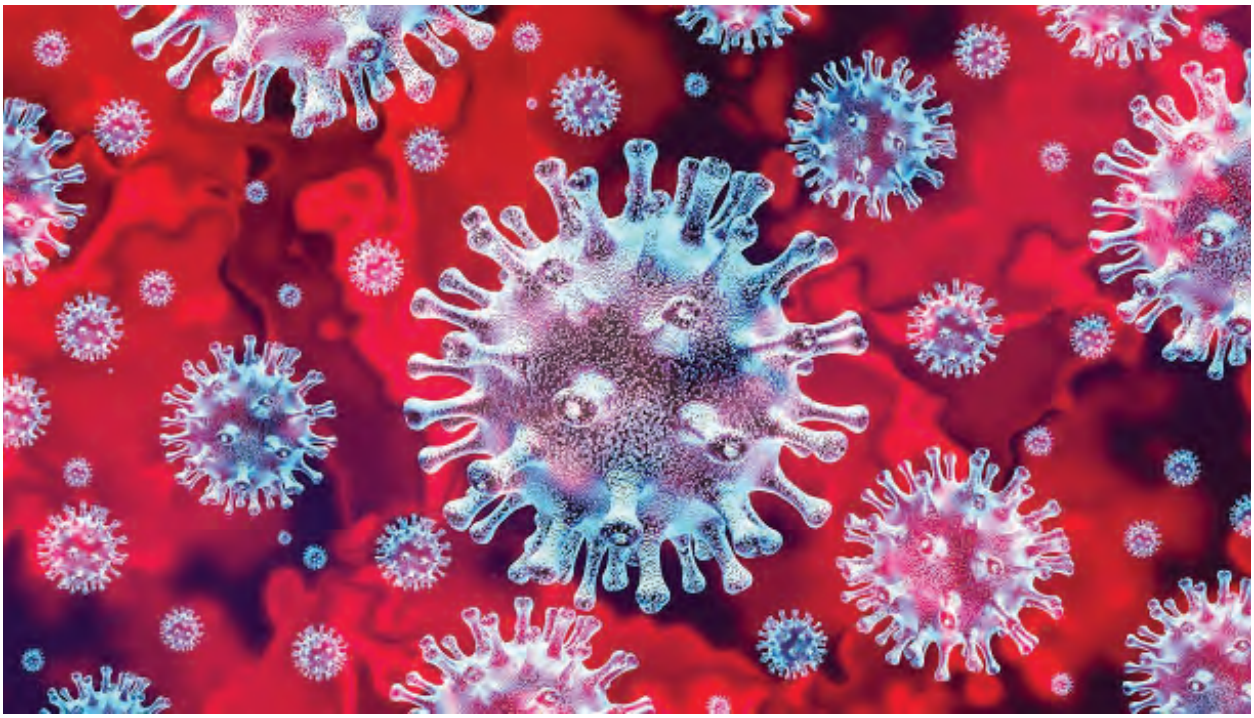
Public Health
Seattle & King County

# Division of Emergency Medical Services
# 2020 Annual Report: COVID-19 Special Edition



November 2020

Medic One/Emergency Medical Services (EMS) serves
nearly 2.2 million people in Seattle & King County and provides life-saving services
on average **every 3 minutes**.

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

In **2019**,

**Emergency Medical Technicians (EMTs)**
responded to approximately 270,000 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.

# 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 2019 performance measures are highlighted below.

## Community

**76% of all out-of-hospital cardiac arrests received bystander CPR.**

76%

## Dispatch

Performance measures for dispatch focus on accurate recognition of cardiac arrest.

97%

**97% of all cardiac arrests were recognized by 9-1-1 operators.**

**97% of these calls were assigned the correct resource level.**

## Basic Life Support

**Average BLS response time: 4.9 minutes**

4.9 min.

**Average chest compression fraction: 91%**

## Advanced Life Support

**Average ALS response time: 7.3 minutes.**

7.3 min.

**Rate of successful first attempt intubations: 80%**

**Overall, this means 253 lives were saved from OHCA in 2019!**

59%

## System Performance

**In 2019, the survival rate for witnessed VF cardiac arrest (widely recognized measure of EMS performance) in Seattle and King County was 59%.**

# Directors' Message

We are pleased to present the Emergency Medical Services (EMS) Division 2020 Annual Report to the King County Council. This year's report provides an in-depth look at the regional response to the novel coronavirus outbreak in Seattle and King County. More specifically, it documents the cooperative nature and determination of our EMS partners as we face this crisis together.

Late last year, we all watched anxiously as countries across the globe grappled with how to contain this novel virus. While monitoring the news, we consulted public health officials about how best to keep our communities and responders safe should COVID-19 find its way to King County. Communications and coordination with our partners were key to ensuring our pre-hospital system was appropriately engaged.

On February 29th, the day we learned of the first COVID cases among residents in nursing homes here in King County, our efforts dramatically shifted from monitoring and prevention to launching a comprehensive regional response. As anticipated, people from every tier of our system stepped up to help, offering a cross section of perspective and experience. Within days, regional means of communication was established, clinical directives and rules of engagement were developed, and ongoing medical quality improvement surveillance was hatched. In the days and months to come, our EMS partners and EMS staff would rise to the occasion time and time again as the virus presented new challenges. Many examples of these efforts are highlighted in the 2020 Annual Report.

While we recognize that COVID is an ongoing, evolving challenge, our system has effectively adapted to contend with the epidemic that took us by storm just six months ago. We have built a foundation of protocols, procedures and processes that ensure the health and safety of our patients, first responders, and the public. These regional standards and best practices will be key to maintaining our proactive COVID-19 response throughout King County.

There is no doubt that our system's ability to forge its way through as "ground zero" in the early days of the pandemic was directly related to our system of regional cooperation, ever so critical during a time of crisis. Leadership and teamwork at every level across the breadth of EMS to collaborate, evaluate, learn, and adapt enabled an ongoing practice of excellence as we sought to provide the highest quality prehospital emergency care.

We often state that our EMS system has a long and vibrant legacy of regional collaboration - this year's report epitomizes that commitment. While the pandemic certainly garnered most of our attention, we must certainly acknowledge the many unsung heroes out in the field and online that kept our operations moving along during this extraordinary time. Our gratitude goes out to the dispatchers querying the many anxious callers, EMTs and paramedics donning protective gear while tending to sick patients, and staff working remotely to process invoices, produce training modules and manage key EMS programs.

We appreciate the opportunity to share this exceptional story with you, and thank you for your continued support of our phenomenal EMS system here in King County.

Patty Hayes, RN MN
Department Director,
Public Health – Seattle & King County

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

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# Executive Summary

This year's Annual Report documents how our extraordinary EMS system is responding to one of the most challenging public health and community crises of our lifetimes.

The community, the state and the nation watched as King County coped with being the epicenter in the early days of the COVID-19 epidemic in the US. Responding to emergent health crises like the coronavirus is certainly a fundamental part of EMS's mission. However, this response placed an unparalleled level of stress on the system. Beyond just the risk of exposure for hundreds of our first responders, COVID-19 response required major adjustments to operational procedures, created an unprecedented unmet demand for PPE and other supplies, and resulted in additional service demands for vulnerable individuals.

Leaders from throughout the system were immediately available to coordinate a response that even now continues to adapt to the dynamic understanding of COVID-19. Practices that protect and support the health of our first responders, including creative strategies to maintain Personal Protective Equipment (PPE) inventory, were enacted. Surveillance activities and the monitoring the EMS system and key COVID-19 performance measures are still conducted daily to ensure data-driven decision making. Despite experiencing higher workloads during the pandemic, Mobile Integrated Health (MIH) programs have stepped up to the challenge with creative solutions for responding to the needs of the community.


In addition, COVID-19 interfered with the EMS Division's normal activities, leading us to consider different ways to conduct our "usual business". We used technology to support service delivery through new and innovative ways, such as telemedicine for various community programs. The Training & Education Section worked with the WA State Department of Health (DOH) and EMS agencies to implement measures so that EMT training and certification requirements wouldn't be jeopardized. Out of necessity came creative solutions, some of which will likely remain in place for years to come.

The 2020 Annual Report conveys the regional system's ability to band together in the face of adversity, and quickly pivot to ensure the highest possible patient outcomes. Our EMS partners and EMS staff in King County should be proud of their achievements and collaborative efforts in providing the best possible medical care, every day, regardless of circumstances, to the residents of King County.



## Acknowledgements

*We would like to thank all of the individuals who contributed to the EMS Division 2020 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.*

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# System Overview

Any time residents of Seattle and King County call 9-1-1 for a medical emergency, they are using the Medic One/EMS system. This internationally renowned regional system responds to an area of 2,134 square miles and serves a population of over two million. The system is managed by the King County Emergency Medical Services (EMS) Division, 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**.

## Medically-Based Model

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

The leadership of the King County and Seattle Medical Program Directors (MPD), Dr. Thomas Rea and Dr. Michael Sayre, ensures the success and the ongoing medical quality improvement of the EMS system. Activities such as the review of every cardiac arrest event for more than 40 years and patient protocol compliance audits, have supported the best possible care. The result of this ongoing quality improvement is enhanced patient outcomes and an excellent cardiac arrest survival rate that has been among the highest reported in the nation.

## Regional Partnerships


Regional partners sustain uniformity and consistency across the entire EMS system. While each provider operates individually, the care provided to the patient operates within a “seamless” system. It is this continuum of consistent, standardized medical care and collaboration between 29 fire agencies, five paramedic agencies, four EMS dispatch centers, over 20 hospitals, the University of Washington, and the citizens throughout King County that allows the system to excel in pre-hospital emergency care.

## Tiered Out-Of-Hospital Response System

The use of a tiered response system ensures the most appropriate care provider responds to each 9-1-1 call. There are five major components in the tiered regional Medic One/EMS system, as described on the following page.

**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., BLS, ALS, CMT or Nurseline) Providing pre-arrival instructions for most medical emergencies, dispatcher guide the caller through life-saving steps, including CPR and AED instructions until the Medic One/EMS provider arrives.

**Tier One Response – Basic Life Support (BLS) Services:** EMTs respond to 100% of emergency medical calls and usually arrive first on scene. Approximately 4,500 EMTs are employed by 30 fire-based agencies. Arriving at the scene in 5.5 minutes on average, BLS provides advanced first aid, CPR and AED usage to stabilize the patient. EMTs are certified by the State of Washington and are required to complete initial and ongoing continuing education and training to maintain certification. In response to low acuity calls, CMT units may be dispatched to respond.


**Tier Two Response – Advanced Life Support (ALS) Services:** Paramedics usually arrive second on scene to provide emergency care for critical or life-threatening injuries and illness. Regional paramedic services are provided by five agencies operating 26 ALS units throughout King County, including fire departments in Bellevue (4), Redmond (3), Shoreline (3), Seattle (7), and King County Medic One (9). A contract with Snohomish County Fire District 26 provides ALS services to the Skykomish and King County Fire District 50 area, from Baring to Stevens Pass. Paramedics are certified by the State of Washington and are required to complete intensive education and ongoing training to maintain certification.

**Additional Medical Care - Transport to Hospitals or Clinics:** Once a patient is stabilized, EMS personnel determine whether transport to a hospital or clinic for further medical attention is needed. Transport is provided by an ALS or BLS agency, private ambulance, or taxi for lower-acuity situations.

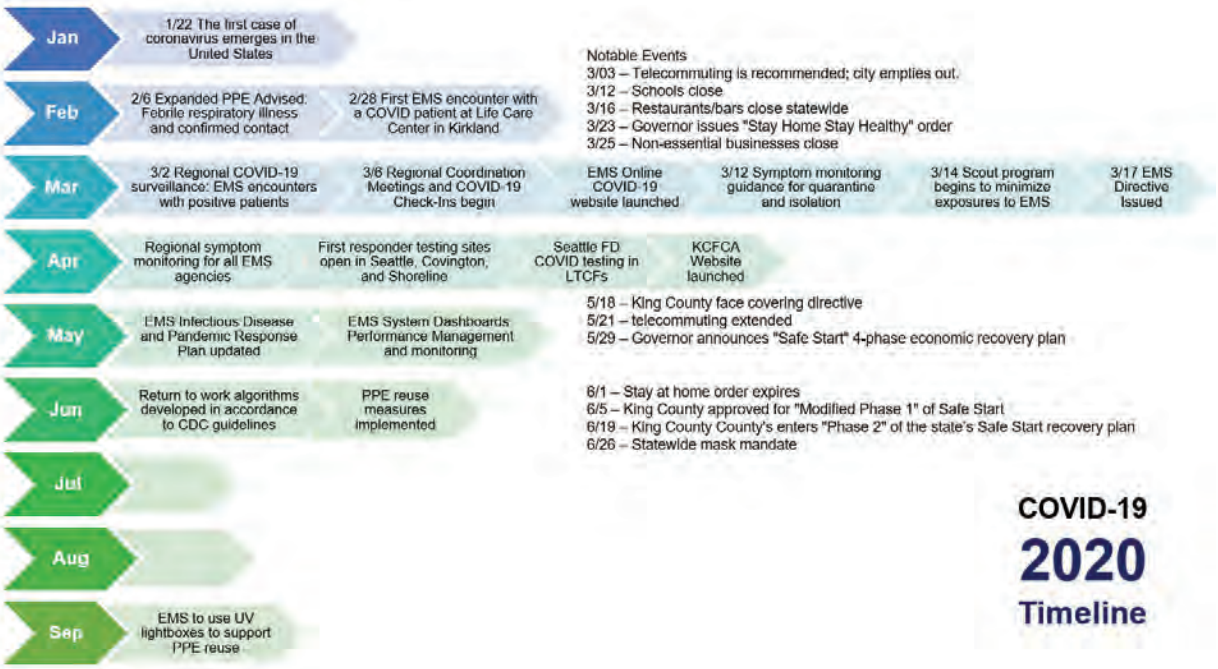
# 2020 EMS Division Highlight

## The EMS System's Response to the Coronavirus: A COVID-19 Chronology

### The Start of a Global Health Emergency

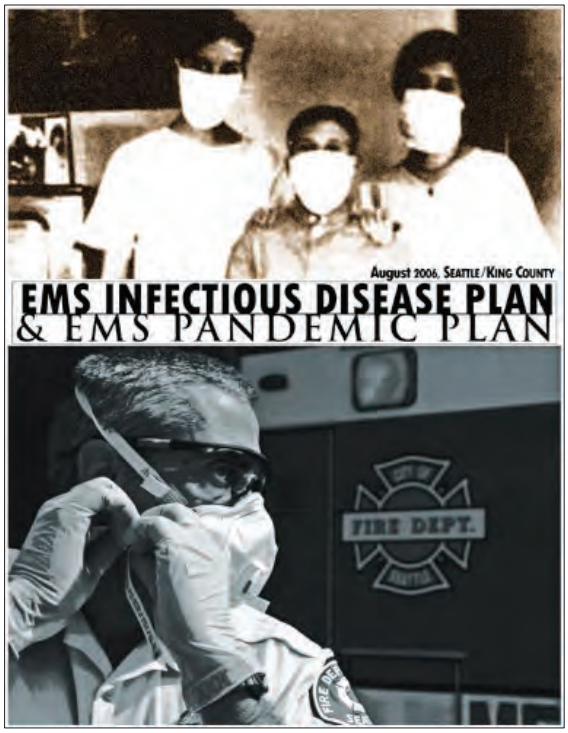
An epidemic involving the 2019-Novel Coronavirus (COVID-19) emerged in Wuhan City, China in December 2019. The infection spread throughout China, and soon there were thousands of cases documented in other parts of the world. Although the likelihood of COVID-19 reaching the United States and EMS providers in King County seemed low, we coordinated with Public Health – Seattle & King County, Washington Department of Health and the CDC to exercise best practices in infection control to remain safe from an unimaginable COVID-19 outbreak.

**COVID-19 2020 Timeline**



## EMS Pandemic Response

Our guide during this time was the EMS Infectious Disease Plan and EMS Pandemic Plan with procedures sanctioned to protect first responders; ensure safe, rapid and adequate response to the incident; and pursue rapid containment for personal safety, patient accountability, and reduce exposures.




*As a "living document", the Pandemic Plan continues to be amended, incorporating revised directives and rules of engagement/ operating practices developed and implemented during these first six months of the COVID-19 response.*

## EMS Directives: Adapting Dispatch and EMS Protocols

In early February 2020, King County's medical directors developed and implemented regional best practices in accordance with our Pandemic Plan. These directives were updated in months to follow to adapt and align with the Federal and State guidance. Best practices for optimal Personal Protective Equipment (PPE) use included training EMS personnel on wearing personal protective equipment and donning and doffing PPE. Decontamination practices to clean and disinfect surfaces in medic units and aid cars following patient delivery were also created in collaboration with our hospital partners for safe transport of patients.

Emergency Communications Centers in Seattle and King County activated Infectious Disease screening. Consistent with DOH guidelines, dispatch center call takers inquired about symptoms, travel, and exposure to identify potential for COVID-19. EMS agencies responding to an emergency medical call where the patient screened positive were alerted by dispatch with instructions of "PPE advised." These measures reduced the potential exposure to EMS personnel and provided situational awareness to best treat the patient while remaining safe.

In addition, EMS actions for patients screened positive for potential infection with COVID-19 were developed to protect EMS personnel. This included implementing protocols to limit airborne droplet spread and the number of personnel who contacted the patient.

## A Call to Action: Kirkland's Life Care Center Crisis

In late February 2020, the first cases of COVID-19 illness originating in the US were identified in north and east King County among residents of nursing homes. These older adults are at especially high risk of morbidity and mortality, and COVID-19 had an especially devastating impact.

Up to that time, world and national public health leaders had identified travel to China, contact with someone infected with COVID, and prominent febrile respiratory illness as risk factors. And yet the initial clusters of diagnosed cases came among persons living in nursing facilities, none of whom had traveled to China or had any known contact with COVID.

The reality that COVID-19 had clustered in nursing facilities had important implications for our regional EMS system. Kirkland Fire Department, Redmond Fire Department, Woodinville Fire Department and private ambulance companies provided the earliest assessment of how to effectively and safely engage the prehospital clinical realities of the pandemic. Their insights quickly became the basis for a regional approach, which was leveraged by EMS stakeholders around the nation. These early efforts were often dramatic and required teamwork among EMS agencies across King County in conjunction with emergency communication centers, Public Health, the Centers for Disease Control, State Department of Health, and area hospitals.

## Leading through Adversity

**Communication, coordination, and collaboration with regional partners prove crucial in the time of crisis.**

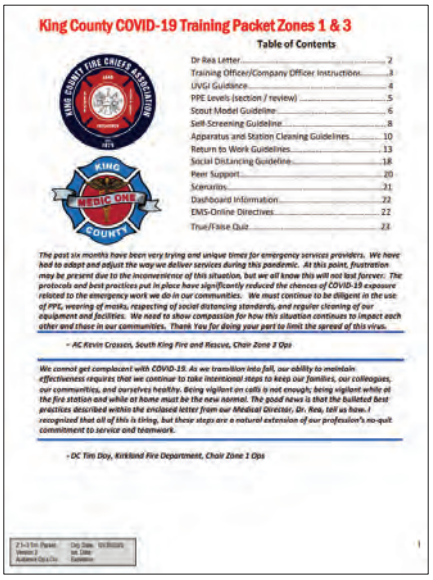
In addition to the myriad lines of communication that were quickly established across the region, the EMS Division activated key groups to help coordinate COVID response efforts centrally across sectors. The Regional Coordination Group brought together hospital and pre-hospital needs and helped strategize on emergency preparedness activations. The Division established regular COVID Check-In calls with 9-1-1 dispatch centers, EMS agency fire chiefs and health officers to provide situational awareness updates and opportunities for medical directors to balance both the operational and clinical needs of the response.

### Medical Direction

*Dr. Thomas Rea* *Dr. Michael Sayre*

All eyes were on our medical directors, who provided clear interpretation of guidelines issued by the Centers for Disease Control and Prevention (CDC), State Department of Health, and organizations such as the American Heart Association. In consultation with Public Health - Seattle & King County Health Officer Jeff Duchin, our Medical Program Director, Dr. Tom Rea and Seattle's Medical Program Director. Michael Sayre developed EMS directives which defined regional standards and best practices for EMS providers to safely respond through this pandemic. Directives outlined modifications to both dispatch and EMS protocols. With frequently changing guidelines, medical directors distilled information in the form of EMS directives to provide clinical guidance and oversight when operationalizing best practices for dispatch and pre-hospital patient care throughout the region.

## Rules of Engagement



King County COVID-19 Training Packet Zones 1 & 3

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The region recognized the urgency in developing common Rules of Engagement (ROE) for all first responders countywide. Instructional ROEs from the Medical Program Director were being distributed to nearly 5,000 EMTs and medics, and it was imperative that our partner agencies were implementing them consistently, knew where to find them, and were aware of any updates. A committee was formed and subsequently constructed a ROE development and updating process. To reach the greatest number of people, three separate sites were created to house these training and operational resources:

- EMS Online – https://www.emsonline.net/
- KCFCA - https://kcfcacovid19.org/.
- SharePoint – https://kc1.sharepoint.com/teams/kc-EMSCOVID19/

## Establishing Situational Awareness

### Daily Surveillance

As soon as the first King County COVID-19 case was identified, EMS leadership created a COVID-19 specific surveillance program to better visualize and understand the magnitude of the virus' impact on operations.

The surveillance let us know:

- how often patients with COVID-19 illness required 9-1-1 medical response,
- the profile of clinical presentations of COVID-19 illness,
- the potential of COVID-19 patient exposure among EMS professionals, and
- the regional epidemiology of COVID-19 hotspots.

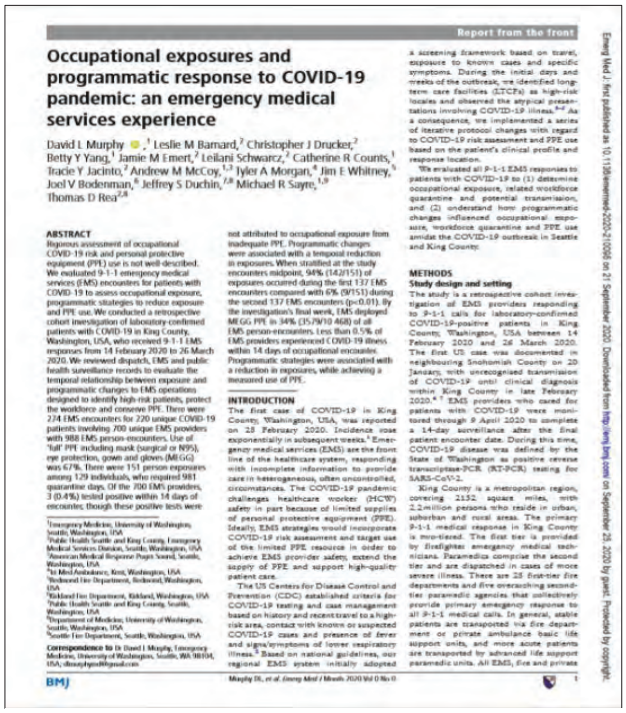
*To date, we have been fortunate to see a relatively low number of our EMS providers – paramedics and EMTs – who tested positive for COVID-19.*

This surveillance provided critical understanding of COVID-19 clinical manifestations, which informed best practices to protect EMS responders, and provided early alerts about COVID-19 outbreaks. The findings from the surveillance led to the specific decision to require first responders to expand and modify their screening strategy to better identify potential COVID-19.

The methods used across King County provided clear-cut benefits to patients and first responders as the numbers of EMS providers requiring quarantine quickly declined. They soon became best practices for others across the United States and beyond, shared through interviews and podcasts by national organizations (American Heart Association, National Highway Safety Traffic Administration, National Association of EMS Physicians) and ultimately as a scientific publication.

The EMS surveillance system has helped regional hospital and public health leaders detect COVID-19 hotspots and mobilize resources to help with infection control and clinical care.

*For more information on COVID-19 surveillance activities, please see **page 19.***



Report from the front

**Occupational exposures and programmatic response to COVID-19 pandemic: an emergency medical services experience**

David L Murphy, Leslie M Barnard, Christopher J Drucker, Betty Y Yang, Jamie M Emert, Leilani Schwarcz, Catherine R Counts, Tracie Y Jacinto, Andrew M McCoy, Tyler A Morgan, Jim E Whitney, Joel V Bodenman, Jeffrey S Duchin, Michael R Sayre, Thomas D Rea

ABSTRACT

INTRODUCTION

METHODS

Study design and setting

BMJ

*For more information, refer to the following link: https://emj.bmj.com/content/early/2020/09/21/emermed-2020-210095).*

## Protecting First Responders and The Public

### A Multi-Pronged Approach

Ensuring the safety and wellness of essential EMS response personnel was crucial to ensuring continuity of care for the people of King County. EMS agency and physician leadership used surveillance findings to implement a multi-pronged approach to ensure high-quality care while minimizing infectious risk to EMS responders and the public.

**Dispatch**: Regional dispatch centers were an integral part of the strategy by incorporating additional key screening questions during the 9-1-1 call to alert and prepare EMS enroute to the patient. Callers were asked about travel history and screened for COVID symptoms, known COVID or close contacts with COVID. Bystander CPR instructions were modified to eliminate any rescue breathing techniques, and focused on providing compression-only CPR. Telecommunicators alerted dispatched EMS teams that they were responding to confirmed COVID cases and advised them to don PPE prior to entering. Dispatcher questions and EMS responses went through successive changes as our knowledge of the virus increased, allowing us to ensure best practices for patient care and EMS safety.

**PPE:** EMS quickly refined its techniques to safely and efficiently apply PPE, while fully recognizing the unprecedented regional and national shortages of this critical equipment. EMS also used a “scout strategy”, for less acute calls which reduced the number of responders in proximity to a potentially infected patient. The strategy provided seamless initial patient engagement while also responsibly deploying PPE so that the EMS team could achieve best-practices protection.


*Videos on donning/doffing PPE and the scout strategy were always just a click away via EMS Online, the King County Fire Chiefs website and the COVID-19 SharePoint site.*

**Long-term Care Facilities:** With the biggest outbreaks of COVID-19 attributed to long-term care facilities it was imperative that the EMS system and such facilities coordinate their patient care and operational safety protocols. The EMS Division Communities of Care program connected these facilities to their local fire and EMS agencies to implement screening, PPE and communication procedures that have helped keep exposure and infection risks low for residents, facility employees, and EMS personnel.

# Coming to the Aid of Our First Responders

## Supporting the Health of our First Responders

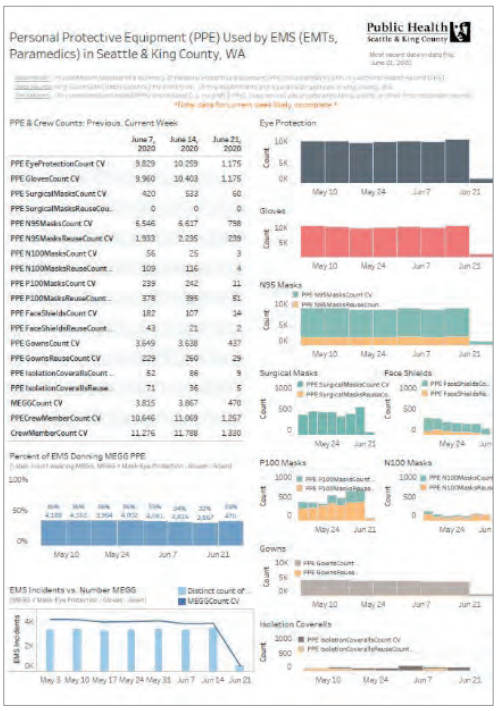
Crucial to ensuring EMS care for the people of King County is defending the safety and wellness of the first responder workforce. One challenge of the pandemic has been the access to timely diagnostic COVID-19 testing. Early on, public safety organizations across Puget Sound struggled to adequately monitor and test their own work force, which in turn jeopardized our region's critical emergency care network. Expanded access to accurate, coordinated testing that could support a larger program of EMS quarantine, monitoring, and isolation was desperately needed.

The EMS Division worked closely with Fire Departments and other public agencies to develop a system to monitor and support EMS providers who may have been exposed to, or infected with, COVID-19. This experience was subsequently leveraged to build out a remarkable community resource for testing that originated in Seattle and was then expanded to surrounding King County. *(For complete information on symptom monitoring and test sites, please see* ***page 21).***

## Ensuring Adequate PPE

The availability, consistent use, and ability to replenish PPE regionwide has been a particular concern. The limited supply requires careful inventory and planning. With the assistance of our EMS partners and the Division's Training and Education Section, Regional QI Section, the Regional Coordination Group was able to discern the current countywide PPE inventory, and project the anticipated use these supplies over the coming weeks and months. The EMS Division tracks PPE usage through electronics health care documentation and reports weekly trends through the PPE Usage Dashboard, helping monitor actual use to forecast needs.

When departments had difficulties securing individual supplies of PPE, they turned to the County to access the state emergency cache and the federal strategic reserves. The region initially intended to coalesce these PPE stores into a centrally location intended to distribute PPE as needed. However, recognizing these supplies were not bottomless, the region transitioned to a new PPE continuity plan, which requires establishing and maintaining a 12-week supply of PPE stored in four locations distributed throughout the county.




## Unique Regional Partnerships

### Gown Partners

Like what was occurring throughout the nation, the manufacture and supply chain of PPE continued to affect the county's efforts to maintain its inventory, Our partners supported a variety of strategies to extend the existing supply of PPE, including non-traditional PPE for low-to-moderate-risk patients, such as reusable gowns. A unique regional partnership with a the volunteer non-profit organization GownPartners.org, and Dr. Geoffrey Ferguson, Medical Program Director at the Summit Snoqualmie Ski Patrol, created the opportunity for EMS agencies to order and begin using re-usable gowns. With a shortage of supply of traditional, disposable fluid-resistant gowns, these gowns provided agencies with another option for critical equipment needed to keep our EMS personnel safe.

### University of Washington Engineering Department


Another collaboration was that of the University of Washington Engineering Department, King County EMS, Fire Departments and the Medic One Foundation. This partnership developed and manufactured Ultra Violet light boxes to assist with the decontamination of masks and extend the usable life span of critical PPE for first responders.

Refer to the following link for more information: https://www.me.washington.edu/news/article/2020-09-02/engineering-for-first-responders.

## Empowering Data-Driven Decisions

Throughout the pandemic response, the EMS Division's Regional QI Section worked collaboratively with Public Health, the CDC, Harborview Medical Center, and EMS dispatch centers and agencies in utilizing EMS data to inform decisions. Data and information provided by the Regional QI Section assisted our partners in effectively responding to the pandemic, as follows:

**Regional QI Highlight: Driving Decisions through Data and Dashboards**

- CDC resources used EMS data to support **syndromic surveillance** based on EMS-suspected COVID incidents and incidents involving COVID-like symptoms such as respiratory issues
- Public Health and the CDC identified **long-term care facilities** where infection prevention control may be needed based on EMS responses to a location
- Harborview Medical Center's Regional COVID-19 Coordinating Center (RC3), formerly the Disaster Medical Coordination Center (DMCC) identified **locations with the greatest need** for assistance. The RC3's role is to coordinate the distribution of COVID patients across hospitals in our region.
- Regional partners, including dispatch centers and EMS agencies, used **dashboards** developed by EMS to track and monitor the virus' activity and impacts in our community to help provide situational awareness and inform decision-making. One such example is monitoring the use of personal protective equipment to inform the weekly orders of PPE needed based on actual PPE used by EMS providers in our region.
- Lastly, EMS data also informs an ongoing CDC-funded evaluation of the **Economic, Social, and Overall Health impacts of COVID-19** in our region, specifically the behavioral health of the population and indicators. EMS provides monthly updates to inform the number of EMS incidents to treat patients for suspected suicide or suicidal ideation. For more information, visit the following link: https://www.kingcounty.gov/depts/health/covid-19/data/~/media/depts/health/communicable-diseases/documents/C19/report-behavioral-health-needs.ashx


Public Health
Seattle & King County

July 15, 2020

**Behavioral Health Needs and Services in King County, WA: March – May 2020**

BACKGROUND

KEY POINTS

1) Washington state survey data show the number of people with symptoms of depression has increased 94% since April 23, 2020. Those who expect to lose employment or lost employment, those with incomes less than $40,000 per year, and people self-identifying as other or with multiple race categories were more likely to report feeling depressed.
2) The number of calls to King County's behavioral health crisis line increased after the start of social distancing, though only calls in April 2020 were significantly higher than those in the same month of 2019 (12% higher).
3) Suicide-related Emergency Medical Services incidents and emergency department visits declined since the start of the pandemic, as did the number of overall incidents and visits.
4) These measures will continue to be observed given the expected increases in mental health concerns.

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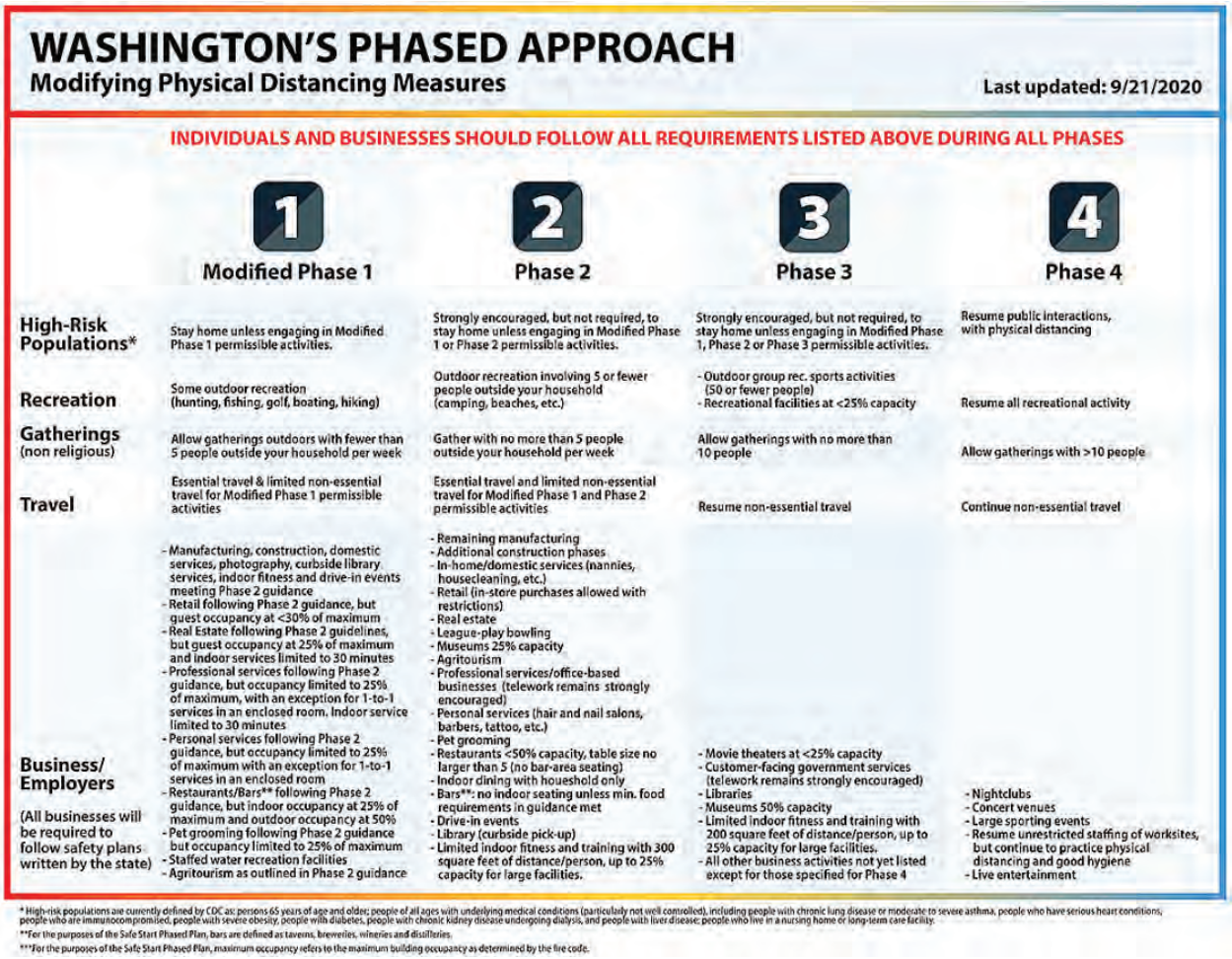
The EMS Division will continue monitoring the impacts of COVID-19 on the EMS system, keeping regional partners updated of the evolving situation. Six months into the COVID-19 response, these efforts have become an ongoing and integral part of our regional monitoring activities and will continue to evolve to meet the needs of our system. *For complete information on Dashboards please see* ***page 23****).*

## Phased Reopening and Our "New Normal"

Governor Inslee's “Stay At Home” order and our region's commitment to prevention measures resulted in COVID-19 cases plateauing and gradually declining. The EMS system was able to catch its breath from what it had endured over the previous few months. Procedures had been drafted, processes put into place, and the feeling of anxiety was replaced with a sense of resilience. In late May, the Governor announced Safe Start, Washington's four-phase plan to reopen the state, and King County entered Phase 2 a few weeks later.

Heading into the Fall, the region will leverage the clinical directives, best practices and procedural infrastructure it has cemented over the past six months to prepare for the forecasted potential increase in COVID cases, along with other "unknowns" that might come our way.

**Safe Start Plan**



**WASHINGTON'S PHASED APPROACH**

**Modifying Physical Distancing Measures**

**Last updated: 9/21/2020**

**INDIVIDUALS AND BUSINESSES SHOULD FOLLOW ALL REQUIREMENTS LISTED ABOVE DURING ALL PHASES**

| | 1 Modified Phase 1 | 2 Phase 2 | 3 Phase 3 | 4 Phase 4 |
|---|---|---|---|---|
| **High-Risk Populations*** | Stay home unless engaging in Modified Phase 1 permissible activities. | Strongly encouraged, but not required, to stay home unless engaging in Modified Phase 1 or Phase 2 permissible activities. | Strongly encouraged, but not required, to stay home unless engaging in Modified Phase 1, Phase 2 or Phase 3 permissible activities. | Resume public interactions, with physical distancing |
| **Recreation** | Some outdoor recreation (hunting, fishing, golf, boating, hiking) | Outdoor recreation involving 5 or fewer people outside your household (camping, beaches, etc.) | - Outdoor group rec. sports activities (50 or fewer people)<br>- Recreational facilities at <25% capacity | Resume all recreational activity |
| **Gatherings** (non religious) | Allow gatherings outdoors with fewer than 5 people outside your household per week | Gather with no more than 5 people outside your household per week | Allow gatherings with no more than 10 people | Allow gatherings with >10 people |
| **Travel** | Essential travel & limited non-essential travel for Modified Phase 1 permissible activities | Essential travel and limited non-essential travel for Modified Phase 1 and Phase 2 permissible activities | Resume non-essential travel | Continue non-essential travel |
| **Business/ Employers**<br>(All businesses will be required to follow safety plans written by the state) | - Manufacturing, construction, domestic services, photography, curbside library services, indoor fitness and drive-in events meeting Phase 2 guidance<br>- Retail following Phase 2 guidance, but guest occupancy at <30% of maximum<br>- Real Estate following Phase 2 guidelines, but guest occupancy at 25% of maximum and indoor services limited to 30 minutes<br>- Professional services following Phase 2 guidance, but occupancy limited to 25% of maximum, with an exception for 1-to-1 services in an enclosed room. Indoor service limited to 30 minutes<br>- Personal services following Phase 2 guidance, but occupancy limited to 25% of maximum with an exception for 1-to-1 services in an enclosed room<br>- Restaurants/Bars** following Phase 2 guidance, but indoor occupancy at 25% of maximum and outdoor occupancy at 50%<br>- Pet grooming following Phase 2 guidance but occupancy limited to 25% of maximum<br>- Staffed water recreation facilities<br>- Agritourism as outlined in Phase 2 guidance | - Remaining manufacturing<br>- Additional construction phases<br>- In-home/domestic services (nannies, housecleaning, etc.)<br>- Retail (in-store purchases allowed with restrictions)<br>- Real estate<br>- League-play bowling<br>- Museums 25% capacity<br>- Agritourism<br>- Professional services/office-based businesses (telework remains strongly encouraged)<br>- Personal services (hair and nail salons, barbers, tattoo, etc.)<br>- Pet grooming<br>- Restaurants <50% capacity, table size no larger than 5 (no bar-area seating)<br>- Indoor dining with household only<br>- Bars**: no indoor seating unless min. food requirements in guidance met<br>- Drive-in events<br>- Library (curbside pick-up)<br>- Limited indoor fitness and training with 300 square feet of distance/person, up to 25% capacity for large facilities. | - Movie theaters at <25% capacity<br>- Customer-facing government services (telework remains strongly encouraged)<br>- Libraries<br>- Museums 50% capacity<br>- Limited indoor fitness and training with 200 square feet of distance/person, up to 25% capacity for large facilities.<br>- All other business activities not yet listed except for those specified for Phase 4 | - Nightclubs<br>- Concert venues<br>- Large sporting events<br>- Resume unrestricted staffing of worksites, but continue to practice physical distancing and good hygiene<br>- Live entertainment |

* High-risk populations are currently defined by CDC as: persons 65 years of age and older; people of all ages with underlying medical conditions (particularly not well controlled), including people with chronic lung disease or moderate to severe asthma, people who have serious heart conditions, people who are immunocompromised, people with severe obesity, people with diabetes, people with chronic kidney disease undergoing dialysis, and people with liver disease; people who live in a nursing home or long-term care facility.

**For the purposes of the Safe Start Phased Plan, bars are defined as taverns, breweries, wineries and distilleries.

***For the purposes of the Safe Start Phased Plan, maximum occupancy refers to the maximum building occupancy as determined by the fire code.

# EMS Division Programs Overview

## Background

The Medic One/EMS 2020-2025 Strategic Plan is the primary policy and financial document directing the Medic One/EMS system in its work. Defining the responsibilities, functions, and programs of the EMS system, the Plan presents a comprehensive strategy to ensure the system can continue to meet its commitments. It documents the system's current structure and priorities and outlines the services, programs and initiatives supported by the countywide, voter-approved EMS levy.

## Overview

The King County EMS Division of Public Health - Seattle & King County works with its regional partners to implement the Strategic Plan. The Division manages the core Regional Services and Strategic Initiatives that support the key elements of the system. These programs help tie together the regional medical model by providing consistent regional medical direction, standardized EMT training and continuing medical education, uniform EMS training for emergency dispatchers, centralized data collection and expert analysis, paramedic service planning and evaluation, and financial management of the regional EMS levy fund. Coordinating these on the regional level ensures prehospital patient care is delivered at the same standards across the system, policies and practices reflecting the diversity of needs are maintained, and local area service delivery is balanced with centralized interests. All EMS Division programs are designed to enhance the integrated Medic One/EMS services and regional approach, and are developed through strong partnerships with other regional EMS agencies and innovative leadership in the emergency medical field.

Understandably, COVID-19 interrupted the EMS Division's normal activities, requiring that we modify our programs and how we approach them. Although it posed a number of challenges, it also brought opportunities to creatively respond in new ways while focusing on the safety and welfare of our community. This section of the report highlights how some of the Division's many programs redirected their focus to respond to COVID, adjusted their approaches, and advanced despite the pandemic.

For more information about other EMS regional programs, please refer to the EMS webpage: **www.kingcounty.gov/health/ems.aspx**.

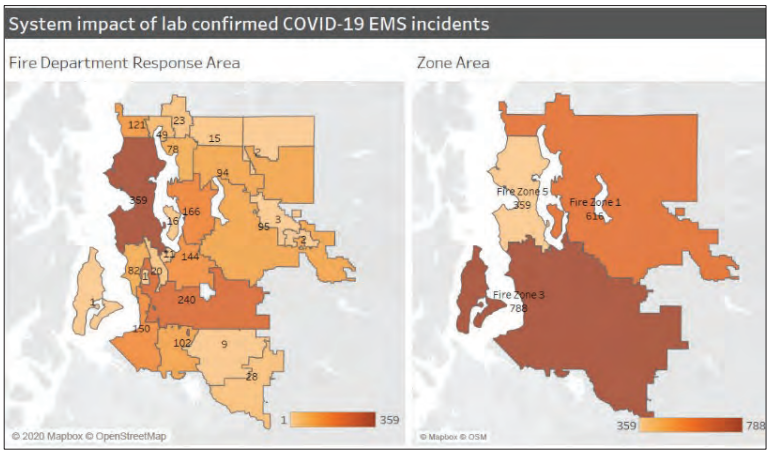
# Regional Quality Improvement

The Regional Quality Improvement (QI) Section of the EMS Division conducts programmatic, scientific, and case-based evaluation of 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.

## COVID-19 Impacts

Public Health – Seattle & King County activated its Health and Medical Area Command (HMAC) to respond to the novel coronavirus in late January 2020. Regional QI Section staff program managers and epidemiologists were deployed to serve in the PH HMAC to help plan and support the region's response to COVID-19. The following three highlights are examples of innovations developed to help our system respond while in the midst of a pandemic:

- Daily COVID-19 surveillance to identify and review EMS incidents with COVID-19 positive patients to assess level of exposure to EMS personnel
- Regional symptom monitoring and testing for first responders and their families
- Data and information critical to provide situational awareness through the development of dashboards to monitor the EMS system and key performance measures related to COVID-19




## COVID-19 Surveillance

On January 20, 2020, the first case of COVID-19 was documented in Washington State. The infection went undetected until the first COVID-19 attributable death was identified locally on February 26[1]. Faced with an epidemic in King County, EMS leadership immediately implemented a COVID-19 surveillance program to better understand the scale of what was coming our way. The program follows standards of emerging disease surveillance as defined by the Centers for Disease Control and Prevention (CDC) for ongoing, systematic collection, analysis, and interpretation of health-related data.

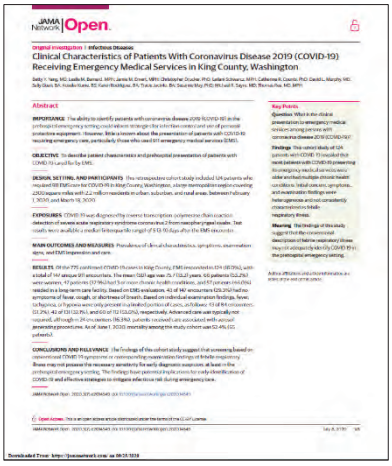
1. Yang BY, Barnard LM, Emert JM, et al. Clinical Characteristics of Patients with Coronavirus Disease 2019 (COVID-19) Receiving Emergency Medical Services in King County, Washington. *JAMA Netw Open.* 2020;3(7):e2014549. doi:10.1001/jamanetworkopen.2020.14549

## Data Collection and Analysis

With the first King County COVID-19 case identified, the EMS Division partnered with Public Health – Seattle and King County Health and Medical Area Command (HMAC), Washington State Department of Health, and CDC outbreak investigation teams to systematically collect information on lab-confirmed COVID-19 patients. This COVID-19 registry is cross-linked to the electronic EMS registry of 9-1-1 responses and enables EMS to determine when, where, how, and why EMS is responding to COVID-19 illness in the community. Conducted daily to ensure timely identification of emergency medical incidents involving COVID-19 patients, this surveillance has proven critical to understanding the clinical manifestations of the virus, informing best practices to protect EMS responders, and providing early alert regarding COVID-19 outbreaks.

The process determines the interval between EMS contact and COVID-19 illness to conclude if the patient was potentially infectious at the time of the encounter. This "exposure window" is derived from the most up-to-date COVID-19 science. A team examines each EMS encounter with an infected patient to determine the possibility of an exposure, which could occur if sufficient Personal Protective Equipment (PPE) was not in place. Any concern is reviewed with the EMS agency health officer to confirm the case details and determine whether the responder may have been exposed and require quarantine. A proactive plan for quarantine and monitoring was implemented as part of the EMS program (see page 21). From March to July 2020, more than 1,200 patients with COVID-19 required 9-1-1 emergency responder care, involving over 1,400 EMS encounters and 6,000 first responders. The majority of the few hundred exposures to EMS personnel occurred during the early weeks of the pandemic.

## Interpretation and Clinical Relevance


JAMA Network Open.

Clinical Characteristics of Patients With Coronavirus Disease 2019 (COVID-19) Receiving Emergency Medical Services in King County, Washington

Abstract

This surveillance program enabled the EMS Division to evaluate COVID-19 patient presentation and clinical characteristics in the prehospital setting[1] right at the onset of the epidemic in our region. The evaluation studied the first 124 COVID-19 patients who required 9-1-1 emergency care in King County. One major finding was that the signs and symptoms among patients with COVID-19 varied greatly and that only a fraction had the conventional symptoms of cough, fever, and difficulty breathing. In fact, the evaluation revealed that there were a **broader range** of clinical presentations and symptoms in emergency patients with COVID-19, especially among older persons. These findings had important implications for EMS systems across the country and showed us early on that that accurately identifying COVID-19 illness based on clinical symptoms and signs would be challenging. https://jamanetwork.com/journals/jamanetworkopen/article-abstract/2767993.

This led to the advantageous decision to require first responders to expand and modify their screening strategy to better identify potential COVID-19. Guided by EMS agency and physician leadership, the region implemented a multi-pronged approach to achieve high-quality care while minimizing infectious risk to the EMS responders. (Please see page 13 for more details).

## Regional COVID-19 Symptom Monitoring, First Responder and Community Testing, and Mobile Assessment Teams

Starting in the early days of the pandemic, first responders across Puget Sound struggled to adequately monitor and test their own work force. The region implemented the following strategies to ensure greater access to accurate, coordinated testing that could support a larger program of EMS quarantine, monitoring, and isolation.

### Regional COVID-19 Symptom Monitoring

The pandemic required integrated approach to monitor symptoms and access timely testing so our first responders could respond to the community's medical emergencies. The EMS Division partnered with expertise from King County Fire Departments to build a web platform that enabled a common, secure means to support the health of first responder workforce.

This tool supports regional agencies in monitoring personnel health and safety, making quarantining and isolation decisions, determining when personnel are safe to return to work, and assisting in agency personnel COVID-19 testing decisions. An automated system notifies and logs self-reported symptoms, prompting individuals twice daily to report symptoms. Health Officers receive a secure daily report of agency personnel's status to guide personnel testing.

### First Responder – Public Safety COVID-19 Testing Sites

Access to COVID-19 testing was limited during the initial months of the pandemic, requiring a novel solution. Working with the Washington State Department of Health, EMS medical leadership authorized EMS providers to operate COVID-19 testing sites. These sites provided access for public safety workers to access testing.


The initial public safety test site was operated by the Seattle Fire Department in collaboration with the University of Washington Laboratory, and provided the model for an efficient and successful testing program. Two additional sites followed, one located in Shoreline and one in Covington, which tied into the web-based monitoring platform for a coordinated program. While spearheaded by Shoreline Fire Department and Puget Sound Regional Fire Authority, these sites relied on collaboration of multiple King County Fire Departments. The public safety testing sites also helped serve the larger region and was a "bridge" resource as public safety outside of King County developed their own testing sites.

## Community Access to Testing: EMS Partners Lead the Way

As the pandemic in King County evolved, so did a need to build testing capacity for the community. The Seattle Fire Department, in partnership with the Mayor's Office of Innovation and Performance and the University of Washington, established the first city-funded, drive-up community test sites in SoDo and along Aurora Avenue in former vehicle emission test facilities.

*Seattle FD Chief Scoggins at the drive-thru testing site.*

Appointments at the two drive-up sites filled quickly from the start, with teams testing over 2,000 people a day. Patients tested are able to securely retrieve their own test results using a QR code linked to the online results reporting system.

As of the end of July 2020, more than 80,000 tests had been performed at the two sites with plans to increase testing capacity by opening up fully ADA-compliant walk-up sites in south Seattle beginning in August 2020.

*Mayor Jim Ferrell was first in line to inaugurate the new Federal Way testing site.*

With the City of Seattle testing sites serving as a model, Public Health, EMS Division, and King County Fire Departments have stood up medium and high-volume community testing sites for both EMS providers and the public. These sites are strategically located across the county to achieve equitable access for those communities where the burden of COVID-19 is greatest.

## Seattle Fire Department Plays Leading Role in COVID-19 Testing: Mobile Assessment Teams

Building upon the City's COVID-19 testing program, the Seattle Fire Department created four rapid deployment Mobile Assessment Teams in April 2020. A pool of 20 firefighters were trained to conduct the nasal swab tests and strategically deployed to senior and long-term care facilities which are most vulnerable to COVID-19.

Recognizing that ongoing testing would be critical to quickly identifying new cases, the Fire Department teams also trained members of the facilities' medical staff to perform nasal swabbing. By June 2020, the teams had visited 23 long-term care facilities and tested more than 1,500 people before transitioning the project to Public Health.

## EMS Dashboards: Data Driven Approaches and Decision-Making

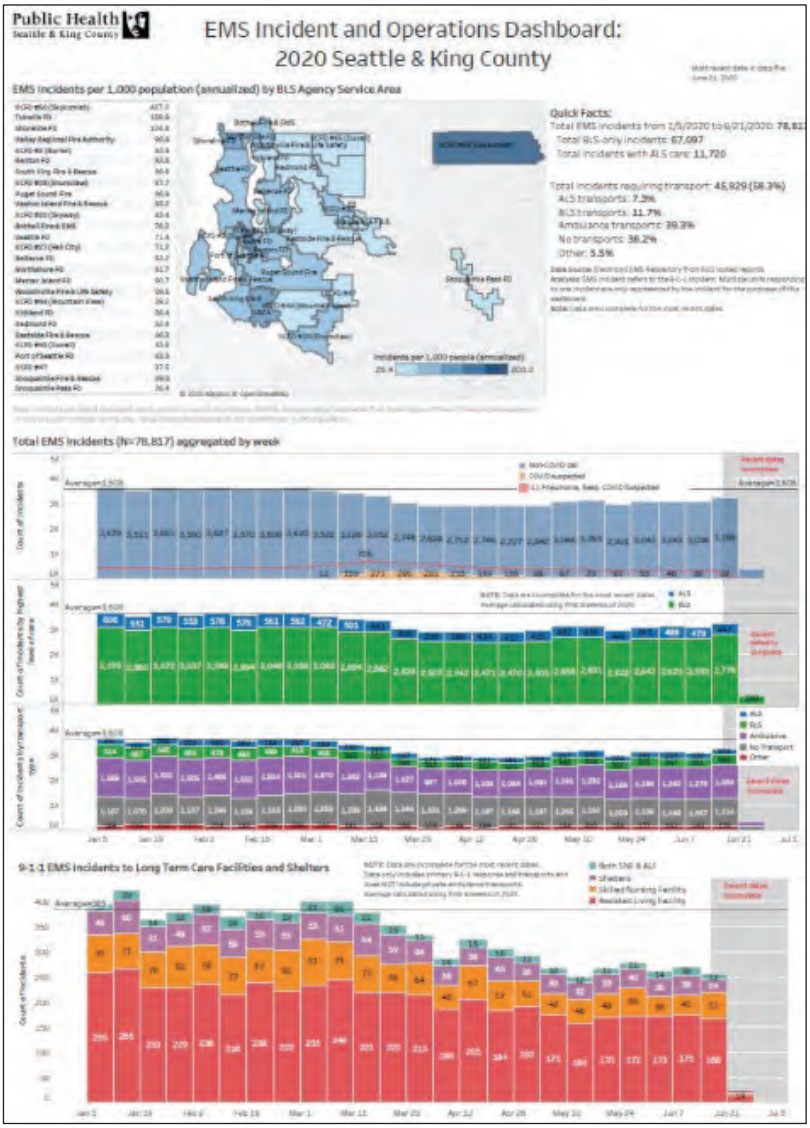
Timely and robust collection and analysis were especially important to assess the impact of the coronavirus across the EMS system. As mentioned on page 16, the EMS Division developed dashboards that helped the region track and monitor key information, identify trends, and consider if and how system strategies may be modified to improve care. These dashboards were shared daily with the key coordination groups to help provide situational awareness and inform decision-making.

### EMS Incident and Operations Dashboard

This data dashboard provides the total number of EMS incidents across King County geographically and by calendar week. The dashboard monitors weekly trends to include:

- All 9-1-1 EMS calls, COVID-19-suspected calls, and calls involving influenza-like illness, pneumonia or respiratory symptoms
- Calls involving basic and advanced life support
- Patients transported to the hospital via EMS
- EMS responses to long-term care facilities.

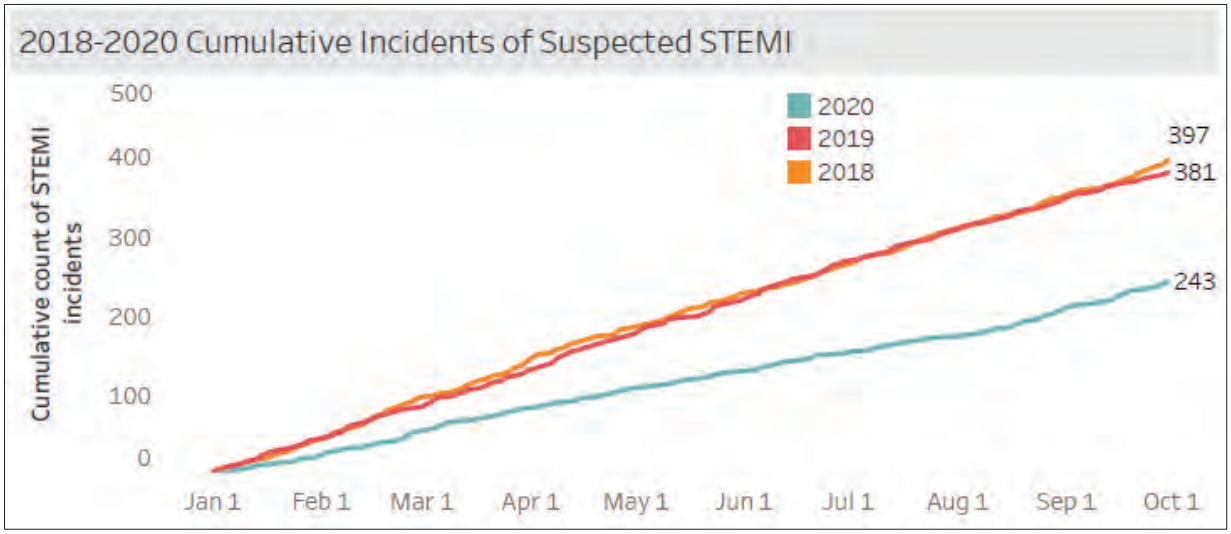
Early on during the initial 2 months of the pandemic, EMS experienced a 25% reduction in 9-1-1 response – a phenomenon observed throughout Washington State and across the US. Subsequently, the EMS response totals have normalized over time. The dashboards have been expanded to understand COVID-19 impacts on specific time-sensitive conditions.



## EMS Time-Sensitive Emergency Incidents Dashboard

There are specific conditions where EMS involvement can substantially improve outcome. These conditions typically involve conditions that are especially time-sensitive. EMS can identify the nature of the illness and provide essential early interventions that improve the likelihood of outcomes. Given this understanding, EMS strategically selected specific conditions to understand the potential impacts of COVID-19 to include ST elevation myocardial infarction where there is an acute blockage of a heart artery, and cardiac arrest where the heart stops pumping blood making the patient collapse. Indeed, if myocardial infarction is not treated in a timely manner, it can progress to cardiac arrest.

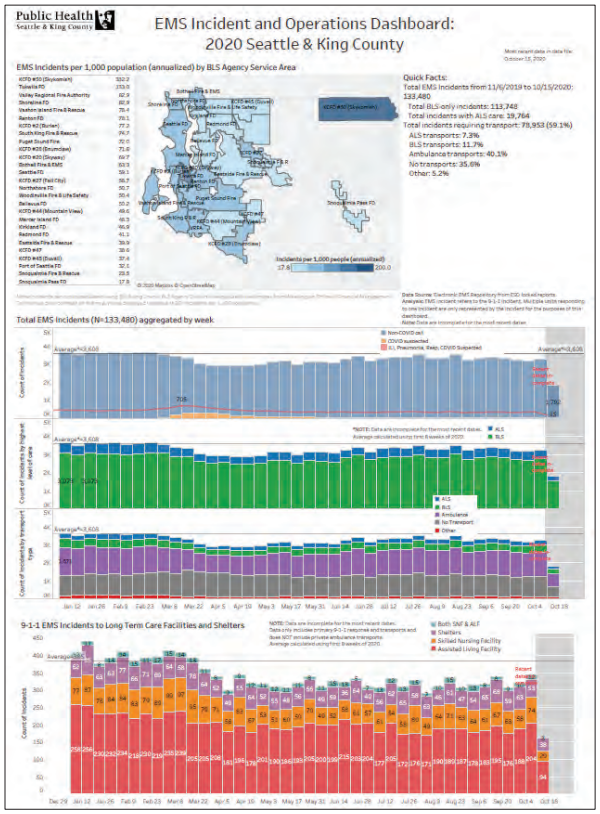
The dashboard provides the week-by-week totals for 2020 and then compares cumulative counts with the years 2018 and 2019. As seen in the dashboard below, there has been a marked decrease in myocardial infarction compared to prior years and a corresponding measured increase in cardiac arrest counts during 2020.




Although interpretation requires caution, a plausible explanation is that persons with myocardial infarction have delayed activating 9-1-1 given their concern for COVID-19 at the hospital, and as a consequence, have progressed to cardiac arrest. Public Health and the King County Fire Chiefs Association have used these results to do public outreach about the lifesaving importance of timely activation of 9-1-1 for symptoms of myocardial infarction or “heart attack,” so as not to delay and suffer cardiac arrest. For more information, refer to: https://www.ahajournals.org/doi/pdf/10.1161/CIRCULATIONAHA.120.048951.

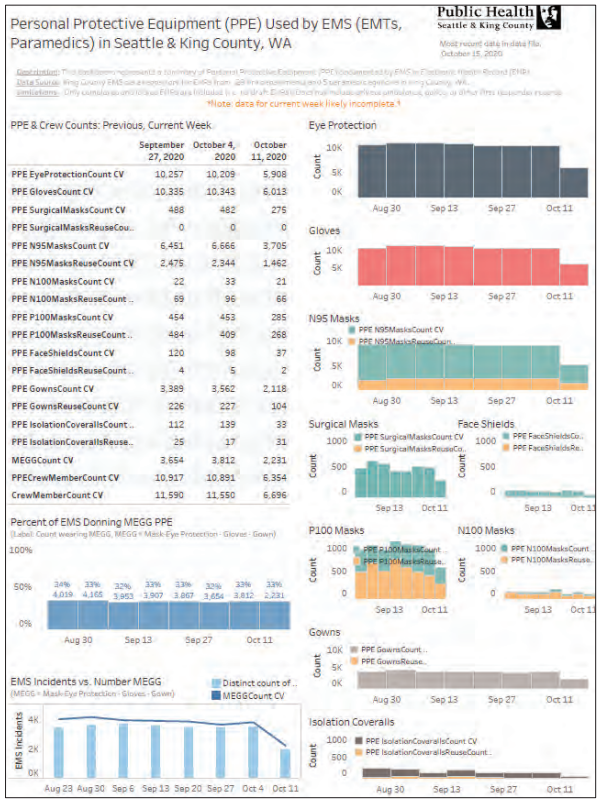
## EMS Responses to COVID-19 Patients Dashboard

The EMS Division maintains a dashboard that reports the counts of EMS involvement with COVID-19 patients as a means to help monitor regional disease activity and provide case-specific safety assessment for EMS providers and patients. This data dashboard shows the total number of responses involving patients who are positive with COVID-19 and treated by EMS. From January 1 to June 30, 2020, EMS responded to 1,010 cases involving a lab-confirmed COVID-19 patient. This dashboard includes the geographic distribution of encounters across King County, the week-by-week totals, and the type of EMS (BLS or ALS) involvement and transport. During this time period, the peak of EMS involvement occurred during the first week of April and then gradually decreased through June 2020. The dashboard also reports patient characteristics to help EMS understand the different clinical presentation of emergency patients with COVID-19 infection.




## Personal Protective Equipment Use by EMS Dashboard

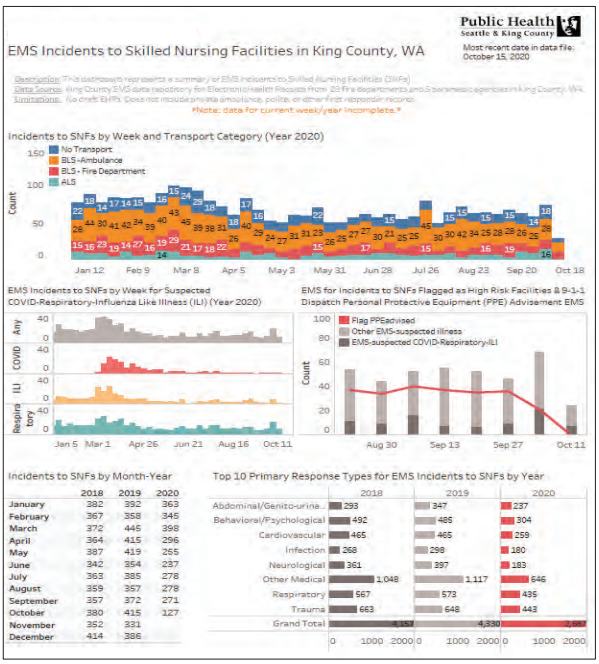
Personal protective equipment (PPE) provides EMS providers protection against infectious disease transmission. However, there is a limited supply that requires careful inventory and planning. This PPE Use dashboard provides a timely and accurate summary of PPE use documented by EMS in the Electronic Health Record (EHR). Weekly trends enable EMS to track actual use to forecast needs according to each PPE item, including: eye protection (face shields), gloves, masks (N95, N100, P100), and gowns or isolation coveralls. On average, about 11,500 sets of PPE to include masks, gloves, eyewear, and gowns are used weekly by EMS. This dashboard is helpful to determine the effectiveness of EMS' PPE conservation strategy.

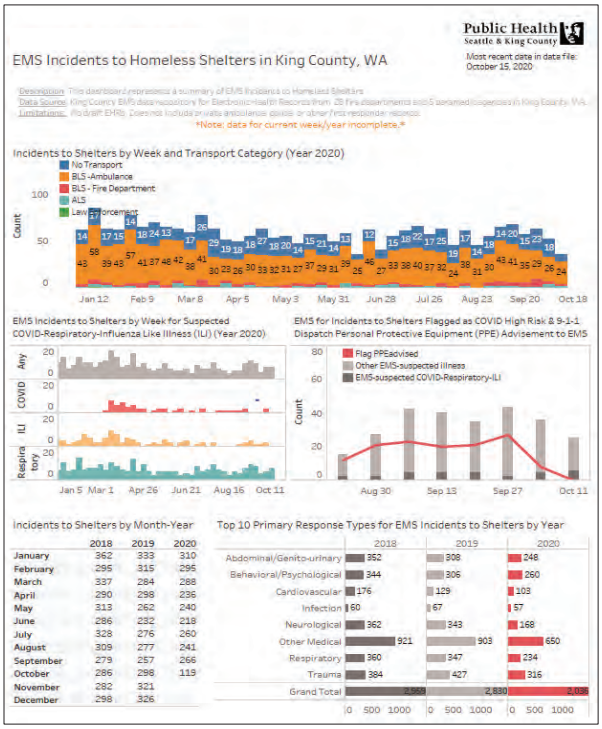


## EMS Incidents to Specialized Residential Facilities in King County

During COVID-19, particular residential facilities have been at high risk given their physical structure and the persons who reside in these locations. Indeed, the initial cluster of COVID-19 cases occurred in skilled nursing facilities, where residents often have regular contact with health care workers and hospitals, congregate in communal settings for meals and socialization, and of course are older with a larger burden of chronic health conditions. Homeless shelters support the most vulnerable in our community, where COVID-19 could also have an especially adverse impact given the challenges to access testing and care and safe locations to isolate ill persons. EMS responded quickly to generate separate dashboards that evaluated the count and type of 9-1-1 calls to skilled nursing facilities and homeless shelters.

EMS 9-1-1 response information was incorporated by regional healthcare stakeholders to help deploy “strike teams” that could go on site to provide testing, aid with clinical care, or locate safe housing for illness isolation. One silver-lining consequence of this multi-stakeholder outreach to these vulnerable locations is that ultimately there was less need for 9-1-1 response as more efficient resources were used to manage on-site health needs.



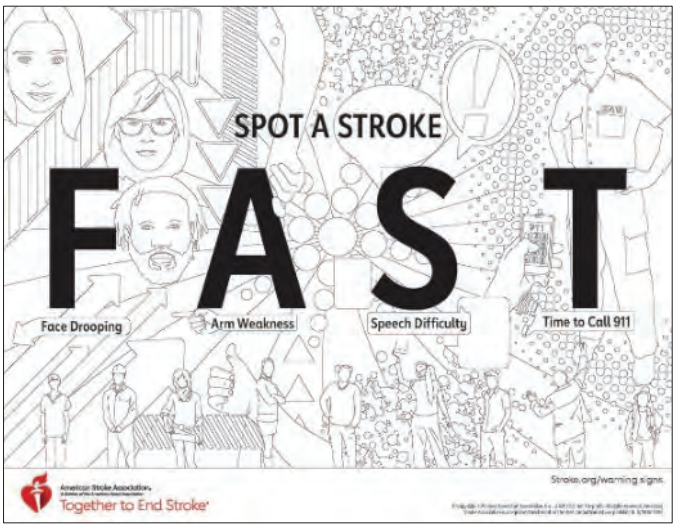



# Medical Quality Improvement

## Continuous Improvement for Regional Stroke System of Care

### Optimizing Stroke Care in King County

Stroke is a disease that impedes the flow of blood and oxygen to a person's brain when a blood vessel is blocked by a clot or has burst. Stroke symptoms may include facial droop, arm muscle weakness and difficulty in speech. Time is a critical factor in stroke care, and getting medical help immediately may reduce the potential for disability and death.



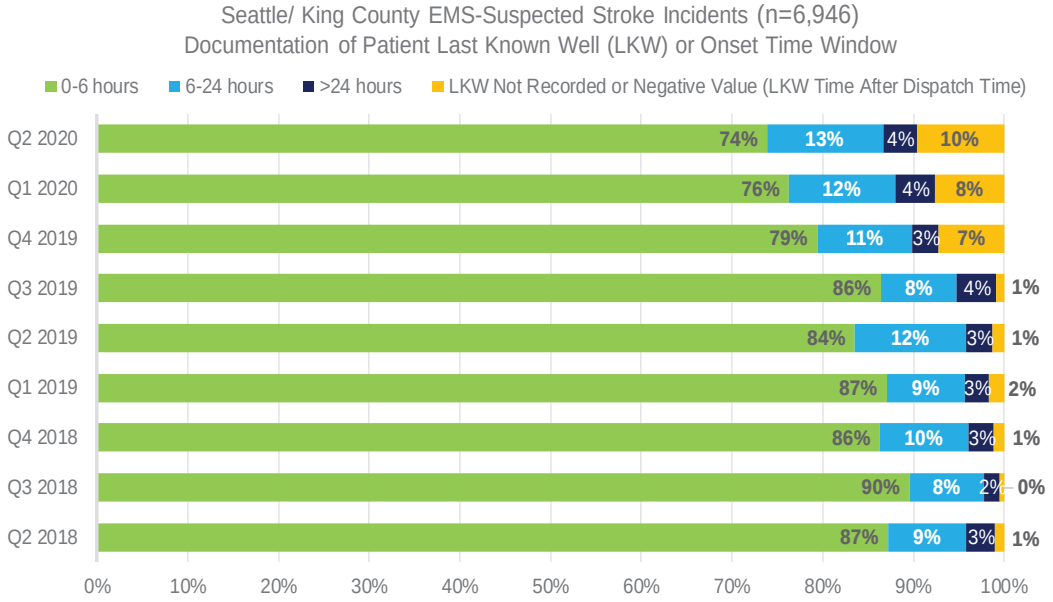

With stroke being the fifth leading cause of death in the United States, our region is committed to improving the stroke system of care across King County. On average, EMS providers in King County care for a suspected stroke patient every few hours.

As highlighted in past reports, the regional stroke system of care continues to evolve. In 2017 and 2018, King County implemented revised stroke triage tools centered on suspected high severity stroke patients. This entailed activating ALS and transporting such patients to those hospitals capable of performing the specialized clot retrieval procedure thrombectomy; and extending the window of time (from six hours to 24) for when a stroke patient may be eligible for such advanced intervention. This timeframe is based on when the patient was "last known to be well" (LKW) which plays a key role in patient care and treatment.

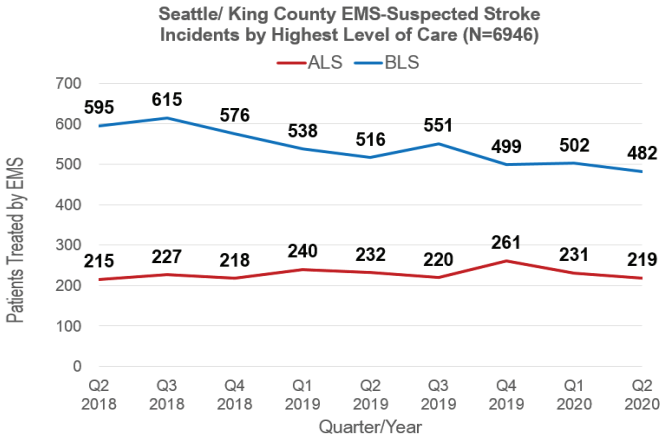
This year, the EMS Division and its partners evaluated the triage tool of extending the LKW window standard to up to 24 hours. This larger time window increases access to endovascular treatment for suspected high-severity stroke patients who may have delayed seeking medical care in circumstances, such as an overnight stroke while a patient is sleeping. **Early evaluation of this stroke triage guideline indicates that EMS effectively implemented the revised triage tool and improved access to endovascular treatment for select patients**.

## Evaluating Impacts to EMS

Accurately documenting a patient's last known well (LKW) time is crucial for downstream clinical decision-making to optimize safe and effective management of acute stroke patients. KCEMS evaluated the completeness of this metric in mid-2020. Over 90% of EMS-suspected stroke patients had a documented LKW time or an onset time. The majority (84%) of all stroke patients were within the 0-6 hour LKW category, and EMS treated 10% of patients were within the expanded 6-24 hour time window.




Activating ALS resources immediately for eligible stroke patients is critical to optimizing regional EMS operations and 9-1-1 responses. The figure indicates that from April 2018 to June 2020, approximately 30% of EMS-suspected stroke patients received ALS-level of care. Despite the expansion of the LKW window from 6 to 24 hours in early 2019, ALS-level responses appear relatively consistent across years, indicating that the expansion of the LKW time window to 24 hours had a modest impact on EMS operations while offering clinical benefits for these selected patients.




References
1. Washington State Department of Health, Center for Health Statistics, Death Certificate Data, 2000-2018, Community Health Assessment Tool (CHAT), October 2019.
2. Benjamin EJ, Blaha MJ, Chiuve SE, et al. on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2017 update: a report from the American Heart Association. *Circulation*. 2017;135:e229-e445.

# Medical Quality Improvement

## Collaboration with Harborview Injury Prevention and Research Center (HIPRC)

Trauma is a major cause of morbidity and mortality in King County, and a primary condition of focus for EMS. Improving outcomes requires active collaboration between EMS and hospitals to assure that patients with serious injury are optimally triaged and receive early life-saving treatment. The EMS Division works closely with partners at the Harborview Injury Prevention Research Center (HIPRC), which maintains the regional trauma registry containing detailed information about hospital care and outcome for seriously injured patients.

These partnerships have enabled critical data linking between prehospital and hospital data. Previously, once patients were delivered to the emergency department, we lost contact with them because we couldn't access hospital data. Now we can evaluate the standard of care provided these patients, starting from prehospital and EMS, and following them to the emergency department to the operating room into intensive care, and finally to convalescence and recovery. Being able to track this information is integral for our quality assurance practices and our continual pursuit of excellence.

Working with HIPRC's INSIGHT program, which exposes undergraduates from around the country to public health and clinical medicine, recently led to refined guidelines for EMS tourniquet care. INSIGHT evaluated every tourniquet patient in King County over a span of 18-months to determine how public health campaigns like *Stop the Bleed* may influence community efforts to aide in serious bleeding situations. The results highlight how actively bystanders and law enforcement participate in early tourniquet application and how EMS can play in assessing tourniquet care.

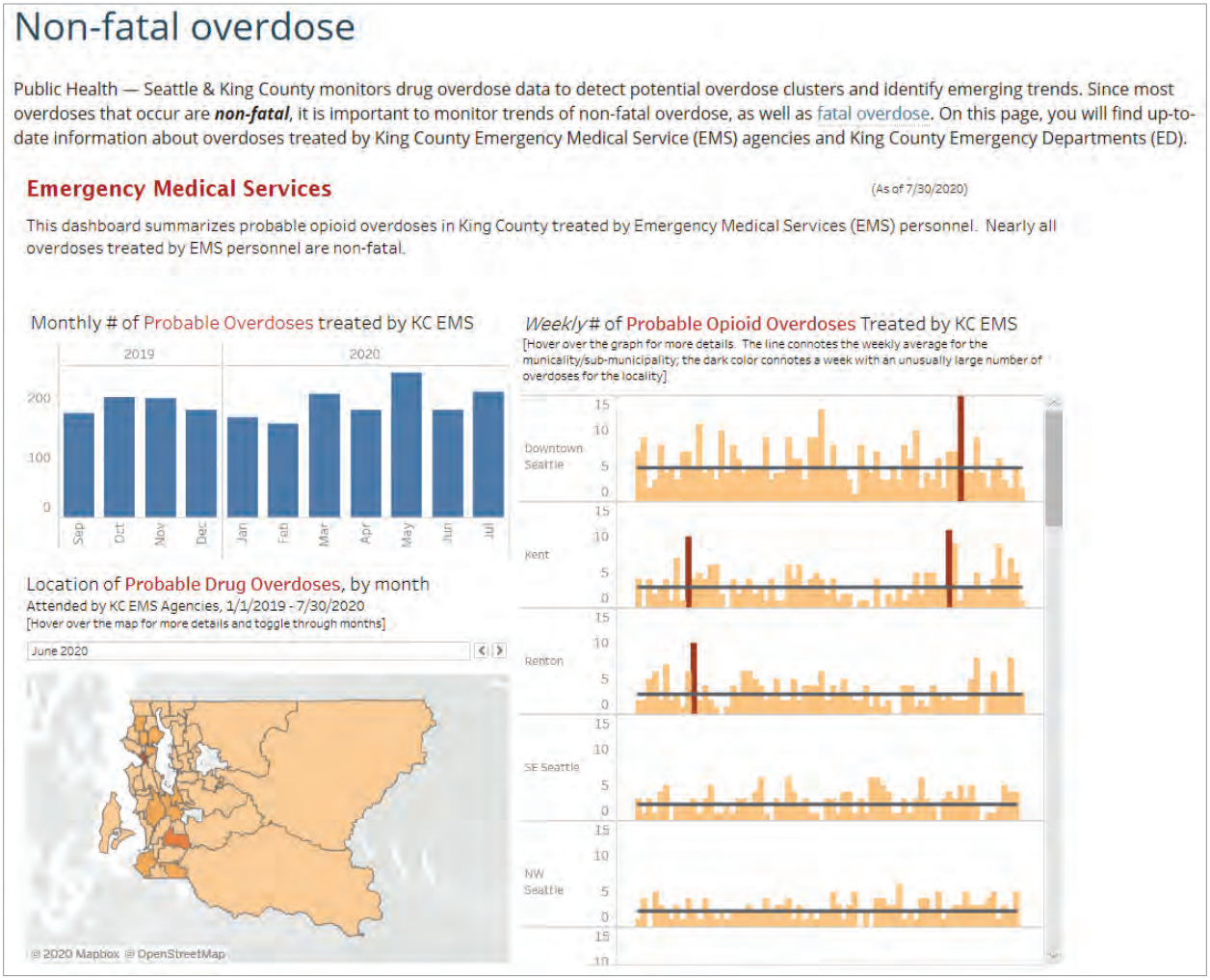
KCEMS is enthusiastic about its collaboration with HIPRC colleagues and looks forward to further strategizing on efforts to improve critical care for trauma.

### Opioid Overdose Surveillance

Opioid use and overdose remain major public health challenges in King County, much like the rest of the United States. This crisis has motivated Public Health - Seattle & King County to prioritize the tracking and reporting of opioid medical events so that it can better understand the epidemiology, increase outreach and improve care for those at risk.

As was reported in the 2019 Annual Report, Public Health developed a dashboard to display EMS responses to probable opioid overdose incidents. The dashboard enables timely surveillance, identifies clusters and upticks in overdose, and detects trends over time and across King County. Because this is an outward-facing dashboard, it increases the visibility, transparency and availability of information to the public.

Since it went live last year, this opioid surveillance tool has successfully identified overdose clusters, and alerted us to emerging drug threats, such as the presence of fentanyl in illicit pills. Armed with this type of information, we are able to circulate public health alerts through EMS providers, and help Public Health and its community providers better engage those at highest risk for overdoses. For additional information about this undertaking, please refer to page 24-25 of the EMS Division 2019 Annual Report. Our Probable Opioid Overdose Dashboard can be accessed here: [https://kingcounty.gov/depts/health/overdose-prevention/non-fatal.aspx](https://kingcounty.gov/depts/health/overdose-prevention/non-fatal.aspx)



# Center for the Evaluation of EMS (CEEMS):

## Grant-Funded Programs

*The Center for the Evaluation of Emergency Medical Services (CEEMS) undertakes rigorous evaluations to advance the science of prehospital emergency care. It provides a forum for leaders from King County EMS and Seattle Fire Department to review new developments in clinical care, understand regional implications, and consider gaps in our understanding. CEEMS projects span a spectrum of investigations including trauma care, cardiac arrest resuscitation, stroke identification and triage, and drug overdose.*

In some instances, projects are supported by external grant funding, providing resources to accelerate specific areas of focus. Its impressive portfolio attracts wide-ranging leadership from across the field of emergency care. Collectively, CEEMS connects innovative ideas to a world-class EMS system to investigate promising approaches, translate scientific understanding into hands-on treatment and improve the delivery of pre-hospital care for King County citizens.

For the past year, CEEMS has partnered with academic organizations, EMS agencies and industry leaders to focus on the following projects:

### Understanding the Differences Between Men and Women to Improve Cardiac Arrest Resuscitation

Through a collaborative initiative supported by the American Heart Association, CEEMS investigators will evaluate potential mechanisms by which cardiac arrest risk and outcome differ between men and women. The overarching goal is to move clinical care away from the current "one-size fits all" resuscitation approach. This project connects the EMS Division with University of Washington emergency medicine, cardiology, bioengineering, and mathematics experts to achieve a “precision medicine” approach that can match the right treatment to the individual patient.

### Sodium Nitrite to Improve Cardiac Arrest Resuscitation (SNOCAT)

During cardiac arrest, the brain can suffer irreversible damage due to lack of oxygen. Sodium nitrite is a cytoprotective substance that helps prevent cell damage, specifically to brain cells.

The SNOCAT study evaluates whether providing sodium nitrite early in the care of cardiac arrest can improve resuscitation and increase survival. The evaluation involves King County’s highly-skilled paramedics and is conducted in conjunction with University of Washington investigators and supported by the National Institutes of Health.

### Pediatric Emergency Care Applied Research Network (PECARN)

Seattle Fire Department, King County EMS, and Children's Hospital are collaborating to participate in PECARN, a federally-funded pediatric emergency medicine research network. PECARN conducts high-priority, multi-institutional research on the prevention and management of acute illnesses and injuries in children. The Initiative with PECARN remains in development.

### The HeartRescue Program

King County has been one of the leaders of the HeartRescue Project, a collaborative effort to increase cardiac arrest survival across the United States, for nine years. Supported by the Medtronic Foundation and partnering with the country's leading emergency and resuscitation experts, the project focuses on systemically expanding successful strategies of resuscitation to regional and statewide levels.

Great focus is placed on measuring care and outcomes to identify opportunities for improvement. With the creation of the Cardiac Arrest Registry to Enhance Survival (CARES), communities have access to data to systematically monitor their performance and benchmark progress.

Both King County and greater Washington State, distinguishing the region and the State have been recognized as consistent national leaders in resuscitation, and King County programs of bystander CPR training, telephone directed CPR instruction by emergency dispatch, and high-performance CPR techniques featured by our EMS agencies have been highlighted as best practices.

## Evaluating Innovative Technology to Monitor and Improve Resuscitation

### Brain Oximetry during Cardiac Arrest

In many cases of out-of-hospital cardiac arrest, the arrest victim succumbs even though the heart has been successfully resuscitated. Most often this is due to global anoxic brain injury (starving the brain of oxygen), which emphasizes just how important cerebral oxygenation (getting oxygen to the brain) is during CPR.

Thanks to recent advances in technology, the King County EMS Division was able to monitor brain oxygen levels during CPR. The project was conducted collaboratively with the Puget Sound Regional Fire Authority and relied heavily upon the innovation and expertise from NONIN and Stryker. In 2020, we completed the field evaluation, and are now in the process of analyzing the data and hope to continue further evaluation of brain oximetry in the field. The results of this study will further our abilities to protect the brain following cardiac arrest.

## Pre-hospital Ventilation in Pre-hospital Emergency Care


During cardiac arrest and other critical emergency conditions, EMS often uses a special ventilation bag to provide "rescue breaths" to patients needing additional airway support. The bag is placed on a special mask or an endotracheal “breathing” tube and squeezed to deliver oxygen-rich breaths.

Airway management interventions involve different levels of invasiveness and complexity that require different technologies and expertise.

With the help of novel technology from Philips Healthcare, the EMS Division and Bellevue Fire Department are studying the dynamics of these rescue breaths to optimize oxygen delivery and ventilation.

## New Strategies to Deliver Lifesaving CPR and Defibrillation: the AED Lifesaver Early Responder Trial (ALERT) Study

The resuscitation of cardiac arrest relies on early CPR and early defibrillation. Even in communities with a mature emergency response, only about half of cardiac arrest victims receive CPR prior to EMS arrival, and less than 5% receive defibrillation prior to EMS arrival. Survival could be improved substantially if these formidable gaps in resuscitation care were addressed

The AED Lifesaver Early Responder Trial (ALERT study) enlists volunteer off-duty EMS professionals equipped with an AED to respond to nearby cardiac arrests using the PulsePoint phone app, potentially at any time and to any location or setting. This is an expanded version of a previous program where responses were limited to just public areas. The ability to respond to all locations - rather than just public locations – is extremely significant, since approximately 80% of arrest occur in private residences, and has the potential to dramatically decrease time from collapse to chest compressions and/or defibrillation.

This project brings together stakeholders from the EMS Division, University of Washington, PulsePoint Foundation, and Philips Healthcare to work with capable communities across the US. Initial evaluation indicates the approach is safe and does have a measurable though modest impact in its current form. Ongoing efforts will evaluate if and how the strategy can be effectively expanded to other communities.

## Mentorship and Collaboration

Each year, affiliate clinicians and researchers, such as medical students, physicians and EMS professionals, are provided the distinctive opportunity to engage in a research project under the mentorship of CEEMS staff. One ongoing program that has yielded important clinical advances is the collaboration between CEEMS and the University of Washington School of Medicine. As part of the training, CEEMS provides a structured "project homes" for UW medical students to undertake research and rigorous scientific evaluation methods. A number of peer-reviewed publications and a wealth of data have resulted from these opportunities and collaboration, often advancing scientific understanding of SCA and improving outcomes. Recent projects include:

- The incidence and impact of seizure as a presentation of cardiac arrest;
- Interruptions in CPR: Quality improvement in high-performance CPR by EMS; and
- EMS involvement with persons with Do Not Resuscitate wishes.

A number of peer-reviewed publications and a wealth of data have resulted from these opportunities and collaboration, often advancing scientific understanding of SCA and improving outcomes.

# Training & Education

The Training & Education Section is responsible for the initial training, continuing education, instructor training, and recertification oversight for the more than 5,000 Emergency Medical Technicians (EMTs) that practice throughout King County. It works collaboratively with its regional EMS stakeholders and the King County Medical Program Director (MPD) to develop and support the curricula so that state, national and agency requirements are met. In addition, the Training & Education Section serves as the liaison between King County's 28 fire agencies that provide basic life support services and the Washington Department of Health (WA DOH) in regard to initial certification, training authorizations, certification renewals, and regulatory or policy updates affecting the delivery of EMS.

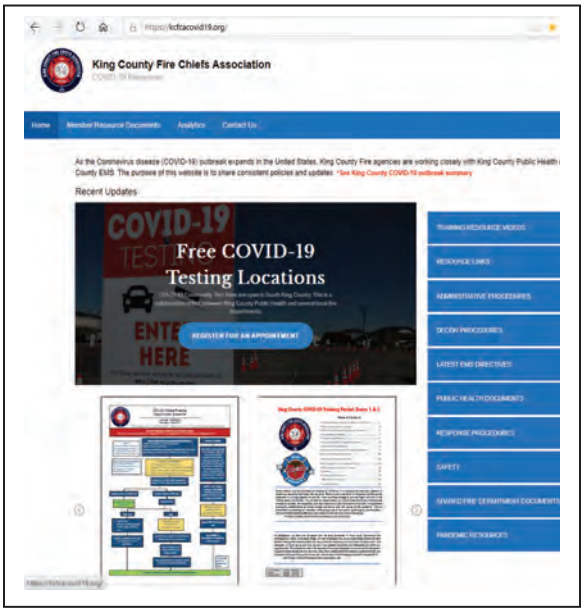
## COVID-19 Impacts

As the requirements necessary to guard against infection and protect public health evolve, so do the Training & Education Section objectives and efforts. In line with the State of Washington Department of Health cancelling in-person instruction, the EMS Division also cancelled its Spring 2020 EMT classes and offered each student the ability to return to the Fall 2020 course. To prepare for the Fall 2020 course, the Training & Education Section is working closely with the WA DOH, regional medical program directors, and senior EMT instructors to ensure in-person training meets the latest CDC and WA DOH guidelines for face coverings, sanitization, and social distancing.

Once the EMT class was cancelled, our training coordinators moved from the classroom into the field to help get the region's first drive-thru COVID-19 testing centers for first responders suspected of exposure up and running. Rather than teaching our county's next crop of EMT students, these instructors spent weeks alongside regional partners training field providers in the processes necessary to safely administer COVID-19 tests through a nasal swab.

### Providing Critical Resources for COVID-19

Recognizing the sizable audience that its EMS Online training platform reaches, the Training and Education Section reconfigured the program's landing page to house COVID-19 training and operational resources. Developed collaboratively by King County medical program directors, the King County Fire Chiefs Association (KCFCA), and the EMS Division with guidance from federal, state and local authorities, these directives provide 9-1-1 dispatch centers and first responders with clear and consistent direction to safely respond to emergency medical incidents.



This includes instructional videos and education materials on topics such as:

- How to safely don (put on) and doff (remove) personal protective equipment such as N-95 or P-100 masks, eye protection, gowns, and gloves;
- Patient assessment and responder health and safety considerations in the time of COVID-19 including the use of scout method to minimize the exposure to a potentially positive COVID-19 patient; and
- Education materials, with more than 20 individual documents and guidelines that are updated on a regular basis.

# Community Programs

The Community Programs Section offers a wide variety of public awareness and education programs to an equally wide variety of communities, such as school aged children, adults, and EMS partners. This includes programs on Injury Prevention; Cardiopulmonary Resuscitation (CPR) and use of Automatic External Defibrillators (AEDs), recognizing medical emergencies and appropriately calling 9-1-1 for medical assistance; emergency medical dispatch training and quality improvement; and BLS response tier efficiencies such as the Mobile Integrated Healthcare that connects 9-1-1 callers to a wide array of health and social services.

## COVID-19 Impacts

While the coronavirus pandemic has presented many and varied challenges for our community health programs, these trying times have also inspired inventive approaches for us to continue effectively serving our communities.

# EMS Division 2020 Program Highlight

### Mobile Integrated Healthcare (MIH)

Mobile Integrated Healthcare (MIH) in King County is a regional, coordinated and inclusive approach to better connect callers to the appropriate services. MIH strategies center on identifying the callers' root causes of need, and connecting the individuals with primary care, behavioral healthcare, sobering facilities and other necessary services to mitigate future need to use the 9-1-1 system. By having mobile, community-based care teams dedicated to connecting callers to the correct resources, EMS is given the tools to provide a meaningful intervention and truly impact the patient's well-being.

MIH programs continue to have the same - or even in some circumstances higher - workloads during the pandemic. Many services to which MIH would typically connect their patients have been closed or compromised due to the pandemic, making it difficult for clients to get the services they need. During the time that many community-based services were unavailable, MIH agencies turned to creative solutions to fill the service gaps their communities were experiencing. This has included partnering with food banks to deliver supplies to clients' homes, coordinating with home health providers to extend their outreach and services, addressing the heightened mental health needs of residents, and working in concert with the fall prevention specialists to deliver and install devices to prevent recurring falls. Social workers for several agencies work remotely but are still able to provide telephone or video consultations.

Like the rest of the EMS system, MIH has adapted their operations to keep their personnel safe. Some programs modified who had contact with patients, responding only with EMTs, while case managers delivered services remotely. Other programs have used PPE and limited in-person visits to occur outside. Several agencies planning to implement new MIH programs this year have delayed their start dates due to the pandemic and its demand on EMS agencies.

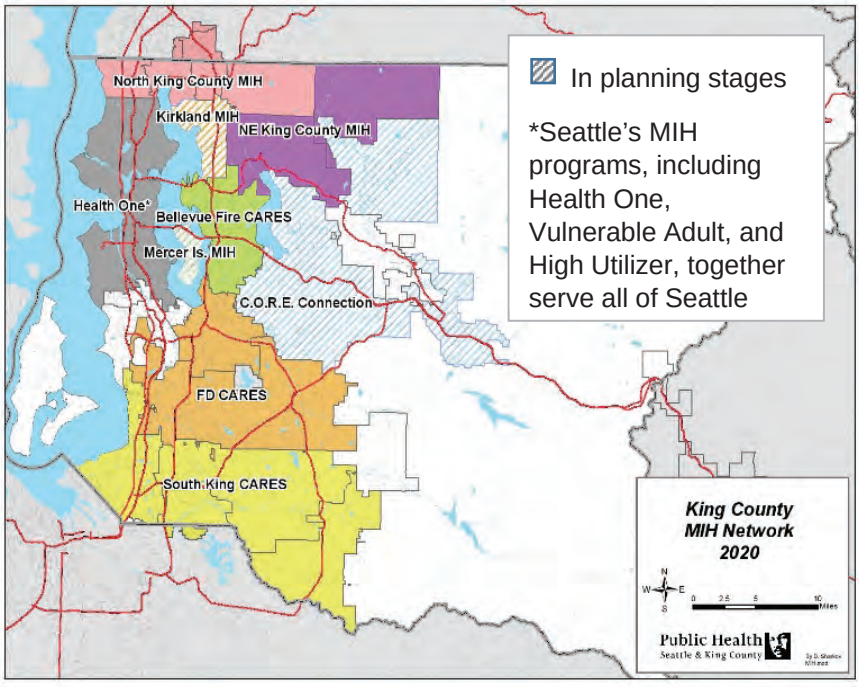
## King County MIH Network Achievements

King County's MIH network currently consists of six (6) programs throughout King County, with additional programs scheduled to launch in 2020-2021. Each program is comprised of an interdisciplinary care team and is tailored to meet its community's unique needs.

| MIH Program | Operated by | Serving |
|---|---|---|
| Bellevue Fire CARES | Bellevue Fire | Bellevue and surrounding contract areas |
| FDCARES | Puget Sound and Renton Regional Fire Authorities | Covington, Kent, Maple Valley, SeaTac, Renton, and some unincorporated areas |
| Health One | Seattle Fire | Seattle |
| North King County MIH | Shoreline Fire | Shoreline, Kenmore, Lake Forest Park, Bothell, and Woodinville |
| Northeast King County MIH | Redmond Fire | Redmond, Duvall, and Snoqualmie |
| South King CARES | South King Fire & Rescue and Valley Regional Fire Authority | Federal Way, Des Moines, Algona, Auburn, Pacific, Black Diamond, and Enumclaw |

Building on years of pilot projects testing these strategies, the regional approach to MIH moving into the 2020-2025 King County EMS levy focuses on the following objectives:

- Connecting our community members to the most appropriate health and social services
- Positioning EMS as an integrated and interconnected link in the broader health and social service systems
- Optimizing availability of emergency services



## Injury Prevention

### One Step Ahead Fall Prevention Program: Helping older adults stay safe, healthy, and independent by reducing falls

A primary challenge was how to provide client in-home visits in a safe, virtual environment. The fall prevention program responded immediately with a collaborative and partnering approach that was based on sound telemedicine guidance from the Washington State Department of Health (DOH), King County Department of Public Health, and Centers for Disease Control and Prevention. This guidance includes best practices, protocols, processes, and procedures to safely meet the needs of our vulnerable population by providing remote virtual visits – televisits. Our one-on-one connections never paused but are delivered in a new and safe virtual manner.

The fall prevention program immediately adapted in a variety of ways to optimize the virtual visit whether video conferencing or telephone. Some examples include:

- Immediately updating our website to communicate, educate and provide client resources
- Reaching out to all current and newly referred clients explaining the changes to our visits and our commitment to provide them the best possible service
- Leveraging new technologies and working closely with KCIT and other stakeholders to implement a variety of new technology tools that are HIPAA compliant and bring improved structure and virtual access to all of us as providers
- Strong collaboration and partnering with EMT, Mobile Integrated Heath (MIH), Fire Cares, home health therapists, caregivers, patient advocates, suppliers, installers, and non-profit organizations to provide services and installation of safety equipment provided by our program
- Providing resources and referrals from other programs to improve clients access to services, home modification, exercise and caregiving support
- Partnering with other telehealth medical providers to ensure consistency with medical referrals and appointments, home health physical therapy, occupation therapy, home health agencies and other medical services

Client and stakeholder feedback has been outstanding. Fall prevention clients continue to express gratitude and appreciation by having the continued ability to connect with us and receive services, even if virtually. They feel supported and listen to, diminishing some of the anxiety and feelings of separation that distancing requirements have imposed on former service delivery practices. The fall prevention program is committed to safely providing valuable and necessary services to our community with care, compassion and creativity.

## CPR & Public Access Defibrillation


**School CPR Program** - Teaching King County students how to perform CPR and use AEDs

School systems throughout King County adopted remote learning during the pandemic, which eliminated in-person CPR instruction training. However, distance learning activities and lesson modules were developed and posted online to support teachers' efforts to provide remote, cognitive CPR education to students. The aim is to resume this valuable program when schools are able to return to in-classroom teaching.

**Employee CPR Training** - Providing King County employees with CPR and AED knowledge and training

Due to the mandatory telecommute schedule for non-essential employees of King County, in-person CPR training is paused during the pandemic. For employees whose positions require current BLS CPR certification, their expiration dates and required renewal of training initially were delayed by several months to accommodate the new schedules and allow the employees to continue working. As the pandemic has progressed, planning efforts are underway to identify safe pathways of providing CPR training and certification for employees in clinical settings who continue to work with patients.


**Public Access Defibrillation** - Programs to make automatic external defibrillators (AEDs) accessible to the public

The COVID-19 pandemic has not had any direct impacts or required significant changes to the PAD program. During this time, King County EMS undertook a project to evaluate the data collected by the PAD program and to modernize the technologies used to support the Public Access Defibrillation Registry to maintain accurate data such as the PAD location.

## Emergency Medical Dispatch (EMD)

**EMD QI Program** - Identifies issues and system-wide trends for education and improvement opportunities.

While the program usually has a general focus, its attention this year was directly aimed on identification and retrieval of the call audios for incidents eventually known to be COVID-19 positive. Following the identification downstream (such as by testing at the hospital), these incidents were traced back through the EMS system and the audio of the call was retrieved. This information will be available for use in a future research project and potentially provide useful information to identify a reoccurrence of COVID-19 or even assist in the identification of a future pandemic event. Additionally, multiple IDCs (initial dispatch codes) closely linked to symptoms or complaints of COVID-19 are being tracked and monitored as part of overall EMS system surveillance to identify new or potential trends in community infections.

**Communities of Care** - Specialized training on when and how best to call 9-1-1.

This program provides training to facility leadership and staff on when to call 9-1-1, what questions are going to be asked, what information to have ready, and how to convey the information effectively. Such connections are imperative during times of public health crises such as the COVID-19 pandemic. When long-term care facilities, including assisted living facilities, skilled nursing facilities, and adult family homes, were identified as high-risk locations locally and nationally, the EMS Division Communities of Care program ensured open communication between the facilities and their EMS partners. EMS calls by LTCFs significantly dropped once restrictive visitation rules were enacted in Spring of 2020. Communities of Care is establishing regional virtual meetings to maintain communication should surges or additional waves occur that require immediate changes to current processes.

### EMD Criteria Based Dispatch (CBD) Guidelines

As mentioned on page 9, the CBD Guidelines were amended to respond to COVID-19. The comprehensive guideline review and update scheduled for this year has been delayed.

## BLS Efficiencies

### Taxi Transport Voucher Program

This program provides EMS personnel additional transportation options for low-acuity incidents. During the early part of the pandemic, participating agencies received instructions to not transport individuals with respiratory infection symptoms by shared vehicle programs like taxi, Uber, Lyft, etc. Although it impacts the taxi transport voucher program, it is the right decision for our community.

# King County Medic One

*King County Medic One (KCM1) is one of the five Advanced Life Support (ALS) paramedic agencies in the regional EMS system. KCM1 now serves approximately 557 square miles of south King County, including Vashon Island, with a population that is now close to 750,000 people. In calendar year 2019, KCM1 responded to over 18,000 calls for advanced care, including cardiac emergencies, pediatric patients, mass casualty, and motor vehicle crashes.*

## Regional Recognition from the Pacific Northwest National Laboratory

In April 2020, the Pacific Northwest National Laboratory recognized King County Medic One for its outstanding COVID-19 response approach.

NORTHWEST REGIONAL TECHNOLOGY CENTER
for Homeland Security

Pacific Northwest
NATIONAL LABORATORY

**OPPORTUNITIES**
Events current at time of publication. Have a virtual resource or event to share? Email us!

- June 18 – Infrastructure Security and Resilience Forum, Seattle, WA
- July 12-15 – 45th National Hazards Workshop, Broomfield, CO
- July 19-23 – 30th Pacific Northwest Economic Region Annual Summit, Big Sky, MT

**CONTACT**

- Want to know more? Visit us on the web at nwrtc.pnnl.gov.
- Contact the NWRTC with questions and comments at nwrtc@pnnl.gov.

# AROUND THE REGION IN HOMELAND SECURITY

## A NOTE FROM THE FIELD

The Northwest Regional Technology Center (NWRTC) is a virtual resource center, operated by Pacific Northwest National Laboratory (PNNL), to support regional preparedness, resilience, response, and recovery. The center enables homeland security solutions for emergency responder communities and federal, state, and local stakeholders in the Northwest.

## PANDEMIC CALLS FOR MINDFULNESS, METICULOUSNESS

Our NWRTC team was fortunate for the opportunity to sit down with Matt Riesenberg, Chief of Operations at King County Medic One. Like many response organizations in these trying times, his team has faced a rapidly evolving situation and we appreciate his taking the time to speak with us.

From the start, Riesenberg cited planning has been key to preparedness and response. "We were fortunate that our department's current and past leadership saw the value in preparing for a pandemic. The county has a pandemic plan that has held up quite well during this emergency."

The unexpected came when personal protective equipment (PPE) became in short supply, a nationwide trend. "During this global crisis, it has been hard for our normal suppliers to keep pace with the orders we have been placing for critically needed personal protective supplies. Our pandemic stores and support from the regional emergency management system helped us keep pace with our needs, but it is still quite tenuous," he said.

The influx of changing information added another layer. "No single medium-sized department would have the resources to research and operationalize every new piece of quality information. We have been working with our partner agencies to vet and develop best practices for the medical care of our patients and the personal protection of our medics," Riesenberg said.

(continued pg. 2)

While the influx of calls remained somewhat steady, the days soon became astronomically busier due to the complexity of this pandemic. "Medics' lives have been full of disinfecting medic units and gear, symptom self-checking throughout their 24hr shifts, meticulously donning and doffing protective equipment, and receiving constant updates on topics of medical care, infectious disease data, and personal safety steps to keep themselves safe," Riesenberg said. "Back at our headquarters, we have been doing everything we can to order resources and supplies, write and review new policies and directives, and do everything we can to keep our people safe and our community well-served."

***"The way our people have rallied—it is enlightening to see how well the human component has adjusted."***

In the field, the rapid onset called for rapid response to not protect not only patients but also first responders. Protocols for flu-like symptoms, chest pains, and shortness of breath soon called for full PPE and intensified screenings, in addition to the basic best practices recommended for all. "Stick to the basics: hand-washing, covering your cough, disinfect surfaces—but do it meticulously." Stations have also incorporated social distances practices such as staggering meals, wearing masks at the station, and limiting the number of staff on a dispatch call.

Riesenberg shared that this response has taken a true team effort. "These men and women are coming to work every day under austere circumstances, working in cumbersome PPE, and dealing with the impact of this crisis with their families." Those same people can be an even greater part of the solution, Riesenberg noted. "Some of the best ideas to tackle the issues associated with this outbreak have come from our own people. Our disciplines can be fairly regimented but this crisis has required us to be innovative and open to new ideas. The way our people have rallied—it is enlightening to see how well the human component has adjusted."

Looking forward, Riesenberg had a note of humanity, heart, and hope:

"We will need to mourn the human losses in our ranks and in our communities. After that we will need to support the community to help its recovery. Long term, first responder and healthcare disciplines can learn from this disease response, that includes funding for PPE stockpiles, periodic infection control training, annual fit-testing for masks, and having your primary operating model bolstered but also having policy, procedures, and funding to support your backup plans—this crisis has really called upon our Plan Bs, Cs, and maybe more."

To learn more about the King County Medic One, visit the King County Public Health website.

## A NOTE FROM NWRTC

Over the last decade, we have been fortunate to partner with many first responder and emergency management teams at the front lines of this pandemic. We want to acknowledge the public health teams, medical personnel, emergency managers, first responders, and others who are keeping us safe.

Our NWRTC is home to a number of reports on regional response, long-term planning, and recovery from our outreach and collaborations over the years that might be relevant to our current crisis: https://nwrtc.pnnl.gov/projects/reports.stm.

We hope you find these resources useful. We look forward to continuing to provide you news and resources from throughout the region in this newsletter and on our website: http://nwrtc.pnnl.gov.

For more information, contact Director Ann Lesperance (ann.lesperance@pnnl.gov | (206) 528-3223), or Deputy Directors Ryan Eddy (ryan.eddy@pnnl.gov | (509) 372-6622) and Rob Jasper (robert.jasper@pnnl.gov | (509) 371-6430), or visit nwrtc.pnnl.gov.

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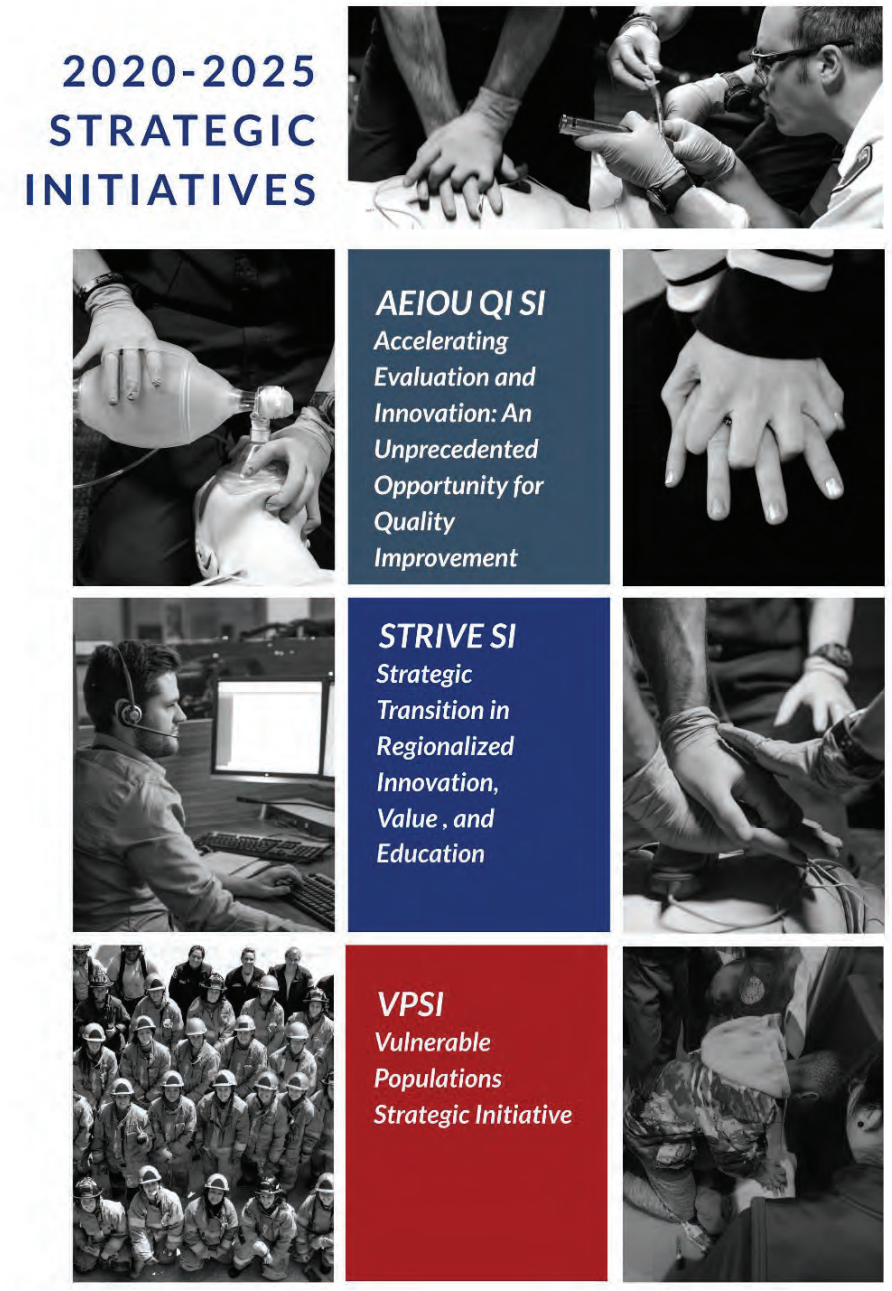
# 2020-2025 Strategic Initiatives

## VPSI, STRIVE, AEIOU QI

The Medic One/EMS 2020-2025 Strategic Plan continue and implement Strategic Initiatives that leverage previous investments made by the region to improve patient care and outcomes. Areas identified include continued focus on vulnerable populations, enhancing quality improvement capabilities, and modernizing the continuing medical education program.

Based on the regional needs and issues identified by stakeholders over the course of levy planning, the following strategic initiatives are centered on using a solid regional approach to strengthen standardization, coordination, interconnectedness and partnerships:



## Accelerating Evaluation and Innovation: An Opportunity for Unprecedented (AEIOU) Quality Improvement (QI) Strategic Initiative

The AEIOU QI strategic initiative builds upon the technological work of the last decade between regional partners from all tiers of the EMS system to bolster the region's quality improvement abilities, capacity, and efforts. Key regional partners include dispatch centers, fire departments, hospitals, the University of Washington, and the King County EMS Division. This Initiative addresses the real challenge and demand to leverage the regional records management system and electronic data to generate meaningful clinical information intended to improve patient care.

While new and complex Initiatives like this usually launch gradually, the sudden appearance of COVID-19 didn't allow for such luxury. As early as February of this year, the EMS Division's Regional Quality Improvement Section pulled information from the system-wide records management system and used web application and data tools like RedCap and Tableau to develop methods to track the virus' activity in our community via COVID-19 dashboards that:

- Inform regional partners of the evolving situation;
- Identify and monitor key performance measures from its 2020 EMS Infectious Disease and Pandemic Response Plan; and
- Monitor the impacts of COVID-19 on the EMS system.

Additionally, they oversee efforts that:

- Conduct daily COVID-19 surveillance to assess potential exposures to EMS personnel; and
- Support the monitoring of EMS personnel health, safety and COVID-19 testing.

Six months into the COVID-19 response, these efforts have become an ongoing and integral part of our regional monitoring activities and will continue to evolve to meet the needs of our system.

## EMS Online Strategic Transition in Regionalized Innovation, Value and Education (STRIVE) Strategic Initiative

This Initiative modernizes the online King County EMS continuing medical education (CME) platform, EMS Online, to meet the changing educational, data, and technological needs of the eLearning environment. This SI will address cross-platform functionality by implementing a Learning Management System (LMS), and extending the LMS functionality to agencies not yet using a LMS platform. The ability to export data would increase, allowing agencies to share and collaborate regionally as desired, and also customize training, based on needs. It would reduce duplication, increase efficiency, and support the region in meeting the eLearning expectations of our EMS workforce.

## Vulnerable Populations Strategic Initiative (VPSI)

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. VPSI's activities focus on meeting the goal of ensuring that EMS provides the best possible care to all King County residents regardless of race, ethnicity, age, socioeconomic status, culture, gender, or language spoken.


Many of the barriers to care faced by vulnerable populations have been exacerbated during the COVID-19 pandemic, and VPSI is adapting to address these emergent needs.

### Focal Areas & Objectives

VPSI includes five focal areas with the following objectives:

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

## Education and Outreach

Community education and outreach efforts focus on reducing barriers for vulnerable communities, including Limited English Proficient (LEP) individuals and seniors, in accessing the 9-1-1 and EMS systems. Community partners include Seattle Office of Emergency Management, the Somali Health Board, the Chinese Information & Service Center, and the University of Washington. VPSI recently expanded to serve the Spanish-speaking community through a new partnership with Saint Vincent De Paul's Centro Rendu. The community partners develop and deliver education in various languages on calling 9-1-1, performing bystander CPR, and recognizing stroke. Hypertension was also introduced as a new VPSI topic.


With the COVID-19 pandemic, the community partners have become an access point for LEP and other vulnerable communities to receive accurate and timely information. While outreach and education transitioned to online and remote channels, community partners adapted their activities to meet emergent community needs, such as helping communities navigate social services, delivering supplies, and connecting communities to the most up to date COVID-19 guidelines in their spoken languages.

## Fire-Based Pilot Studies

Over the past year and with the support of UW graduate students, VPSI was involved in two pilot studies with fire departments to test alternative EMS care delivery models when working with vulnerable populations, including:

- Creating a linkage between fire departments and Crisis Connections' single portal referral service, OneCall, for clients with mental health needs (ongoing)
- Evaluating the referral of clients experiencing homelessness to street-based case management services (concluded)

These pilots have reinforced lessons learned from previous VPSI fire-based pilots, including:

- Delivering regular, ongoing training for EMS personnel to provide alternative care for vulnerable populations
- Providing services in real-time and with a warm hand-off from a referral
- Enabling 24/7 access to services
- Fostering collaboration of an interdisciplinary care team
- Making data collection and feedback easy and timely

*The COVID-19 pandemic disrupted the expansion of the OneCall pilot to a broader group of Fire Department personnel who could benefit from its services, prompting the exploration of extending the pilot timeline.*

- Providing regular communication with stakeholders

## University of Washington Partnership

Through an ongoing partnership between the UW School of Public Health and the EMS Division, VPSI connects students to capstone, thesis, and practicum opportunities. UW faculty and undergraduate students conduct outreach and education, primarily to seniors, about accessing the 9-1-1 and EMS systems. Graduate students support the study design and evaluation of VPSI fire-based pilots.

With the COVID-19 pandemic, UW has adapted their outreach program to reach seniors through phone and mail, rather than door-to-door contact, to encourage individuals to continue calling 9-1-1 for life-threatening emergencies, such as cardiac arrest and stroke.

## Workforce Mental Wellness

The COVID-19 pandemic has affected the mental wellness of many first responders. In response, VPSI has sponsored webinars and trainings for personnel across King County's EMS system to address stress and other emotional impacts of COVID-19. Mental wellness trainings are focused on leadership, administrators, peer support for Fire Department personnel, dispatchers, retired personnel, and families.

## Equity and Social Justice (ESJ)

To promote ESJ throughout EMS, VPSI focuses on building career paths to promote a diverse workforce. Through targeted outreach, recruitment, and training programs, such as the Strategic Training and Recruitment (S.T.A.R) program and Future Women in EMS and Fire, EMS aims to build a workforce that reflects the diverse communities it serves. VPSI also focuses on the education of EMS leadership and staff in ESJ values by hosting trainings and workshops. In addition, a diversity consultant is currently developing a regional diversity toolkit with best practices to advance the recruitment and hiring of a diverse EMS workforce.

While some of the in-person outreach and training programs have been disrupted by COVID-19, there are plans to reinstate these activities as soon as it is safe to do so. Through its various focal areas, VPSI aims to embody multiple ESJ goals as reflected in the King County ESJ Strategic Plan, including:

- Investing in community-based partnerships where the needs are greatest;
- Creating an equitable and inclusive workplace with ESJ-focused workforce development; and
- Partnering with agencies who provide services to LEP and engage communities in ways that are inclusive and culturally responsive.

## Next Steps

Promoting equitable access to EMS services is more important than ever during the COVID-19 pandemic. VPSI will continue to assess and adapt to the changing landscape and community needs, particularly for vulnerable communities who often face additional barriers to accessing care. Moving forward, VPSI will work with its regional partners to:

- Continue conducting community outreach and education to diverse language communities, adapt to meet community needs as a result of COVID-19, and expand to additional topics such as hypertension and falls.
- Adapt outreach and education activities to reach vulnerable communities through a variety of channels, including remote options until in-person activities can safely resume.
- Continue the OneCall pilot and evaluate its ability to serve clients who call 9-1-1 with mental health needs.
- Improve access to mental wellness trainings and resources for EMS personnel to address the emotional impacts of COVID-19 on first responders.
- Continue the creation of a regional diversity toolkit and other efforts to promote the recruitment and hiring of a diverse workforce across King County EMS agencies.

# EMS Statistics: Operations & Key Performance Measures

## 2019 Overview

### Background

The operational metrics and key performance measures presented in our EMS Statistics section reflect data collected from January 1, 2019 to December 31, 2019. Continuing to build on the last decade's technological investments, the EMS Division is able to collect and analyze data from 9-1-1 dispatch centers, EMS agencies, and hospitals due to the regional use of a single records management system and integration across technology platforms.

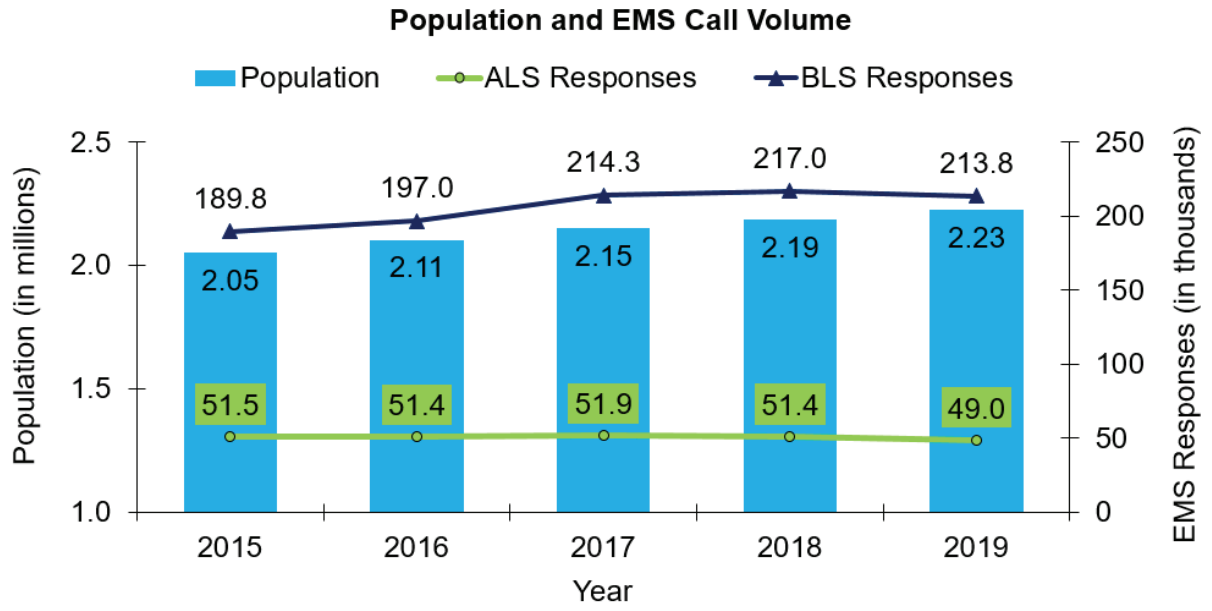
### Population

King County is the largest metropolitan county in the State of Washington in terms of population, number of cities (39), and employment. Ranked the 13th most populous county in the United States, King County's population growth remained steady through 2019. Since 2010, King County's population increased by 15.3%, representing an increase of nearly 295,000 people. Spanning across a geographic region of 2,132 square miles and 1,713 square miles of unincorporated King County.

| Year | Population | % Growth (Annualized) |
|---|---|---|
| 1980 | 1,269,898 | |
| 1990 | 1,507,305 | 1.87% |
| 2000 | 1,737,034 | 1.52% |
| 2010 | 1,931,249 | 1.12% |
| 2019 | 2,226,300 | 1.70% |

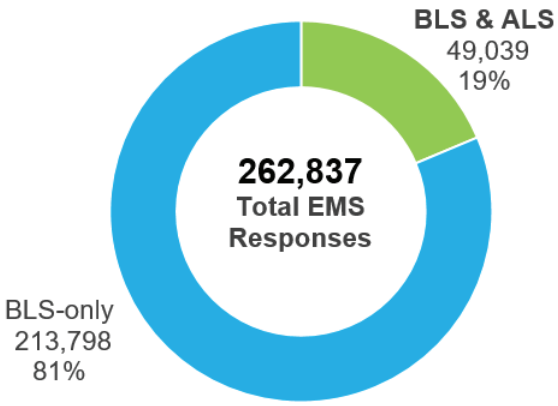
Population serves as an important indicator to predict the trend in the number of emergency medical responses. This means that the demographic profile of King County matters: *When King County's population increase, the number of emergency medical responses (call volume) typically increases. As population decreases, EMS responses will typically decrease.* Historically, calls for both BLS and ALS typically decrease during times of economic recession. The distribution of calls between ALS and BLS have also changed with revisions to criteria-based guidelines.

The graph below shows the strong correlation of population increases to the number of basic life support calls. ALS calls remained relatively stable across 2015-2019 and decreased slightly in 2019.




## Call Volume

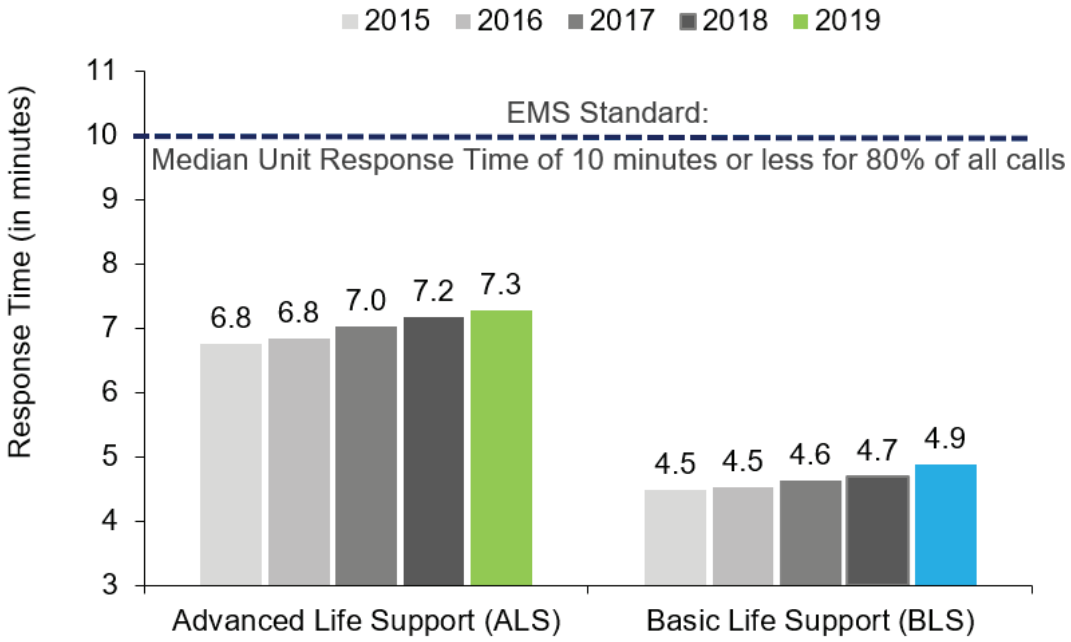
In 2019, EMS responded to 262,837 calls. In the tiered EMS response system, BLS responds to 100% of all EMS calls. Of the total EMS responses, BLS-only responses accounted for 81% (213,798) of all total calls BLS and ALS jointly responded to 49,039 calls, representing 19% of all EMS responses. Cancelled enroute calls accounted for approximately 21.1% (10,352) of all ALS calls compared to 3.6% of all BLS calls (7,709).




## Response Time

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 9-1-1 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.

**2015-2019 Median Unit Response Time (in minutes)**
(Time of unit dispatch to arrival at scene)




**ALS Median Response Times (RT)**

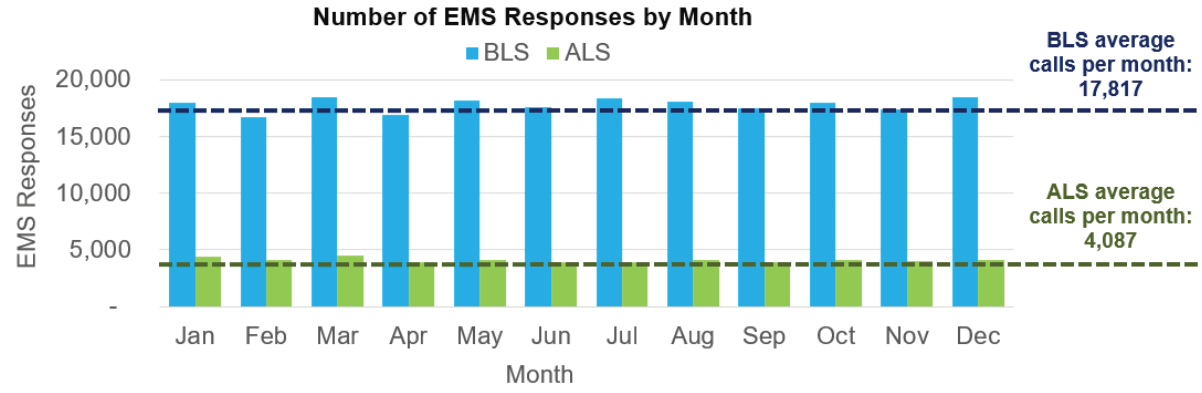
| Measure | Dispatch Time | Unit RT | Total RT |
|---|---|---|---|
| Median Time (in minutes) | 1.58 | 7.28 | 10.15 |
| 8 minutes or less | 81.9% | 58.8% | 30.8% |
| 10 minutes or less | 85.5% | 78.2% | 48.9% |
| 12 minutes or less | 89.0% | 89.1% | 62.5% |
| 14 minutes or less | 92.0% | 94.4% | 71.5% |

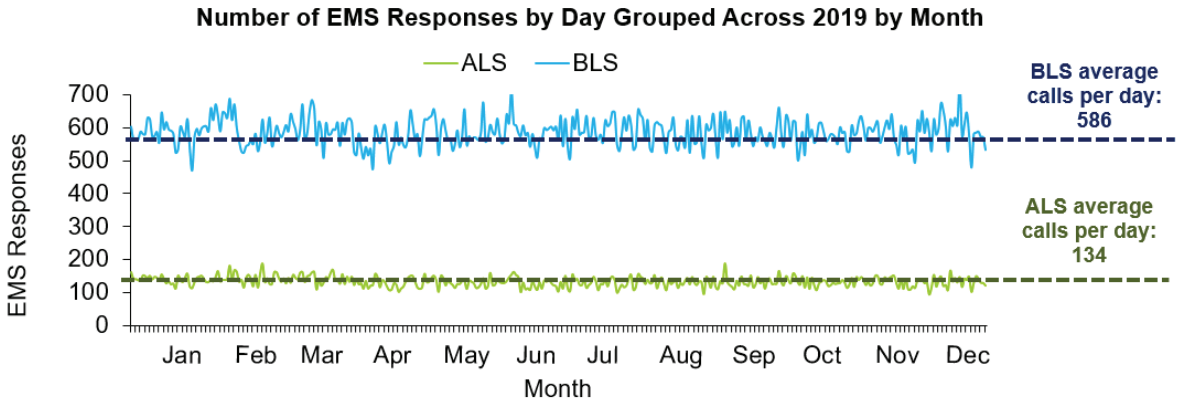
**BLS Median Response Times (RT)**

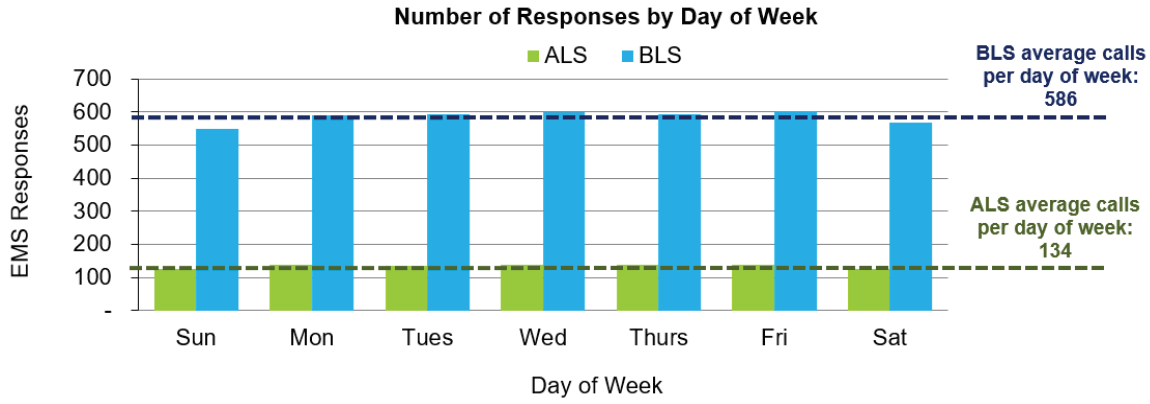
| Measure | Dispatch Time | Unit RT | Total RT |
|---|---|---|---|
| Median Time (in minutes) | 1.00 | 4.88 | 6.12 |
| 6 minutes or less | 96.5% | 68.8% | 48.2% |

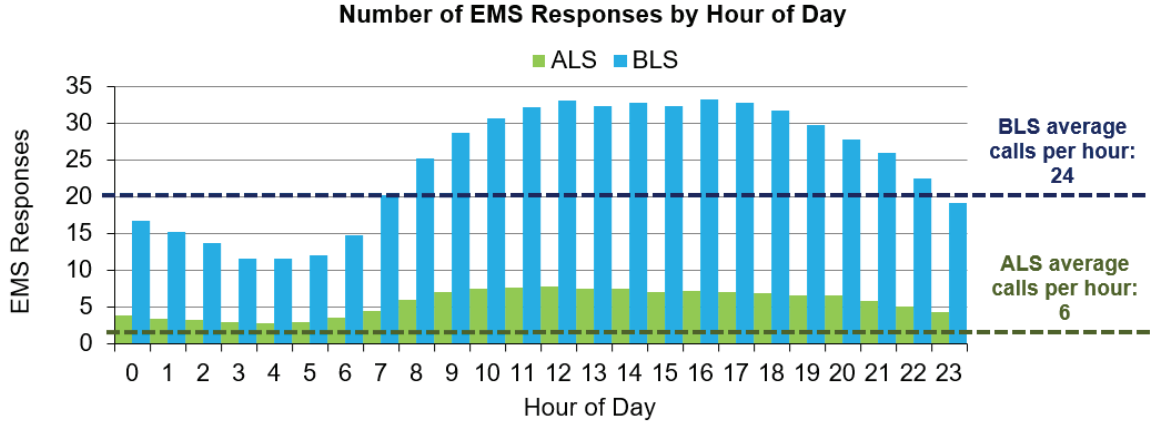
## Characteristics of Responses

The following graphs reflect the patterns of ALS and BLS responses in 2019:



## EMS Call Types

EMS responds to a wide variety of emergency medical calls. In 2019, 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 |
|---|---|---|
| Cardiovascular | 8,098 (24.2%) | 13,445 (7.0%) |
| Respiratory | 4,348 (13.0%) | 12,590 (6.6%) |
| Neurological | 3,657 (10.9%) | 20,160 (10.5%) |
| Behavioral/ Psychological | 3,186 (9.5%) | 17,481 (9.1%) |
| Trauma | 2,343 (7.0%) | 38,317 (19.9%) |
| Alcohol/Drug | 2,248 (6.7%) | 14,223 (7.4%) |
| Pain | 1,067 (3.2%) | 9,750 (5.1%) |
| Endocrine/ Metabolic | 1,030 (3.1%) | 3,161 (1.6%) |
| Allergy/ Anaphylaxis | 739 (2.2%) | 1,833 (1.0%) |
| Infection | 614 (1.8%) | 4,285 (2.2%) |
| Abdominal/ Genito-Urinary | 491 (1.5%) | 5,110 (2.7%) |
| Obstetric/ Gynecological | 234 (0.7%) | 905 (0.5%) |
| Obvious Death | 154 (0.5%) | 1,971 (1.0%) |
| Environmental Exposure | 79 (0.2%) | 345 (0.2%) |
| Other Medical | 5,164 (15.4%) | 48,538 (25.3%) |
| **Total Medical Calls*** | **33,452 100%)** | **192,114 (100%)** |

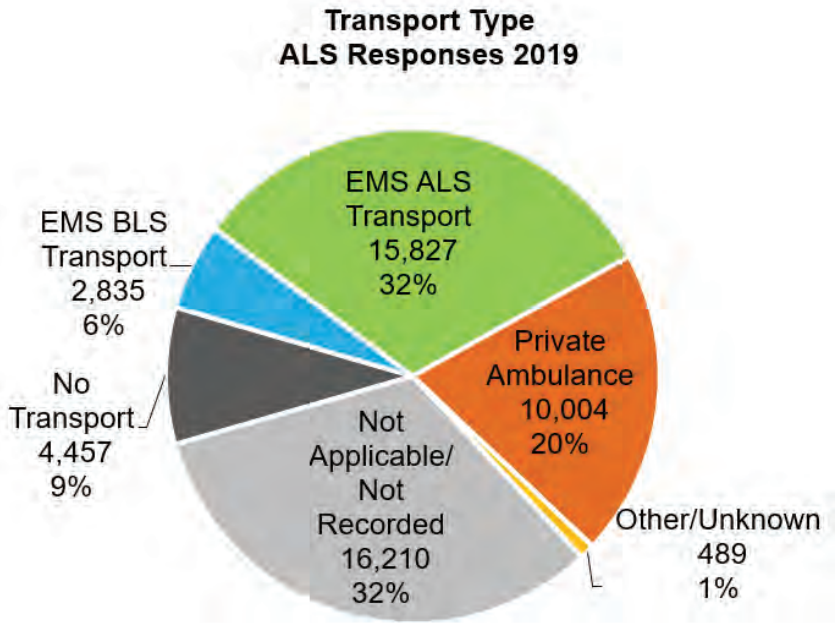
| Age | ALS | BLS |
|---|---|---|
| 0-4 | 827 (2.5%) | 4,407 (2.3%) |
| 5-9 | 310 (0.9%) | 2,076 (1.1%) |
| 10-17 | 745 (2.2%) | 6,139 (3.1%) |
| 18-24 | 1,369 (4.1%) | 12,337 (6.3%) |
| 25-44 | 5,740 (17.1%) | 44,284 (22.7%) |
| 45-64 | 10,151 (30.3%) | 50,102 (25.7%) |
| 65-84 | 10,605 (31.7%) | 52,343 (26.8%) |
| 85+ | 3,742 (11.2%) | 23,556 (12.1%) |
| **Total** | **33,489 (100%)** | **195,244 (100%)** |

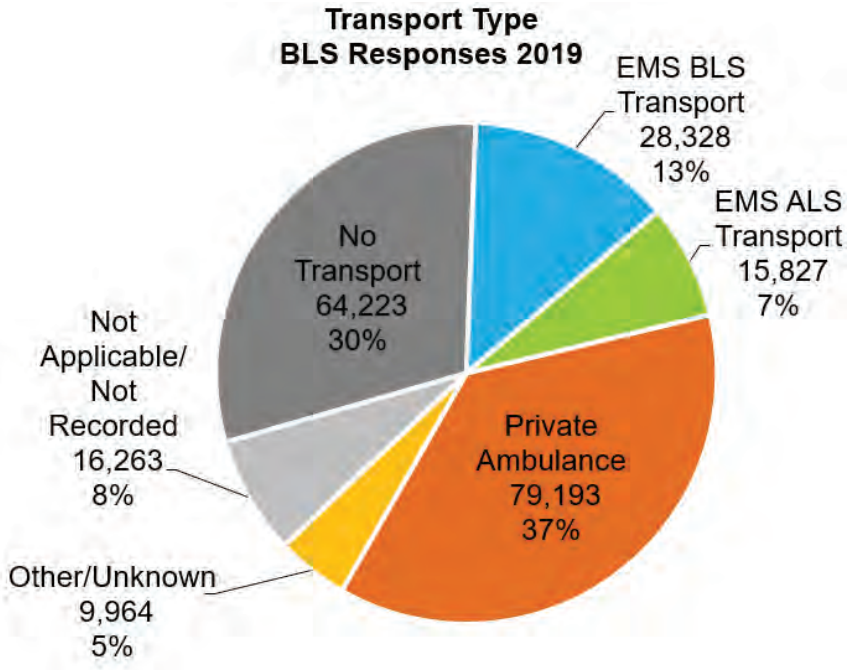
Total medical calls excludes non-medical calls (i.e., standby, cancelled)

## Transport Type

An important component of providing EMS care is appropriate triage. 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 to the below lists the transport types for EMS responses across 2019, broken into two categories for ALS and BLS responses:

- EMS ALS ground transport via medic units and ALS air transport (e.g., Airlift Northwest)
- EMS BLS transport by fire departments via aid cars
- Private ambulance partners (e.g., AMR, Tri-Med, Northwest Ambulance, Falck)
- Other methods which may involve private vehicles such as taxis, cabulances or transport by a family member or friend
- No transport may occur if a patient refuses transport, or if it is deemed that transport is not needed
- Not applicable or not recorded includes EMS responses that are cancelled enroute or at scene, and/or if a patient cannot be located, and is not present



## Cardiac Arrest Statistics - Seattle & King County 2019 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:

1. Overall Group: Persons suffering arrest who are two years or older who received ALS treatment and had no advanced directives to limit care, and
2. 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 2015-2019 for Seattle and King County. The report presents 2019 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.

## Cardiac Arrest Statistics – Seattle & King County

1. 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 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| Cardiac Arrests | 1,114 | 1,228 | 1,215 | 1,298 | 1,308 |

2. 2019 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 | Number Treated | Number Survived to Hospital Discharge | Percent Survived |
|---|---|---|---|
| Arrest Before Arrival of EMS: | 1,112 | 199 | 18% |
| Ventricular Fibrillation/ Tachycardia (VF/VT) | 262 | 128 | 49% |
| Asystole | 522 | 8 | 2% |
| PEA | 258 | 40 | 16% |
| Not Shockable, unknown if PEA or asystole | 40 | 2 | 5% |
| Pulses on First Check | 20 | 13 | 65% |
| Unknown | 10 | 8 | 80% |
| Arrest After Arrival of EMS: | 196 | 54 | 28% |
| Ventricular Fibrillation/Tachycardia (VF/VT) | 38 | 28 | 74% |
| Asystole | 36 | 4 | 11% |
| PEA | 113 | 20 | 18% |
| Not Shockable, unknown if PEA or asystole | 5 | 0 | 0% |
| Pulses on First Check | 3 | 1 | 33% |
| Unknown | 1 | 1 | 100% |
| Total | 1,308 | 253 | 19% |

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

| Year | 2019 | 5-year cumulative 2015-2019 |
|---|---|---|
| Survival Rate | 115/195 (59%) | 548/998 (55%) |

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

| Year | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| Bystander CPR | 666/985 (68%) | 791/1,086 (73%) | 763/1,084 (70%) | 747/1,114 (67%) | 840/1,112 (76%) |

## Summary of Key Points for 2019

The EMS system successfully **resuscitated 19% of all EMS-treated cardiac arrest victims** in Seattle and King County, a success rate two to three times higher than most communities.

This 19% represents **253 lives saved by the EMS system**, most of whom return home to resume their lives with loved ones, friends, and colleagues.

**Survival to hospital discharge was 59%** for arrests among the Utstein group, which is an achievement rivaled by only a handful of exceptionally proficient EMS systems from around the world.

The **bystander CPR rate of 76% was the highest reported for the EMS system**. Bystander initiation of CPR is often due to the immense efforts of telecommunicators providing CPR instructions in challenging and highly stressful situations.

## Cardiac Arrest Highlight: Perspectives During a Pandemic

Resuscitation from out-of-hospital cardiac arrest (OHCA) is a key measure for emergency medical services (EMS) - it provides a benchmark to gauge a system's coordinated response to the most critical illness of cardiac arrest. In OHCA, a person's heart stops beating, causing the person to lose consciousness and collapse. Without timely and expert efforts, most people experiencing OHCA will die.

The ability to rapidly identify OHCA and initiate life-saving treatments, such as cardiopulmonary resuscitation (CPR) and defibrillation, are key to successfully resuscitating patients. With telecommunicator assistance, law enforcement and bystanders can provide these initial treatments until highly-trained emergency medical technicians (EMTs) and paramedics arrive. EMTs provide high-performance CPR while paramedics use advanced life-saving skills such as intubation and intravenous medication administration. If EMS responders can restart the heart, they transport the patient to the hospital for ongoing treatment.

The resuscitation of cardiac arrest is challenging under the best circumstances. However, we now must also contend with the ongoing COVID-19 pandemic. As mentioned earlier, the EMS Division immediately established a surveillance program to assess the impacts of COVID-19 on patients and emergency responders. (See page 9 for additional information about the surveillance activities.)

Of particular concern was determining how to provide critical resuscitation efforts to patients while ensuring the safety of bystanders and first responders. We needed to assess the frequency of COVID-19 among the OHCA population, understand the risk to people who help provide resuscitation efforts, and enact measures that effectively balanced the risk and benefits for patients AND responders.

### What is the Prevalence of Infection Among OHCA Patients?

The EMS Division joined efforts with the Prevention Division's Communicable Disease and Epidemiology Section and the Medical Examiner's Office to determine the prevalence of COVID-19 infection among OHCA patients. This rigorous evaluation showed that at the height of the regional epidemic, the overall likelihood of COVID-19 infection among OHCA was only about 5%. – meaning that there is an exceptionally low risk of COVID-19 exposure through OHCA patients, and that providing CPR and using an AED is still the best course of action. This small percentage provided a considerable reassurance for those who might witness someone collapsing and want to help. To read the full article, refer to: https://www.ahajournals.org/doi/pdf/10.1161/CIRCULATIONAHA.120.048951

## What is the Risk for EMS Responders?

Although bystander and law enforcement CPR and defibrillation are critical for successful resuscitation, these groups may spend only a handful of minutes providing care. In contrast, EMS responders often perform high-risk interventions for up to an hour in an effort to resuscitate the patient. Such interventions can increase the spread of infectious disease, intensifying the risk of transmission or EMS responders.

To reduce this threat, EMS responders don the full complement of personal protective equipment (PPE) prior to arriving at the patient's side. However, even with this PPE strategy, the full extent of risk among EMS personnel is uncertain. This led the EMS Division to thoroughly examine the risk of COVID-19 transmission to EMS responders.

Conducted during the early months of the King County epidemic[2].the study investigated 700 EMS responders who cared for 232 COVID-19 patients experiencing a range of emergencies. The results revealed a COVID-19 disease prevalence of less than 0.5% among EMS responders after their COVID-19 encounter, understanding that the source of COVID-19 among EMS may not be the occupational setting but also possibly due to transmission outside the workplace. The prevalence of infection among EMS responders was similar to the general population, suggesting that EMS occupation does not inevitably produce risk. Rather, the findings provide strong evidence that PPE works to effectively protect EMS responders, even when involved in protracted and high-risk care.

The timely and rigorous evaluation of EMS and COVID-19 has provided national leadership as communities around the US and beyond have struggled to respond to this unprecedented pandemic. The results of the investigations – produced quickly and definitively – have been featured in high-impact reports. Collectively, the findings from King County have informed international strategies of prehospital emergency care while helping to frame the discussion of how to best balance the risk and benefit of providing effective emergency care during the COVID-19 pandemic.

References


1. Sayre, MR, Barnard, LM, Counts, CR, Drucker, CJ, Kudenchuk, PJ, Rea, TD, and Eisenberg, MS. (2020). Prevalence of COVID-19 in Out-of-Hospital Cardiac Arrest: Implications for Bystander CPR. *Circulation*. June 2020
2. Murphy, D, Barnard, L, Drucker, C, Yang, B, Emert, J, Schwarcz, L, Counts, C, Jacinto, T, McCoy, A, Morgan, T, et al. (*In Review*). Occupational Exposures and Programmatic Response to COVID-19 Pandemic: An Emergency Medical Services Experience. *Emergency Medicine Journal*.

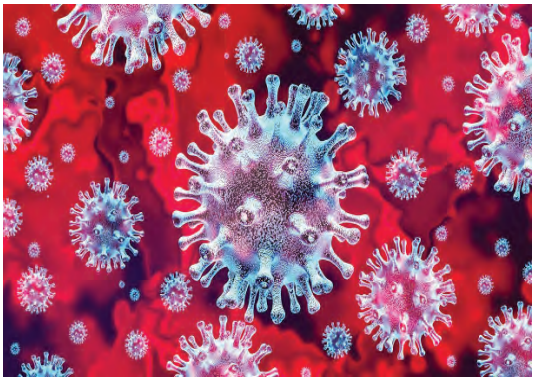
# EMS Funding and the 2020 Financial Plan

## 2020-2025 Levy Overview

The 2020-2025 EMS levy was planned in 2018 when the region was in the ninth year of a historical economic expansion, the second longest period of expansion on record. Seattle and King County local economic signals were solid with strong job growth, low unemployment, and rising rent and home prices. The economic forecast called for continued growth through the 2020-2025 levy period, although at a reduced pace. In the time leading up to the new levy, Assessed Valuations (AV) and new construction grew significantly. Increased property taxes from new construction resulted in carrying forward $26 million into the new levy; AV growth allowed us to start with a significantly lower levy rate (26.5 cents/$1,000 AV compared to 33.5 cents/$1,000 AV in 2014).

Despite the healthy outlook, King County leaders insisted on including appropriate reserves in the levy to ensure the system could weather an economic downturn. The final levy plan included Rainy Day and Supplemental reserves to accommodate a potential change in economic conditions.

### 2020 Coronavirus Impacts

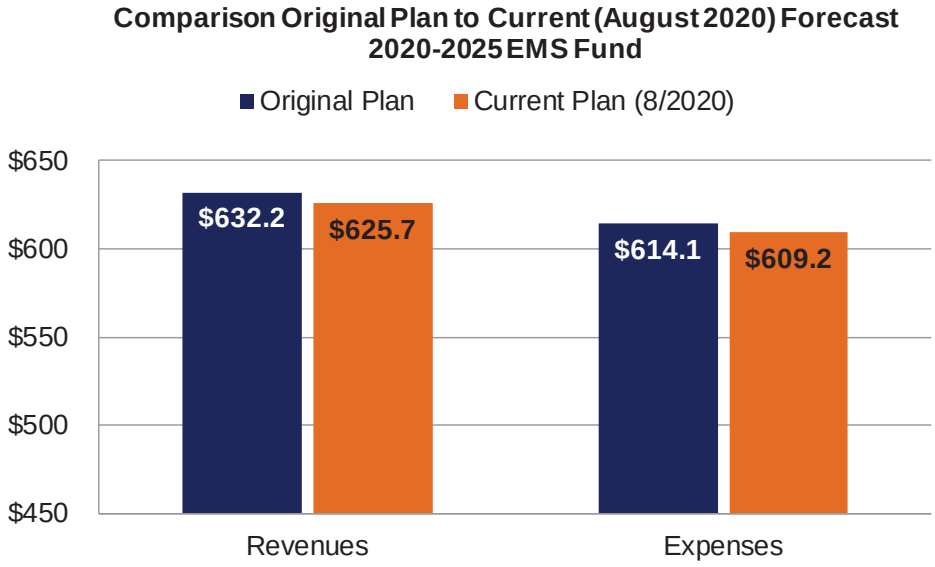


The first year of this new levy began with the good news that economic forecasts were slightly better than planned - the starting levy AV was slightly higher than anticipated, and the assessed value of new construction for the remaining five years of the levy increased, particularly in 2023 and 2024. In all, property tax revenues for the levy period were forecasted to increase by $7.1 million.

Then COVID-19 arrived. As early as the first week in March, businesses began encouraging employees to work from home; sporting events were suspended; and tourism stagnated. King County saw reduced sales tax and related revenues, particularly taxes connected to the large congregate activities that had been cancelled. While property taxes are more stable than other revenues and are delayed in showing the effects of an economic downturn, we anticipated that the primary funding for EMS would be negatively impacted.

The King County Office of Economic and Forecast Analysis (OEFA) produced two forecasts based on the estimated impacts of the coronavirus – May and August 2020. Both reflect reduced property tax revenues. This report is based on the late August 2020 forecast.

For the KC EMS Fund, the August 2020 forecast reduces revenues by $6.5 million; reduces expenditures by $4.9 million for a net change of $1.6 million less than the original plan.




## EMS Division Response

For the continued stability of the regional EMS system and our partners (many of whom are experiencing reduced funding), it is imperative that the support included in the Medic One/EMS Strategic Plan continue.

The current EMS plan is to:

- Cautiously move forward implementing 2020-2025 Strategic Plan
- Continue to support regional partners per Strategic Plan
- Be mindful that we have five (5) years remaining in the EMS Levy
- Use Rainy Day Reserves to cover revenue shortfalls (if needed)

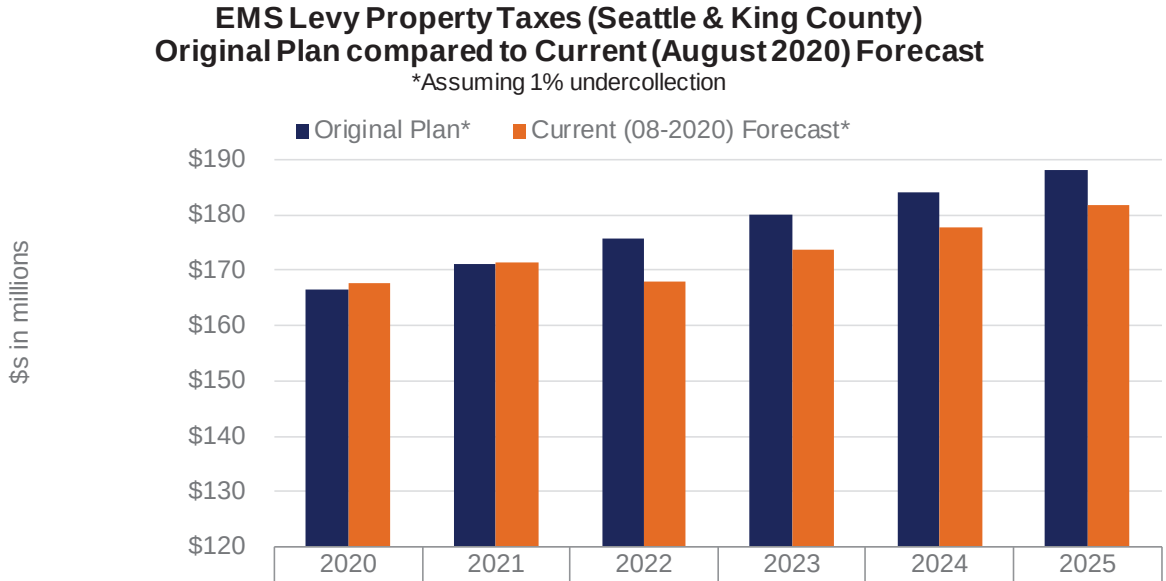
The EMS Division will continue to monitor the financial health of the system moving forward, and work with the region on adjustments as necessary.

# EMS Levy Property Taxes (Seattle & King County)

## EMS Levy Property Taxes

The primary revenue source for the KC EMS fund is property taxes and income the levy receives as a property tax fund in King County. Funds are restricted by state law and can only be spent on EMS-related activities. The levy growth is limited to a 1% increase from existing properties, plus assessment on new construction, per 84.55.101 RCW.

Funding levels are dependent on increasing AV, new construction, and the split between City of Seattle and the KC EMS Fund. The current forecast projects a reduction in property taxes in 2022. While forecast includes increases from the lower 2022 level, forecast levels remain below planned levels.




| | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|
| Original Plan* | $166.6 | $171.2 | $175.7 | $179.9 | $184.1 | $188.2 |
| Current (08-2020) Forecast* | $167.7 | $171.5 | $168.0 | $173.8 | $177.9 | $181.9 |

## Distribution of funds between King County and City of Seattle

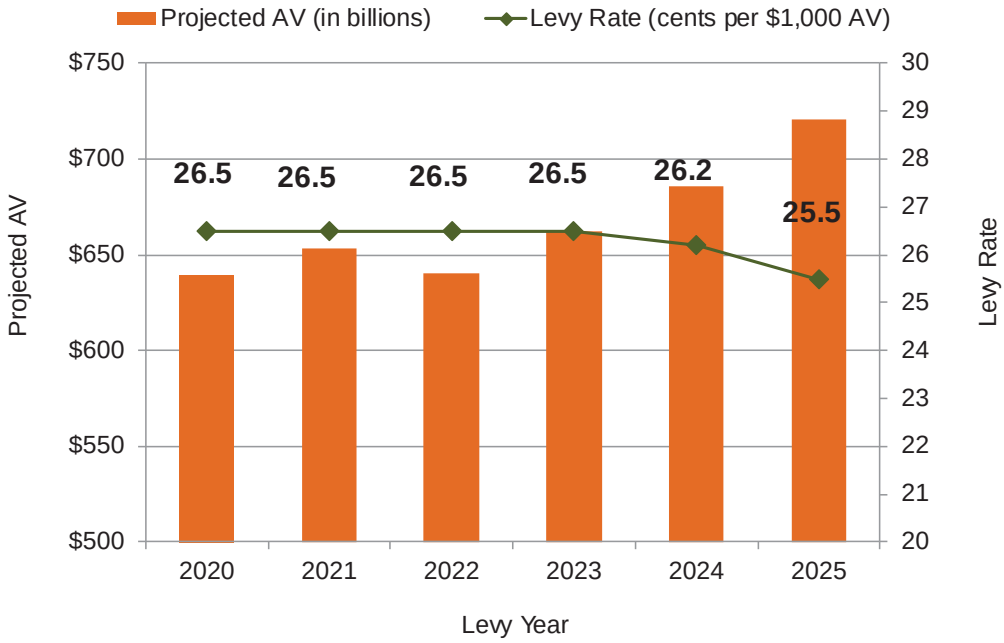
An inter-local agreement between King County and the City of Seattle allows for EMS levy funds collected within the Seattle city limits to go directly to, and be managed separately by, the city. Throughout the 2014-2019 levy period, the City of Seattle "split" increased from 38% to 40.4%; during the 2020-2025 levy period, the City of Seattle “split” is forecast starting at 40.2% in 2020 to 40.7% in 2025. It remains unknown how the recession will affect assessed AV in different parts of King County and, therefore, how funding is distributed between City of Seattle and KC EMS fund.

## Assessed Valuations (AV) in the Region

Per RCW, the total amount of EMS property taxes collected per year is limited to 1% plus new construction. When AV increases at a rate higher than 1% per year, levy rates must decrease to keep the increased property tax collection at 1% + new construction. This occurred during the 2014-2019 levy, with the levy rate decreasing from 33.5 cents/$1,000 AV in 2014 to 21.7 cents/$1,000 AV in 2019.

Conversely, when AV declines, the levy rate can increase up to its statutory level (in the case of EMS levy, the rate on the ballot). Countywide AV is forecast to decrease by 2% in 2022 and the levy is forecast to be limited to the statutory level of 26.5 cent/$1,000 AV through 2023. Once in this "capped" situation, increases or decreases in AV will directly affect EMS property taxes.

**Property Tax Assessed Valuations**
**2020-2025 EMS Levy**




*The August 2020 forecast shows the EMS levy rate remaining at its legal limit of 26.5 cents per $1,000 AV through 2023.*

## 2020 KC EMS Fund Financial Plan (King County only)

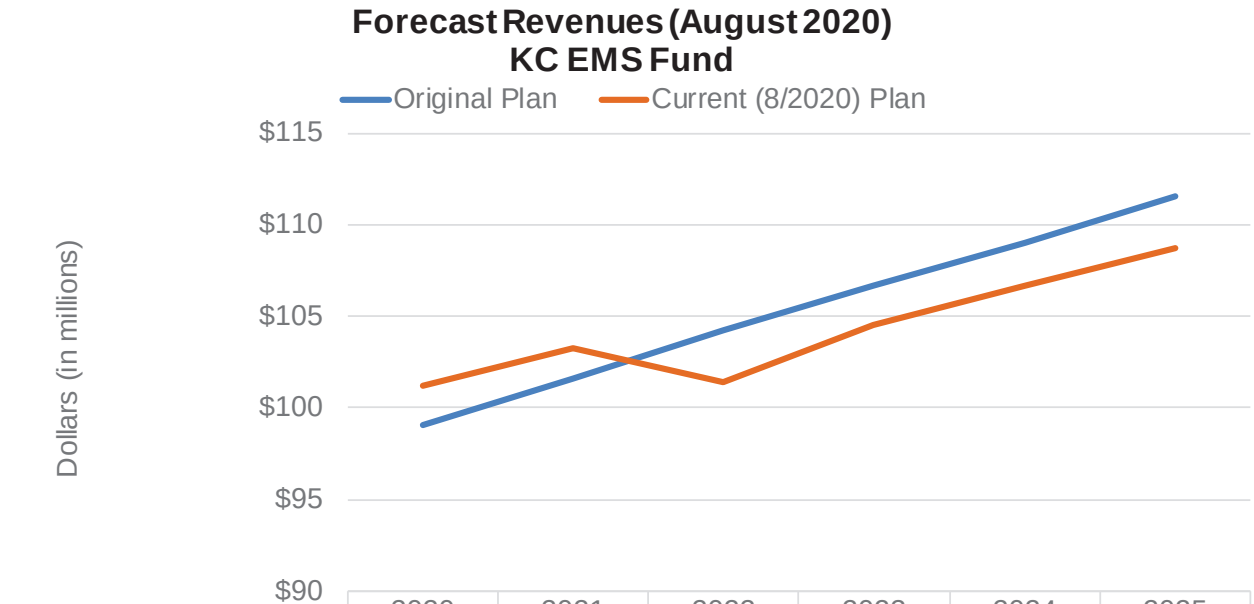
Since EMS levy funds collected within the City of Seattle go directly to, and are managed separately by, the City, the following section excludes the City of Seattle, and pertains only to the EMS fund within the remainder of King County (the KC EMS Fund).

### Revenue Forecast

Forecast reductions in AV are projected to limit the EMS levy to the statutory rate of 26.5 cents/$1,000 AV for most of the levy period. This reduction, along with lowered new construction forecast, results in a notable reduction in KC EMS Levy Fund property taxes beginning in 2022 with modest increases through the remainder of the levy period.

Issues that will impact KC EMS fund property tax revenues include changes in forecasted AV (either up or down) and the split between the City of Seattle and King County EMS Fund.

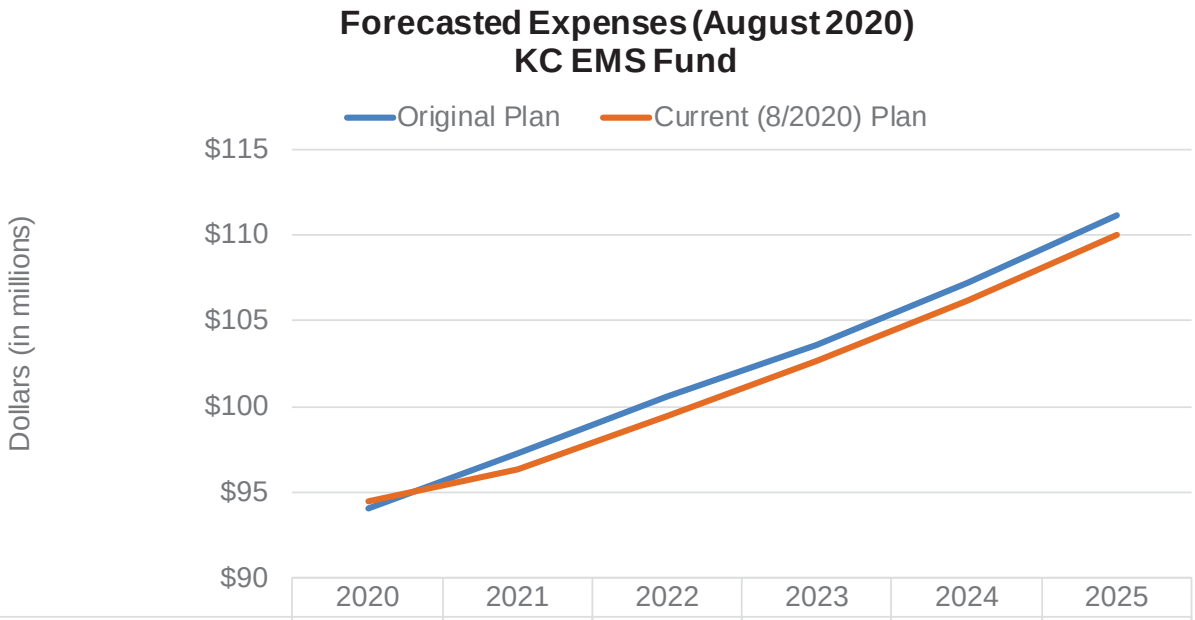
Interest income, while a small portion of the overall EMS Fund forecast is also projected to decrease significantly due to lowered rates and fund balance.




| | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|
| Original Plan | $99.1 | $101.6 | $104.2 | $106.6 | $109.0 | $111.5 |
| Current (8/2020) Plan | $101.2 | $103.2 | $101.4 | $104.5 | $106.6 | $108.7 |

## Expenditure Forecast

CPI-W is used to inflate most EMS allocations. The updated forecast significantly reduced projected June-June 2020 Seattle CPI-W down to 1.01% from a March forecast of 2.6%, and anticipates slightly lower than planned CPIs for the reminder of the levy period. Due to this, overall expenditures are forecasted to be slightly lower than planned.




| | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|
| Original Plan | $94.1 | $97.3 | $100.6 | $103.6 | $107.2 | $111.2 |
| Current (8/2020) Plan | $94.5 | $96.3 | $99.5 | $102.6 | $106.2 | $110.0 |

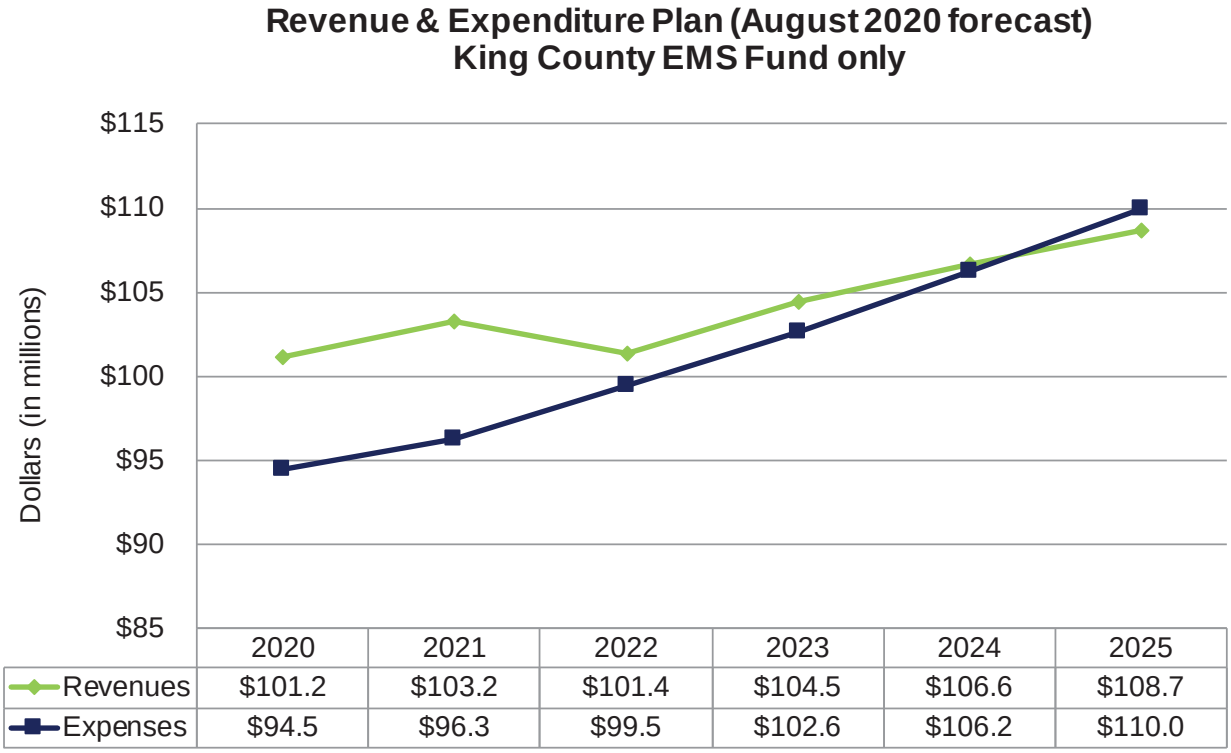
## Reserves

The 2020-2025 Medic One/EMS Strategic Plan included incorporating reserves and contingencies to mitigate financial risk. Contingencies to cover significant increases in operating costs are budgeted at $1 million a year ($6 million overall). Reserves were budgeted at $43 million. Due to reduced expenditures and increased funds carried forward from the previous levy period, projected reserves at the end of the 2020-2025 levy period are not dramatically different.

## Conclusion

The economic recession related to COVID-19 has affected forecast EMS revenues. Fortunately, safeguarding the EMS system from unforeseen financial risk was one of the most discussed topics during the levy planning process. As a result, EMS strategic and financial plans include sufficient reserves for exactly this type of situation. Although the world consists of a lot of unknowns right now, the EMS Division is committed to moving forward as outlined in the Strategic Plan to meet the needs of the EMS system, its users, and our community.

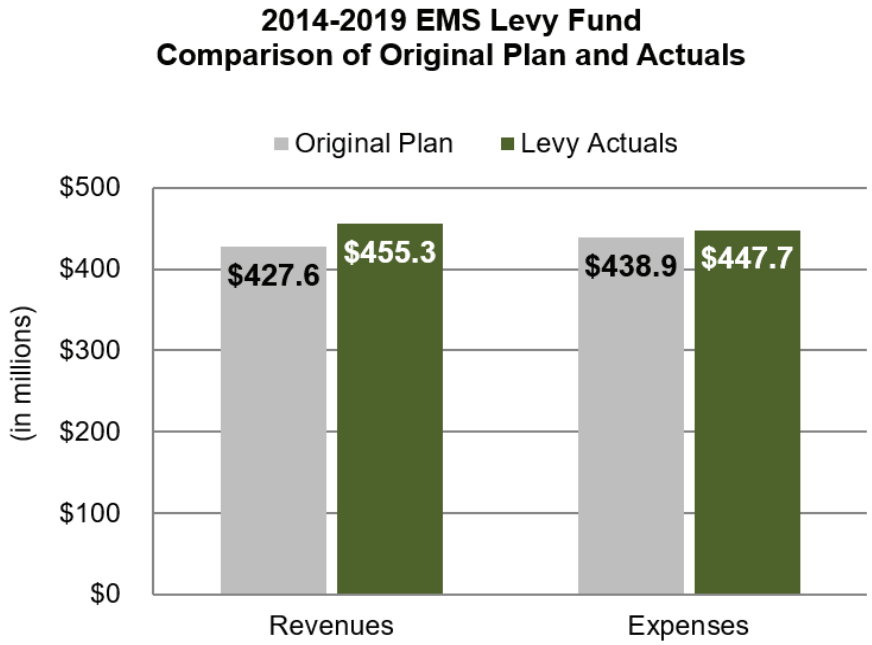
The following chart shows projected yearly changes including a decrease in revenues between 2021 and 2022. Expenditures, after a lower than usual rate of increase in 2021, increase at a rate closer to the original plan between 2023 and 2025.




| | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|
| Revenues | $101.2 | $103.2 | $101.4 | $104.5 | $106.6 | $108.7 |
| Expenses | $94.5 | $96.3 | $99.5 | $102.6 | $106.2 | $110.0 |

# 2014-2019 EMS Levy – A Retrospective

This section summarizes the financial conditions, trends and changes experienced during the 2014-2019 Medic One/EMS levy. An inter-local agreement between King County and the City of Seattle allows for EMS levy funds collected within Seattle to go directly to, and be managed separately by, the City. Therefore, with the exception of the Assessed Valuation chart, this segment excludes the city of Seattle, and pertains only to the EMS fund within the remainder of King County (the KC EMS Fund).



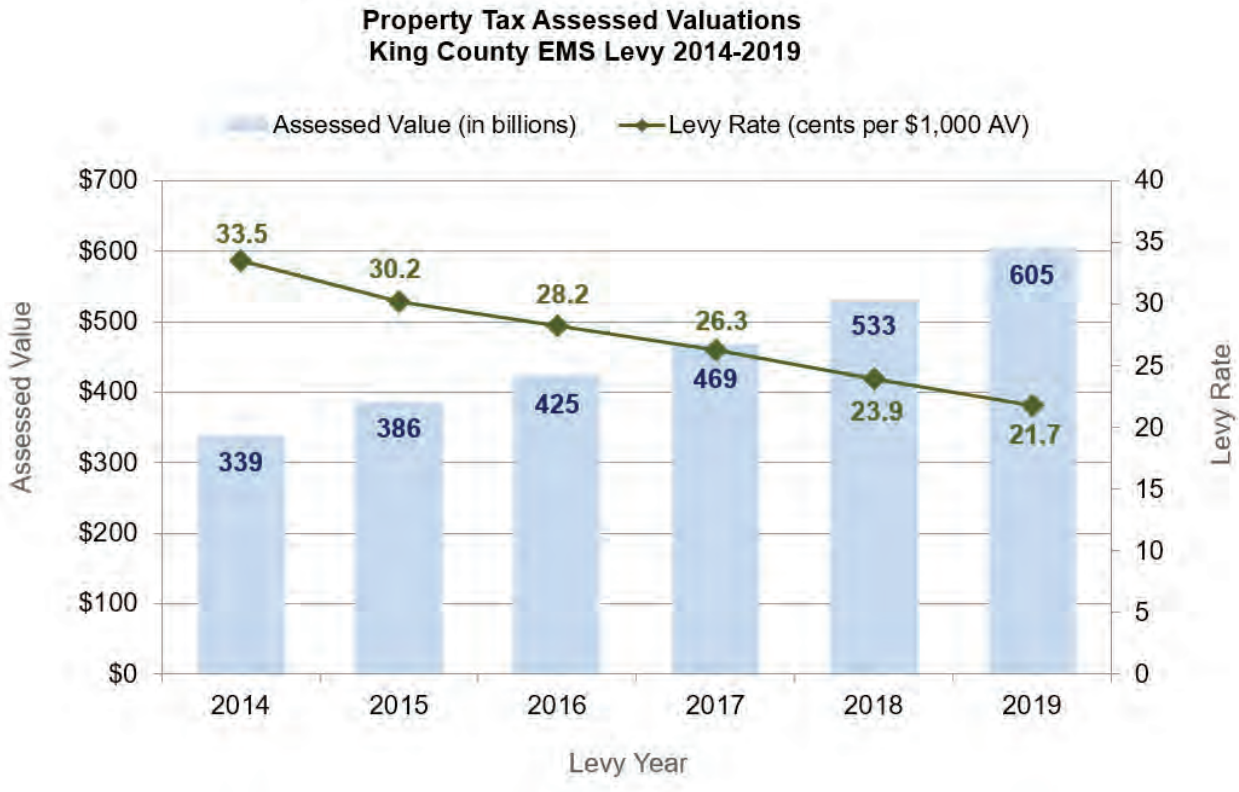
## Overview

The Medic One/EMS 2014-2019 levy was planned while the region was recovering from the 2008 recession and was based on conservative financial modeling. The recovery was much stronger than anticipated and resulted in both increased revenues and expenditures.

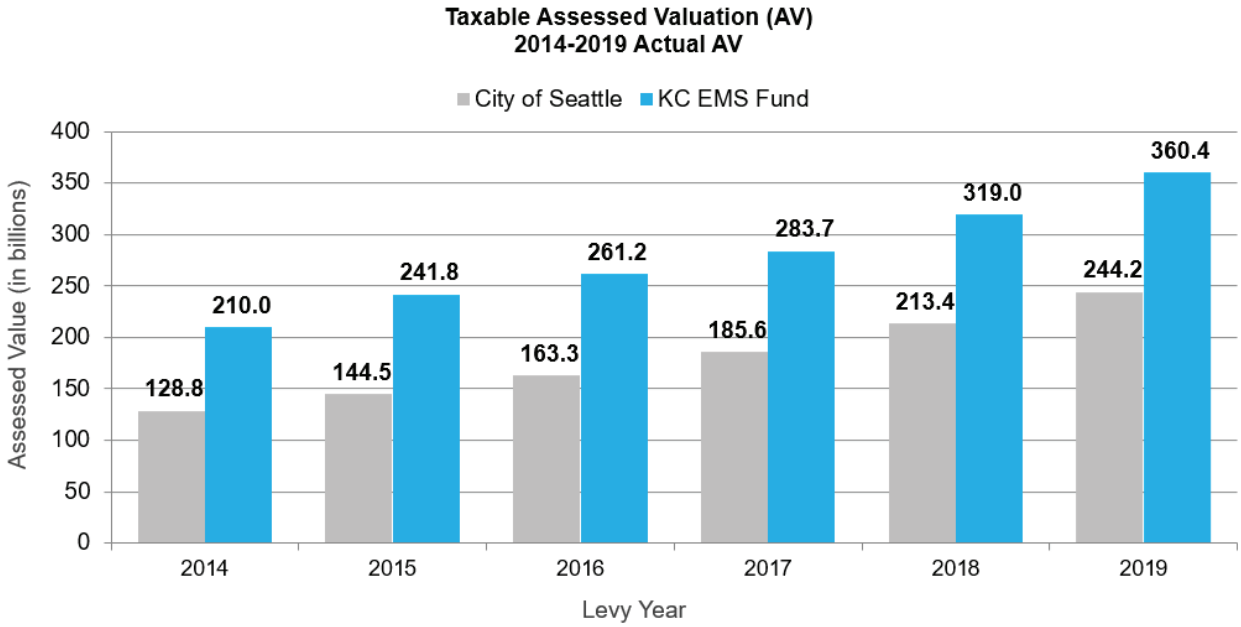
The additional revenues covered increased costs, system investments, and funded a 90-day Rainy Day Reserve, which became a new requirement after the EMS levy was planned. The end balance of this reserve in 2019 was able to almost fully fund estimated 2025 Rainy Day Reserve requirements for the 2020-2025 EMS levy.

### Assessed Valuations (AV)/Property Taxes - King County & City of Seattle

The economic downturn and depressed Assessed Valuations (AV) from the previous levy span led the 2014-2019 levy rate to begin at 33.5 cents. As mandated by RCW, the total amount collected per year by the levy is limited to 1% plus new construction. When AV grows at a rate higher than 1%, the levy rate reduces to not exceed that 1% + new construction limit. The decrease in levy rate shown on the following chart is proportionate to the increase in AV.




Increased assessed value led to a significantly decreased levy rate, dropping from 33.5 cents/$1,000 AV in 2014 to 21.7 cents/$1,000 AV in 2019.




**Taxable Assessed Valuation**

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|
| % City of Seattle | 38.0% | 37.4% | 38.5% | 39.6% | 40.1% | 40.4% |
| % KC EMS Fund | 62.0% | 62.6% | 61.5% | 60.4% | 59.9% | 59.6% |

As the region recovered and grew from the recession, Seattle's AV increased at a higher rate than the rest of the county. Note: The KC EMS Fund taxable AV does not include AV related to Milton. Milton receives taxes directly from King County.

## King County EMS Fund

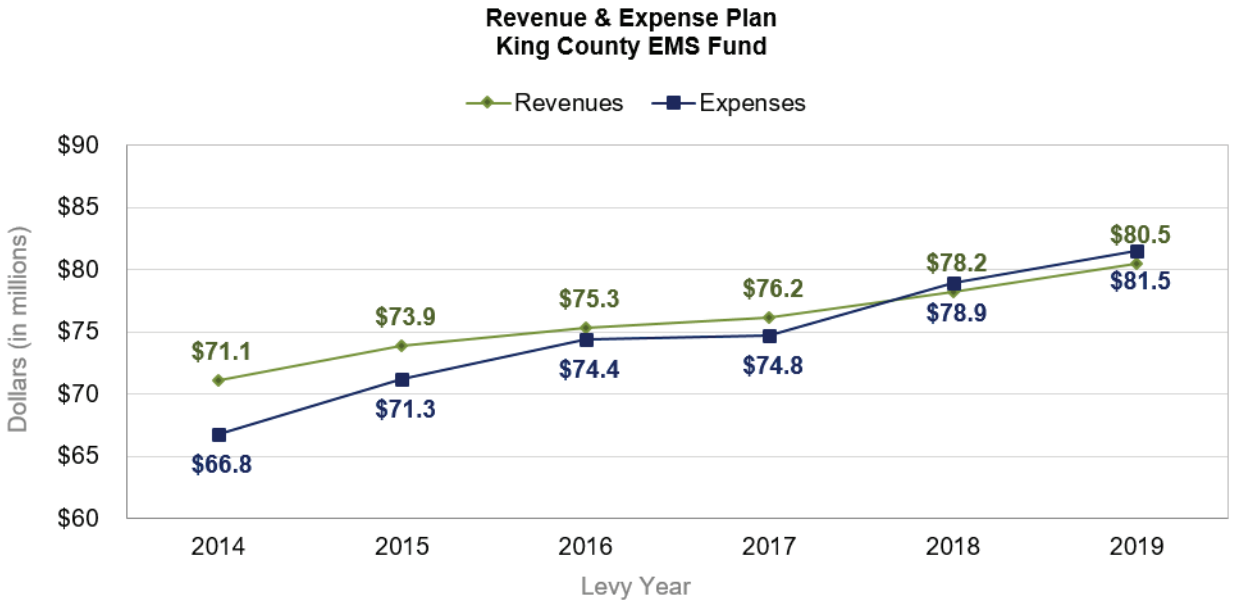
### Revenues

Approximately 98% of revenue for the EMS levy comes from taxes and income related to property taxes. Interest income increased significantly above planned due to the economic conditions. In 2016, programs that were previously in the Public Health fund (Grants, Donations and Entrepreneurial) were moved into the EMS fund.

Revenues* 2014-2019 Levy

| Revenue Type | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Total |
|---|---|---|---|---|---|---|---|
| Property Taxes | 70.30 | 72.89 | 73.38 | 74.32 | 76.18 | 78.09 | 445.16 |
| Interest/Other Income | 0.59 | 0.55 | 0.71 | 0.83 | 1.14 | 1.59 | 5.42 |
| Charges for Services | 0.25 | 0.50 | 0.70 | 0.67 | 0.56 | 0.50 | 3.17 |
| Grants | - | - | 0.55 | 0.35 | 0.31 | 0.31 | 1.53 |
| Total | 71.14 | 73.94 | 75.34 | 76.17 | 78.19 | 80.49 | 455.27 |

Dollars in millions; Grants and Entrepreneurial income added to EMS Fund from PH Fund in 2016.




The levy is structured so that taxes collected early in the levy period are planned to cover expenditures in the later years of the levy. **The overall revenue increases resulted in a smaller than anticipated differential between revenues and expenditures at the end of the levy**.

## 2014-2019 Revenue Trends

Most of the revenue trends are related to the economic recovery from the 2008 recession.

- Assessed Valuation (AV), particularly the first year of the levy, was higher than planned.
- New Construction AV was higher than planned.
- Interest income increased slightly higher than the original plan.
- The percent of AV related to the City of Seattle increased. The impact of this to the KC EMS Fund was mitigated by the total increase in property tax revenue.
- Increased revenues allowed the funding of Rainy Day Reserves in the 2014-2019 levy period.

## Expenditures

EMS levy revenues support Medic One/EMS operations related to direct service delivery and support programs:

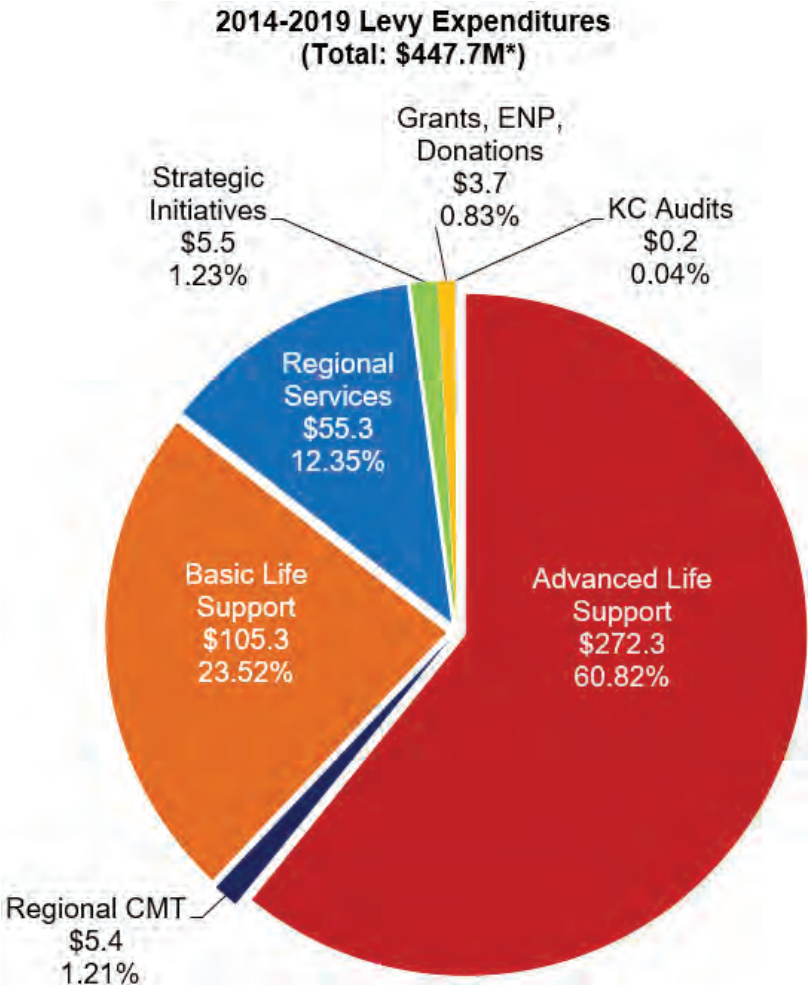
Advanced Life Support (ALS) Services (paramedics) - covers all eligible ALS costs

**Basic Life Support (BLS) Services (Firefighter/EMTs)** - contributes to each fire agency to contribute to BLS services

**Regional Support Services (RSS)** - funds core programs critical to providing the highest quality out-of-hospital emergency care available

**Strategic Initiatives (SI)** - supports pilots projects aimed at improving the system

**Community Medical Technician (CMT) Units/Mobile Integrated Health (MIH)** - extended pilots from the 2014-2019, allowing for the further refinement of MIH into a region wide program for the 2020-2025 levy




**Audits** - incorporated into general King County overhead, which was originally funded separately.

**Grants, Entrepreneurial and Donations** - moved grants, entrepreneurial and donations from Public Health Fund to EMS Levy Fund in 2016. To provide more focus on supporting King County agencies, a decision was made to phase out of the Entrepreneurial programs near the end of the levy period with the program closing at the end of 2020.

The following table presents the 2014-2019 levy period expenditures for each area listed above:

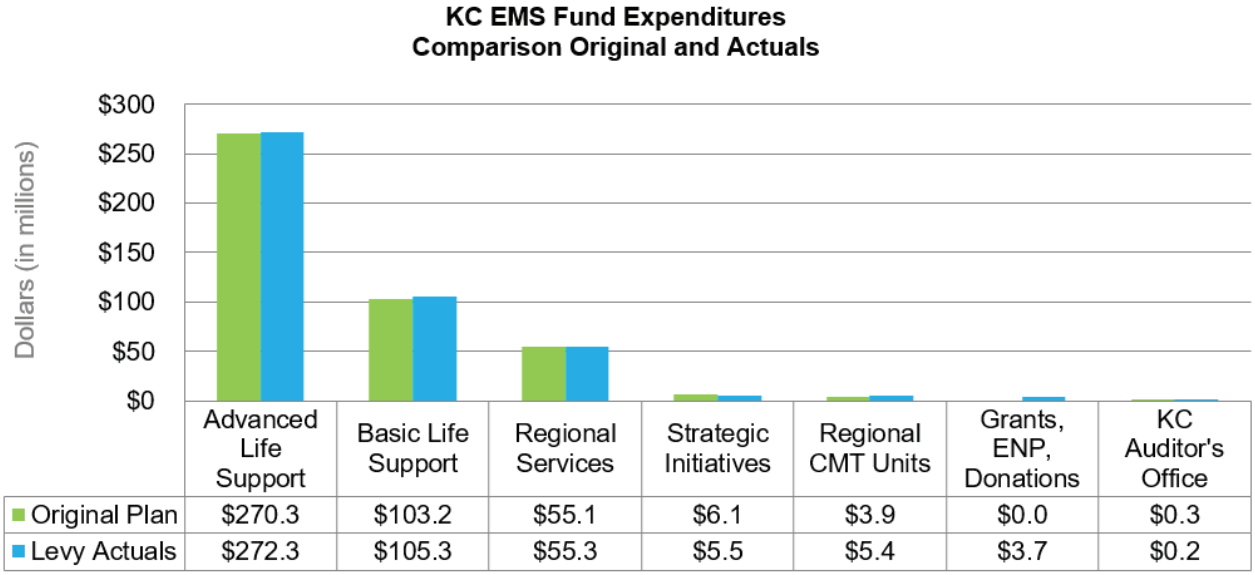
**2014-2019 Levy Expenditures Actuals** (in thousands)

| Expenditure Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2014-2019 Total |
|---|---|---|---|---|---|---|---|
| ALS | 42,155.7 | 44,621.1 | 43,840.4 | 44,730.7 | 47,997.2 | 48,929.7 | **272,274.8** |
| BLS | 15,871.0 | 16,534.2 | 17,573.4 | 17,885.9 | 18,270.3 | 19,180.7 | **105,315.5** |
| RSS | 8,460.2 | 9,385.6 | 9,842.7 | 8,655.0 | 9,098.9 | 9,846.5 | **55,288.9** |
| SI | 311.2 | 387.2 | 661.2 | 1,058.7 | 1,639.1 | 1,413.7 | **5,471.2** |
| CMT/MIH | - | 294.7 | 1,086.0 | 1,477.6 | 1,093.8 | 1,426.7 | **5,378.8** |
| Audit | - | 38.9 | 158.4 | - | - | - | **197.3** |
| Grants, ENP, Donations | - | - | 1,226.8 | 946.3 | 828.2 | 734.8 | **3,736.1** |
| **Total** | **66,798.1** | **71,261.7** | **74,388.9** | **74,754.2** | **78,927.5** | **81,532.1** | **447,662.6** |

## 2014-2019 Expenditure Trends

Expenditure differences from the original Financial Plan include:

- ALS increases covered unplanned rise in overall costs and use of reserves (see “Use of Reserves” table for more detailed information).
- BLS increases reflect the addition of the BLS Core Services Program that helps agencies with unanticipated costs (funded at $3.7 million for the levy period).
- Regional Services increases are due to accessing reserves early in the levy period to help cover unanticipated increases in county central rate (see “Use of Reserves” table for more detailed information).



## Strategic Initiatives (SIs)

The 2014-2019 Strategic Plan included five Strategic Initiatives. Four of these 2014-2019 initiatives were integrated into regional programs to supplement system performance for the 2020-2025 levy; one (Vulnerable Populations) will continue as an initiative during the 2020-2025 levy period. In addition, two initiatives funded in the 2008-2013 Strategic Plan continued into the 2014-2019 levy period.

**Strategic Initiative Expenditures**

| **2014-2019 Strategic Initiatives:** | **Total** |
|---|---|
| Regional Records Management System | 834,882 |
| BLS QI and Training | 985,748 |
| Vulnerable Populations | 1,502,918 |
| BLS Efficiencies | 846,300 |
| Efficiency & Evaluation Studies | 1,014,653 |
| **2014-2019 Total Expenditures** | **5,184,500** |
| **2008-2013 Strategic Initiatives:** | |
| Emergency Medical Dispatch (EMD) | 122,532 |
| Systemwide Enhanced Network Design (SEND) | 164,187 |
| **2008-2013 Total Expenditures** | **286,719** |
| **Total Strategic Initiative Expenditures** | **5,471,219** |

## Reserves

Reserve categories established during 2014-2019 levy planning were formally transitioned in 2017 to comply with updated King County Financial Policies. What were 12 different categories became three: Expenditure Reserves, Rate Stabilization Reserves and a Rainy Day Reserve, and maintained the same reserve usage and policies.

**2017-2019 Reserves**

| Reserve Name | 2017 | 2018 | 2019 |
|---|---|---|---|
| Expenditure Reserves | | | |
| Regional CMT Units | 1,519,484 | 1,519,484 | - |
| ALS Capacity | 1,067,700 | 400,000 | - |
| ALS Equipment | 488,900 | 488,900 | - |
| Planned Future Years Expenditures | 9,402,152 | 6,347,689 | - |
| KCM1 Equipment* | 1,772,380 | 1,234,029 | 1,822,419 |
| Program Balances (ALS & RSS)* | 11,874,941 | 12,770,017 | 14,908,940 |
| Rainy Day Reserves | 18,219,800 | 19,257,433 | 20,103,826 |
| Rate Stabilization Reserves | | 1,659,272 | 6,175,709 |
| **Total Reserves** | **44,345,357** | **43,676,824** | **43,010,894** |

*Previously considered designations

## Use of Reserves

The use of reserves is subject to review and recommendation by both the EMSAC Financial Subcommittee and the full EMSAC. The following table shows actual reserve usage through the end of 2018. Regional Services is using existing program balances to cover a portion of the amount eligible for reserves.

**Use of Reserves and Designations**

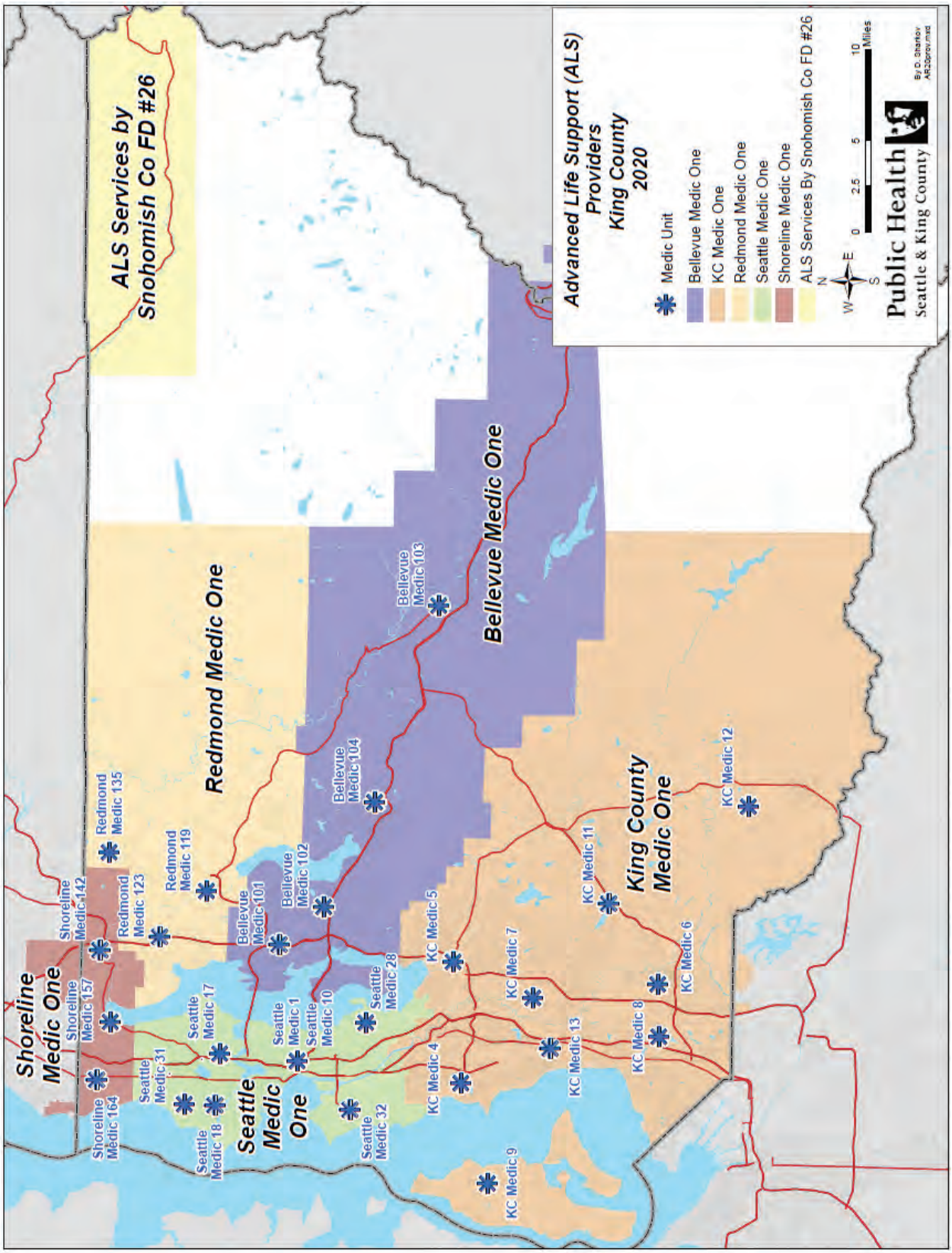
| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Total |
|---|---|---|---|---|---|---|---|
| **Reserves** | | | | | | | |
| **ALS Equipment** | | | | | | | |
| Power Load Systems | | 434,562 | 174,333 | 188,990 | - | - | **797,885** |
| **ALS Operating Reserve** | | | | | | | |
| Excess Paid Time Off (PTO) | 214,000 | 25,689 | 243,741 | - | - | 864,000 | **1,347,430** |
| Regional Services | 306,261 | 925,922 | 579,148 | - | - | - | **1,811,331** |
| Paramedic Students | 271,648 | 407,012 | 414,645 | 290,950 | 297,932 | 305,977 | **1,988,164** |
| Dispatch Costs | 133,893 | 169,629 | 157,683 | - | - | - | **461,205** |
| ALS Mid-levy Allocation Adjustment | - | - | 1,989,324 | 2,049,288 | 2,124,702 | 2,220,526 | **8,383,840** |
| **ALS Capacity** | - | - | - | 300,517 | 59,483 | - | **360,000** |
| **ALS Risk Abatement Reserve** | - | 649,672 | 161,885 | 45,000 | 80,000 | 83,579 | **1,020,136** |
| **CMT/MIH** | - | - | - | - | - | 1,519,484 | **1,519,484** |
| **Subtotal** | **925,802** | **2,612,486** | **3,720,759** | **2,874,745** | **2,562,117** | **4,993,565** | **17,689,474** |
| | | | | | | | **Designations** |
| Supplemental BLS Allocation | 219,144 | - | - | - | - | - | **219,144** |
| Supplemental BLS Core Services | - | - | - | 11,698 | - | - | **11,698** |
| **Subtotal** | **219,144** | **-** | **-** | **11,698** | **-** | **-** | **230,842** |
| **TOTAL** | **1,144,946** | **2,612,486** | **3,720,759** | **2,886,443** | **2,562,117** | **4,993,565** | **17,920,316** |

## Conclusion

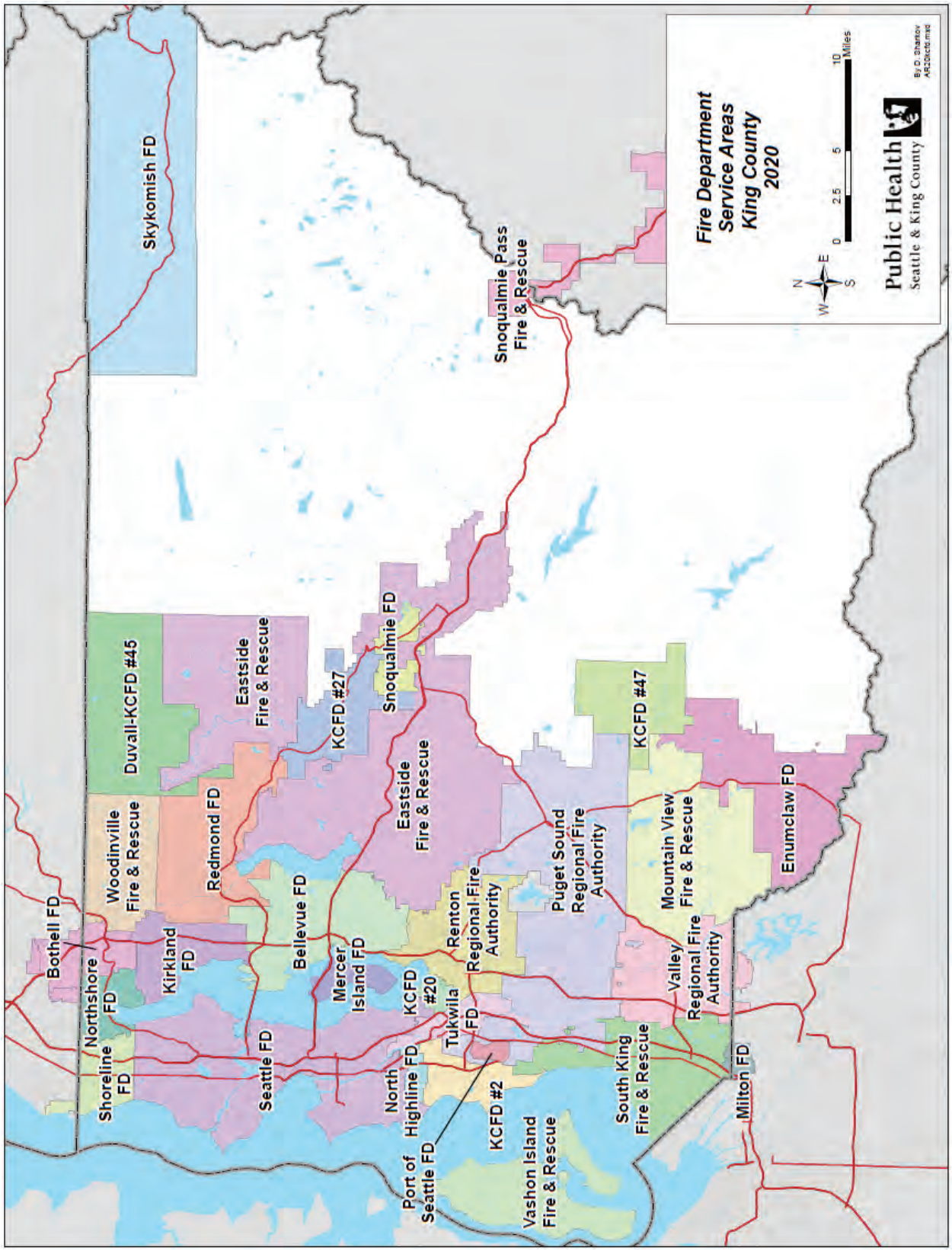
Over the 2014-2019 levy span, expenses continued to increase at a rate greater than originally anticipated. ALS and Regional Services programs have accessed reserves to help address these additional costs, and BLS agencies received support from designations and the BLS Core Services program. These changes were taken into consideration in developing and estimated costs for the 2020-2025 EMS levy.

Increased revenues due to higher property taxes were used to cover increased expenditures and investment in the system and to fully fund new 90-day Rainy Day Reserves and the ability to carry forward $26 million to help fund reserves in the 2020-2025 EMS levy.

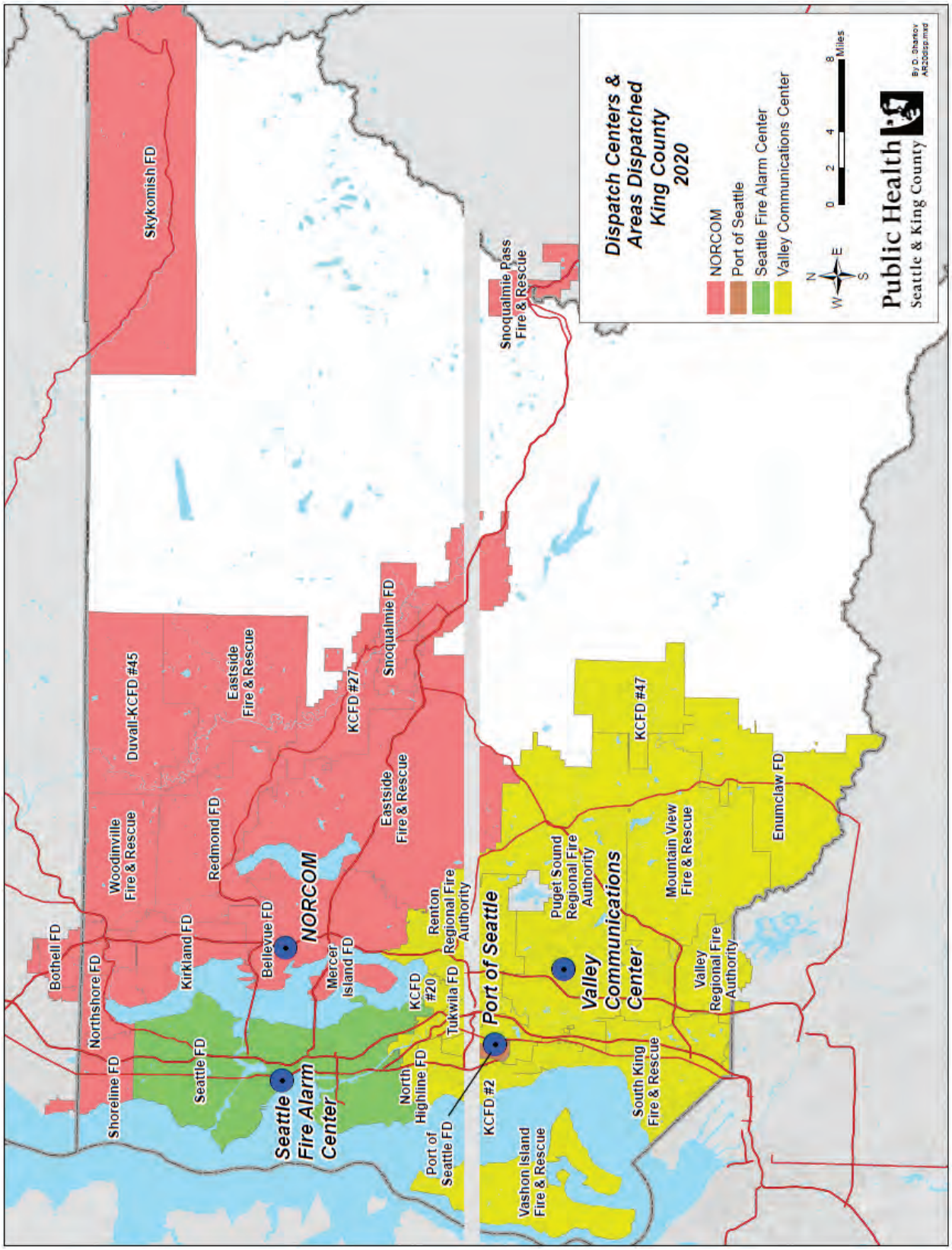
## Appendix A – Regional Maps
## Advanced Life Support (ALS) Provider Areas



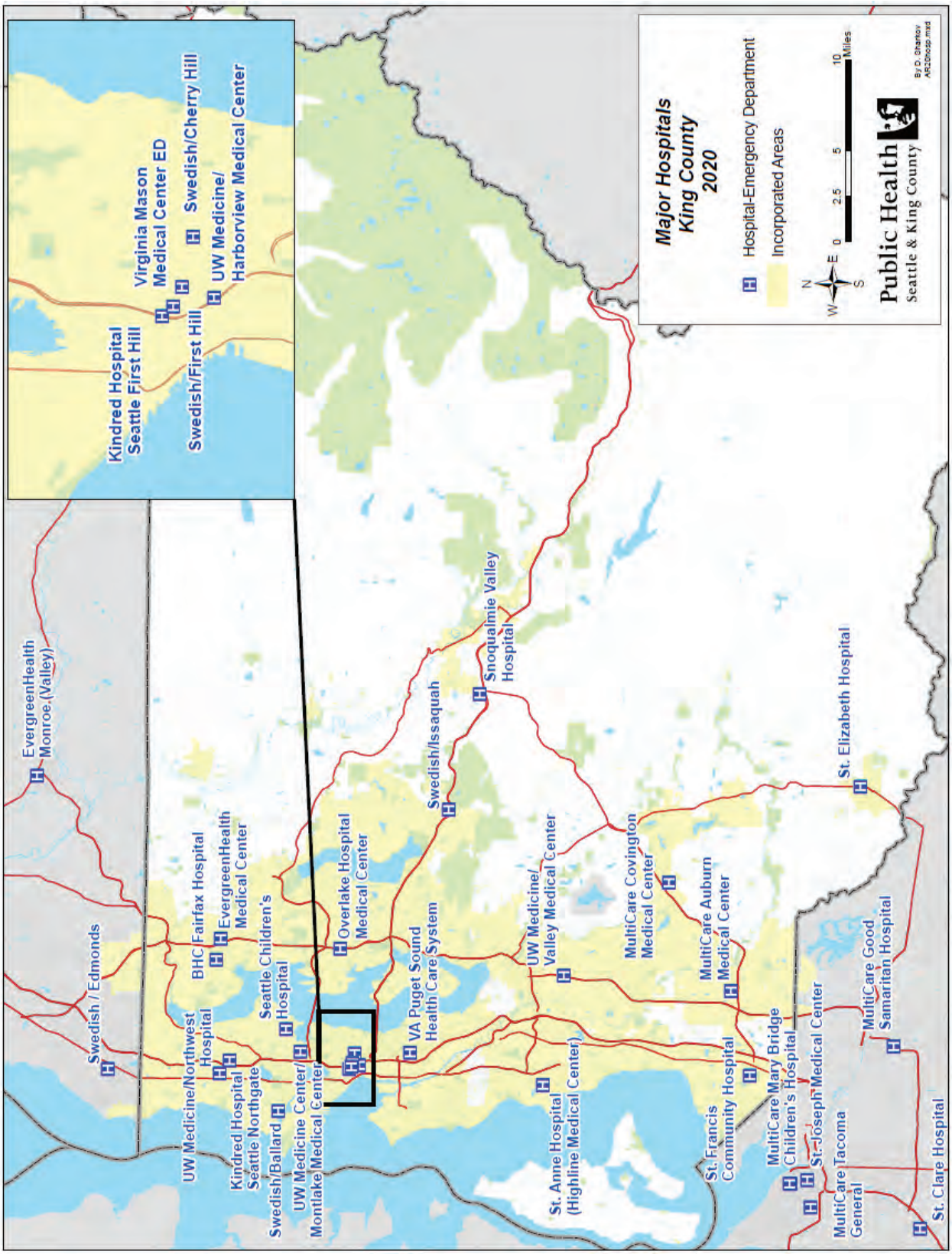
## Appendix A – Regional Maps
## Basic Life Support (BLS) Provider Areas



## Appendix A – Regional Maps
## Dispatch Center Service Areas



# Appendix A – Regional Maps
## Regional Hospitals in Seattle & King County



## Appendix B – EMS Advisory Committee (EMSAC) Members

| Name | Representation | Title/Organization |
|---|---|---|
| Michele Plorde, Chair | Emergency Medical Services Division | Director, EMS Division |
| Patty Hayes | Public Health - Seattle & King County | Director, PHSKC Department |
| Jay Hagen | ALS Providers - Bellevue | Chief, Bellevue Fire Department |
| Keith Keller | ALS Providers - KC Medic One | MSA, King County Medic One |
| Jim Whitney | 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 |
| Jeff Clark | BLS in Cities > 50,000 (Sammamish) | Chief, Eastside Fire & Rescue |
| Mike Marrs | BLS in Cities > 50,000 (Burien) | Chief, Fire District #2 |
| Joe Sanford | BLS in Cities > 50,000 (Kirkland) | Chief, Kirkland Fire Department |
| Matthew Morris | BLS in Cities > 50,000 (Kent) | Chief, Puget Sound Regional Fire Authority |
| Roy Gunsolus | BLS in Cities > 50,000 (Renton) | Chief, Renton Regional Fire Authority |
| Vic Pennington | BLS in Cities >50,000 (Federal Way) | Chief, South King Fire & Rescue |
| Brent Swearingen | BLS in Cities > 50,000 (Auburn) | Chief, Valley Regional Fire Authority |
| Dr. Tom Rea | King County Medical Program Director Chair, Medical Directors' Committee | Medical Program Director |
| Dr. Peter Kudenchuk | Medical Director, KCM1 | Medical Director, KCM1 |
| Dr. Michael Sayre | Seattle Medical Program Director | Medical Program Director, Seattle |
| Anita Sandall | KC Fire Commissioner's Assn. - Rural | Fire Commissioner, Eastside Fire & Rescue |
| John Rickert | KC Fire Commissioner's Assn. - Urban | Fire Commissioner, South King Fire & Rescue |
| Ryan Simonds | Labor - BLS | Renton Regional Fire Authority |
| Steve Perry | Labor - ALS | Paramedic, KCM1 |
| Lora Ueland | Dispatch | Director, Valley Communications Center |
| Brandt Butte | Ambulance | American Medical Response |
| Ed Plumlee | Citizen Representative | |
| Vacant | Health Care System | |

## Appendix C: EMS Division Publications

The EMS Division collaborates with medical program directors, EMS providers, and the University of Washington faculty and other guest researchers to conduct research and analyses. In 2019, King County EMS disseminated research findings to wider national and international audiences through the following publications in peer-reviewed scientific and trade journals:


1. Yang BY, Barnard LM, Emert JM, et al. Clinical Characteristics of Patients With Coronavirus Disease 2019 (COVID-19) Receiving Emergency Medical Services in King County, Washington. *JAMA Netw Open*. 2020;3(7):e2014549. Published 2020 Jul 1. doi:10.1001/jamanetworkopen.2020.14549
2. Sayre MR, Barnard LM, Counts CR, et al. Prevalence of COVID-19 in Out-of-Hospital Cardiac Arrest: Implications for Bystander CPR [published online ahead of print, 2020 Jun 4]. *Circulation*. 2020;10.1161/CIRCULATIONAHA.120.048951. doi:10.1161/CIRCULATIONAHA.120.048951
3. Murphy DL, Barnard LM, Drucker DJ, et al. Occupational exposures and programmatic response to COVID-19 pandemic: an emergency medical services experience. medRxiv. Preprint posted May 24, 2020. doi:10.1101/2020.05.22.20110718
4. McMichael TM, Currie DW, Clark S, et al. Epidemiology of Covid-19 in a Long-Term Care Facility in King County, Washington. *N Engl J Med*. 2020;382(21):2005-2011. doi:10.1056/NEJMoa2005412
5. Arons MM, Hatfield KM, Reddy SC, et al. Presymptomatic SARS-CoV-2 Infections and Transmission in a Skilled Nursing Facility. *N Engl J Med*. 2020;382(22):2081-2090. doi:10.1056/NEJMoa2008457
6. Kimball A, Hatfield KM, Arons M, et al. Asymptomatic and Presymptomatic SARS-CoV-2 Infections in Residents of a Long-Term Care Skilled Nursing Facility - King County, Washington, March 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(13):377-381. Published 2020 Apr 3. doi:10.15585/mmwr.mm6913e1
7. McMichael TM, Clark S, Pogosjans S, et al. COVID-19 in a Long-Term Care Facility - King County, Washington, February 27-March 9, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(12):339-342. Published 2020 Mar 27. doi:10.15585/mmwr.mm6912e1
8. Johnson NJ, Danielson KR, Counts CR, et al. Targeted Temperature Management at 33 Versus 36 Degrees: A Retrospective Cohort Study. *Crit Care Med*. 2020;48(3):362-369. doi:10.1097/CCM.0000000000004159
9. Hanisch JR, Counts CR, Latimer AJ, Rea TD, Yin L, Sayre MR. Causes of Chest Compression Interruptions During Out-of-Hospital Cardiac Arrest Resuscitation. *J Am Heart Assoc*. 2020;9(6):e015599. doi:10.1161/JAHA.119.015599
10. Schwarzkoph M, Yin L, Hergert L, Drucker C, Counts CR, Eisenberg M. Seizure-like presentation in OHCA creates barriers to dispatch recognition of cardiac arrest [published online ahead of print, 2020 Jul 13]. *Resuscitation*. 2020;S0300-9572(20)30275-6. doi:10.1016/j.resuscitation.2020.06.036
11. Kragholm K, Hansen CM, Dupre ME, et al. Care and outcomes of urban and non-urban out-of-hospital cardiac arrest patients during the HeartRescue Project in Washington state and North Carolina. *Resuscitation*. 2020;152:5-15. doi:10.1016/j.resuscitation.2020.04.030

12. Daya MR, Leroux BG, Dorian P, et al. Survival After Intravenous Versus Intraosseous Amiodarone, Lidocaine, or Placebo in Out-of-Hospital Shock-Refractory Cardiac Arrest. *Circulation*. 2020;141(3):188-198. doi:10.1161/CIRCULATIONAHA.119.042240
13. Blomberg SN, Folke F, Ersbøll AK, et al. Machine learning as a supportive tool to recognize cardiac arrest in emergency calls. *Resuscitation*. 2019;138:322-329. doi:10.1016/j.resuscitation.2019.01.015
14. Blomberg SN, Folke F, Ersbøll AK, et al. Reply letter to "Machine learning as a supportive tool to recognize cardiac arrest in emergency calls". *Resuscitation*. 2019;144:205-206. doi:10.1016/j.resuscitation.2019.09.013
15. Coult J, Blackwood J, Rea TD, Kudenchuk PJ, Kwok H. A Method to Detect Presence of Chest Compressions During Resuscitation Using Transthoracic Impedance. *IEEE J Biomed Health Inform*. 2020;24(3):768-774. doi:10.1109/JBHI.2019.2918790
16. Murphy DL, Rea TD, Sayre MR. Response: Inclined versus supine position for endotracheal intubation. *Am J Emerg Med*. 2019;37(8):1588. doi:10.1016/j.ajem.2019.05.028
17. Murphy DL, Rea TD, McCoy AM, et al. Inclined position is associated with improved first pass success and laryngoscopic view in prehospital endotracheal intubations. *Am J Emerg Med*. 2019;37(5):937-941. doi:10.1016/j.ajem.2019.02.038
18. Stangenes SR, Painter IS, Rea TD, Meischke H. Delays in recognition of the need for telephone-assisted CPR due to caller descriptions of chief complaint. *Resuscitation*. 2020;149:82-86. doi:10.1016/j.resuscitation.2020.02.013
19. Coult J, Blackwood J, Rea TD, Kudenchuk PJ, Kwok H. A Method to Detect Presence of Chest Compressions During Resuscitation Using Transthoracic Impedance. *IEEE J Biomed Health Inform*. 2020;24(3):768-774. doi:10.1109/JBHI.2019.2918790
20. Branch KR, Hira R, Brusen R, et al. Diagnostic accuracy of early computed tomographic coronary angiography to detect coronary artery disease after out-of-hospital circulatory arrest. *Resuscitation*. 2020;153:243-250. doi:10.1016/j.resuscitation.2020.04.033
21. Dougherty CM, Burr RL, Kudenchuk PJ, Glenny RW. Aerobic Exercise Effects on Quality of Life and Psychological Distress After an Implantable Cardioverter Defibrillator. *J Cardiopulm Rehabil Prev*. 2020;40(2):94-101. doi:10.1097/HCR.0000000000000444
22. Vitturi DA, Maynard C, Olsufka M, et al. Nitrite elicits divergent NO-dependent signaling that associates with outcome in out of hospital cardiac arrest. *Redox Biol*. 2020;32:101463. doi:10.1016/j.redox.2020.101463
23. Dumas F, Coult J, Blackwood J, Kudenchuk P, Cariou A, Rea TD. The association of chronic health status and survival following ventricular fibrillation cardiac arrest: Investigation of a primary myocardial mechanism. *Resuscitation*. 2019;137:190-196. doi:10.1016/j.resuscitation.2019.02.018
24. Johnson NJ, Caldwell E, Carlbom DJ, et al. The acute respiratory distress syndrome after out-of-hospital cardiac arrest: Incidence, risk factors, and outcomes. *Resuscitation*. 2019;135:37-44. doi:10.1016/j.resuscitation.2019.01.009
25. Coult J, Blackwood J, Sherman L, Rea TD, Kudenchuk PJ, Kwok H. Ventricular Fibrillation Waveform Analysis During Chest Compressions to Predict Survival From Cardiac Arrest. *Circ Arrhythm Electrophysiol*. 2019;12(1):e006924. doi:10.1161/CIRCEP.118.006924

26. Diana ML, Zhang Y, Yeager VA, Stoecker C, Counts CR. The impact of accountable care organization participation on hospital patient experience. *Health Care Manage Rev*. 2019;44(2):148-158. doi:10.1097/HMR.0000000000000219

27. Daya MR, Leroux BG, Dorian P, et al. Survival After Intravenous Versus Intraosseous Amiodarone, Lidocaine, or Placebo in Out-of-Hospital Shock-Refractory Cardiac Arrest. *Circulation*. 2020;141(3):188-198. doi:10.1161/CIRCULATIONAHA.119.042240

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## Appendix D: EMS Performance Measures

| Resource Category | Performance Measure | Definition | 2019 Results |
|---|---|---|---|
| **Systemwide** | Rate of cardiac arrest survival | % discharge from hospital for all witnessed cardiac arrests due to cardiac etiology in VF/VT. Includes only circulatory arrests of non-traumatic etiology receiving ALS care in patients > 2 years old | 59% |
| **Bystander** | Rate of bystander CPR in cases of cardiac arrest | % of bystander CPR provided for all cases of cardiac arrest. Includes only circulatory arrests of non-traumatic etiology that received ALS care in patients age > 2 years old | 76% |
| **Dispatch** | Rate of correctly identified cardiac arrest by telecommunicators | % of confirmed cardiac arrest cases that were correctly identified by dispatcher when provided opportunity to assess | 97% |
| | Rate of correctly identified resource used by telecommunicators | % of total number of reviewed calls that received correct EMS resource | 95% |
| | Rate of correctly transferred T-IDC calls | % of T-IDC calls that were sent to the Nurseline versus received a BLS response | 68% |
| **Basic Life Support (Emergency Medical Technicians)** | % 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: 5.1<br>Suburban: 5.6<br>Rural: 6.7<br>Wilderness: - |
| | 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 | 98% |
| | Rate that “on scene time” standards are met | % of suspected CVA and suspected TIA patients with < 15-minute BLS scene time | 45% |
| | Rate of taxi transported patients | % of taxi transports of all BLS transports | % not available (334 vouchers issued in 2019) |
| | Compression fraction during resuscitation attempts | % of time that compressions are actively applied to the chest during the first 20 minutes of the case, until efforts are ceased, or until sustained ROSC is achieved (whichever event comes earliest) | 91% |

*Modified measure to look at EMS-suspected stroke patients instead of hospital-confirmed stroke patients to better align with WA state Key Performance Indicators 6.1 and 6.2 (reference: https://www.doh.wa.gov/Portals/1/Documents/Pubs/530189February2017.pdf).

| Resource Category | Performance Measure | Definition | 2019 Results |
|---|---|---|---|
| **Advanced Life Support (Paramedics)** | % that response time standards are met | Respond on average 10 minutes or less, 14 minutes or less, 80% of all calls | =<10 min. 78.2%<br>=<14 min. 94.4%<br>Mean time 8 min. |
| | 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 | 72% |
| | 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 | 84% |
| | Rate of scene time for trauma patients | % of trauma patients taken to Harborview Medical Center by paramedics with < 15 minutes ALS scene time | 43% |
| | Rate of successful first attempt intubations | % of successful first attempt intubations | 83% |
| **Regional** | Rate of cancelled enroute ALS calls | % of cancelled enroute ALS calls to all ALS calls | 24% |
| | % of calls where no upgrade or downgrade was needed | % of calls where ALS was not cancelled and not requested from scene | 55% |
| | Rate of ALS requests from scene | % of BLS requests for ALS from scene of all ALS calls | 21% |
| | # of paramedic hours above planned 2 paramedic staff per unit | # of paramedic hours above planned two (2) paramedic unit staffing | 544 hours |
| | Rate of satisfied customers | % of satisfied or very satisfied customers as reflected in survey results | Not available |

## Appendix E: EMS Division Contact Information

The EMS Division consists of four (4) sections and King County Medic One.

**Emergency Medical Services Division**
Public Health – Seattle & King County
401 Fifth Avenue, Suite 1200
Seattle, WA 98104
Website: http://www.kingcounty.gov/health/ems.aspx

Phone: (206) 296-4693
Fax: (206) 296-4866

**Administration Section**
Contracts
Finance
Strategic Planning

Phone: (206) 263-8549

**Community Programs Section**
Communities of Care Program
CPR/AED Training Programs
Emergency Medical Dispatch (EMD)
Injury Prevention - One Step Ahead Fall Prevention Program
Mobile Integrated Healthcare

Phone: (206) 263-1457

**Regional Quality Improvement Section**
Center for the Evaluation of EMS (CEEMS)
Regional Medical Control and Quality Improvement
Regional Data Collection and Analysis

Phone: (206) 263-8057

**Training and Education Section**
EMS Online
Basic Life Support Training
Advanced Life Support Training

Phone: (206) 263-8054

**King County Medic One**
20811 84th Avenue S., Suite 102
Kent, WA 98032

Phone: (206) 296-8550
Fax: (206) 296-0515

## Appendix F: EMS Fund 1190 Financial Plan

| | 2018 Actuals | 2019 Actuals |
|---|---|---|
| **BEGINNING FUND BALANCE (A)** | **44,345,357** | **43,676,824** |
| **REVENUES:** | | |
| Property Taxes | 76,185,694 | 78,085,547 |
| Grants | 306,134 | 314,217 |
| Charges for Services | 566,509 | 498,809 |
| Interest Earnings/Miscellaneous Revenue | 1,136,261 | 1,592,883 |
| **TOTAL REVENUES (B)** | **78,194,597** | **80,491,456** |
| **EXPENDITURES:** | | |
| Advanced Life Support Services | 47,997,154 | 48,929,725 |
| Basic Life Support Services | 17,671,236 | 18,492,862 |
| Regional Services | 9,098,884 | 9,846,540 |
| Strategic Initiatives | 1,639,115 | 1,413,693 |
| Regional CMT Units | 1,093,750 | 1,426,714 |
| BLS Core Services Support | 599,033 | 687,865 |
| Grants, Entrepreneurial & Donations | 828,204 | 734,784 |
| **TOTAL EXPENDITURES (C)** | **78,927,376** | **81,532,183** |
| **TOTAL REVENUES LESS TOTAL EXPENDITURES (D)** | ***(732,779)*** | ***(1,040,727)*** |
| **Other Fund Transactions (E)** | 64,246 | 374,797 |
| **ENDING FUND BALANCE (A+D+E=F)** | **43,676,824** | **43,010,894** |
| **RESERVES AND DESIGNATIONS** | | |
| Designations (including Program Balances) | (14,004,046) | (16,731,359) |
| Reserves* | (29,672,778) | (26,279,535) |
| **TOTAL RESERVES AND DESIGNATIONS (G)** | **(43,676,824)** | **(43,010,894)** |
| **ENDING UNDESIGNATED FUND BALANCE** | - | - |

*Refer to page 70 for additional details on reserves

# Appendix G: Ordinance 12849 – Evaluation of Countywide EMS

Louise Miller
Pete von Reichbauer
Rob McKenna
Dwight Pelz
Maggi Fimia
Greg Nickels
Larry Gossett
Cynthia Sullivan
Larry Phillips
Chris Vance

09/05/97 9:56 AM

Introduced By: **Jane Hague**

EMSrvw3/cgh/js/we

Proposed No.: 97-554

ORDINANCE NO. 12849

AN ORDINANCE directing the Executive to evaluate the provision of county-wide emergency medical services and to establish an EMS Financial Planning Task Force, and declaring an emergency.

PREAMBLE:

Emergency medical services are among the most vital services provided by the county to its residents. Since its initial development in 1977, the county's emergency medical services program has become a model for similar programs world-wide and is now a firmly established regional system on which citizens rely.

The county council fully supports the continued provision of this invaluable service and believes it should be afforded a long-term, stable funding source. The current, near total reliance on a six-year voter-approved levy puts the program's funding in regular jeopardy and connotes that the county considers it an optional program. Emergency medical services are among the county's most highly demanded and respected services and, because of the crucial, life-saving aid provided, are not considered optional. These services are critical and deserve a secure funding base that supports an appropriate level of service.

The county council is committed to researching more secure, permanent funding sources for this important program and, therefore, is directing that a Task Force be established to fully analyze potential funding alternatives. In addition, in order to help guide the development of this program, the county council is directing the executive to evaluate and pursue various means to better educate citizens on the use of emergency medical services as well as to report annually on various factors related to the provision of emergency medical services, including trends that might affect demand and financial estimates for the upcoming years.

BE IT ORDAINED BY THE COUNCIL OF KING COUNTY:

- 1 -

SECTION 1. Findings. Because the directives contained in this ordinance are so closely tied to the proposed emergency medical services levy as outlined in proposed ordinance 97-392, the county council finds it necessary to approve this ordinance in conjunction with proposed ordinance 97-392. Proposed ordinance 97-392 must be effective by September 19, 1997 in order to meet the deadline for the November 1997 ballot. Therefore, it is necessary to enact this ordinance as an emergency so that it may be effective at the same time as proposed ordinance 97-392.

SECTION 2. Annual Review. By September 1 of each year that the county-wide EMS levy is collected, the executive shall prepare and present to the council an evaluation of the following:

A. implementation status of the policies, plans and strategic initiatives included in the Emergency Medical Services Strategic Plan;

B. trends in the health care industry that might affect demand for emergency medical services, including, but not limited to, enrollment criteria for and service provided by the state's basic health plan;

C. emergency medical services provided to special populations including the elderly and citizens who are not fluent in english; and

D. estimated expenditure levels and revenue assumptions for the upcoming levy year and the associated levy rate.

SECTION 3. User Education. The executive shall evaluate whether specific population groups rely on emergency medical services for non-emergency health care, and shall develop and implement an educational outreach plan and materials designed to better inform citizens of the various health care options available to them other than emergency medical services. This evaluation and plan shall be presented to the county council in conjunction with the first annual review outlined in section 2 of this ordinance.

SECTION 4. EMS Financial Planning Task Force. The executive shall appoint a fifteen-member EMS financial planning task force, to be confirmed by the county council. This task force will work in cooperation with the EMS advisory committee recommended by the 1998-2003 Emergency Medical Services Strategic Plan.

A. By December 31, 1998, this task force will present to the county council an analysis of long-term funding alternatives that would allow the county to reduce its reliance on property tax levies to support emergency medical services.

B. This task force shall consist of the director of the Seattle-King County division of public health, the medical program director for the King County emergency medical services division, the director of the office of budget and strategic planning, the director of the department of finance, two representatives from the county council, 1 representative from each city within the county with a population over 50,000, two representatives from smaller cities appointed by the Suburban Cities Association, two fire district commissioners and two citizens-at-large from the unincorporated area.

12849

SECTION 5. Emergency. For the reasons set forth in section one of this ordinance, the county council finds as a fact and declares that an emergency exists and that this ordinance is necessary for the immediate preservation of public peace, health, or safety or for the support of county government and existing public institutions.

INTRODUCED AND READ for the first time this 8th day of September, 1997

PASSED by a vote of 13 to 0 on this 8th day of September, 1997

KING COUNTY COUNCIL
KING COUNTY, WASHINGTON

Chair

ATTEST:

Clerk of the Council

APPROVED this 8th day of September, 1997

King County Executive

Attachments: None

The Clerk of the King County Council does hereby certify that the attached is a true and correct copy of the original.

Witness my hand and official seal this 9th day of Sept. 1997

Clerk of the King County Council

By