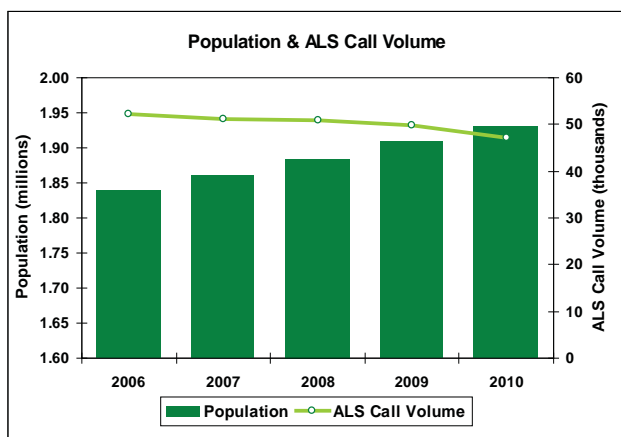
Summary of 2010 EMS Statistics (Seattle and King County)*

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 2010.

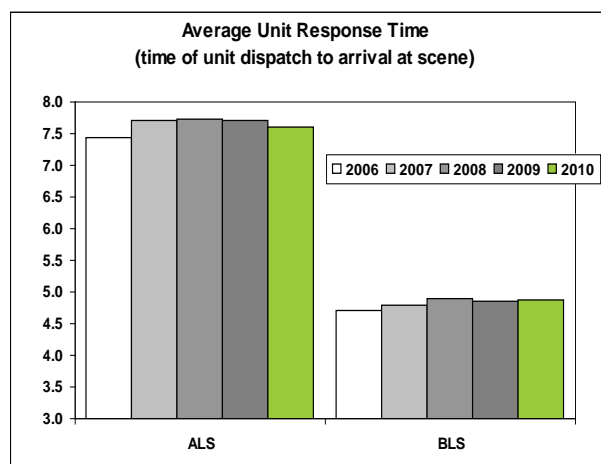
Population	Seattle-King County	% Growth (Annualized)
1980	1,269,898	
1990	1,507,305	1.87%
2000	1,737,034	1.52%
2010	1,931,249	1.12%

Results from the 2010 Census were released earlier this year, confirming that population growth in King County had diminished significantly over the past decade.

Population has often been a factor in the rate of EMS call volume growth and in 2010 showed a second year in BLS call volume decline. The two graphs below depict the population growth relative to both BLS and ALS call volume patterns. Of continued interest is the four-year actual decline in ALS calls volumes due in part to the success of the ALS Dispatch Criteria Revisions. Note that the scales for population and call volumes are different.



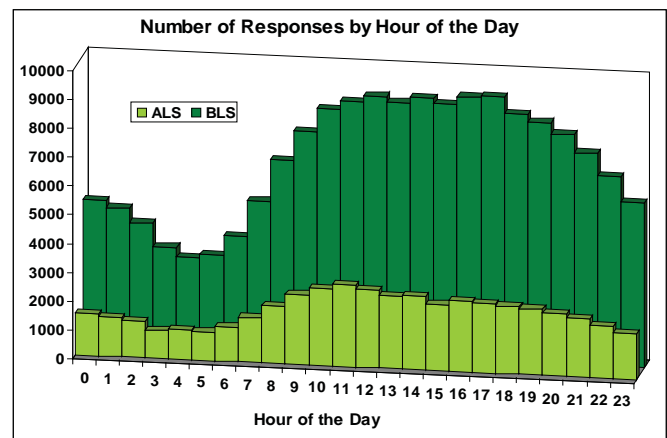
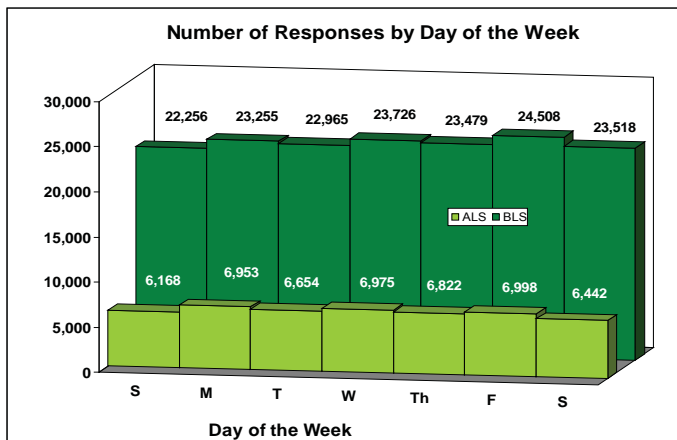
**EMS data uses a fully integrated EMS Division and Seattle dataset. Response times are defined as follows: Total - the time of call received at dispatch center to the time of arrival at the scene, and Unit - the time of unit dispatch to time of arrival at the scene. In some instances, totals differ due to missing values.*



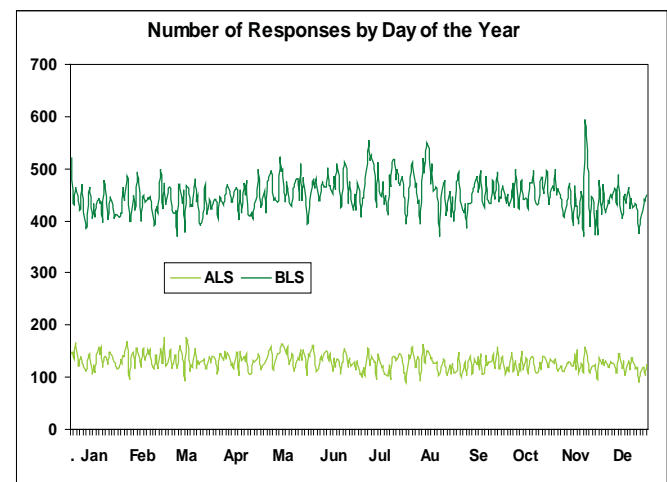
Characteristics of Responses

Operations

Service	ALS		BLS	
Number of Responses	47,012		163,707	
Average Response Time	Total RT	Unit RT	Total RT	Unit RT
	11.4	7.6	6.0	4.9
6 minutes or less			64.9%	82.0%
8 minutes or less	37.3%	68.7%		
10 minutes or less	55.2%	83.3%		
12 minutes or less	67.6%	91.1%		
14 minutes or less	75.9%	95.1%		
Cancelled Enroute Calls	7,805 (16.6%)		5,138 (3.1%)	



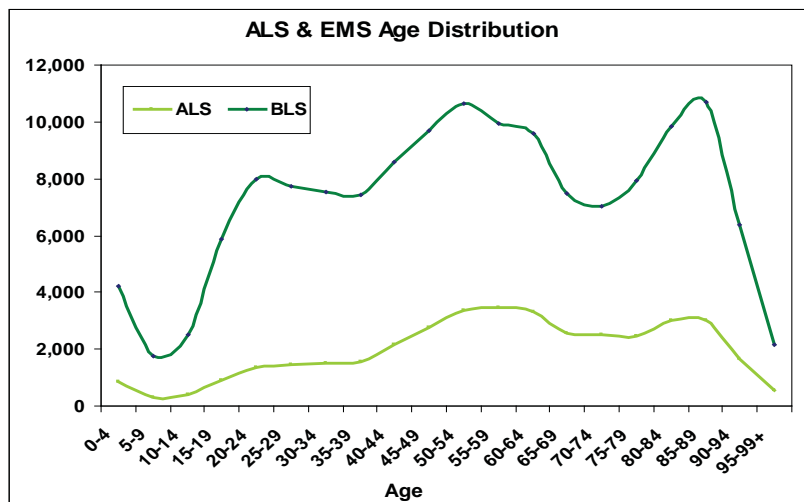
The average BLS unit response times have remained stable, indicating some capacity to manage additional calls. Average ALS response times declined slightly last year. The three graphs located above and to the right reflect the patterns of ALS and BLS response during the day, the week, and throughout the year. There is a notable difference in range of BLS responses per day over time (~370-600 calls) in comparison to ALS responses (~90-175 calls). *Note the unusual spike in BLS responses in the month of November corresponding with the mid-month snowstorm.



The following information reflects a variety of statistics that characterize 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. Paramedics providing advanced life support are more likely to attend to older patients for cardiac conditions, while EMTs often attend to trauma in young adults.

Responses by Age Group

Responses by Age Group	ALS	BLS
0-4 yrs	872 (2.2%)	4,205 (2.9%)
5-9 yrs	319 (0.8%)	1,739 (1.2%)
10-17 yrs	828 (2.1%)	5,428 (3.7%)
18-24 yrs	1,831 (4.7%)	10,984 (7.6%)
25-44 yrs	6,722 (17.1%)	31,258 (21.6%)
45-64 yrs	12,898 (32.8%)	39,875 (27.5%)
65-84 yrs	10,572 (26.9%)	32,267 (22.3%)
85+ yrs	5,264 (13.4%)	19,226 (13.3%)
Total	39,306	144,982

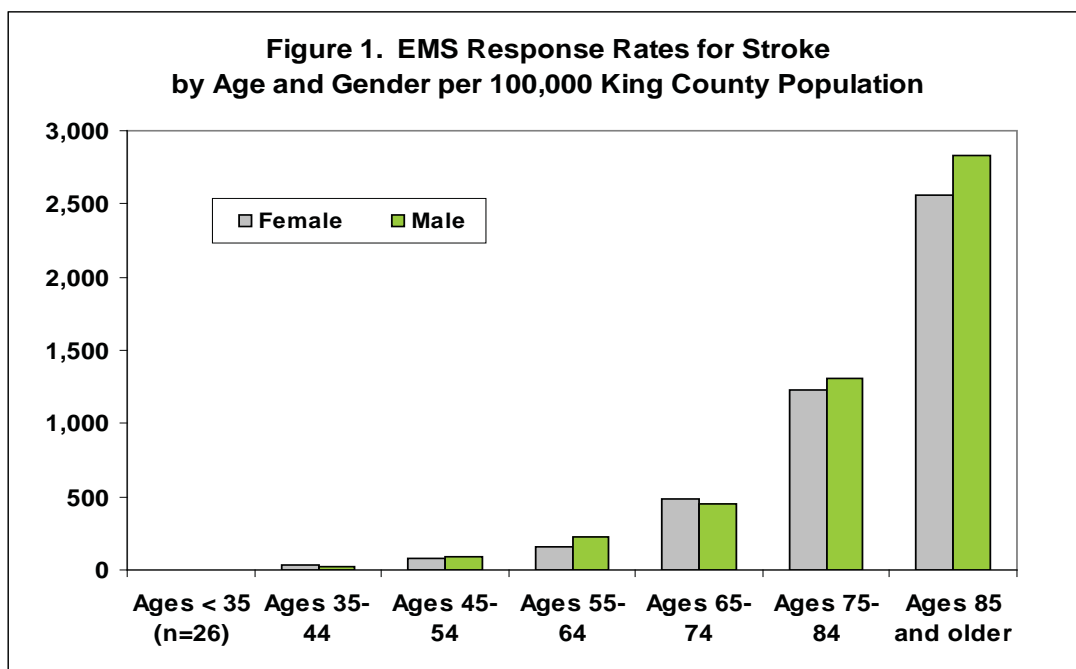


Public Health Highlight: Characteristics of Stroke

Recognition and timely transport to hospital are key EMS activities for the pre-hospital care of patients with a suspected stroke or transient ischemic attack (TIA). Stroke recognition at dispatch can direct the appropriate level of resources and minimize time to hospital arrival and treatment onset. Identification of a stroke or TIA at the scene can shorten time to treatment and maximize chances of patient recovery by transport to qualified stroke hospitals by calling ahead to alert hospital staff that a patient is on the way. Even with an unconfirmed diagnosis, thorough and accurate recording of vital signs and timely transport to hospital may help shorten the time to hospital diagnosis and treatment.

Most patients diagnosed with a suspected stroke or TIA in the pre-hospital setting are treated by emergency medical technicians (EMTs) trained to provide basic life support (BLS), although paramedics provide advanced life support (ALS) for about 25% of identified patients. EMTs and paramedics reported 2,356 and 788 suspected stroke/TIA cases, respectively, in 2009. These 3,144 cases comprised 2.3% of the total 150,516 patient responses. Slightly more than half (54%) were identified as stroke/TIA at the time of the 9-1-1 call for medical assistance. Most of the remainder identified as stroke by the EMS responders presented as sick/unknown, unconscious/syncope (fainting), or falls/accidents/pain at the time of call.

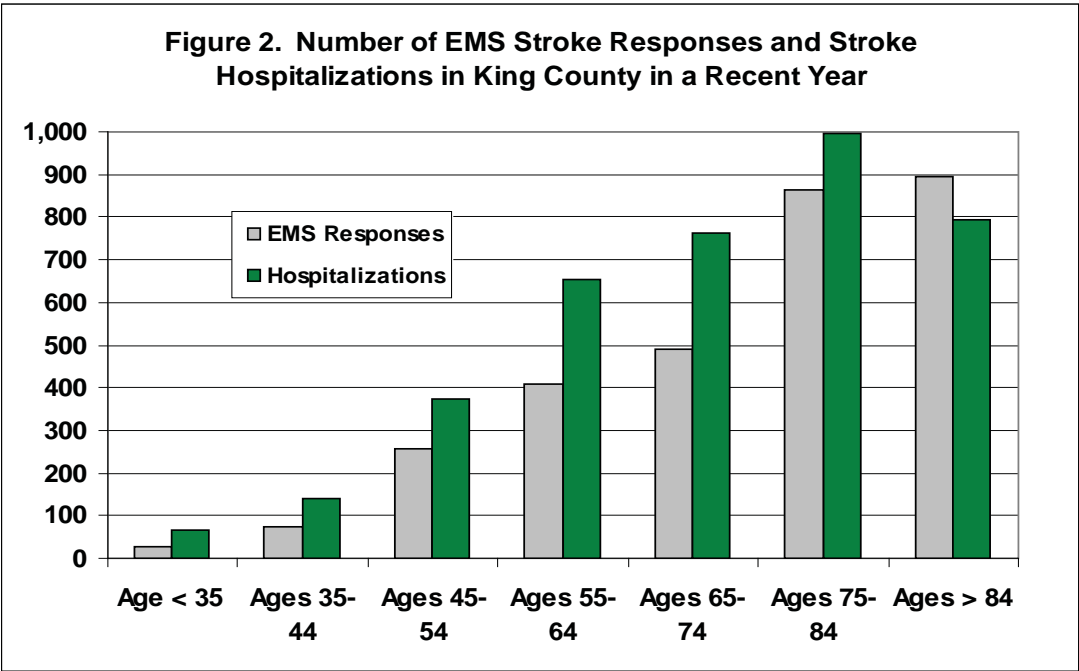
Patient characteristics of the EMS population evaluated as stroke/TIA followed the pattern reported for stroke patients in the general population. A higher proportion was female, 57% compared to 43%. The women were older, with an average age of 76.3 years (SD 14.6) compared to an average of 72.1 years (SD 14.5) for men. Age and gender specific rates based on King County population estimates are shown in Figure 1. Rates increased markedly with patient age and were slightly higher for men than for women in the older age ranges.



Among the 25% suspected stroke/TIA patients attended by paramedics, 32% received an IV for fluid and medication administration, and 12% were intubated to support breathing and protect the airway. Over 95% of all cases were taken to hospital. Transport was most frequent by BLS, with over 85% of the total. Of these, private ambulances transported 70%, with 30% by a fire department unit. About 10% of the total was transported to hospital by a unit equipped to provide advanced life support, such as a fire department paramedic unit, an ALS-equipped private ambulance, or airlift. Private vehicle or other transport was used for the remainder.

Time-of-hospital arrival was known for patients with fire department transport; this time was unknown for those transported by private ambulance. The median elapsed minutes from the initial 9-1-1 call to hospital arrival was shorter for patients attended by EMTs compared to paramedics, 35 versus 42 minutes. For the patients with paramedic care, those with an initial ALS dispatch had a shorter median time to hospital arrival than those with an initial BLS dispatch followed by a call from the EMTs at the scene for paramedic assistance, 40 versus 54 minutes.

Definitive diagnosis of stroke depends upon patient assessment in hospital. Studies have reported that from 40 to 70% of suspected stroke patients in the EMS setting are diagnosed with stroke at hospital 1,2,3. As the EMS and hospital data were not linked, the pre-hospital and hospital stroke/TIA diagnoses could not be compared. Data available from the WA State Department of Health show that rates for King County residents with a hospital stroke diagnosis parallel the pre-hospital rates shown in Figure 1. Figure 2 below compares the number of patients evaluated as stroke/TIA by EMS and the number of King County residents hospitalized with a diagnosis of stroke. While patients identified as stroke by EMS may be counted among those hospitalized for stroke, patients characterized as having another medical problem by EMS may be diagnosed as stroke at hospital, and the EMS diagnosis of stroke/TIA may be ruled out for others. Hospital cases also include King County residents for whom EMS was not summoned.

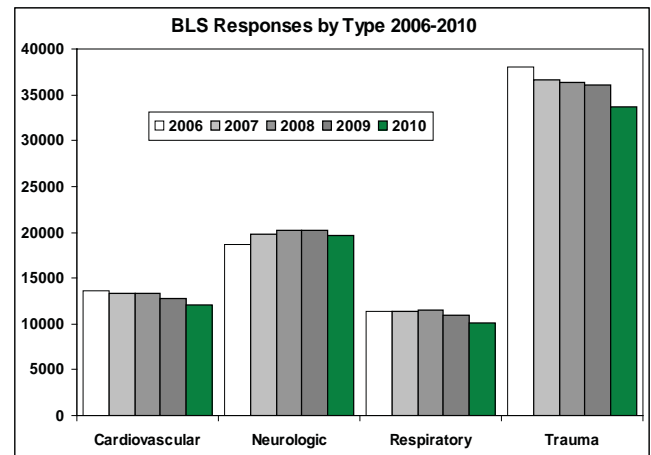
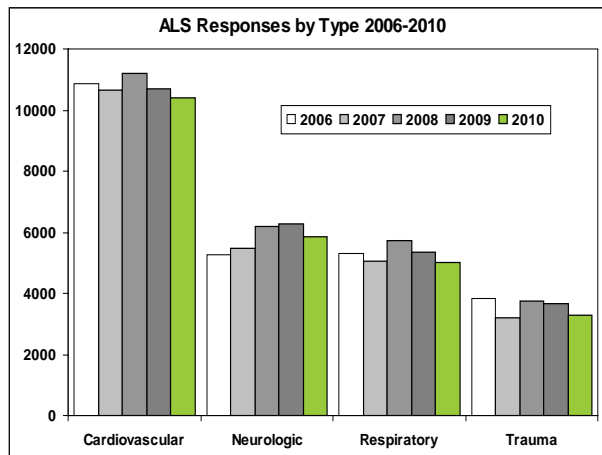


Characteristics of Responses, continued

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. This aspect requires not only an in-depth knowledge of specific invasive medical procedures but also requires a considerable breadth of knowledge and skills for diagnoses and management.

Responses by Medical Type

Responses by Medical Type	ALS	BLS
Cardiovascular	10,379 (26.8%)	12,038 (9.3%)
Neurologic	5,832 (15.1%)	19,635 (15.1%)
Respiratory	5,017 (13.0%)	10,052 (7.8%)
Trauma	3,271 (8.4%)	33,650 (26.0%)
Abdominal/Genitourinary	2,211 (5.7%)	10,997 (8.5%)
Metabolic/Endocrine	1,750 (4.5%)	3,598 (2.8%)
Alcohol/Drug	1,672 (4.3%)	6,605 (5.1%)
Psychiatric	1,371 (3.5%)	7,244 (5.6%)
Obstetric/Gynecological	467 (1.2%)	1,127 (0.9%)
Anaphylaxis/Allergy	381 (0.9%)	1,040 (0.8%)
Other Illness	6,381 (16.5%)	23,704 (18.3%)
Total Medical	38,732	129,690

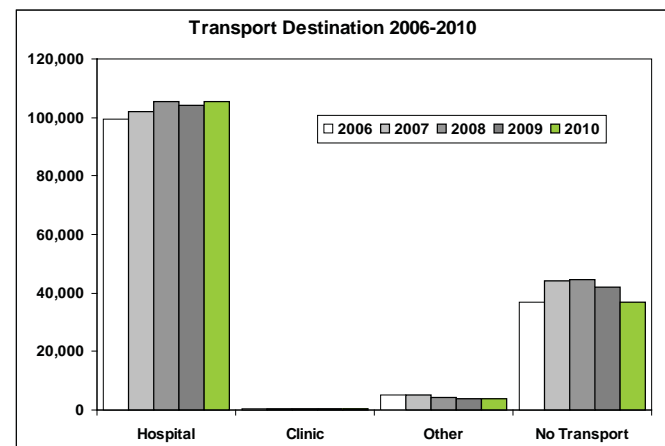
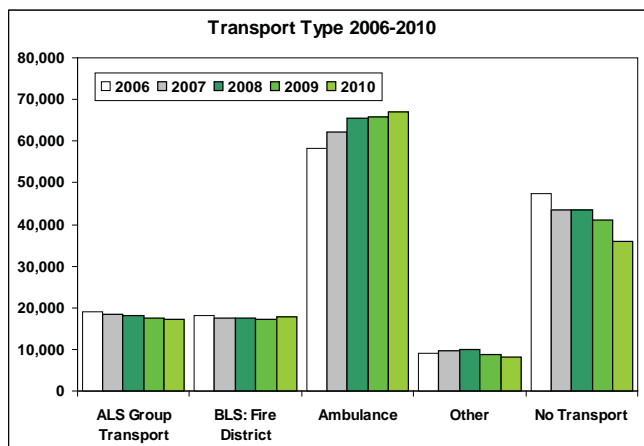


Similar to the variation reflected in the types of responses EMS agencies provide, EMS personnel respond to a variety of physical settings, again requiring a versatility of skills. For example, providers may respond to settings where they need to interact with other medical professionals or need to deliver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

Incident Locations	ALS	BLS
Home/Residence	24,287 (58.2%)	78,210 (54.7%)
Nursing Home/Adult Family Home	3,552 (8.5%)	11,259 (7.9%)
Clinic/MD Office	2,119 (5.1%)	3,587 (2.5%)
Other/Unknown Location	11,752 (28.2%)	50,017 (35.0%)
Total	41,710	143,073

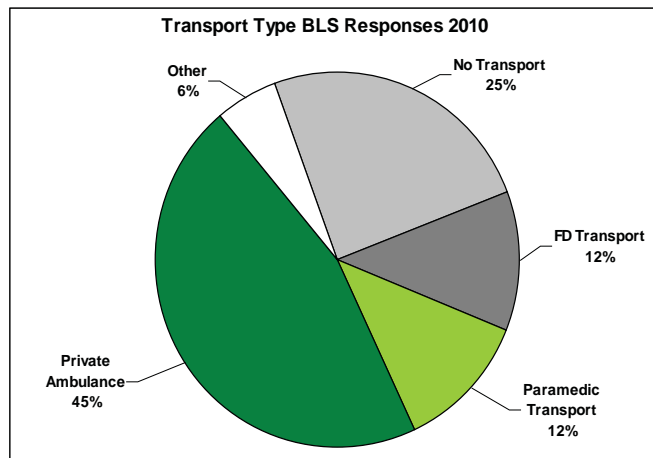
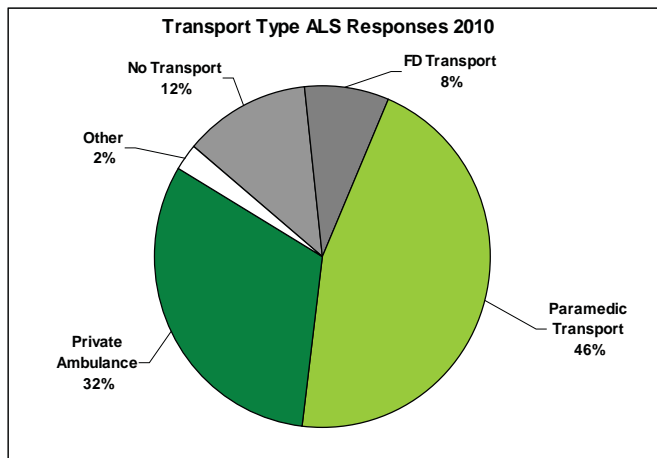
An important component of providing EMS care is appropriate triage. EMS personnel use their skills and knowledge to match the clinical need of the patient with the most appropriate transport and destination plan. The figures below reflect the transport trends over the past five years.

Transport Type and Destinations

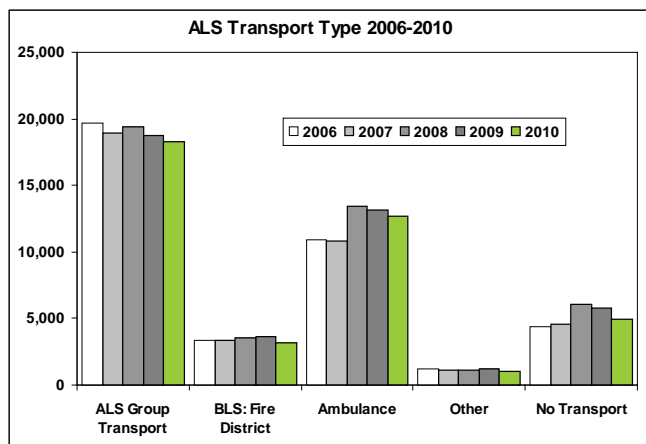


Characteristics of Responses, continued

Transport Type		Transport Destination	
ALS Transport	17,017 (11.7%)		
ALS Air	93 (0.1%)	Hospital	105,467 (72.1%)
BLS - Fire District	17,717 (12.1%)	Clinic	463 (0.3%)
BLS - Ambulance	66,966 (45.9%)	Other	3,696 (2.5%)
Other	8,221 (5.6%)	No Transport	36,714 (25.1%)
No Transport	36,005 (24.7%)		
Total	146,019	Total	146,340



ALS Transport Type	
ALS Transport	18,139 (45.4%)
ALS Air	98 (0.3%)
BLS - Fire District	3,128 (7.8%)
BLS - Ambulance	12,678 (31.7%)
Other	990 (2.5%)
No Transport	4,923 (12.3%)
Total	39,956



Cardiac Arrest Statistics

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

All Cardiac Arrests:

	Year				
	2006*	2007	2008	2009	2010
Total number of cardiac arrests (all causes, resuscitation attempted)	993	1,035	1,046	1,072	1,069

*modification in case definition initiated

For 2010, the following table shows cardiac arrests broken down by arrest before and after EMS arrival, rhythm on arrival, and survival for each category:

Total cases treated:	1,069		
		# Survival	% Survival
Arrest before arrival:	941	177	19%
Ventricular fibrillation/ tachycardia (VF/VT)	268	114	43%
Asystole	420	17	4%
PEA	252	46	18%
Unknown	1	0	0%
Arrest after arrival:	128	41	32%
VF/VT	29	14	48%
Asystole	12	3	25%
PEA	87	24	28%
Unknown	0	0	0%

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

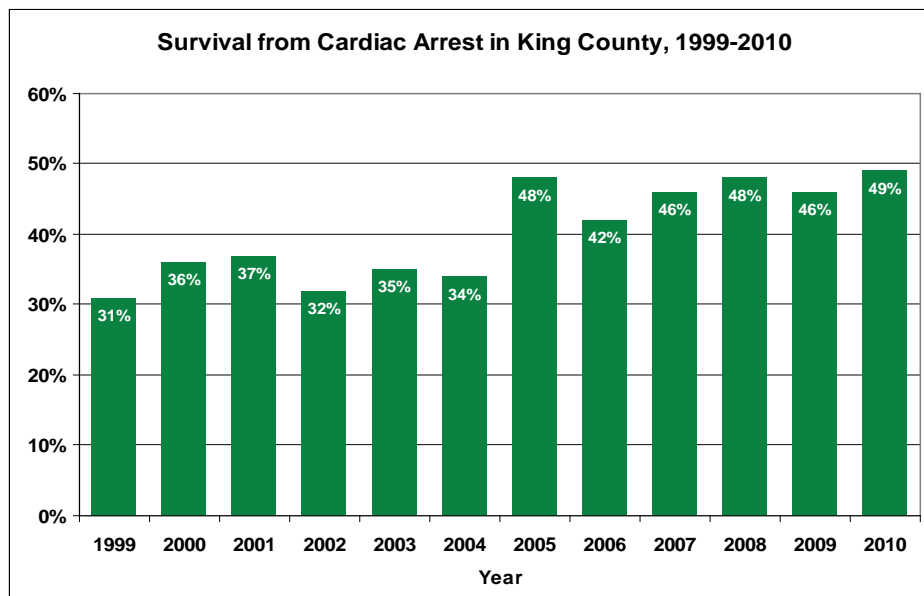
Year	Rate
2010	96/196 (49%)
2006-2010	450/952 (47%)

CPR initiated by Bystanders

(includes all cases of CPR):

Year	Rate
2004	501/952 (53%)
2005	568/1,007 (56%)
2006	496/875 (57%)
2007	502/898 (56%)
2008	530/920 (58%)
2009	577/1,067 (54%)
2010	650/1,063 (61%)

Cardiac Arrest Statistics, continued



Cardiac Arrest Highlight: Police Defibrillation Pilot Project

Background

Out-of-hospital sudden cardiac arrest accounts for approximately 10% of total mortality in North America. Efforts to improve resuscitation primarily focus on providing CPR and defibrillation as rapidly as possible. Innovative methods to achieve early defibrillation can dramatically improve survival. Equipping police with automatic external defibrillators (AEDs) affords the ability to arrive sooner to an arrest patient than traditional EMS, and therefore may lead to improved survival. However, the few police AED programs that have been studied have been poorly implemented and have had no measurable involvement or survival benefit.

Goals

The goal of this program is to understand, design, and implement effective police defibrillation. To decrease time to defibrillation, three objectives must be met:

- Provide Police with basic cardiopulmonary resuscitation (CPR) skills and training in the use of an automated external defibrillator (AED);
- Integrate police response with overall EMS system; and
- Design a program that is efficient, easy to use, and easy to remember for all participants.

Program Summary

Starting in early 2010, King County Emergency Medical Services (EMS) partnered with Phillips to provide Bellevue and Kent Police Departments in King County with 100 Philips FRX AEDs (an approximate retail cost is \$250,000). Both communities have a high level of collaboration between police and fire services and the respective Chiefs pledged full support. King County EMS trained all police officers in hands-only CPR and AED operation. By April 1, 2010 both departments were prepared and ready to deploy. Norcom and Valley Communications dispatching agencies began sending police along with EMS as primary responders to cardiac arrests.

Numbers

These data characterize the police response to cardiac arrest in Bellevue and Kent from February 1, 2010 through February 1, 2011:

Police were initially dispatched in 64 of 113 (57%) cardiac arrests in the two communities: Police are dispatched only to confirmed cardiac arrests. Some of the non-police dispatches occurred during the start up of the police AED program. In other instances, the call was not initially identified as cardiac arrest.

Police arrived before EMS in 18 of 64 (28%) cases: Because of rapid dispatch, EMS is typically enroute before police is dispatched. This is because of rapid dispatch which sends a fire department EMT unit as soon as a serious condition is identified, even if cardiac arrest is not initially recognized. Even with rapid dispatch, police managed to arrive first in 28% of the cases in which they were dispatched. This speaks directly to the enthusiasm police officers have for responding to these situations.

Police applied the AED 15 of 18 times when they arrived first: The high rate of Police AED application is a testament to the professional, dedicated, initiative that police are showing for this program. In the three instances they did not apply the AED, EMS arrived on scene at essentially the same time as police.

Four patients were shocked: Because AEDs only shock VF, it is not expected that this number would be higher.

Three of four (75%) patients survived to hospital discharge: These numbers are small though we hope similar findings will occur in the future.

Recognition

Police officers who arrived before EMS and applied the AED are given a letter of appreciation for their efforts. In instances where the patient survived, a certificate of commendation is awarded.

Conclusion

Since the inception of this pilot program, five additional King County police agencies have equipped their patrol cars and are responding to cardiac arrest events. We believe this indicates the program is being well received in the police community. We hope to see the Police Defibrillation Program continue to help bolster the effort to increase survival from cardiac arrest in King County.

The EMS Division would like to thank all of the individuals who contribute to this pilot program including:

Chief Mike Eisner, Bellevue Fire Department	NORCOM
Chief Linda Pillo, Bellevue Police Department	Valley Communications
Chief Jim Schneider, Kent Fire Department	Philips Medical
Chief Ken Thomas, Kent Police Department	

Above all, the EMS Division owes a debt of gratitude to the dispatchers, police officers, EMTs, and paramedics who serve their communities with the highest degree of professionalism.

EMS FUNDING AND 2011 FINANCIAL PLAN

OVERVIEW: EMS Levy Structure

The EMS levy is a regular property tax levy, subject to limitations contained in Chapter 84.55.010 RCW. Levy funds are restricted by RCW and can only be spent on EMS-related activities. The levy growth is limited to a 1% increase for existing properties, plus assessment on new construction.

EMS levy funds are collected throughout King County and managed by the EMS Division for the region, based on RCW 84.52.069 Emergency Medical Care and Service levies, and policy guidelines of the Medic One/EMS 2008-2013 Strategic Plan. King County and the City of Seattle signed an inter-local agreement stating that EMS levy funds collected within Seattle go directly to the City. Subsequently, funds generated within the City of Seattle are managed separately by the city. Therefore, this section targets only the EMS fund within the remainder of King County (referred to as the KC EMS Fund), and excludes the City of Seattle.

King County EMS funds are spent on the four main areas of Advanced Life Support (ALS), Basic Life Support (BLS), Regional Support Services, and Strategic Initiatives. All 2011 budget numbers in this report are based on the 2011 Financial Plan adopted in the 2011 1st Quarter Supplemental ordinance and comply with EMS Financial Policies.

Introduction

Economic conditions have changed significantly since the Medic One/EMS 2008-2013 Strategic Plan was developed in 2006. To manage to the reduced revenues, both the KC EMS Fund and EMS partners are focusing on efficiencies, including:

- Realigning resources to promote efficiencies and provide value to EMS partners;
- Continuing to manage the use of resources – particularly ALS and BLS call volumes;
- Developing reserves and designations to cover ALS costs as recommended by King County Auditor's office;
- Prudent usage of reserves as needed and appropriate;
- Reviewing operational and business practices for efficiencies; and
- Delaying and/or eliminating the addition of new ALS units as appropriate.

As a result of current financial forecasts and the focus on efficiencies, revenues and expenditures are both forecast \$21 million less than originally planned for the levy period.

This section concentrates on the EMS Levy Fund. Information focusing on grants, donations, and entrepreneurial projects within the Public Health Fund is included at the end of this section.

1. Revenues

The primary revenue supporting the King County EMS Fund is property taxes, although fees for reimbursable services, interest earnings, grants, and miscellaneous taxes contribute a small amount to the fund.

EMS Revenue (KC EMS Fund)		
	2010 Actual	2011 Plan
Property Taxes	98.44%	98.90%
Charges for Services	0.29%	0.30%
Interest and other Miscellaneous	1.27%	0.80%
Total	100%	100%

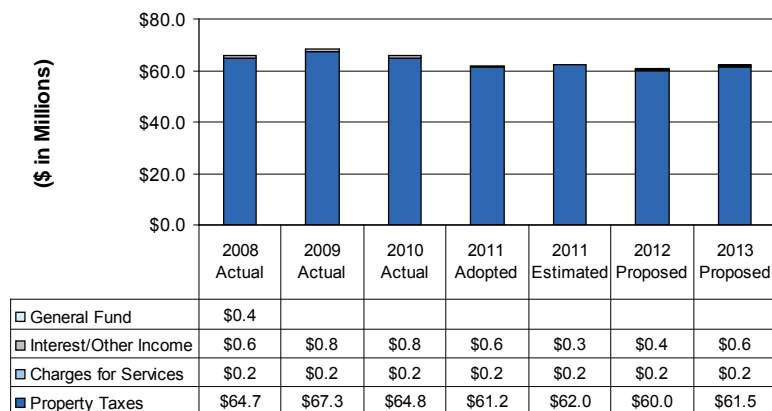
*Based on 2011 Financial Plan adopted in 2011 1st Quarter Supplemental

2010 Revenue for the KC EMS Fund, excluding the City of Seattle, was \$65,806,988; 2011 Adopted Revenue for the KC EMS Fund, excluding the City of Seattle, was \$61,914,065; forecast 2011 revenue is \$62,508,023.

The 2008-2013 EMS Financial Plan was developed in 2006 and 2007. Consistent with forecasts from that time period, it did not forecast the current economic downturn, and therefore did not assume any decreases in Assessed Valuations (AV). Instead, it assumed modest growth in property values and a one-percent limit on revenues from existing properties.

The chart below shows the actual and forecast revenues with property tax reductions through 2012 with a slight upturn in 2013. The reductions in property taxes are the result of lowered assessed valuations.

KC EMS Fund Revenues 2008-2013



EMS FUNDING AND 2010 FINANCIAL PLAN, continued

The original levy financial plan assumed a fairly stable division of levy revenues between the KC EMS Fund and the City of Seattle, based on the proportional distribution of assessed valuation (36% City of Seattle/64% KC EMS Fund).

Division of Assessment	2010	2011
KC EMS Fund	\$65,486,161	\$62,794,359
City of Seattle	\$37,105,294	\$35,794,830
Total	\$102,591,455	\$98,589,189
% of King County	63.8%	63.7%

2. Expenditures

EMS revenues support four major EMS activities related to direct service delivery or support programs (percentages cited below are based on 2010 expenditures).

- Advanced Life Support (ALS) Services:

- Receives over 60% of EMS funds;
- Inflated with compound inflator that considers the different inflators for labor, pharmaceuticals, equipment and benefits; reconciled to actual indices; and
- Uses standard unit cost consisting of an operating and equipment allocation.

- Basic Life Support (BLS) Services:

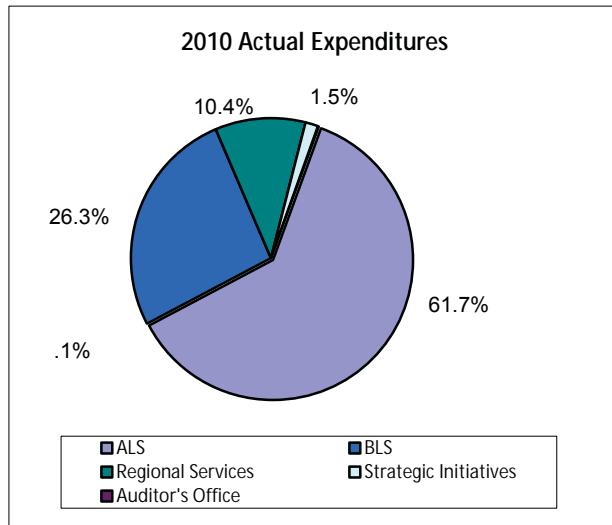
- Receives approximately 26% of EMS funds;
- Inflated by forecast CPI and reconciled to actual CPI;
- The 2010 reconciliation resulted in a slight reduction in the total BLS budget; and
- Funds are distributed to individual agencies based on an allocation that includes the assessed valuation of the district and demand on services (based on call volume).

- Regional Support Programs:

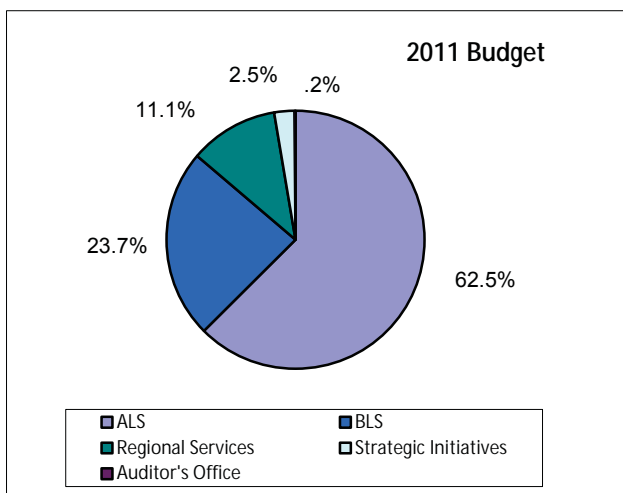
- Receives approximately 10% of EMS funds; and
- Uses CPI as inflator.

- Strategic Initiatives:

- Receives 1.5% of EMS funds;
- Funded with lifetime budgets; and
- The budgeted amount by year is adjusted to reflect changing cash flows based on project needs.



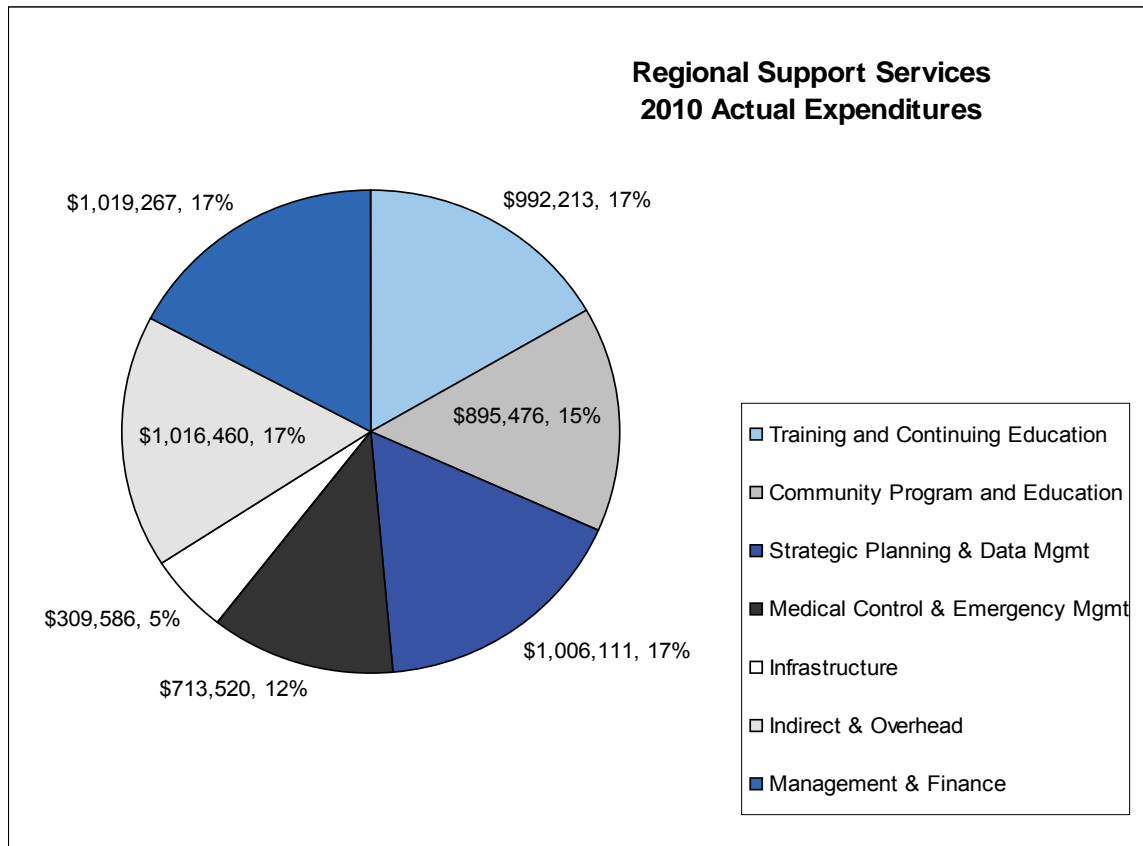
Sub-Area	2010 Actuals
ALS	\$35,272,596
BLS	\$15,032,807
Regional Services	\$5,952,633
Strategic Initiatives	\$833,196
Auditor's Office	\$68,181
Total	\$57,159,413



Sub-Area	2011 Budget*
ALS	\$40,016,845
BLS	\$15,154,163
Regional Services	\$7,108,377
Strategic Initiatives	\$1,614,202
Auditor's Office	\$91,947
Total	\$63,985,534

*1st Quarter Supplemental

EMS FUNDING AND 2010 FINANCIAL PLAN, continued



EMS Strategic Initiatives - Life to Date Results (2008-2013)					
	2008 Actual	2009 Actual	2010 Actual	Life Time Budget	Balance
Emergency Medical Dispatch Strategic Initiatives					
CAD Integration	\$258,448			\$522,519	\$264,071
Dispatch Center Performance Standards	\$406	\$260,186	\$265,299	\$1,452,465	\$926,574
Advanced EMD training		\$7,008	\$24,569	\$233,921	\$202,344
Better management of Non-Emergency calls	\$60,242	\$119,595	\$116,563	\$419,069	\$122,669
Injury Prevention Strategic Initiatives	\$161,890	\$168,242	\$153,773	\$1,371,225	\$887,320
Public Access Defibrillation	\$76	\$402	\$3,134	\$162,980	\$159,368
Interactive Enhancements to EMS Online	\$8,150	\$57,740	\$127,070	\$1,042,928	\$849,968
Enhanced Network Design (SEND)	\$101,996	\$16,297	\$13,200	\$1,040,262	\$908,769
All Hazards Emergency Management Preparation				\$115,000	\$115,000
EMS Efficiencies and Evaluations Studies			\$129,588	648,416	\$518,828
Levy Planning				\$250,270	\$250,270
Total	\$591,208	\$629,470	\$833,196	\$7,259,055	\$5,205,181

3. EMS Contingencies, Reserves and Required Fund Balance

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

Based on comments from the Auditor in 2009 related to fully funding ALS costs, the EMS Division led a regional process to identify potential expenses that fell outside of the unit allocation. This information was used to revise existing reserves and develop new reserves that would be available to cover potential expenses that were not included in the ALS allocation. New reserves for dispatch/communications, facilities, excess backfill for paid time off (PTO), and paramedic student training were added. The salary contingency was converted to a salary reserve. In addition, amounts set aside within existing reserves were revised.

A matrix was developed that identified eligible uses of reserves and triggers, agency responsibilities (including cost sharing), how triggers were determined, and how reserves were costed and could be expensed. As part of the 2011 budget process, the King County Council approved these new reserves and access to the reserves. To access reserves, the proposed use must be reviewed and approved by both the Financial Subcommittee of EMSAC, and EMSAC itself. If approval levels are above funds appropriated by council, council approval would need to be secured before approving distribution of funds to agencies.

Provider/Program Balances: Three agencies used program balances, which are operating allocations that agencies choose to set-aside for future years' needs, in 2010. Two agencies set aside funds for future years.

ALS Provider Loans: Two agencies have taken out provider loans. The financial plan reflects payment plans to pay off loans by end of levy period. Both paid the 2010 portion of the loans in 2010.

Designations from 2002-2007 Levy: In 2010, designations from the 2002-2007 levy (funds carried over from the previous levy period) were accessed to cover increased dispatch costs and tenant improvements at Evergreen Hospital and tenant improvements for Medic 5 at Renton Fire Station 11.

Reserves: No reserves were used in 2010. For 2011, the budget appropriates the use of reserves for vehicle costs, excess paid time off (PTO), dispatch, diesel, salaries, and facilities. Of these, only funds to cover the full cost of vehicles and Salary/COLA reserves have been approved for use. Salary reserves can be used to cover the difference between Consumer Price Index (CPI) and the 2% minimum cost of living increase in contracts only in 2011 - this is provided as a one year only bridge to allow agencies to manage costs with allocations that may be based on low CPI inflation.

The Millage Reduction reserve can be used to lower property tax rates in the future, or replenish other reserves. The King County Council increased millage reduction to \$5 million in 2010 (compared to \$1 million in the original financial plan), and \$6 million in 2011 per King County Ordinance 16984 (compared to \$1.5 million in the original financial plan).

Fund Balances: EMS Financial Policies require a fund balance of 6% of revenues. The current fund balance is above the minimum requirement.

EMS FUNDING AND 2010 FINANCIAL PLAN, continued

The following chart shows the available contingencies, designations and reserves at the end of 2010 and their projected amounts for 2011:

CONTINGENCIES, RESERVES & DESIGNATIONS (available amounts)	2010 Year End	2011 Projected
EMS Contingencies		
Use of Designations		\$557,068
ALS Salary and Wage Contingency		
Disaster Response Contingency		\$3,420,000
SUBTOTAL EMS CONTINGENCIES		\$3,977,068
Reserves & Designations		
Encumbrances	\$118,317	\$118,317
Reappropriation		
Designations		
Provider/Program Balances	\$5,200,985	\$3,921,690
ALS Provider Loans	(\$704,379)	(\$469,586)
KCM1 Equipment Replacement	\$2,042,123	\$602,123
Designations from 2002-2007 Levy	\$230,842	
Reserves for Unanticipated Inflation		
Diesel Cost Stabilization	\$750,000	\$90,000
Pharmaceuticals/Medical Equipment	\$828,000	\$1,097,000
Call Volume/Utilization Reserve	\$732,000	\$942,821
Reserves		
<i>Salary Reserve</i>		\$385,000
<i>Excess Backfill for PTO</i>		\$400,000
<i>Paramedic Student Training</i>		\$310,000
<i>Dispatch/Communications</i>		\$620,000
Medic Unit/Chassis Obsolescence	\$360,749	\$550,619
<i>Facilities</i>		\$650,000
<i>Risk Abatement</i>	\$565,000	\$2,200,000
<i>Outstanding ALS Retirement Liability</i>	\$2,185,000	\$3,900,000
Millage Reduction	\$5,041,654	\$6,041,654
SUBTOTAL RESERVES & DESIGNATIONS	\$17,350,291	\$21,359,638
TOTAL	\$17,350,291	\$25,336,706
* <i>Italicized items indicate new reserves</i>		

The following table shows historical use of reserves and designations from the 2002-2007 levy in the 2008-2013 levy period:

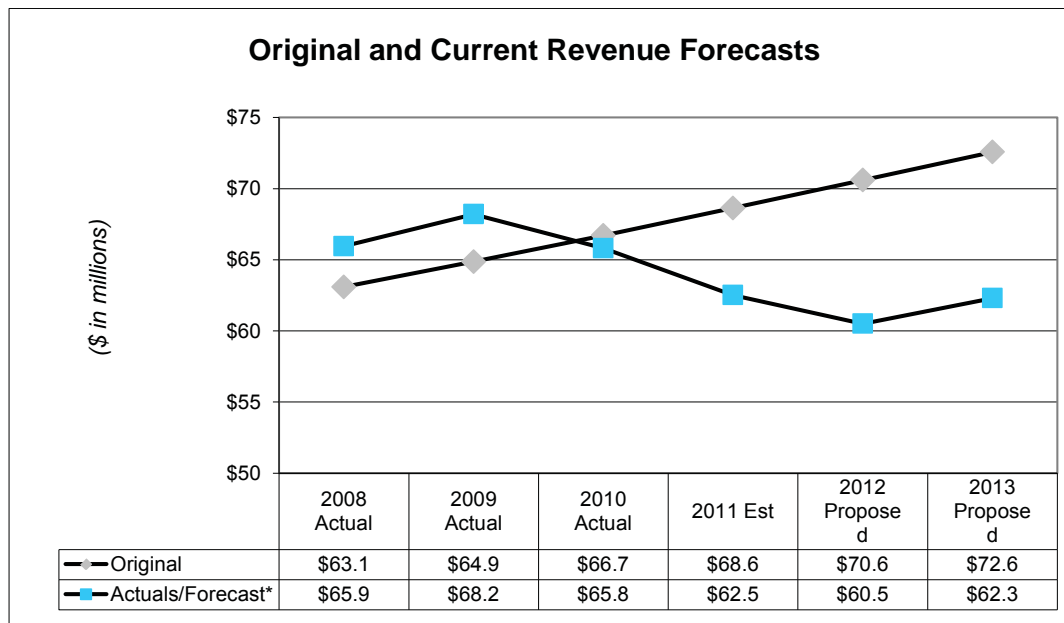
USE OF RESERVES & DESIGNATIONS				
Reserves	2009	2010	2011	Total
Diesel Reserve	\$171,903			\$171,903
Vehicle/Chassis Reserve	\$201,751		\$389,381	\$591,132
Salary/COLA Reserve			\$336,542	\$336,542
SubTotal	\$373,654		\$725,923	\$1,099,577
Designations from 2002-2007 Levy				
Facility Tenant Improvements	\$150,000	\$190,914		\$340,914
Dispatch		\$258,018		\$258,018
SubTotal	\$150,000	\$448,932		\$598,932
TOTAL	\$523,654	\$448,932	\$725,923	\$1,698,509

4. 2008-2013 Financial Plan Trends

Reductions in assessed valuations, along with the 30 cent per \$1,000/AV cap on the EMS levy, have resulted in lowered property tax assessment forecasts. The economic downturn has also lowered inflation rates. Since EMS allocation increases are based on economic metrics, allocation amounts have subsequently been lower than originally planned. In addition, King County EMS management made specific decisions to cut costs by not implementing two 12-hour ALS units planned for 2012 and 2013, and to decrease the overall Strategic Initiative program budget.

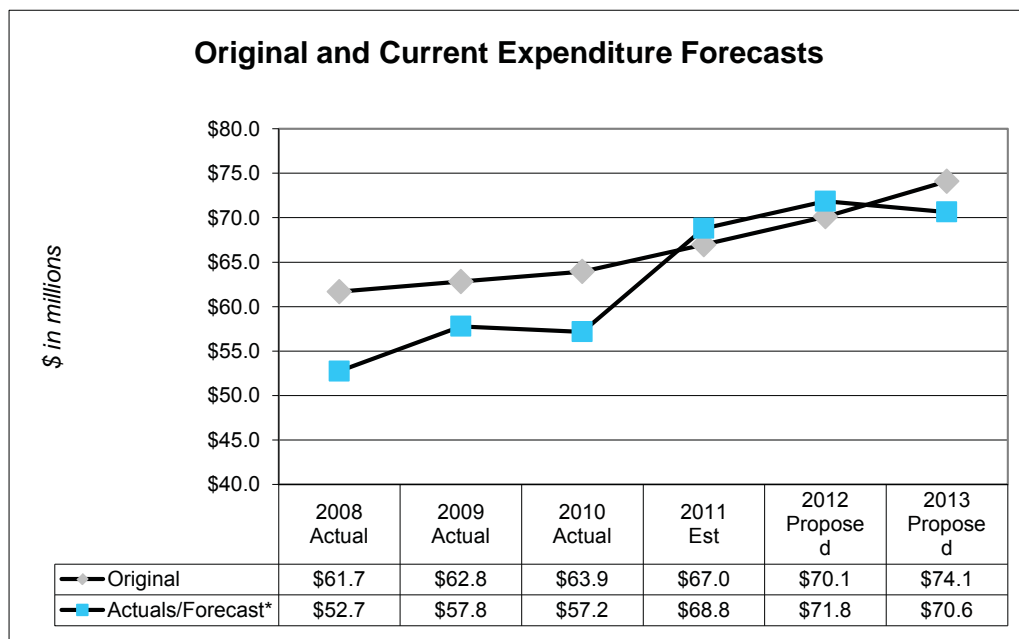
The charts on the following page compare the planned revenues and expenditures (from the EMS Levy Ordinance 15861) with the current forecast (March 2011):

EMS FUNDING AND 2010 FINANCIAL PLAN, continued



Based on June 2011 Office of Economic and Financial Analysis (OEFA) forecasts

Total revenue forecast in the original plan was \$406 million; current revenue forecast is \$385 million or \$21 million less than planned.



Based on June 2011 Office of Economic and Financial Analysis (OEFA) forecasts

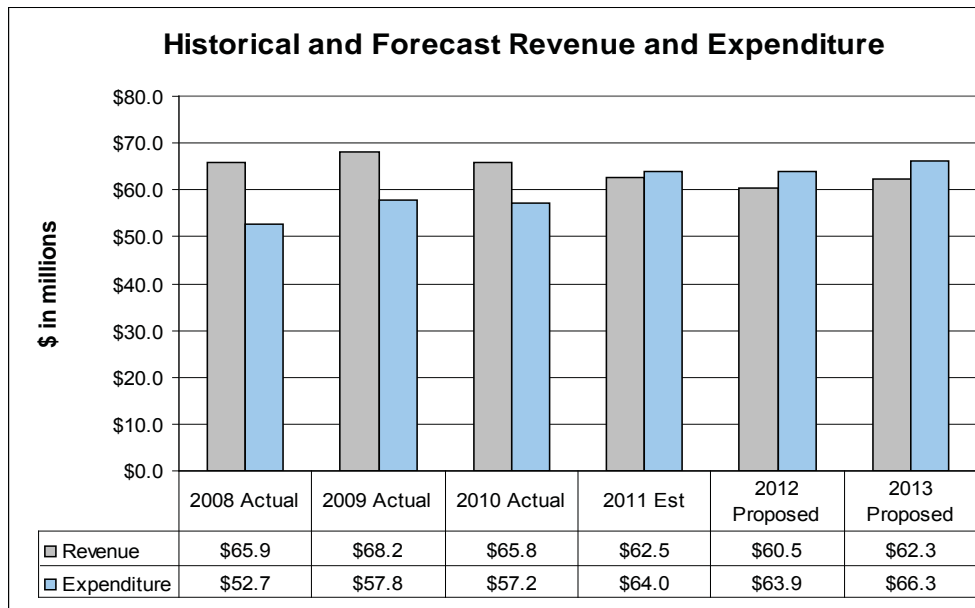
The expenditure forecast in the original plan was \$400 million; current expenditure forecast is \$379 million; \$21 million less than planned. The 2011 through 2013 forecasts include disaster relief contingency (budgeted but not used in previous years) and forecast use of other designations.

The following table shows the difference between the original and current assumptions:

Comparison of Original and Current Financial Plans (in millions) *							
	2008	2009	2010	2011	2012	2013	Total
Difference (Current minus Original)							
Revenue	\$2.86	\$3.34	(\$0.90)	(\$6.13)	(\$10.09)	(\$10.32)	(\$21.24)
Expenditures	(\$8.95)	(\$5.04)	(\$6.78)	\$1.82	\$1.74	(\$3.46)	(\$20.66)
*Financial Plan in Ordinance 15861							

The result is that both revenues and expenditures are forecast at \$21 million less than the original plan, with revenue reductions offset by expenditure reductions.

The chart below shows actual and forecast revenues and expenditures (not including funds budgeted in contingency) for the 2008-2011 levy period.



EMS FUNDING AND 2010 FINANCIAL PLAN, continued

2011 expenditure increases include the use of approximately \$1.44 million of King County Medic One's equipment reserves to purchase new medic vehicles, and cashflow related increases to Strategic Initiative projects.

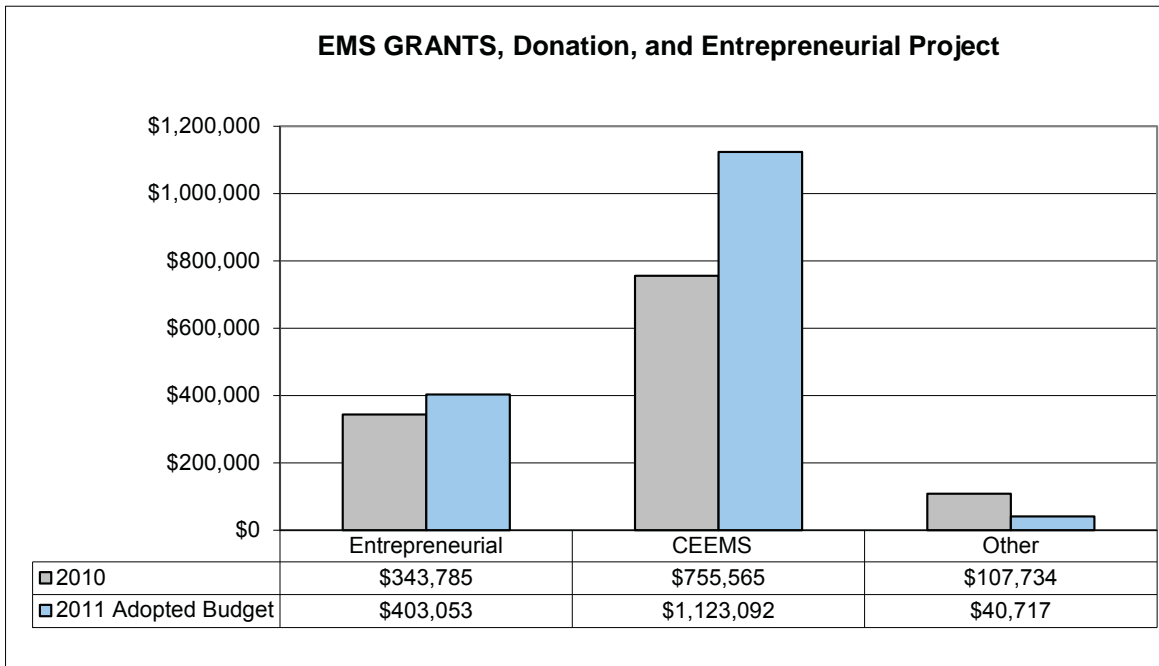
The EMS Division remains committed to minimizing new costs and looking for programmatic efficiencies. The regional EMS partners have reiterated their commitment to continue to look at placing funds into the millage reserve, while at the same time meeting the needs of the system, to potentially reduce the rate needed for the next levy.

5. EMS Grants, Donation, and Entrepreneurial Projects (Public Health Fund)

The EMS Division, through the EMS Grants Group and the Center for Evaluation of Emergency Medical Services (CEEMS) within the Public Health Fund, has been very successful in competing for research grants. In 2011, the Medtronic Foundation awarded a 5-year \$1.3 million grant to implement the HeartRescue Flagship Program to improve outcomes from sudden cardiac arrest throughout Washington State by focusing on community, pre-hospital, and hospital response levels of care (see p. 30). In 2009, the Life Sciences Discovery Fund (PITCAR) awarded a \$2.6 million, four-year programmatic grant to support the Program to Integrate Technology and Cardiac Arrest Resuscitation, a collection of projects aimed at developing and advancing new technologies to improve the care and treatment of out-of-hospital cardiac arrest (see p.28).

The EMS Grants Group focuses on research grants that usually do not obligate the EMS program to fund future services. The results of these research grants have been incorporated into the existing work load of EMS personnel or have affected interventions, protocols and standard operating procedures used in the field. The EMS Division will evaluate any on-going continuation of activities initiated through EMS Grant Group and CEEMS during the planning process for the next levy period.

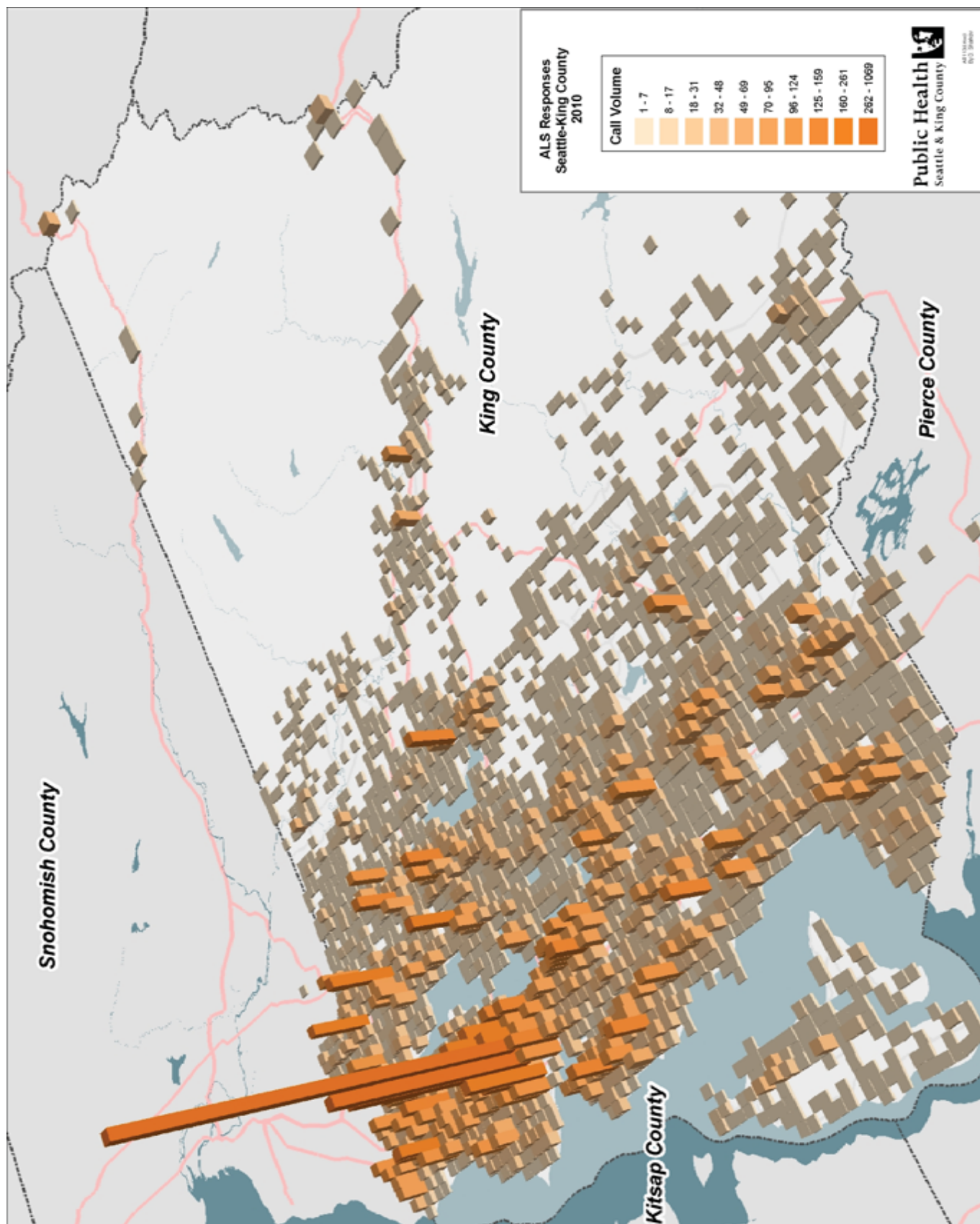
The EMS Online Entrepreneurial Project provides online training to agencies outside King County as a subscription service. The project was based on the interest of the outside agencies, a response to the King County Executive's Entrepreneurial Project initiative and included legal review and approval. The expenses incurred in providing the service outside of King County are covered by revenue from the subscription program. In addition, subscription revenues are used to make enhancements above those funded by the EMS levy (see p.25).



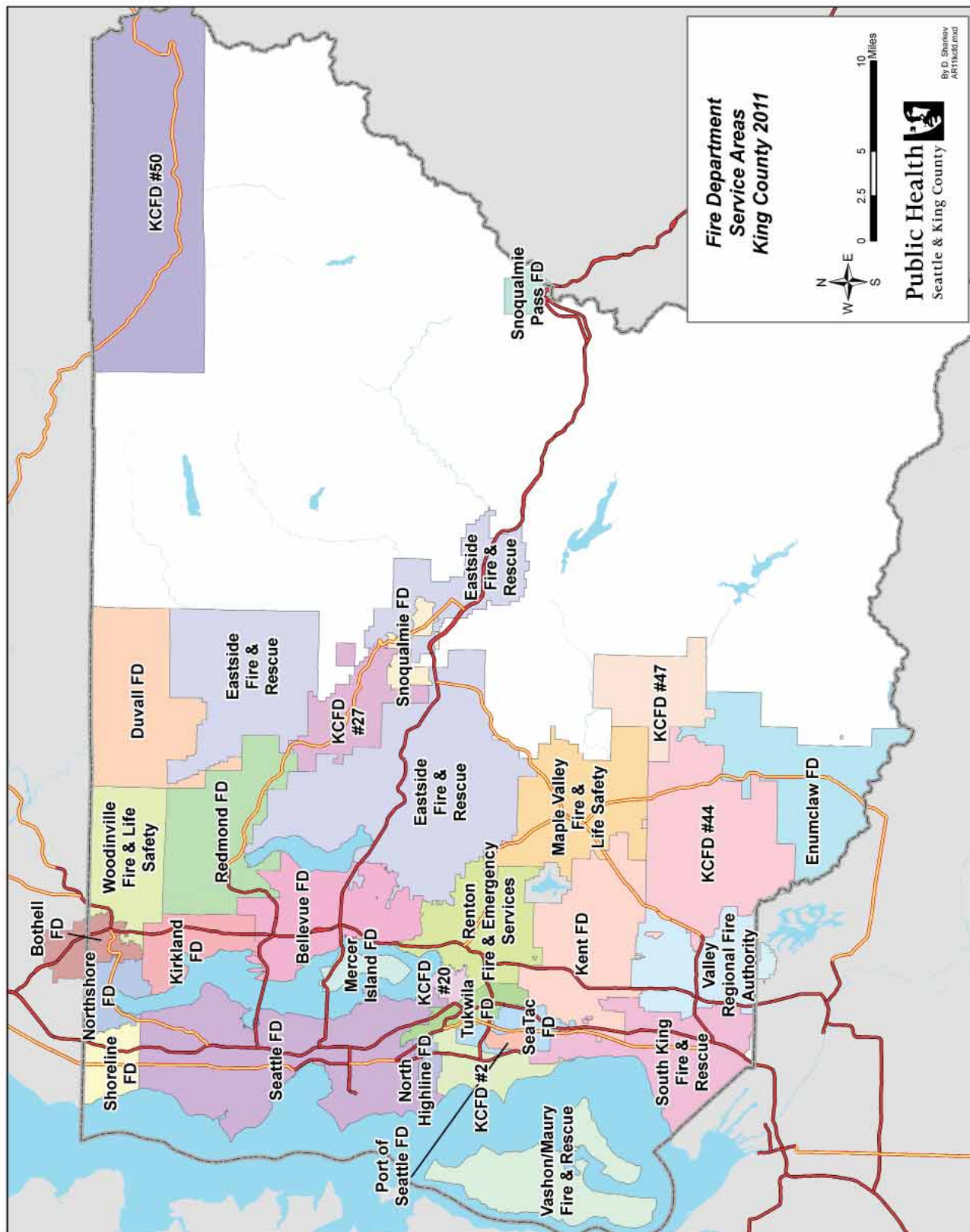
6. Recommendations for EMS Levy Fund 2012 Rates

Due to the changed economic conditions, it is recommended that the 2012 levy rates remain at the statutory limit. It is recommended that reserves set aside for lowering property taxes be saved to “buy down” the levy rate for the next levy, or held in reserve to cover lower than currently anticipated property taxes in the final years of the current levy.

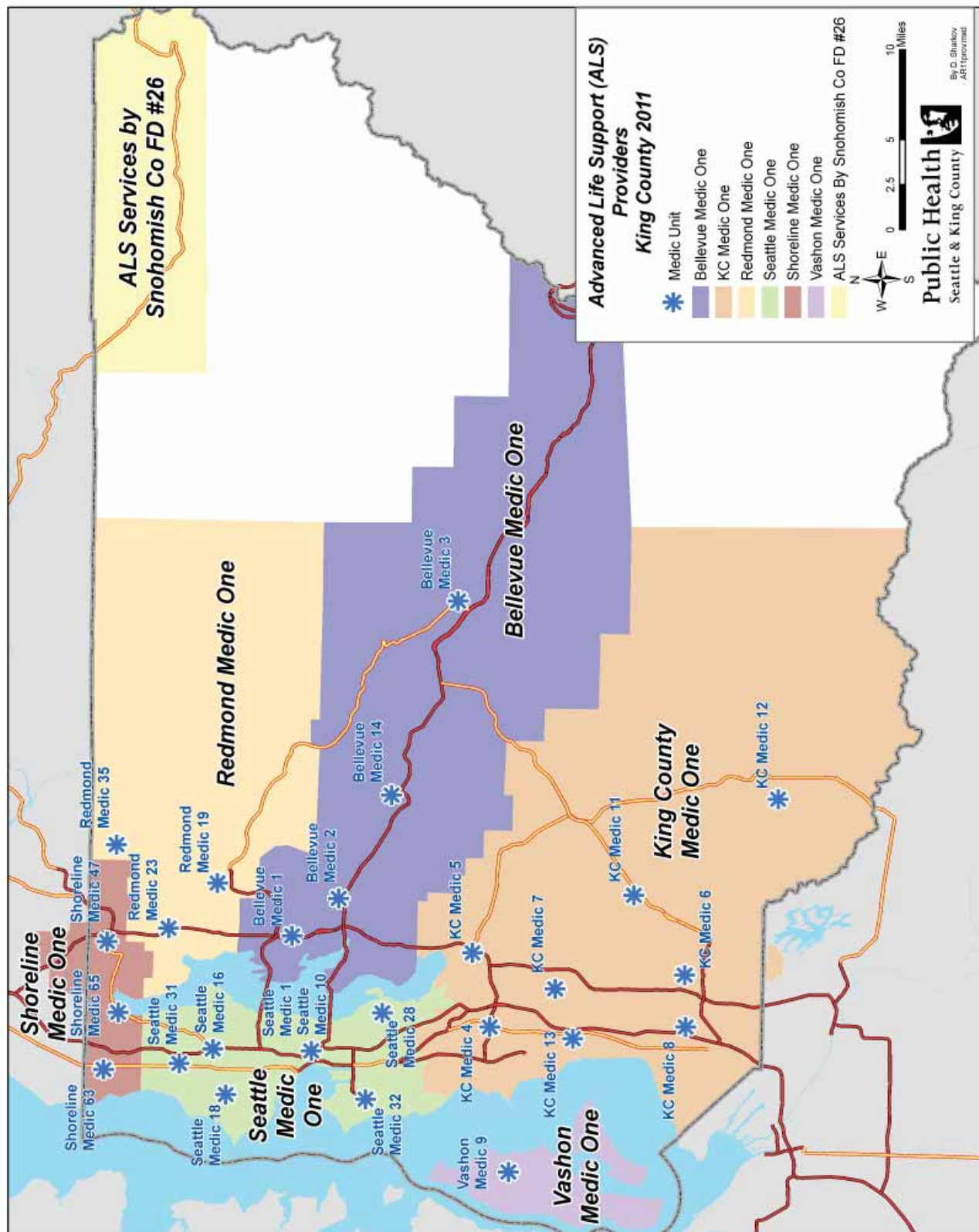
Appendix A: Regional Map of 2010 Total ALS Call Volume



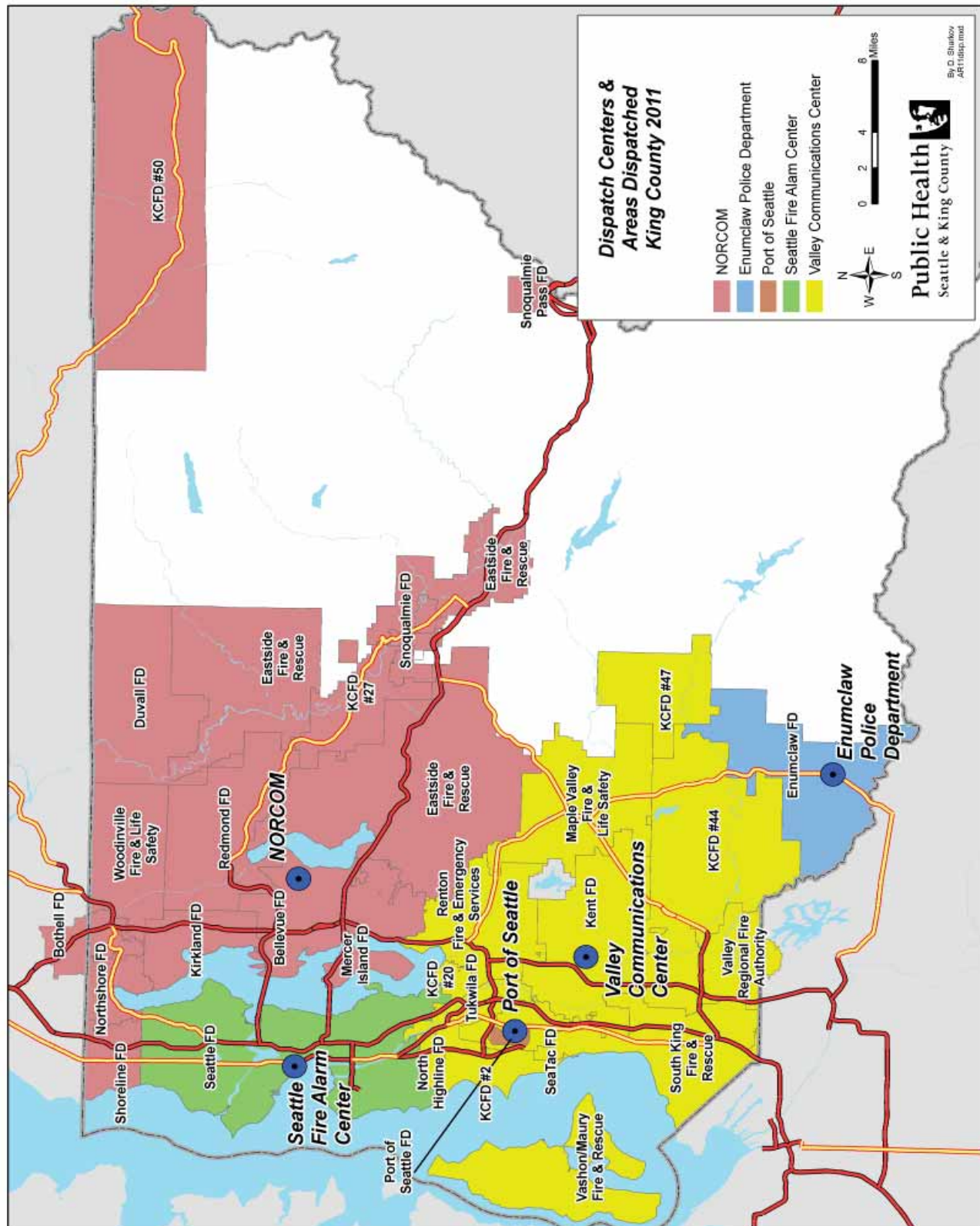
Appendix B: Regional Map of BLS Provider Areas



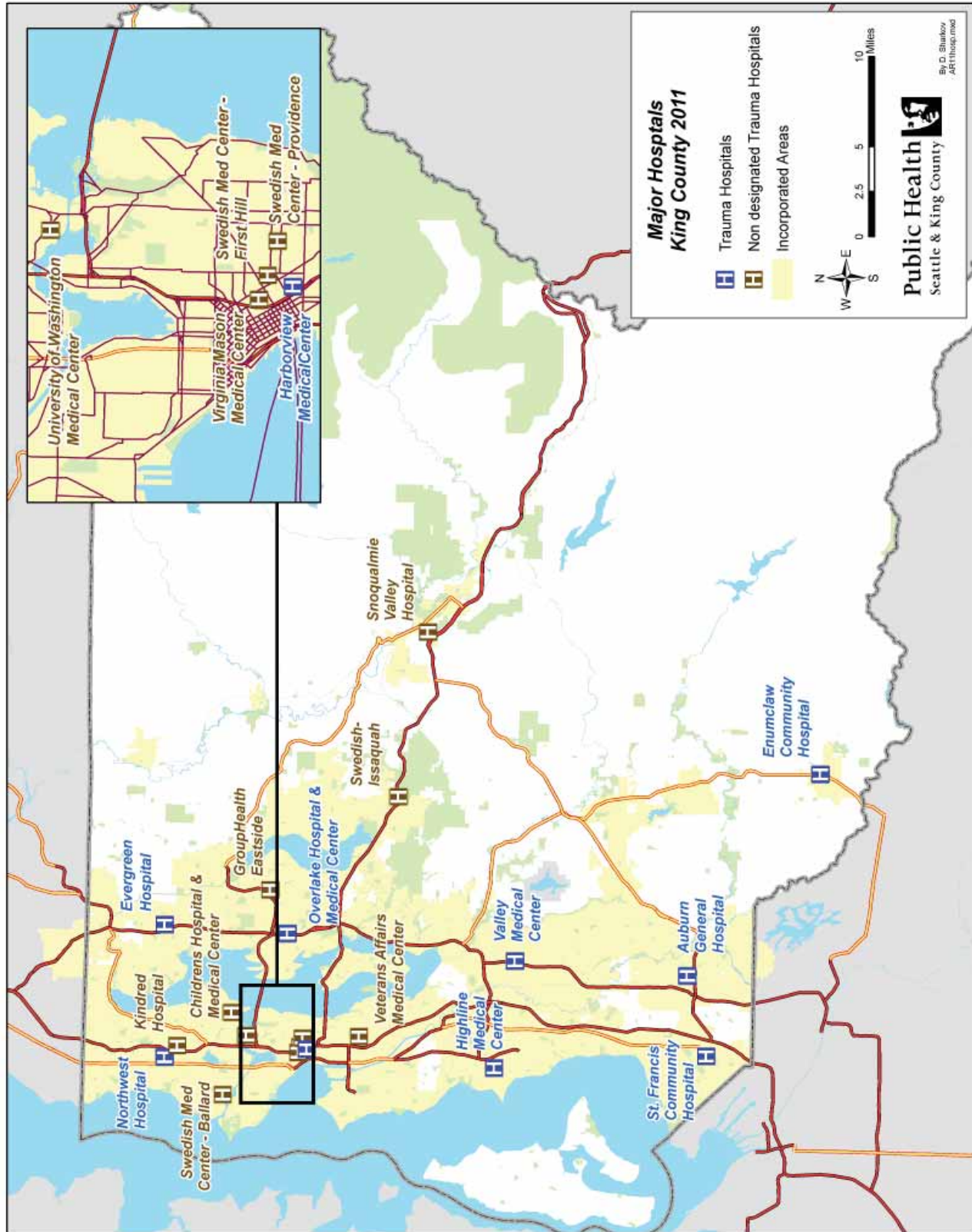
Appendix C: Regional Map of ALS Provider Areas



Appendix D: Regional Map of Dispatch Center Service Areas



Appendix E: Regional Map of EMS Hospitals



Appendix F: Public Access AEDs - King County



Appendix G: 2011 EMS Advisory Committee Listing

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

Appendix H: EMS FUND 1190 Revenue/Expenditures Summary

	2009 Actual	2010 Actual	2011 Budget *
BEGINNING FUND BALANCE	\$19,686,011	\$29,988,811	\$34,891,636
REVENUES			
Property Taxes	\$67,256,696	\$64,780,871	\$61,230,215
Grants	\$4,986	\$2,186	\$1,650
Charges for Services	\$181,397	\$193,498	\$190,000
Interest Earnings/Miscellaneous Revenue	\$723,852	\$778,185	\$438,200
Other Financing Sources	\$35,654	\$52,248	\$54,000
Transfer from Current Expense Subfund			
EMS REVENUE TOTAL	\$68,202,585	\$65,806,988	\$61,914,065
EXPENDITURES			
Advanced Life Support Services (12)	(\$35,656,800)	(\$35,272,596)	(\$40,016,845)
Basic Life Support Services	(\$15,281,662)	(\$15,032,807)	(\$15,154,163)
Regional Services	(\$6,149,464)	(\$5,952,633)	(\$7,108,377)
Strategic Initiatives	(\$629,468)	(\$833,196)	(\$1,614,202)
Use of Designations			(\$557,068)
ALS Salary and Wage Contingency ¹			
Disaster Response Contingency			(\$3,420,000)
Use of Reserves			(\$840,000)
King County Auditor's Office	(\$60,000)	(\$68,181)	(\$91,947)
EMS EXPENDITURE TOTAL	(\$57,777,394)	(\$57,159,413)	(\$68,802,602)
GAAP Adjustment	(\$119,000)	(\$5,600)	
Journal Entry Error	(\$3,391)	(\$3,391)	\$1,500,000
Subtotal	(\$122,391)	(\$8,991)	\$1,500,000
ENDING FUND BALANCE	\$29,988,811	\$38,627,395	\$29,503,099
RESERVES AND DESIGNATIONS			
Encumbrances	(\$519,010)	(\$118,317)	(\$519,010)
Reappropriation			
Designations (incl. program balances)	(\$4,084,252)	(\$5,200,985)	(\$2,361,819)
ALS Providers Loans	\$939,172	\$704,379	\$469,586
KCM1 Equipment Replacement	(\$1,811,306)	(\$2,042,123)	(\$371,306)
Designations from 2002-2007 Levy	(\$689,773)	(\$230,842)	(\$240,841)
Reserves for Unanticipated Inflation	(\$2,506,000)	(\$2,310,000)	(\$2,129,821)
Reserves (incl. millage reduction)	(\$10,352,698)	(\$8,152,403)	(\$15,057,273)
TOTAL RESERVES AND DESIGNATIONS	(\$19,023,867)	(\$17,350,291)	(\$20,210,484)
ENDING UNDESIGNATED FUND BALANCE	\$10,964,944	\$21,277,104	\$9,292,615
TARGET FUND BALANCE	\$4,092,155	\$3,948,419	\$3,714,844
* 1st Quarter Supplemental from 2012 REQ EMS Financial Model OEFA Mar 2012 CAFR Reconcile.			
King County Medic One Donations			
Fund 6980/Account 06204**	2009	2010	
Beginning Balance	\$79,285	\$112,869	
Donations	\$33,584	\$15,011	
Expenditures		(\$120,949)	
2010 Ending Balance	\$112,869	\$6,931	

** Sources: ARMS downloads

Appendix I: EMS Division Bibliography and Citations

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Appendix J: EMS Division Contact Information

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

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

Specific Program Contacts:

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