

EMERGENCY MEDICAL SERVICES DIVISION

2023 ANNUAL REPORT

TO THE KING COUNTY COUNCIL



SEPTEMBER 2023



Medic One/Emergency Medical Services (EMS) serves over 2.3 million people in Seattle & King County and provides life-saving services on average **every 2 minutes**.

It is available to everyone, whatever and wherever the emergency. Every year, **the Medic One/EMS System saves thousands of lives:**

In 2022,

Emergency Medical Technicians (EMTs) responded to approximately 250,000 calls regionwide.

Paramedics responded to approximately 50,000 calls for advanced life support.

Compared to other communities, cardiac arrest victims are **two to three times more likely to survive** in Seattle & King County from out-of-hospital cardiac arrest.

Strong, effective medicine is the hallmark of the regional Medic One/EMS system

Greetings from the Directors,

We are pleased to submit the 2023 Emergency Medical Services (EMS) Division Annual Report, as required by King County Ordinance #12849.

As would be expected, the past few annual reports have centered almost exclusively on how EMS programs and activities responded to the COVID-19 pandemic. Although a fall resurgence is certainly possible, we've chosen to focus this year's report on two major themes we've observed recently: the need to build a sustainable workforce for the future, and the remarkable cross-divisional collaborations on a variety of key Public Health-led initiatives.

We are incredibly proud of our EMS providers' dedication to serve people in need while contending with the ongoing impacts of the pandemic. It is this passion and commitment to community that EMS agencies are now seeking during this time of record hiring and training. We are experiencing a high rate of turnover in EMS/fire personnel for a variety of reasons, including retirements, burnout, or the 'great reckoning', and this will likely continue for a number of years. You'll read in our report some of the strategies we're using to address this issue and how we're using this opportunity to create a more diverse and inclusive workforce that better reflects our community.

In addition, one of the unanticipated but certainly welcome pandemic effects is the existence of numerous micro-pathways forged among Public Health workers during the pandemic activation. This has resulted in unexpected collaborations between divisions, sections, and teams, and we report on how these cross-collaborations are continuing forward in new and different ways. As our first responders faced increased calls to opioid overdoses, scenes of gun violence, and behavioral health related calls, we've been able to tap into the many connections created during the pandemic and repurpose them in ways we hadn't anticipated, all ultimately to benefit our patients and our system.

Finally, we'd like to acknowledge the effect the pandemic has had on the personal well-being of our first responders and staff. Consistently prioritizing the needs of others during an unprecedented time of uncertainty results in deep fatigue and burnout. Regional leadership has worked to increase mental health awareness and provide resources so that we can support our providers as they make sacrifices to meet the healthcare needs of the community.

We appreciate the opportunity to share with you evidence of our continued commitment to excellence in the EMS system in King County and thank you for your continued support and advocacy.



A handwritten signature in blue ink, appearing to read "Faisal Khan".

Dr. Faisal Khan,
Department Director,
Public Health - Seattle
& King County



A handwritten signature in black ink, appearing to read "Michele Plorde".

Michele Plorde, MPH
Division Director,
Emergency Medical
Services
Public Health - Seattle
& King County

Special thanks to our regional partners

Dispatch Centers

NORCOM - Northeast King County Regional Public Safety Communication Agency
Port of Seattle
Seattle Fire Alarm Center
Valley Communications Center

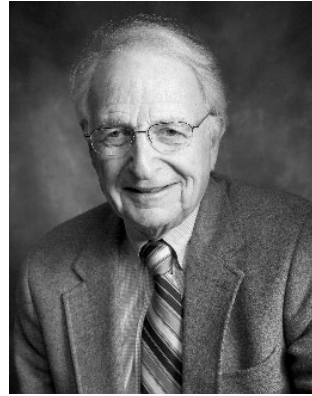
BLS Providers

Bellevue FD
Bothell FD
Eastside Fire & Rescue
Enumclaw FD
KCFD #2 (Burien)
KCFD #20 (Skyway/Bryn Mawr)
KCFD #27 (Fall City)
KCFD #45 (Duvall)
KCFD #47 (Kangley-Palmer)
KCFD #50 (Skykomish)
KCFD #51 (Snoqualmie Pass)
Kirkland FD
Mercer Island FD
Mountain View Fire & Rescue
Port of Seattle FD
Puget Sound RFA
Redmond FD
Renton RFA
Seattle FD
Shoreline FD
Snoqualmie Fire & Rescue
South King Fire & Rescue
Valley RFA
Vashon Island Fire & Rescue

ALS Providers

Bellevue Medic One
King County Medic One
Redmond Medic One
Seattle Medic One
Shoreline Medic One

In memory of Dr. Leonard Cobb



Acknowledgements

We would like to thank those who contributed to the EMS Division 2023 Annual Report, including the staff members of the EMS Division, King County Medic One, the University of Washington, and our regional partners. We recognize below those who contributed in various ways to the content, writing, design, and production of this document.

Executive & Managing Editors

Helen Chatalas
Tracie Jacinto

Administration Section

Becky Ellis
Cynthia Bradshaw

Community Programs Section

Chris Drucker
Leah Doctorello
Kristine Mejilla

King County Medic One

Andrea Coulson
Evan Van Otten

University of Washington

Dr. Tom Rea
Dr. Peter Kudenchuk

Regional QI Section

Jennifer Blackwood
Tracie Jacinto
Jennifer Liu
Megin Parayil
Dmitry Sharkov
Jenny Shin
Lihua Yin

Training & Education Section

Jason Hammond

Table of Contents

EMS System Overview 7

EMS Tiered Response System

Building a Strong and Resilient Workforce of the Future 8

Investing in Our People and Supporting our Workforce Needs
Future Women in EMS and Fire Workshops
S.T.A.R. Program
Key Investments and Improvements
Prioritizing Mental Health and Wellness

Caring for the Needs of our Communities 10

Preventing Falls for our Older Adults
Mobile Integrated Healthcare: Providing the Most Appropriate Care for our Patients

Supporting Public Health Initiatives 12

EMS Responding to Public Health Crises
The Opioid Crisis in King County
EMS Responses to Firearm Injuries
Health through Housing Partnership

Measuring and Improving 16

EMS System Operational Statistics
Cardiac Arrest Statistics - Seattle & King County 2022 Overview

Research & Innovation 20

Center for the Evaluation of EMS: Evaluation and Investigation
Cardiac Arrest
EMS Wellness
EMS and Patient Communication
2020-2025 Strategic Initiatives: VPSI, AEIOU QI, STRIVE

Financial Management 24

EMS Funding & 2022 Financial Plan Overview
Updated Levy Forecast: Assessed Valuations & EMS Reserves and Contingencies
Financial Plan

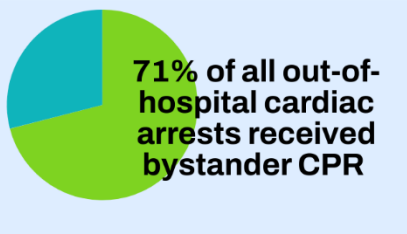
Appendices 26

A - EMS Performance Measures
B - Map of Regional Dispatch Centers
C - Map of Basic Life Support Service Areas
D - Map of Advanced Life Support Service Areas
E - Map of Major Hospitals
F - EMS Advisory Committee (EMSAC)

It takes a SYSTEM to save a victim

In order to increase survival from out-of-hospital cardiac arrest (OHCA) and to ensure high quality patient care, King County EMS tracks a number of performance measures designed for continuous quality improvement. Selected 2022 performance measures are highlighted below.

Community



71%

Dispatch

Performance measures for dispatch focus on accurate recognition of cardiac arrest


96% of all cardiac arrests were recognized by 9-1-1 operators

96% of these calls were assigned the correct resource level

96%

Basic Life Support


Median BLS unit response time: 5.2 minutes

Average chest compression fraction: 91% 

5.2 min.

Advanced Life Support

Median ALS unit response time: 7.8 minutes

Rate of successful first attempt intubations: 84% 

7.8 min.

Overall, **288** lives were saved from OHCA in 2022!



System Performance

In 2022, the survival rate for witnessed VF cardiac arrest (widely recognized measure of EMS performance) in Seattle and King County was 47%.

EMS Tiered Response System

Any time residents of Seattle and King County call 9-1-1 for a medical emergency, they are using the Medic One/EMS system. The internationally renowned regional system responds to an area of 2,134 square miles and serves a population of over two million people. The system is managed by the Emergency Medical Services (EMS) Division, Public Health - Seattle & King County and relies on complex partnerships with fire departments, paramedic agencies, EMS dispatch centers and hospitals for the program's success. The Medic One/EMS system in Seattle and King County is distinct from other systems in that it is medically-based, regional, and uses a tiered system for out-of-hospital response. There are four major components in the tiered regional Medic One/EMS system, described below.

EMS System 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.

Telecommunicator (Dispatcher) Triage - 9-1-1 calls are received and triaged by telecommunicators at one of four dispatch centers. Following medically-approved guidelines, telecommunicators determine the most appropriate level of care needed and resource(s) (e.g., ALS, MIH, or Nurseline). Providing pre-arrival instructions for most medical emergencies, the dispatcher guides the caller through life-saving steps, including CPR/AED instructions until the Medic One/EMS provider arrives.

Tier One Response - Basic Life Support (BLS) Services - EMTs respond to 100% of emergency medical technician calls and usually arrive first on scene. Approximately 4,400 EMTs are employed by 24 fire-based agencies. Arriving at the scene in 5.2 minutes on average, BLS provides advanced first aid to stabilize the patient. EMTs are certified by the State and are required to complete initial and ongoing education and training to maintain certification. MIH units may be dispatched to respond to low acuity calls.

Tier Two Response - Advanced Life Support (ALS) Services - Paramedics usually arrive second on scene to provide emergency care for critical or life-threatening injuries or illness. Regional paramedic services are provided by five agencies operating 27 ALS units throughout King County, including fire departments in Bellevue (4), Redmond (3), Shoreline (3), Seattle (8), and King County Medic One (9).



Access to EMS System
Bystander calls 9-1-1



Triage by Dispatcher
Use of Criteria-Based Dispatch Guidelines



First Tier of Response
All EMS service requests receive a first tier response from Basic Life Support (BLS) by firefighter/EMTs or Mobile Integrated Health (MIH)



Second Tier of Response
Advanced Life Support (ALS) by paramedics



Additional Medical Care
Transport to hospital

Investing in Our People & Supporting Our Workforce Needs

The EMS Division continues to support building EMS career pathways and creating a diverse workforce through various targeted outreach, recruitment, and training opportunities. The Future Women in EMS and Fire (FWIEF) workshops and the Strategic Training and Recruitment (S.T.A.R.) program both play a pivotal role in attracting individuals from diverse and underrepresented communities to the field of emergency medical services. The EMS Division also sponsors the King County Fire Chiefs Association's Diversity and Recruitment workshops designed to help potential candidates be successful in the pre-hiring, hiring, training, and career segments of their professional journey. By offering free EMT training, mentoring, and career development opportunities, we continue to promote diversity, equity, and inclusion while enriching our regional workforce with varied perspectives and fostering culturally competent approaches to emergency medical care.

Future Women in EMS and Fire Workshops

Since 2018, the EMS Division has partnered with fire departments across King County to sponsor FWIEF workshops. Geared specifically to encourage women to join the fire and EMS service as a career, this bi-annual weekend experience includes interactive interview panels, hands-on stations, lectures, and real-life demonstrations. Each workshop is completely organized and run by women from over 18 different fire departments who offer great insight, advice, empowerment, and opportunities to women who are seeking a career in fire/EMS. Host agencies alternate between the north and south to provide all departments an opportunity to showcase the characteristics and culture specific to their agency. Attendees have provided highly positive feedback and told of their experience successfully navigating the testing process and being hired by agencies throughout the county. However, there is still work to be done, as some of responses to follow-up surveys have indicated there are still many challenges that women face while going through the testing and hiring process and completing the fire academy.



S.T.A.R. Program

Fostering an EMS workforce that reflects the demographic makeup of the region and providing training opportunities for those that are traditionally underrepresented in the EMS workforce are the goals of the S.T.A.R. Program. These are accomplished by educating the community about the S.T.A.R. program and opportunities to work in EMS, covering the tuition of the EMT training program, and creating a culture and environment for S.T.A.R. students to feel like they belong and become successful. Mentorship, employment workshops, and study groups are made available to ensure successful completion of the class, passing the National Registry EMT exam, and seeking employment in the EMS workforce.

Key Investments and Improvements

This past year, the region once again saw a record number of EMT hires throughout the EMS system. The EMS Division expanded its support for existing EMT training courses offered through partner fire agencies so that approximately 250 new EMTs could receive their initial certification. This is a significant increase from the 100 or so trained annually in previous years. By supporting a greater number of EMT training classes, we will increase the pool of well-trained professionals to meet the growing demands of EMS in the county.



Hiring has also been front and center for King County Medic One (KCM1) which provides paramedic service to approximately 900,000 residents throughout South King County. KCM1 actively participates in public outreach and recruitment events across the region and even hosted “Virtual Open Houses” to give candidates the chance to learn about working as a paramedic with the agency. Training and recruiting more EMTs should have the future downstream effect of an even more diverse group of paramedics to serve King County.

The EMS Division made the strategic decision to shorten its county-hosted 14-week EMT class to 10 weeks to enable trained professionals to enter the workforce more rapidly. The streamlined curriculum and enhanced focus on essential skills allows for a shortened and more intensive training program that doesn’t sacrifice instructional hours or time devoted to skills assessment. In addition, we have been actively recruiting and training more EMT evaluators and instructors to accommodate the increased training needs. A greater number of trainers create enhanced mentorship, supervision, and skill development of our regional first responders. It also provides greater flexibility to staff the county’s initial and ongoing EMT trainings.

The EMS Division further strengthened its relationships with the regional training consortiums, bringing greater access to a wider range of training resources, best practices, and expertise. This past January, KCM1 became the newest member of the South King County Fire Training Consortium which provides regionally consistent training to Zone 3 (South King County) area firefighters/EMTs. In its role there, KCM1 provides BLS training oversight, quality improvement, and quality assurance for the fire departments, enhancing ALS and BLS interactions. These collaborative efforts enrich all training programs and contribute greatly to the continuous professional development of our regional first response personnel.

Prioritizing Mental Health and Wellness

First responders encounter a great deal of emotional stress and secondary trauma in their jobs, resulting in high rates of compassion fatigue, burnout, and suicide when compared to the general population. The EMS Division continues to partner with the King County Fire Chiefs Association to identify training opportunities for both leadership and front-line personnel to improve the mental wellness of first responders and dispatchers with a focus on prevention. This includes online awareness trainings, in-person speakers specializing in secondary trauma, and peer support trainings. In addition, EMT CE training now includes a focus on first responder wellness to address the mental health needs of our EMS personnel. The annual BLS Health and Education Training Symposium will also include a mental health awareness workshop.

Caring for the Needs of our Communities

The complex health needs of our residents in King County can be as diverse as our communities themselves. The EMS Division and its partners offer a wide variety of services and programs that include preventing the need to call 9-1-1 in the first place while also ensuring the most appropriate care is provided for lower-acuity calls.

Preventing Falls for our Older Adults

As the leading cause of injuries for adults 65 years and older, falls are a major threat to the independence and quality of life of older adults. However, they are not an inevitable part of aging and there are proven effective strategies to help prevent falls among older adults.

Our One Step Ahead Program, which offers adults 50 years and older a home safety assessment to identify fall hazards, enrolled hundreds of older adults this past year. This fall prevention program includes an at-home visit by a physical therapist to explore the various causes and concerns falls, and work on resolving potential threats such as installing grab bars in key locations around the home. Since the program's inception in 2003, nearly 4,000 residents of King County outside Seattle have taken proactive steps toward staying healthy, independent, and safe in their homes.

Recognizing that the best way to reduce falls is to be physically active, the Falls Prevention Team aggressively promoted the Shape Up! program at community engagement events throughout King County. The Shape Up program provides discounts to adults 50+ to participate in group physical activity classes at seven community/senior centers in the region. Over the past year, this campaign supported over 2,200 seniors in their efforts to build strength, balance, and flexibility. To reach a greater audience, fall prevention materials have been translated and presented in culturally sensitive manners to help raise awareness among older adults with limited English proficiency.

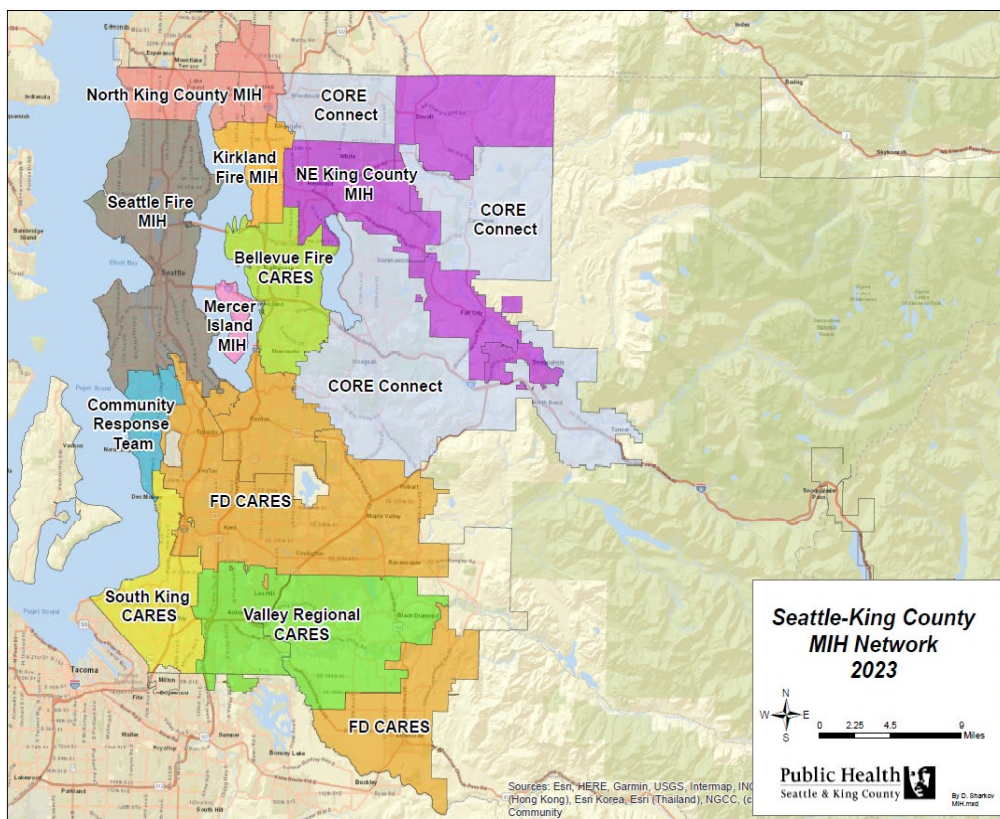


Mobile Integrated Health (MIH): Providing the Most Appropriate Care for our Patients

All fire departments across King County experience 9-1-1 calls from individuals that require care but may not necessarily need or benefit from the traditional “lights and sirens” response. To better address the needs of these low-acuity callers, King County fire departments are connecting 9-1-1 callers to appropriate health and social services through an alternative EMS service known as Mobile Integrated Healthcare (MIH).

Through MIH programs, multidisciplinary EMS teams work closely and extensively with frequent callers, lower-acuity callers, and patients requiring complex care to identify their root causes of need and navigate them to appropriate health and social services. By having mobile, community-based care teams dedicated to connecting callers to more appropriate resources, the EMS system offers another option for a more meaningful intervention and truly impacts the patient’s well-being.

King County’s 2023 MIH network consists of 11 programs throughout the region, involving partnerships across 21 of the 24 fire departments in King County. Each program is comprised of a multidisciplinary care team and is tailored to meet their community’s unique needs. Driven by local fire agencies with regional support from the EMS Division, King County’s MIH programs currently serve over 1.8 million residents (nearly 80%) throughout King County.



The EMS Division recently conducted a mid-levy review assessing the strengths of the established MIH network and offering recommendations for future activities. Interviews for this review showed that all MIH programs throughout King County have been well received internally by leadership and response crews alike, as well as externally by MIH clients and their families. The region encouraged identifying a sustainable pathway to continue expanding MIH, focusing on data and assessment to help demonstrate the impact and success of a regional MIH network, and supporting rural agencies and new MIH programs as they enter the MIH Network.

EMS Responding to Public Health Crises

EMS responses to emergency medical conditions such as opioid overdoses, firearm injuries and COVID-19 are valuable sources of information for Public Health. EMS data often represents an early indicator to inform trends in the types of emergency medical incidents occurring and where help may be needed in certain communities. Our data and information continue to support nearly real-time surveillance here in King County and inform the following public health focus areas:



Non-Fatal Opioid Overdoses

Near real-time EMS data aids communities in identifying potential clusters of non-fatal opioid overdoses, and helps direct resources to combat overdoses. Future efforts will include collaboration with Public Health and fire departments to implement pilot programs for outreach and education, and supply naloxone to its communities.



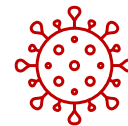
The Impact of Firearm Injuries

EMS responses to firearm injuries has continues to rise steadily. Public Health's public-facing dashboard features near real-time EMS data, helping Public Health and other regional partners in providing access to critical programs aimed at reducing gun violence.



Climate Health: Extreme Weather Events

EMS data plays a key role in monitoring trends such as heat exhaustion. In extreme weather events, EMS data helps to coordinate targeted Public Health education and outreach efforts to the community.



COVID-19

EMS data continues to provide situational awareness about COVID-19. Early in the pandemic, EMS responses involving COVID-19 patients identified potential locations such as long-term care facilities that may be in need of Public Health resources.



Death Investigations

EMS records inform death investigations performed by the Medical Examiner's Office and Child Death Review Program. In accordance with State of Washington's Revised Code, sharing this information is often helpful in aiding death investigations performed by these programs to understand pre-hospital patient care and actions taken by EMS in the field.



Health through Housing

King County is working hard to address the lack of housing for people experiencing homelessness. EMS is often called to publicly funded permanent supportive housing sites. Information, such as EMS responses to these locations, has provided insight into the unique needs of these facilities and how to provide the best care to individual residents.

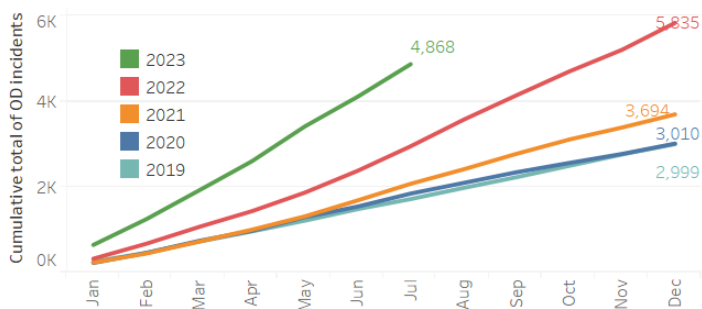
The Opioid Crisis in King County

As first responders, EMS is uniquely positioned to engage with and provide care to a population that is at risk for repeat overdose, and to connect people who use drugs to treatment and other healthcare services. Earlier this year, the Public Health Prevention Division, in conjunction with the EMS Division, received a 4-year grant to focus on preventing future opioid overdoses from the **Substance Abuse and Mental Health Administration (SAMHSA)**. This grant supports a countywide strategic approach to prevent overdoses and improve patient outcomes. Goals of this grant include:

- increasing knowledge among the EMS workforce on substance abuse and overdose prevention;
- reducing overdose fatalities; and
- increasing access to treatment and recovery support services.

Public Health - Seattle & King County monitors drug overdose data to detect potential overdose clusters and identify emerging trends. Since 2018, the EMS Division has collaborated with other divisions in Public Health - Seattle & King County to display non-fatal opioid overdose incidents via a public-facing dashboard. Since 2020, the number of non-fatal overdoses treated by EMS has grown on an exponential scale, jumping by 94% between 2020 and 2022. The number of opioid overdoses treated by KC EMS continues to increase and may exceed the number of EMS incidents seen in 2022.

Cumulative Incidents of Opioid Overdoses treated by KC EMS



The dashboard displays monthly and neighborhood-specific overdose trends and promotes rapid communication of emerging drug-related threats to regional partners. Public Health uses this data and information to detect clusters and identify patients for post-overdose follow-up program. The ability to accurately identify these incidents in a timely manner provides an important tool to address key questions about who is being affected, why they're being affected, and how to prevent future occurrences. Please refer to the following link for more information:

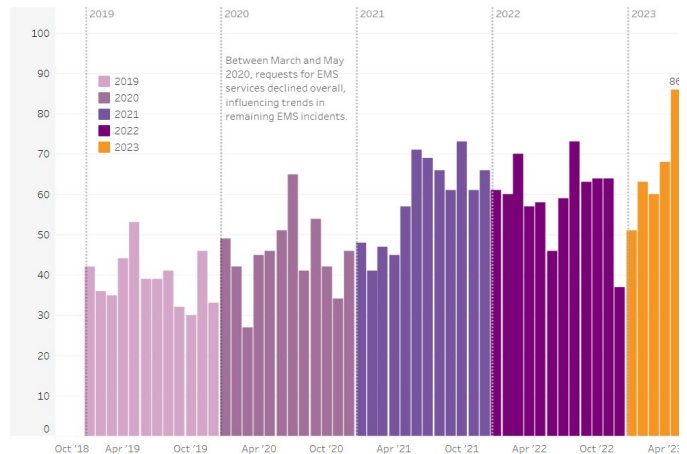
<https://kingcounty.gov/en/dept/dph/health-safety/safety-injury-prevention/overdose-prevention-response/data-dashboards>.



EMS Responses to Firearm Injuries

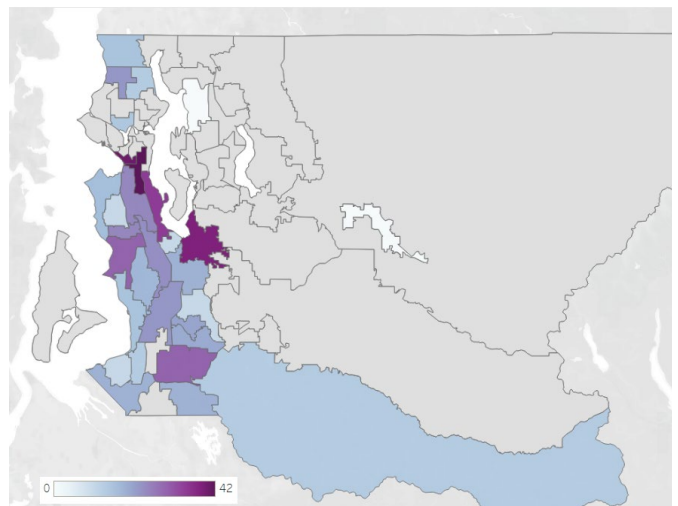
Gun violence and firearm injuries have been on an increasing trend both nationally and locally. According to the King County Prosecuting Attorney’s 2022 Year-End County Firearm Violence Report, the number of incidents of shots fired increased rose by over 16% from 2021 to 2022. The overall number of shooting victims decreased by 6% in 2022 compared to 2021.

A unique partnership between the EMS Division and the Assessment, Policy Development, and Evaluation (APDE) Unit at Public Health - Seattle & King County integrates EMS care data with information about firearm hospitalizations and death to address data gaps and improve ongoing surveillance. Dashboards characterizing time trends, demographics, injury severity, method of injury, transport types, and geographical distribution of EMS incidents involving firearm injuries were made available starting in May 2022.



EMS responded to a total of 2,166 firearm injury incidents between January 1, 2019 to July 31, 2022. Over 80% (1,760) of all incidents involved males. The most common age group was 25-44 years, although the number of firearm incidents involving individuals ages 18-24 years has increased over the years. Almost half of all firearm incidents occurred at a private residence. While risk varies substantially by King County geography, all parts of King County were impacted by firearm injuries. Please refer to the link for more information:

<https://kingcounty.gov/depts/health/data/firearms/EMS.aspx>



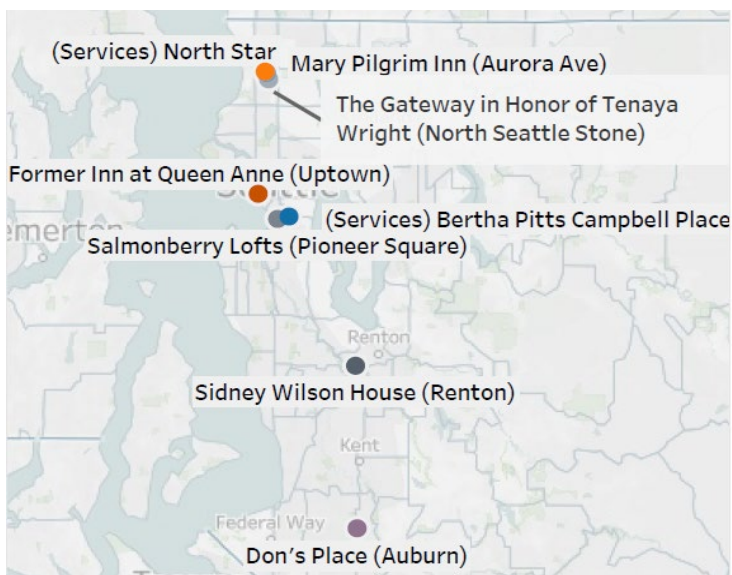
EMS providers treat a spectrum of severity requiring a range of EMS resources and triage. ALS attended to about half of all EMS firearm incidents. EMS providers in King County use lifesaving interventions (e.g., tourniquets, special bandaging, field blood transfusion) to bridge critical patients to hospital care. EMS applied tourniquets in approximately 12% (258) of firearm incidents. Importantly, EMS manages tourniquets placed prior to their arrival by laypersons or law enforcement and decides if they should remove, replace, or leave the initial tourniquet in place for severe or life-threatening injuries. King County implemented the whole blood field program in a phased manner beginning in 2021, and now, all of the region is able to use this resource in EMS incidents involving life-threatening hemorrhagic shock. The program is among the first of its kind in the United States and requires a high level of operational expertise and strong support from the Harborview Medical Center Blood Bank.

Health Through Housing Partnership

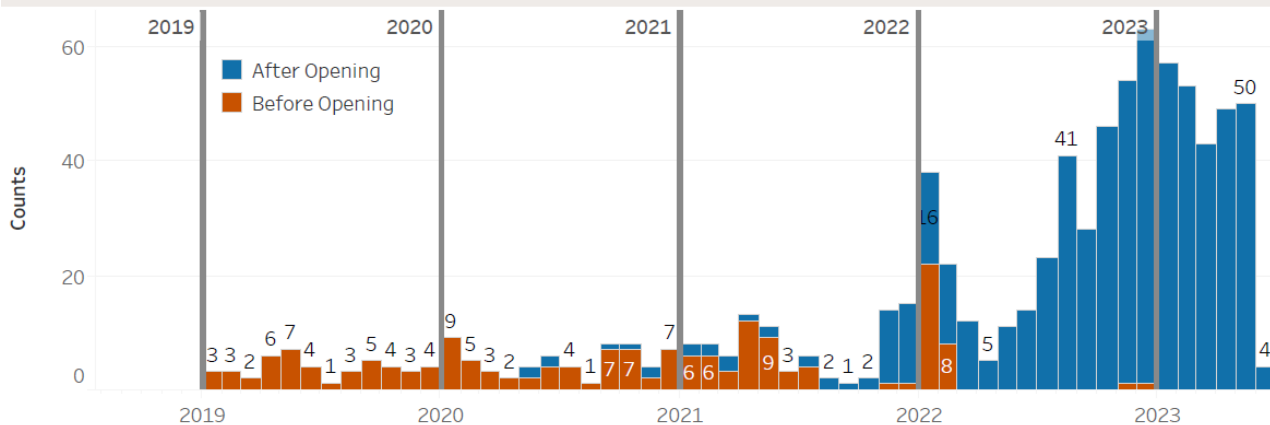
The [Health Through Housing - King County](#) effort is a regional strategy to offer people experiencing chronic homelessness into apartments that are “dignified, affordable, and service enriched.” The EMS Division is partnering with Health through Housing (HtH) by facilitating discussions to improve awareness, coordination and communication across the many service sectors interfacing with the residents to enhance the overall experience at HtH locations across King County. These discussions have proven to be highly effective in fostering a better understanding of the perspectives and needs of the various service providers. A key component includes reviewing the overall and individual EMS responses to the HtH facilities on a quarterly basis, identifying any trends over time, and addressing acute topics as they arise (e.g., opioid overdoses, false fire alarms, and hoarding).



Map of HtH Locations



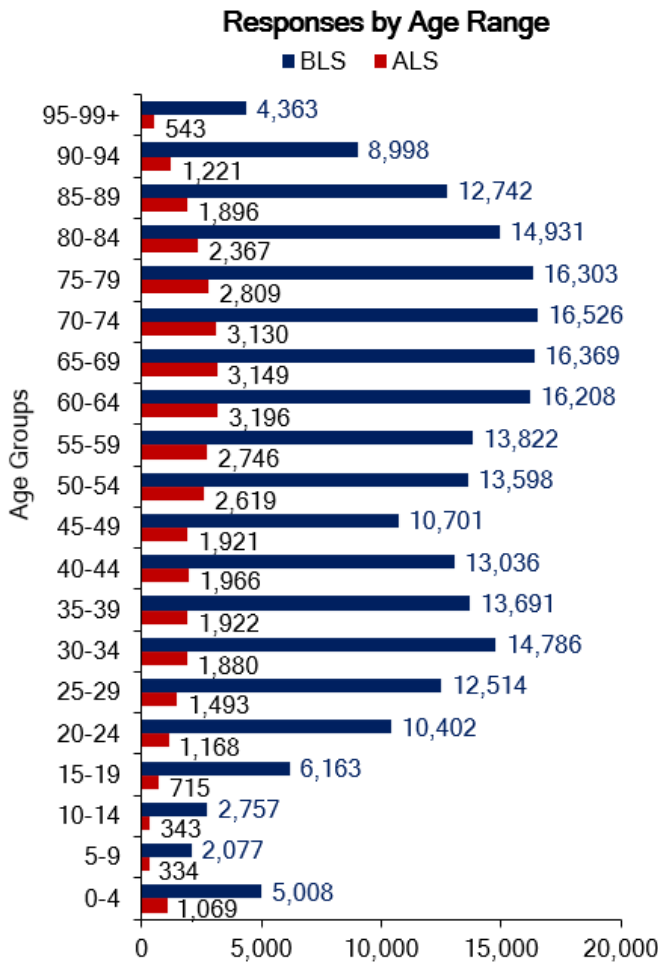
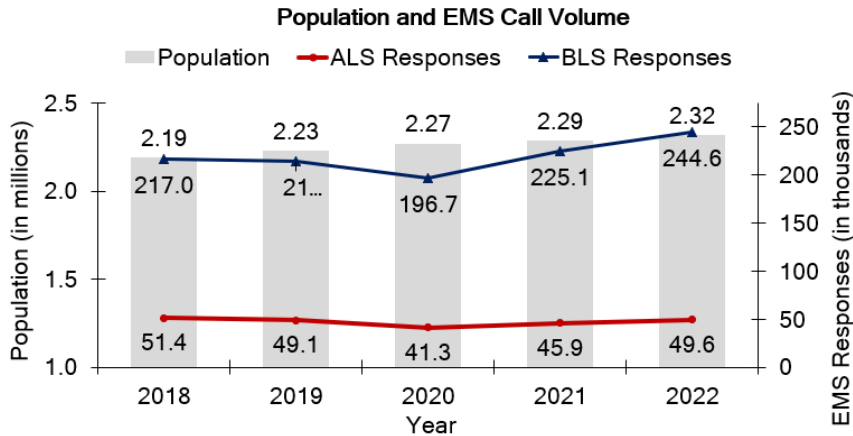
Total Incidents to Facilities by Month (Jan 2019 - Present)



MEASURING & IMPROVING

EMS System Operational Statistics

Population serves as an important indicator to predict the trend in the number of emergency medical responses¹. This means that the demographic profile of King County matters: When King County's population increases, the number of emergency medical responses (call volume) typically increase.



In the tiered EMS response system, BLS responds to 100% of all EMS calls. Cancelled enroute calls accounted for approximately 22% (10,813) of all ALS calls compared to 4% of all BLS calls (8,671).

2022 STATS

244,648
Total EMS Responses

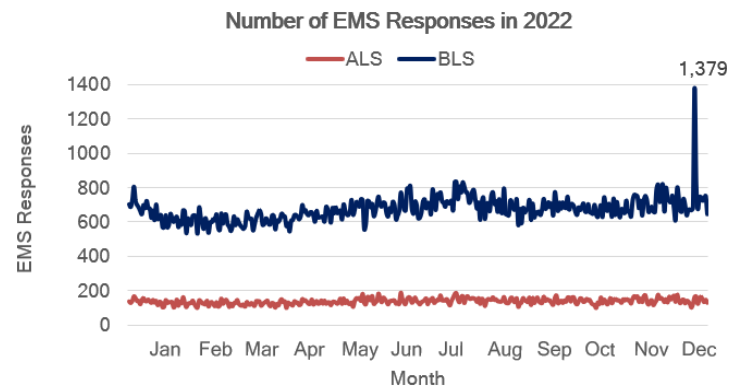
145,404 (75%)
BLS-Only Responses

49,622 (25%)
BLS & ALS Responses

Average # of Calls Per Month
20,387 BLS
4,135 ALS

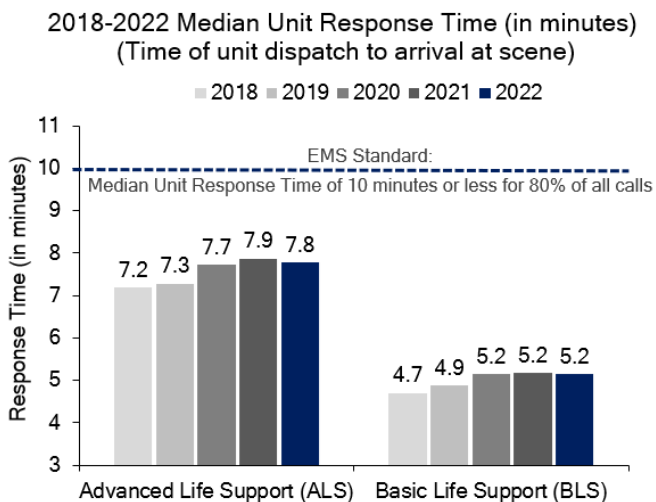
Average # of Calls Per Day
670 BLS
136 ALS

The following graph shows the patterns of ALS and BLS responses in 2022. Notably, EMS saw a 100% increase in EMS calls during the extreme ice event on December 23, 2022.



¹ https://ofm.wa.gov/sites/default/files/public/dataresearch/pop/april1/ofm_april1_poptrends.pdf

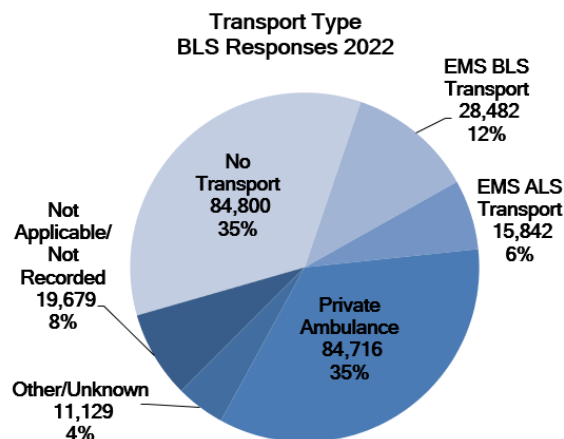
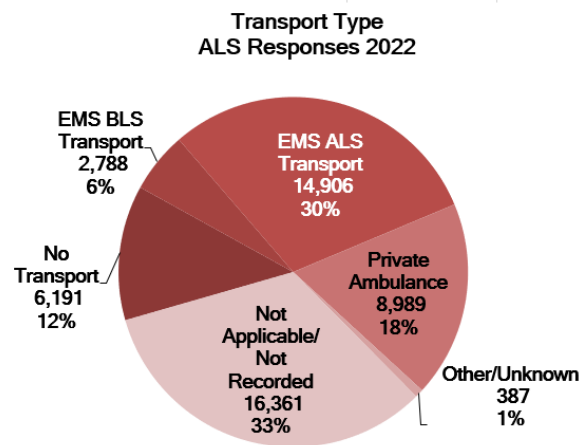
Unit response time serves as a key performance indicator of operational efficiency in any EMS system. Two important metrics include the total response time - the time between the 9-1-1 call being received by the dispatch center and the EMS unit's arrival on scene - and the unit response time. The unit response time is the time between the unit dispatched and EMS arrival on scene. Across the last five years, ALS consistently met the standard performance goal of a median response time of 10 minutes or less, and 80% of all calls within 14 minutes or less.



EMS Call Types: EMS responds to a wide variety of emergency medical calls. In 2022, nearly 50% of ALS responses involved serious, life-threatening emergencies such as cardiovascular, respiratory, and neurological calls, with a higher percentage of calls to patients 65 years or older. BLS responds to 100% of all calls which are comprised of nearly 20% involving trauma, with a higher percentage of patients who are 65 years or younger.

MEDICAL TYPE	ALS		BLS	
	Count	%	Count	%
Cardiovascular	8,459	26.4%	15,236	7.1%
Respiratory	3,873	12.1%	14,105	6.6%
Behavioral/Psychological	3,228	10.1%	22,458	10.5%
Neurological	3,204	10.0%	20,220	9.5%
Alcohol/Drug	2,597	8.1%	13,743	6.4%
Trauma	2,430	7.6%	41,518	19.4%
Abdominal/Genito-Urinary	1,403	4.4%	15,920	7.4%
Endocrine/Metabolic	833	2.6%	2,790	1.3%
Infection	725	2.3%	6,320	3.0%
Allergy/Anaphylaxis	689	2.2%	1,658	0.8%
Obstetric/Gynecological	258	0.8%	879	0.4%
Environmental	86	0.3%	566	0.3%
Obvious Death	150	0.5%	2,899	1.4%
Other Medical	3,633	11.4%	37,091	17.3%
No Injury/Illness	414	1.3%	18,464	8.6%
Total Medical Calls	31,982	98.7%	213,867	91.4%

Transport Type is an important component of providing EMS care. Once a patient is stabilized, EMS personnel use their skills and knowledge to determine whether transporting the patient to a hospital is needed for further medical attention. Based on the clinical needs of the patient, a decision to identify the most appropriate transport resource is made. The graphs shown below identifies the transport types for EMS responses across 2022, broken into two categories for ALS and BLS responses.



Cardiac Arrest Statistics - Seattle & King County 2022 Overview

Cardiac arrest is a public health challenge with stark health consequences. It occurs when a person's heart stops working suddenly, often without warning. As a consequence, blood stops circulating and the body is deprived of oxygen. The person collapses, loses consciousness, and their breathing becomes agonal (gasping) or stops completely. The sudden nature of cardiac arrest always leads to death unless there is rapid action by a series of rescuers.

The assistance during those immediate first few minutes of a cardiac arrest is the most critical. This quick and coordinated action has been described by the "links in the chain of survival" that include prompt recognition, early CPR (chest compressions to resume or improve blood circulation) and defibrillation (electrical shock to restore the heart's rhythm), and advanced EMS and hospital care. The actions taken by laypersons, law enforcement, telecommunicators and EMS personnel (firefighter/EMTs and paramedics), and hospitals influence the chances of a successful resuscitation. Success is defined when the arrest victim is resuscitated and ultimately discharged alive from the hospital. This measure of success is a key benchmark for a regional EMS system. Seattle and King County uses a comprehensive surveillance system to capture and review each cardiac arrest as the foundation to continuously strive to improve patient care and health outcomes.

Cardiac Arrest Data Reporting

Cardiac arrest data reported each year combines both Seattle and the balance of King County, providing a snapshot of outcomes and treatment for two specific groups of cardiac arrest victims:

Overall Group

Persons suffering arrest who are two years or older who received ALS treatment and had no advanced directives to limit care

Utstein Group

Persons in the overall group whose cardiac arrests were witnessed by bystanders are primarily due to a medical condition of the heart with an initial heart rhythm that requires a defibrillator shock.

Although cardiac arrest calls comprise only about 1% of the total EMS call volume, performance and outcome are considered good proxies for the performance of an entire EMS system. This is because cardiac arrest resuscitation tests every component of the emergency response. The "Utstein" group provides a closer look at a specific population of cardiac arrest patients for whom each link in the chain of survival has special importance. This particular group was defined nearly three decades ago when the international community recognized a need for standardization for reporting about cardiac arrest to help compare performance across different systems. As a result, the Utstein cardiac arrest survival rate is considered the benchmark for EMS systems. Although special emphasis is placed on the Utstein group, both groups are informative and drive quality improvement initiatives and innovative practices to enhance care.

The following page presents results from the cardiac arrest surveillance system from years 2018-2022 for Seattle and King County. The report presents 2022 results and five-year cumulative results. The five-year cumulative results provide the best general gauge of EMS system performance as there can be year-to-year variability caused by circumstances outside the EMS system control.

Overall number of cardiac arrests for which ALS resuscitation efforts were attempted for patients two (2) years or older with no advance directives to limit care:

Year	2018	2019	2020	2021	2022
Cardiac Arrests	1,298	1,308	1,350	1,499	1,598

- 2022 Highlight: Overall survival to hospital discharge based on arrest before or after arrival of EMS personnel and initially monitored cardiac arrest rhythm:

Initial Cardiac Arrest Rhythm	Patients Treated	Patients Survived to Hospital Discharge	Percent Survived
Arrest <u>Before</u> Arrival of EMS	1,378	224	16%
Ventricular Fibrillation/ Pulseless Ventricular Tachycardia (VF/pVT)	288	114	40%
Asystole	703	13	2%
Pulseless Electrical Activity (PEA)	263	54	21%
Not Shockable, unknown if PEA or asystole	83	11	13%
Pulses on First Check	38	32	84%
Paced	3	0	0%
Unknown	0	0	N/A
Arrest <u>After</u> Arrival of EMS	220	64	29%
Ventricular Fibrillation/ Pulseless Ventricular Tachycardia (VF/pVT)	37	25	68%
Asystole	41	7	17%
Pulseless Electrical Activity (PEA)	132	30	23%
Not Shockable, unknown if PEA or asystole	5	1	20%
Pulse on First Check	3	1	33%
Paced	1	0	0%
Unknown	1	0	0%
Total	1,598	288	18%

- Utstein Group: Survival to hospital discharge for non-traumatic arrests, witnessed by bystanders (excludes EMS-witnessed), with an initial rhythm of ventricular fibrillation/pulseless ventricular tachycardia (VF/pVT):

Year	2022	5-year Cumulative Total 2018-2022
Survival Rate	91/192 (47%)	501/1,023 (49%)

- Overall CPR initiated by bystanders, limited to arrest before arrival of EMS personnel:

Year	2018	2019	2020	2021	2022
Bystander CPR	747/1,114 (67%)	840/1,112 (76%)	880/1,157 (76%)	966/1,292 (75%)	976/1,378 (71%)

Center for the Evaluation of EMS: Evaluation and Investigation

The Center for the Evaluation of Emergency Medical Services (CEEMS) undertakes rigorous evaluations to advance the science of pre-hospital emergency care. Quality improvement efforts often involve a collaboration of clinicians and researchers and include personnel from the EMS Division, the University of Washington, and other experts. This past year saw important reports on the topics of cardiac arrest resuscitation, patient-provider communication, and EMS wellness. Below is a sampling of this work.

Cardiac Arrest

Dispatch: Emergency medical dispatchers are trained to recognize cardiac arrest and coach the caller in providing CPR. After reviewing cardiac arrest 9-1-1 recordings, the EMS Division identified patient positioning as a key barrier for why some cardiac arrest patients did not receive CPR (for example, the patient suffered cardiac arrest while seated in a chair and the caller was unable to move them). The study identified that rescuers could re-position the patient with substantial dispatcher direction and encouragement, but that these efforts had diminishing returns as time progressed. It also helped frame whether dispatchers should have a contingency plan to coach CPR when the patient cannot be repositioned by the bystander.

Publication: *Resuscitation*. [Association between bystander physical limitations, delays in chest compression during telecommunicator-assisted cardiopulmonary resuscitation, and outcome after out-of-hospital cardiac arrest - PubMed \(nih.gov\)](#)

EMS: Striving for resuscitation excellence includes reviewing each cardiac arrest case. Defibrillators provide information that can be used with innovative techniques to better predict a patient's physiology and predict how a patient will respond to specific treatments. Although just in its early stages, such research has provided early insights that may enable EMS to better predict the patient's acute physiology and apply the "right treatment at the right time".

Publications: *Circulation* and *Resuscitation*. [Investigating the Airway Opening Index during cardiopulmonary resuscitation - PubMed \(nih.gov\)](#)
[Prediction of Shock-Refractory Ventricular Fibrillation During Resuscitation of Out-of-Hospital Cardiac Arrest - PubMed \(nih.gov\)](#)

Hospital care: The EMS Division tracks patient care and outcomes from hospitalization to understand the impacts of prehospital and hospital care for cardiac arrest. Hospital care focuses on diagnosing and treating the underlying cause of cardiac arrest while also working to help the heart and brain recover. Imaging the body with a computed tomography (CT) is one potential approach to rapidly identify the cause of arrest and help determine appropriate care. Critical to survival is ensuring the brain has sufficient oxygen, which for some patients can be aided by maintaining a constant cool temperature for up to 24 hours in the hospital's intensive care unit. An investigation by King County found that those patients who required higher doses of epinephrin to restart the heart were more likely to benefit from hospital cool intervention.

Publications: *Resuscitation* and *JAMA Network Open*. [Diagnostic yield, safety, and outcomes of Head-to-pelvis sudden death CT imaging in post arrest care: The CT FIRST cohort study - PubMed \(nih.gov\)](#)
[Analysis of Epinephrine Dose, Targeted Temperature Management, and Neurologic and Survival Outcomes Among Adults With Out-of-Hospital Cardiac Arrest - PubMed \(nih.gov\)](#)



EMS Wellness

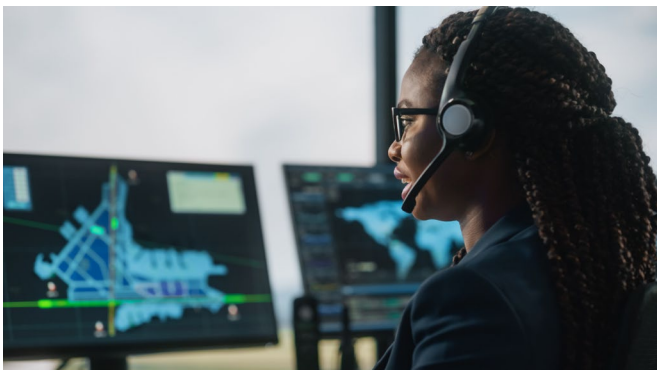
The EMS providers in King County were heroic during the pandemic, making sacrifices to meet the healthcare need, sometimes in the face of uncertainty or their own personal well-being. Recognizing the stress and mental fatigue experienced by our providers, regional leadership has worked to increase awareness and provide resources for well-being. A series of surveys helped characterize provider “burnout” and develop tools to address psychological distress. While far from comprehensive, these investigations helped focus resources to efficiently help address well-being needs during a time of unparalleled service requirements.



Publications. *Prehospital Emergency Care and Health Promotion Practice*

[Burnout and Workplace Incivility Among Emergency Medical Services Practitioners: A Preliminary Report - PubMed \(nih.gov\)](#)

[Development and Evaluation of an Online Toolkit for Managers of 9-1-1 Emergency Communications Centers to Reduce Occupational Stress - PubMed \(nih.gov\)](#)

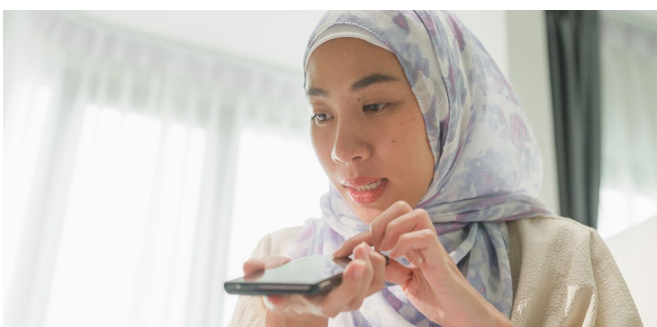


EMS and Patient Communication

EMS often encounters patients with limited English proficiency, which can challenge effective communication and care. Investigators from the University of Washington collaborated with EMTs, paramedics, and persons with limited English to help define and prioritize impediments to best practice where there are communication barriers. The results will help focus ongoing efforts to improve care for this at-risk group of patients.

Journal: *JAMA Network Open*

[Perceptions of Prehospital Care for Patients With Limited English Proficiency Among Emergency Medical Technicians and Paramedics - PubMed \(nih.gov\)](#)



2020-2025 Strategic Initiatives

The Medic One/EMS 2020-2025 Strategic Plan continues and implements Strategic Initiatives that leverage previous investments made by the region to improve patient care and outcomes. Areas identified include sustaining focus on vulnerable populations, enhancing quality improvement capabilities, and modernizing the continuing medical education program. Based on the regional needs and issues identified by partners over the course of levy planning, the following strategic initiatives are centered on using a solid regional approach to strengthen standardization, coordination, inter-connectedness and partnerships.

The **Vulnerable Populations Strategic Initiative (VPSI)** represents a unique collaboration between Public Health - Seattle & King County, the EMS Division, fire departments, community-based organizations, and the University of Washington. Founded in 2014, VPSI aims to ensure that EMS provides the best possible care to all King County residents regardless of race, ethnicity, age, socioeconomic status, culture, gender, or language spoken. VPSI includes five focal areas with the following objectives:

1. **Community Education and Outreach:** Conduct 9-1-1-related education and outreach activities in communities that are vulnerable to health disparities;
2. **Fire-Based Pilot Studies:** Conduct pilot studies on alternative EMS care delivery to populations requiring complex care;
3. **UW Partnership:** Support the collaboration between UW School of Public Health and VPSI;
4. **Mental Wellness:** Assess and address mental wellness needs among EMS personnel in King County; and
5. **Equity and Social Justice (ESJ):** Build career paths in EMS to promote a diverse workforce and integrate ESJ values into the EMS workplace.

2020-2025 STRATEGIC INITIATIVES



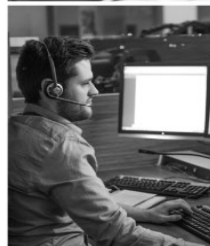
VPSI

Vulnerable Populations Strategic Initiative



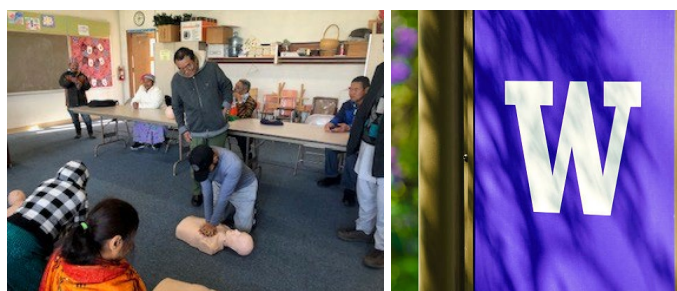
AEIOU QI SI

Accelerating Evaluation & Innovation: An Opportunity for Unprecedented Quality Improvement



STRIVE SI

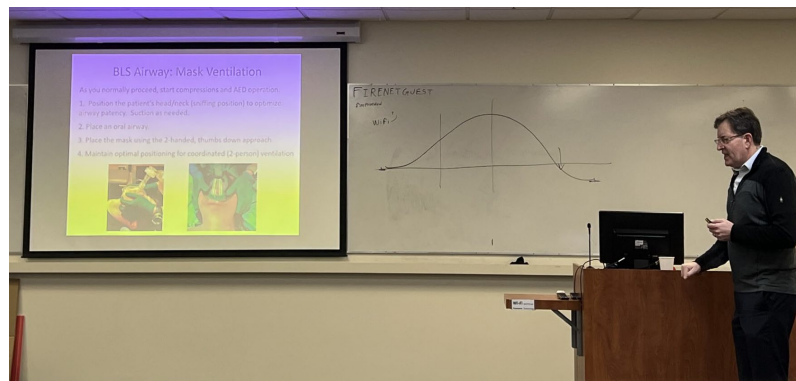
Strategic Transition in Regionalized Innovation, Value, and Education



AEIOU QI Strategic Initiative

This Initiative builds upon the past decade’s technological advancements of records management and electronic data to improve patient care. The objectives of this Strategic Initiative include:

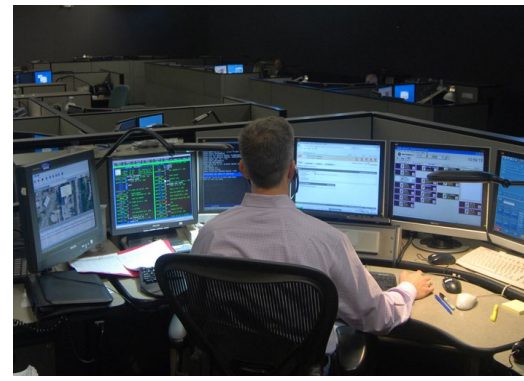
1. **Accelerating case-based feedback** and outcome by improving the timeliness, quality, and access to data, investments in technology, and integration across platforms across the EMS system;
2. **Evaluating near real-time information** through systemwide regional quality improvement and surveillance. This allows us to monitor conditions of focus (e.g., cardiac arrest, stroke, opioids) and increase support to EMS agencies to conduct operational and clinical run reviews of EMS care and patient outcomes at the regional and local agency level;
3. **Innovation** by conducting pilot projects to strengthen quality improvement capabilities;
4. **Opportunities** to increase the EMS Division’s coordination role by convening regional partners to lead quality improvement projects and address the need to meaningfully use the wealth of data available; and
5. **Unprecedented** ability to improve our approaches to quality improvement through training and education.



STRIVE Strategic Initiative

The **Strategic Transition in Regionalized Innovation, Value, & Education Initiative** modernizes the EMS Division’s online continuing medical education (CME) platform - EMS Online - to meet the changing educational, data, and technological needs of the eLearning environment. This Initiative will:

1. **Address cross-platform functionality** by implementing a Learning Management System (LMS) and Learning Records System (LRS);
2. **Extend the functionality to all agencies** to access data, share and collaborate regionally as desired, customize training based on needs;
3. **Reduce duplication, increase efficiency;** and
4. **Support the region** in meeting the eLearning expectations of our EMS workforce members.



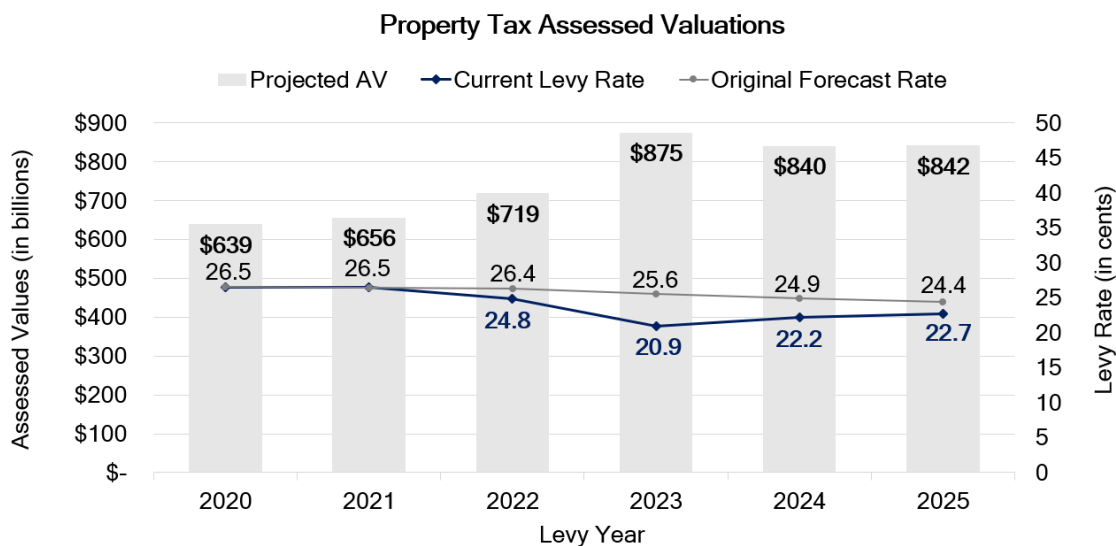
EMS Funding & 2022 Financial Plan Overview

The 2020-2025 EMS levy was planned in 2018, which was the ninth year of a historical economic expansion. The economy quickly changed with the emergence of COVID-19 in 2020, and the region has experienced economic changes through the 2020-2025 levy period. Overall property taxes and interest income have been higher than planned and have offset increased inflation as well as fund the expansion of programs supporting new EMTs and paramedics.

The financial information in this report is based on the March 2022 forecast by the King County Office of Economic and Forecast Analysis. An inter-local agreement between King County and the City of Seattle allows for EMS levy funds collected within the Seattle city limits to go directly to and be managed by the city. Therefore, this section focuses on funds within the King County EMS Fund.

Updated Levy Forecast

Assessed Valuations (AV) in the Region - Per the Revised Code of Washington, the total increase in EMS property taxes collected per year is limited to 1% plus new construction. Because of this, when AV increases at a rate higher than 1% per year, levy rates decrease to stay within the legal limit. Forecasted increases in AV project that 2020-2025 levy rates will decrease from 26.5 cents/\$1,000 AV in 2020 to 22.7 cents/\$1,000 AV by 2025.



EMS Fund 1190 Reserves & Contingencies - The 2020-2025 Medic One/EMS Strategic Plan included reserves and contingencies to mitigate financial risk. Reserves consist of a 90-day Rainy Day Reserve, an ALS Reserve, and Supplemental Reserve, all of which provide fiscal stability to the EMS system. At the end of 2022, we have fully funded the Rainy Day and ALS Reserves and we continue to increase the funding level of the Supplemental Reserve. The EMS Advisory Committee recommended using a total of \$430,000 of ALS Reserve funding to help cover the costs associated with collocating medic units at two new fire stations (Kirkland and Bothell).

Reserves 2022	
ALS Expenditure Reserve	\$ 6,920,362
Rainy Day Reserve (90 days)	\$33,131,538
Supplemental Reserve	\$11,150,313
Total Reserves	\$51,202,213

Financial Plan

The following financial plan provides an overview of the EMS Fund 1190, including a summary of revenues, expenditures, fund balance, and reserves and designations based on 2022 actuals and a 2023 estimated forecast. In alignment with King County's strategic goal of financial stewardship, this Plan is regularly reviewed by EMS regional partners to ensure sound financial management.

EMS FUND 1190 FINANCIAL PLAN/		
	2022 Actuals	2023 Estimate
BEGINNING FUND BALANCE (A)	78,942,183	92,886,145
REVENUES		
Property Taxes	109,821,699	117,459,790
Interest Earnings/Miscellaneous Revenue	1,886,842	3,342,506
TOTAL REVENUES (B)	111,708,541	120,802,296
EXPENDITURES		
Advanced Life Support Services	56,130,434	68,205,825
Basic Life Support Services	22,975,355	25,876,992
Regional Services	11,721,261	14,488,854
Strategic Initiatives	783,169	2,157,963
Mobile Integrated Healthcare	3,340,423	4,839,289
Grants, Entrepreneurial & Donations	282,773	349,433
TOTAL EXPENDITURES (C)	95,233,415	115,918,356
TOTAL REVENUES LESS TOTAL EXPENDITURES (D)	16,475,126	4,883,940
Other Fund Transactions (E)	(2,531,164)	2,531,164
ENDING FUND BALANCE (A+D+E=F)	92,886,145	100,301,249
RESERVES AND DESIGNATIONS		
Designations (including Program Balances)	(41,683,932)	(40,897,179)
Reserves	(51,202,213)	(59,404,070)
TOTAL RESERVES AND DESIGNATIONS (G)	(92,886,145)	(100,301,249)
ENDING UNDESIGNATED FUND BALANCE	-	-

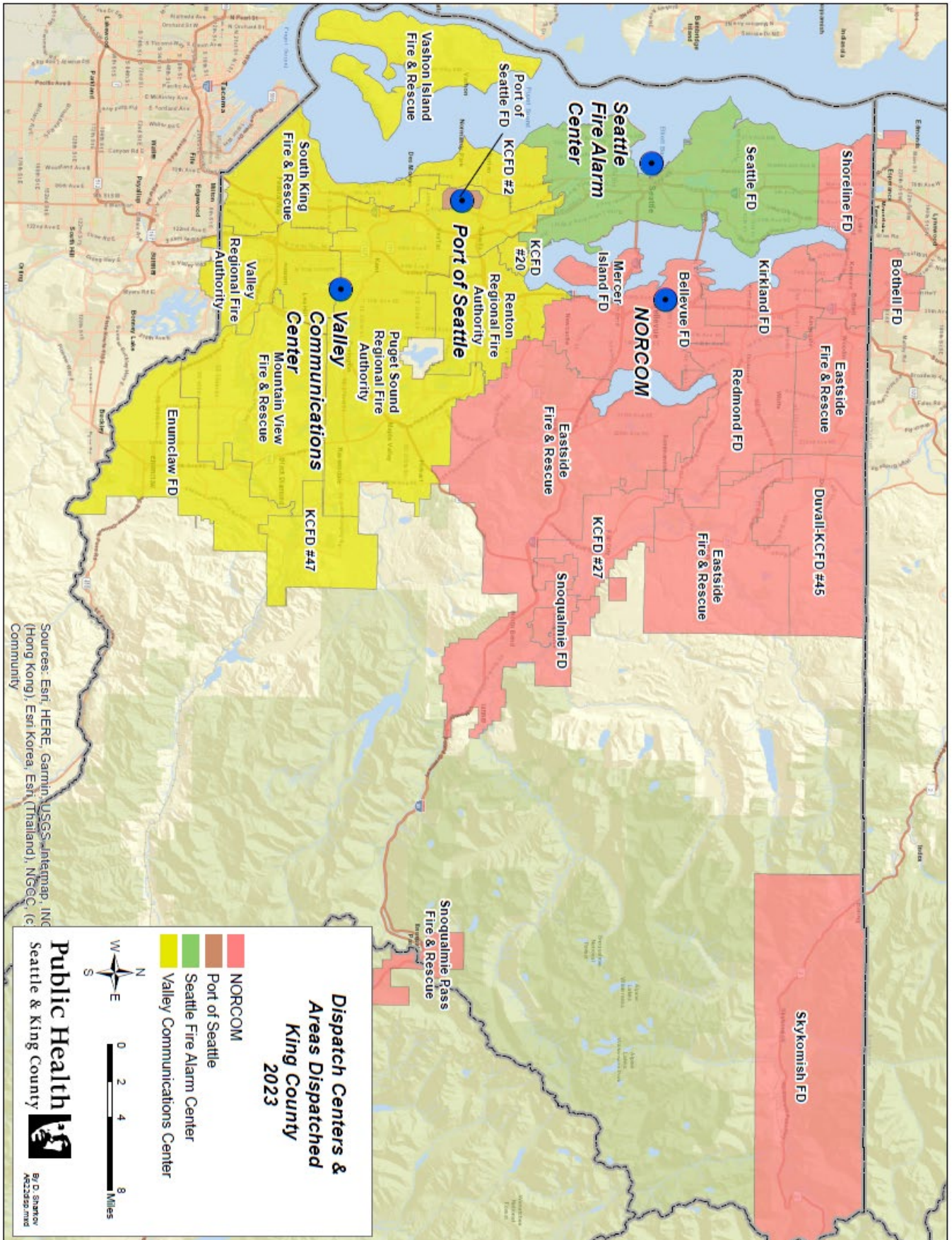
Conclusion

The structure of the EMS levy, which includes elements to address unforeseen financial risks, continues to accommodate changing economic conditions and emerging needs. Increased property taxes and interest income are covering inflationary increases, and planned contingencies and reserves are available to fund unanticipated needs.

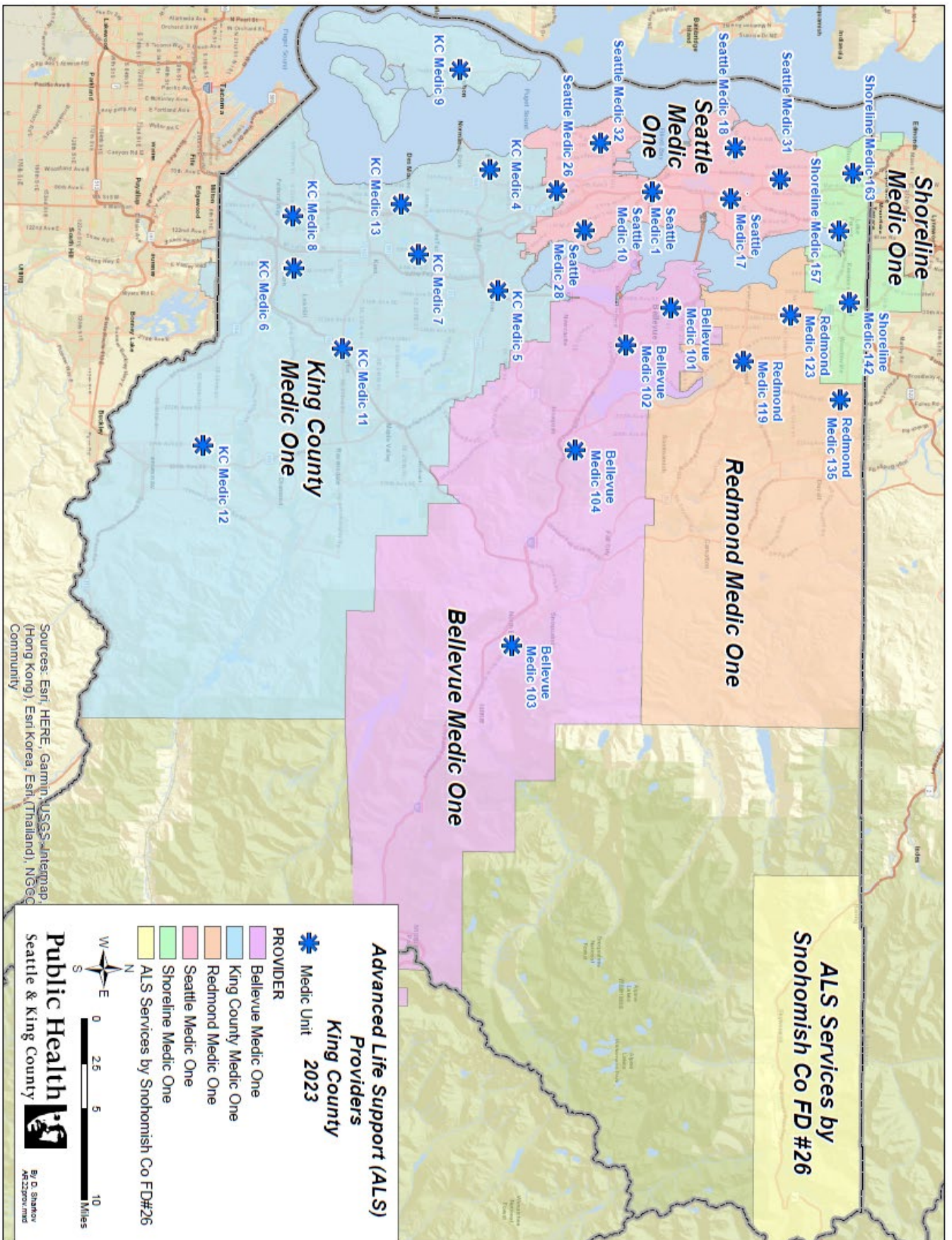
Appendix A: EMS Performance Measures

Resource Category	Performance Measure & Definition	2022 Results
Systemwide	Rate of cardiac arrest survival (Utstein) % of patients discharged alive from hospital for all non-traumatic bystander witnessed cardiac arrests with an initial arrest rhythm of VF/VT	47%
	Rate of bystander CPR in cases of cardiac arrest % bystander CPR provided for cardiac arrest cases where the arrest occurred before arrival of EMS personnel. Includes only non-traumatic etiology that received ALS care in patients 2 years of age or older	71%
	Rate of correctly identified cardiac arrest by telecommunicators % of confirmed cardiac arrest cases that were correctly identified by dispatcher when provided opportunity to assess	96%
Dispatch	Rate of correctly identified resource used by telecommunicators % of total number of reviewed calls that received correct EMS resource	96%
	Rate of correctly transferred T-IDC calls % of T-IDC calls that were sent to the Nurseline versus received a BLS response	82%
	% that response time standards are met for emergency BLS calls Urban response areas: 10 minutes or less, 80 % of all calls Suburban response areas: 20 minutes or less, 80% of all calls Wilderness response areas: As soon as possible	Urban: 4.9 Suburban: 6.0 Rural: 6.8 Wilderness: -
Basic Life Support (Emergency Medical Technicians)	Rate of EMTs documenting FAST and glucometry for suspected stroke patients* % of EMS-suspected stroke patients with EMT documentation of FAST exam and glucometry results	68%
	Rate that "on scene time" standards are met % of suspected CVA and suspected TIA patients with < 15-minute BLS scene time	39%
	Rate of taxi transported patients % of taxi transports of all BLS transports	<1% 618 vouchers issued
	Compression fraction during resuscitation attempts % of time that compressions are actively applied to the chest, until efforts are ceased, or until sustained ROSC is achieved (whichever event comes earliest)	91%
	% that response time standards are met Respond on average 10 minutes or less, 14 minutes or less, 80% of all calls	=<10 min. 75% =<14 min. 94% Median time 7.8 min.
Advanced Life Support (Paramedics)	Rate of paramedics documenting a 12-lead ECG for STEMI patients % of suspected STEMI cases where paramedics documented to use of a 12-lead ECG	93%
	Rate that "on scene time" standards are met % of suspected STEMI patients with < 15 minute on scene time	33%
	Rate of paramedics documenting Glasgow Coma Scale for trauma patients % of trauma patients transported to Harborview Medical Center by paramedics where GCS was documented	88%
	Rate of scene time for trauma patients % of trauma patients taken to Harborview Medical Center by paramedics with < 15 minutes ALS scene time	47%
	Rate of successful first attempt intubations % of successful first attempt intubations	84%
	Rate of cancelled enroute ALS calls % of cancelled enroute ALS calls to all ALS calls	22%
Regional	% of calls where no upgrade or downgrade was needed % of calls where ALS was not cancelled and not requested from scene	54%
	Rate of ALS requests from scene % of BLS requests for ALS from scene of all ALS calls	24%
	# of mandatory overtime hours for paramedics # of non-voluntary hours that paramedics were required to work to fully staff medic units	7,411 hours

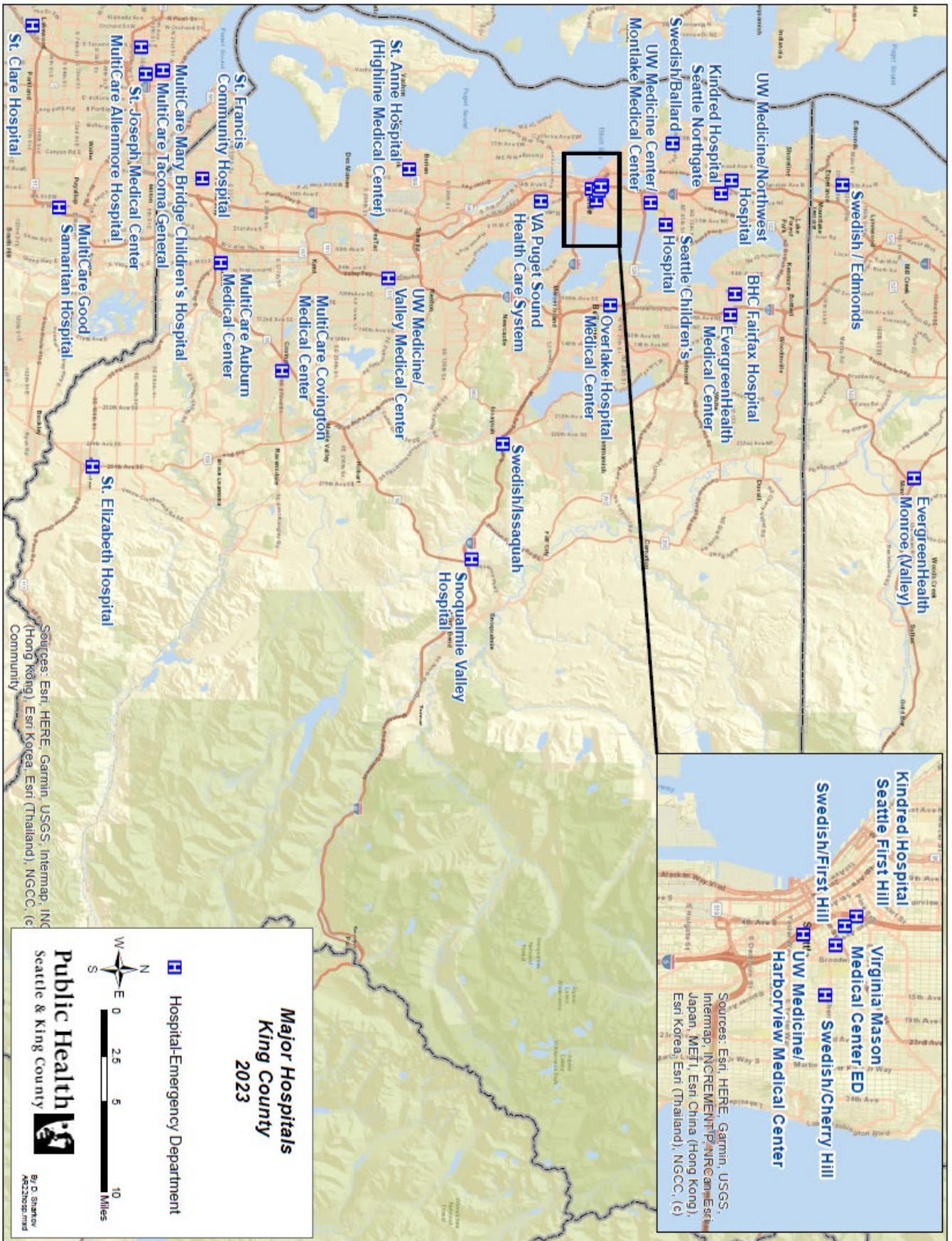
Appendix B: Regional Dispatch Centers



Appendix C: Advanced Life Support (ALS) Service Areas



Appendix E: Major Hospitals



Appendix F: EMS Advisory Committee (EMSAC)

Formed in 1997, the EMS Advisory Committee (EMSAC) monitors the uniformity and consistency of the Medic One/EMS system. It consists of approximately 20 members representing all aspects of the EMS system and provides key counsel to the EMS Division regarding regional Medic One/EMS policies and practices in King County. Members convene on a quarterly basis to review implementation of the Strategic Plan as well as other proposals put forth, including Strategic Initiatives, consolidations and medic unit recommendations.

Name	Representation	Title/Organization
Michele Plorde, Chair	Emergency Medical Services Division	Director
Faisal Khan	Public Health - Seattle & King County	Director
Jay Hagen	ALS Providers - Bellevue	Chief, Bellevue Fire Department
Andrea Coulson	ALS Providers - KC Medic One	Chief, King County Medic One
Adrian Sheppard	ALS Providers - Redmond	Chief, Redmond Fire Department
Harold Scoggins	ALS Providers - Seattle	Chief, Seattle Fire Department
Matt Cowan	ALS Providers - Shoreline	Chief, Shoreline Fire Department
Brad Thompson	BLS in Cities > 50,000 (Auburn)	Chief, Valley Regional Fire Authority
Mike Marrs	BLS in Cities > 50,000 (Burien)	Chief, Fire District #2
Dave Mataftin	BLS in Cities > 50,000 (Federal Way)	Chief, South King Fire & Rescue
Brian Carson	BLS in Cities > 50,000 (Kent)	Chief, Puget Sound Regional Fire Authority
Joe Sanford	BLS in Cities > 50,000 (Kirkland)	Chief, Kirkland Fire Department
Steve Heitman	BLS in Cities > 50,000 (Renton)	Chief, Renton Regional Fire Authority
Ben Lane	BLS in Cities > 50,000 (Sammamish)	Chief, Eastside Fire & Rescue
Dr. Tom Rea	King County	Medical Program Director
Dr. Peter Kudenchuk	Chair, Medical Directors' Committee	Medical Program Director, KCM1
Dr. Michael Sayre	Seattle	Medical Program Director
Anita Sandall	KC Fire Commissioner's Assn. - Rural	Fire Commissioner, Eastside Fire & Rescue
Mike Millman	KC Fire Commissioner's Assn. - Urban	Fire Commissioner, Woodinville Fire & Rescue
Ryan Simonds	Labor - BLS	Renton Regional Fire Authority
Steve Perry	Labor - ALS	Paramedic, KCM1
Lora Ueland	Dispatch	Director, Valley Communications Center
Brant Butte	Private Ambulance	American Medical Response
Ed Plumlee	Citizen Representative	
Vacant	Health Care System	