King County EMS Community Medical Technician Pilot III
Final Evaluation Report

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Executive Summary

King County is recognized internationally as a leader in many aspects of prehospital medical care. Through the efforts of exceptionally well-trained telecommunicators, emergency medical technicians, and paramedics, King County provides crucial services throughout the region. Managing these resources efficiently enables the system to react and respond to various needs from the community. Over time, the broad array of 9-1-1 calls has extended well beyond life-critical incidents and quite often overlaps with social and behavioral health needs as well as the outflow of missed or incorrect interactions with the broader healthcare community. In this sense, EMS has become an even larger safety net for the community.

Over the course of multiple years and two Medic One/EMS Levy periods, the regional system has implemented successive iterations of the Community Medical Technician, or CMT, pilot program in order to test methods for managing the impact of low-acuity calls to the EMS system. Initially the pilots focused on improving efficiency of the BLS system by offloading low-acuity calls to a dedicated response CMT unit; later iterations also included the additional scope of identifying individuals with whom the CMT unit could interact longitudinally in order to make connections with community-based services or other health and social services.

The currently operating CMT Pilot III involves three CMT units that were introduced in a staggered manner starting in May 2015 and have been running concurrently since February 2016. The longest running unit is a partnership with the Puget Sound Regional Fire Authority FDCARES program. A second unit is led by the Shoreline Fire Department but additionally covers the response area of and has involvement from Bothell Fire and EMS and Woodinville Fire and Rescue. The most recently introduced unit is cooperatively operated and staffed by South King Fire and Rescue and Valley Regional Fire Authority. Each CMT unit is staffed with two individuals, though each unit has different staffing models. The FDCARES/CMT partnership unit is staffed by one firefighter/EMT and one nurse, the Shoreline-led North King County CMT unit is staffed ideally by two lead-CMTs or one lead-CMT and a pool firefighter/EMT, and the SKFR and VRFA CMT unit is cooperatively staffed by one firefighter/EMT from each agency.

In this evaluation report, a total of over 10,000 records were included in the analysis. The evaluation shows comparable age and gender breakdowns between cases and controls, with the average age of 61.1 years for cases and 57.6 years for controls, and 52.8% females for cases vs. 51.7% for controls.

Consistent with prior evaluations of the CMT Pilots, the three CMT units did show longer response times compared to the control BLS units, with a mean of 10:03 min:sec for the CMT units compared to a mean of

4:36 min:sec in the control group. The on-scene durations of the CMT units were longer than the control units, 23:37 min:sec vs. 18:06 min:sec, respectively. For the 3,583 cases reviewed in this report, a BLS unit was requested to the scene in 247 cases; en route 13 of these requests appear to have been cancelled and the BLS unit arrived in 234 cases (6.5%). An ALS unit was requested to the scene in 40 cases; en route 4 of those cases appeared to have been cancelled, resulting in 36 ALS units arriving on scene (1.0%).

Transportation data were difficult to consistently compare, largely due to the CMT agencies transitioning to the ESO electronic patient care record system at different times through the pilot project. This limited the ability to cross-compare the CMT units, with the only common timeframe being August through December of 2017. The ESO data do indicate that approximately 58% of the incidents resulted in the patient being left on scene and/or not transported. Similar to prior CMT pilots, a high proportion of the individuals who were transported were transported to an emergency department.

Consistent with the primary goal of responding to low-acuity medical 9-1-1 calls, the vast majority of the cases were dispatched at the low-acuity response levels of Y (2,611, 72.9%) and T (84, 2.3%). Additionally, the CMT units were dispatched on other response level calls, including 783 R calls (21.9%) and 45 M calls (1.3%). Further analysis is necessary to appropriately compare the initial dispatch codes due to the fact that during the course of the pilot an update to the King County Criteria Based Dispatch Guidelines was implemented at the two dispatch centers, NORCOM and Valley Communications.

Follow-up surveys with a subset of the individuals seen by the CMT units were conducted and show high satisfaction rates with the CMT response. The overall satisfaction rate, which includes both the responses for “very satisfied” and “satisfied,” for the CMT units was 97%, and was very similar to the overall satisfaction rate of the control group interviews, 98.9%.

An online survey available to responders staffing the CMT units was completed to in part identify the general safety concerns of the responders during 9-1-1 calls as well as gauge thoughts and impressions of the CMT pilot before and after their interaction with the program. The online survey has low overall participation, with 20 responses included in this report. Few safety concerns were noted by respondents, with 3 responses indicating they experienced a specific safety concern during a CMT call. Overall, there was generally positive thoughts and impressions of the program leading into their involvement of the program and this shifted to even more positive impressions following their involvement.

As general support of the CMT program has grown with successive iterations of the pilot, other programs have additionally been piloted in various fire departments to approach a similar population of 9-1-1 callers. Following multiple regional meetings, King County EMS agencies have supported the move to developing an overarching framework for both the CMT programs and other similar programs. These types of programs will be further developed under the umbrella term of Mobile Integrated Healthcare, MIH. The framework for these programs will be developed for potential inclusion in the next levy period.

Introduction

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 EMS system is managed by the King County Emergency Medical Services Division, and relies on complex partnerships with fire departments, paramedic agencies, EMS dispatch centers, and hospitals to make the program seamless and successful. As such, the EMS system provides an

incredibly important safety net for the public. As requests for assistance have increased, the EMS system has worked to refine and improve so that the needs of the community are met and the system maintains its ability to respond timely and effectively.

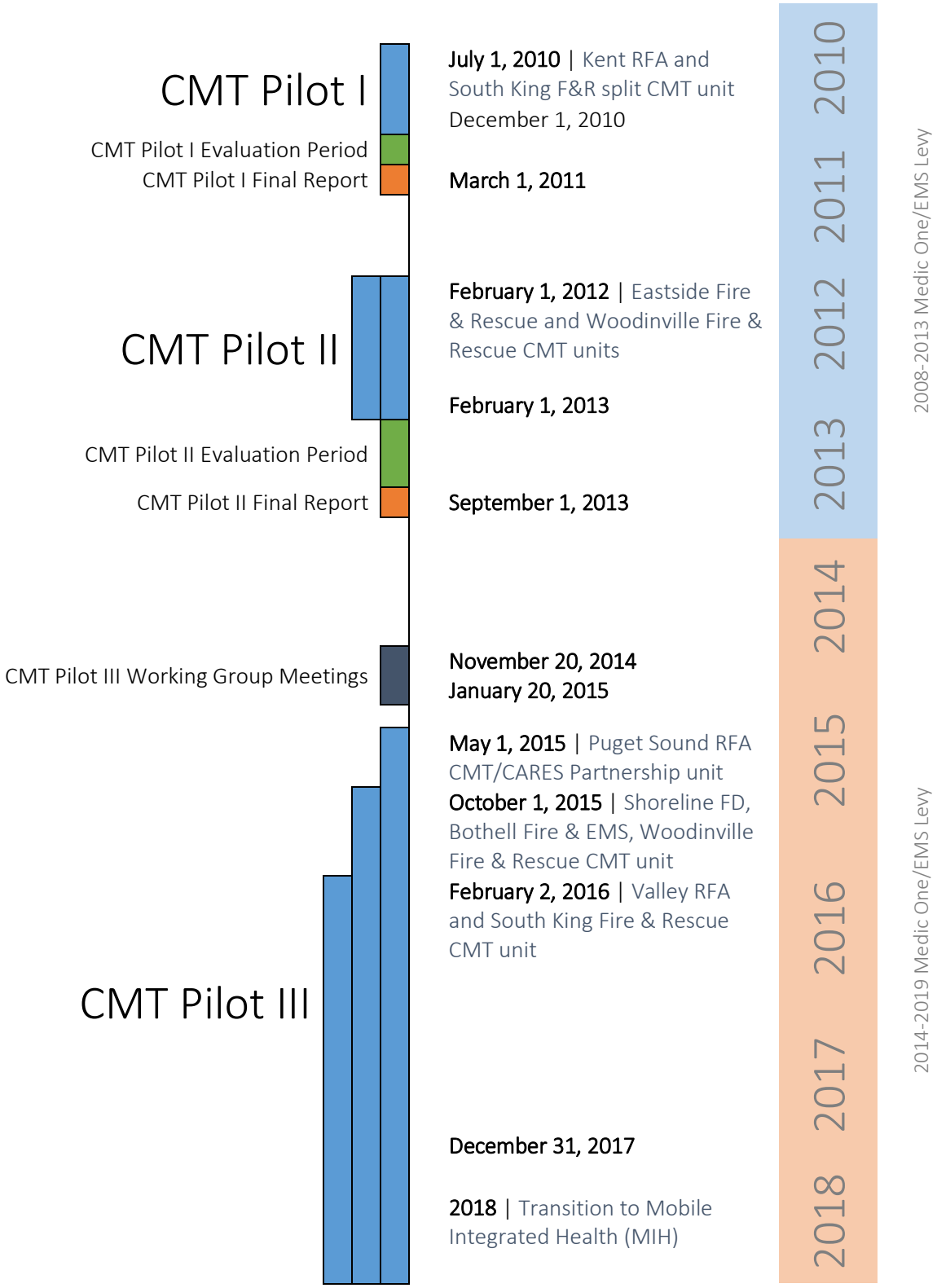
Background

The EMS system within King County has historically worked to provide the absolute best care to the community. This involves looking at opportunities to improve the efficiency and effectiveness of the response system to maximize the availability of response units for the most critical calls in the system. Beginning in the 2008-2013 Medic One/EMS Levy period, the Community Medical Technician (CMT) pilot has been one model by which King County has explored an opportunity to improve the system. The initial CMT pilot was focused on providing a proof-of-concept for an additional layer of response dedicated to low-acuity medical calls entering the 9-1-1 system. In the second CMT pilot, the scope was widened to also include longitudinal follow-up with certain 9-1-1 callers in attempt to reduce future reliance on the EMS system and instead work to improve coordination and connection to a variety of health and social services.

In the third CMT pilot, the regional system worked to implement units in high call volume areas of the County and attempt to have CMT units that cross jurisdictional boundaries in order to maximize the total available call volume by expanding the geographic coverage of each CMT unit. The first of the CMT units in Pilot III began in May, 2015, and is a partnership unit with Puget Sound Regional Fire Department's FDCARES program. The unit is called CARE71 and operates 24/7 with a two-person crew. Initially CARE71 was staffed with two firefighter/EMTs but after several months of operation the staffing model changed to one firefighter/EMT paired with a Registered Nurse (RN). The second CMT unit, called CMT63, is led by the Shoreline Fire Department but also extends into the response areas of Bothell Fire & EMS and Woodinville Fire and Rescue, under a program that was called the North King County CMT. Staffing of the unit was accomplished primarily by two lead CMTs; in total four lead CMTs were identified from the partnering agencies, and where necessary the CMT unit was operated with one of the lead CMTs along with a firefighter/EMT from a pool of responders who had been received CMT-specific training. The North King County CMT unit initially operated 12 hours per day for 7 days per week, but during the course of the pilot decreased the hours of operation and the operating days per week. The final CMT unit implemented in Pilot III was jointly operated and staffed by South King Fire and Rescue and Valley Regional Fire Authority and is called CMT36. Each agency contributes a firefighter/EMT to the unit each day and the unit operates for 12 hours per day, 7 days per week.

The following page highlights the major decision points and milestones of the CMT Pilot Projects that have operated in King County over the course of the last two levy periods. Most recently in late 2017, regional partners, including the three CMT-participating agencies, have started the work of transitioning the CMT concept into the broader vision of Mobile Integrated Health (MIH). As a developing concept, MIH includes utilizing EMS as a bridge between prehospital/crisis systems and a broad array of health and social services.

Timeline of CMT Pilot Projects and Major Decision Milestones in King County



Performance Measures

Regional partners met between late 2014 to early 2015 to develop a baseline set of metrics prior to launching the Pilot III CMT units. The following are the system measures and program measures decided upon by the group, as well as the various anticipated outcomes of the pilot.

System Measures

Metric	What it measures	Collection method	Definition	Baseline
Response time	Length of time to respond to 9-1-1 call	CAD data	Elapsed time from dispatch time to arrival time	CMT Pilot II: median response time of 13.9 minutes
On scene duration	Length of time spent with patient at the scene	CAD data	Elapsed time from arrival time to close time	CMT Pilot II: median on scene duration of 24.8 minutes
Requests from scene	CMT requests for assistance from scene	CAD data, Patient Care Reports	BLS request: requesting BLS unit for lift assist, transport, etc. ALS request: requesting ALS unit for paramedic assessment, transport, etc.	CMT Pilot II: - BLS request in 8.2% of CMT cases (13 for transport, 6 for other) - ALS request in 1.3% of CMT cases
Transports	Number of times patient was transported from scene	CAD data, Patient Care Reports	Transport includes BLS (fire), ALS (paramedics), private ambulance, private vehicle, and taxi	CMT Pilot II: 72 transports (31.2% of CMT cases), primarily by private ambulance and BLS (fire)
Transport destination	Distribution of destination locations for transported patients	CAD data, Patient Care Reports	Destinations include Emergency Department, Urgent Care, Primary Care Provider office or other clinic, Sobering Center, Detox Center, etc.	CMT Pilot II: 87.5% of transported patients sent to the Emergency Department
Referrals	Number of times the CMTs refer individuals to community resources	Patient Care Reports, custom reporting	Number of referrals attempted with be counted as well as those that were declined by the patients	CMT Pilot II: 45 accepted referrals and 9 declined referrals for a total of 54 attempted referrals
BLS unit availability	Availability of BLS units to respond to other 9-1-1 fire and medical emergencies	CAD data	Number of times a CMT was on a call, allowing a BLS first-due unit to respond to another 9-1-1 call	CMT Pilot II: 25 BLS responses when CMT was handling a low-acuity case
CMT unit utilization/ reliability	The percentage of the eligible CMT calls to which the CMT unit was dispatched	CAD data	Eligible CMT Initial Dispatch Codes include the “yellow” IDCs and dispatched “T” IDCs	Not previously measured

CMT role	CMT performs CMT role as the primary or secondary responder to a low-acuity call, as "extra hands" to a nearby critical call, or as a non-dispatched "special service" case	Patient Care Reports, CAD data	Number of times the CMT responded in the various CMT roles	CMT Pilot II: 231 cases as primary or secondary responder to low-acuity calls, 69 extra hands calls, and 61 special service calls, for a total of 361 CMT cases
Top dispatches by IDC	The types of responses to which the CMT unit is dispatched	CAD data	Frequency counts of Initial Dispatch Codes (IDCs) for CMT responses	CMT Pilot II: 24Y2 (47.6%), 17Y4 (11.3%), 1Y2 (3.5%)

Program Measures

Metric	What it measures	Collection method	Definition	Baseline
Patient satisfaction	Satisfaction of patients seen by CMTs across several components	Interview	Components of satisfaction include overall satisfaction, response time satisfaction, and on scene duration satisfaction	CMT Pilot II: 97.9% satisfied or very satisfied with overall care and information provided
Special service	Utilization of the Special Services CMT Role	CMT Log	Number of times the CMT engaged with individuals in non-dispatched "Special Services" role as part of follow-up after a 911 call	CMT Pilot II = 61 Special Service cases (16.9% of the 361 CMT Role Cases)
CMT safety	General measure of CMT safety concerns during 911 responses	Interview	Percent of CMTs who encountered a specific safety issue during a CMT response	CMT Pilot II = 20.0% of CMTs identified specific safety issue (dog on scene, gun on scene, etc.)
CMT thoughts and impressions	How CMTs view the overall benefits and utility of the program	Interview	Initial thoughts and impressions scores compared to thoughts and impressions scores at major program marks (1-year, 2-year, etc.)	CMT Pilot II - Woodinville: 23% positive or very positive before, 12% after - Eastside F&R: 39% positive or very positive before, 85% after

Outcomes

Outcomes of Base CMT Model

Provide cost efficiencies by reconfiguring response to low-acuity medical 9-1-1 calls.

- Calculate savings "per call," CMT response vs. non-CMT (baseline) response
- Calculate savings achieved by referring appropriate individuals to non-emergency department locations

- Calculate savings achieved by transporting individuals by taxi, private vehicle, or other non-traditional EMS transport option

Increase availability of BLS resources for higher-acuity medical and fire responses
- Increase "in service" availability percentages for aid cars and engines
- Calculate time savings in responses to which CMT allows first-due BLS resource to be available for response

Provide alternative response to low-acuity medical 9-1-1 calls while providing patient satisfaction at or above non-CMT responses
- Patient interviews to determine satisfaction levels on a Likert Scale in the following categories:
    - Overall Care and Information Provided
    - Time Spent On Scene with Patient
    - Response Time

Outcomes provided via partnerships

Provide a method for identifying and assisting "repeat request customers" that heavily impact the EMS system
- Increase referrals to programs that aim to assist these individuals
- Decrease utilization rates of individuals that heavily impact the EMS system

Refer appropriate individuals to community health, mental, and social resources to improve their connection to, coordination with, and experience with needed health care.
- Increase number of partnering community health, mental, and social resources that agree to accept CMT referrals and engage with patients
- Increase number of referrals to eligible individuals
- Promote follow-through on referral activities via guided conversations with patients

Outcomes of CMT Program

Provide training to appropriately prepare CMTs for tasks and responsibilities encountered while on duty
- Develop a curriculum to improve skills on referring individuals to appropriate resources, identify barriers to health and accessing resources, and assisting individuals in navigating to appropriate healthcare settings

Results

This report includes analyses drawn from three datasets. An internal-to-King County EMS database incorporated the individual CMT unit data with the original dispatch information from Computer Aided Dispatch (CAD) systems at the two primary public safety answering points (PSAPs) that dispatched the three CMT units, Valley Communications in Kent, WA, responsible for dispatching the CARE71 and CMT36 units, and North East King County Regional Public Safety Communications Agency (NORCOM), responsible for dispatching the CMT63 unit. The second database utilized is the King County EMS "paperMIRF" database, a data repository for the patient care records for the emergency responses throughout King County. With the widespread adoption of the singular electronic patient care record system ESO by the EMS agencies in King County through the period of 2015 through 2017, the third database is drawn primarily from the ESO records from participating agencies.

Complicating the analysis is that the three participating agencies moved to ESO at different times through the pilot reporting period. A singular database to keep track of the data could not be achieved, and therefore cross-comparisons between the CMT units is limited. The following tables, 1 and 2, outline the demographic information of individuals seen during Pilot III and select measures of overall system performance.

Demographics

Table 1. Demographics of individuals seen during Pilot III

	Case	*Control*
Age, mean	61.1 years	57.6 years
CARE71	*59.7 years*	*51.0 years*
CMT63	*65.0 years*	*66.5 years*
CMT36	*65.5 years*	*60.0 years*
Sex, percent female	52.8%	51.7%
CARE71	*51.9%*	*50.5%*
CMT63	*54.7%*	*52.1%*
CMT36	*56.4%*	*54.0%*

System Measures

Table 2. Specified measures for overall system performance

	Case	*Control*
Response Time, mean HH:MM	10:03	4:36
CARE71	*9:37*	*4:25*
CMT63	*8:34*	*4:49*
CMT36	*14:12*	*4:46*
On Scene Duration, mean HH:MM	23:37	18:06
CARE71	*23:39*	*16:59*
CMT63	*25:29*	*21:46*
CMT36	*21:23*	*16:27*
Requests from Scene, number (%)	270 (7.5%)	N/A
BLS, arrived on scene	*234 (6.5%)*	
ALS, arrived on scene	*36 (1.0%)*	
Transports (from ESO, during common timeframe of 8/17 to 12/17)	N=1,597	
No Transport	*923 (57.8%)*	
BLS, fire based	*47 (2.9%)*	
BLS, private ambulance	*527 (33.0%)*	
ALS, paramedic	*32 (2.0%)*	
POV	*55 (3.4%)*	
Other (taxi, police, etc.)	*13 (0.8%)*	
Transport Destination (from ESO, during common timeframe of 8/17 to 12/17)	N=674	
Hospital, All CMT	*621 (92.1%)*	
Hospital, CARE71	*367*	
Hospital, CMT63	*23*	
Hospital, CMT36	*231*	
Referrals	Available via sub-reports	
BLS Unit Availability	Data unavailable or unreliable	

	CMT Unit Utilization/Reliability	Illustrated in Figures 1-6	
	Primary or Secondary Role, number (%)	3,583 (43.0%)	4,751 (57.0%)
	CARE71	*2,658 (51.8%)*	*2,475 (48.2%)*
	CMT63	*483 (28.4%)*	*1,218 (71.6%)*
	CMT36	*442 (29.5%)*	*1,058 (70.5%)*
	Extra Hands, number (%)	27 (100%)	N/A
	CARE71	*N/A*	
	CMT63	*27 (100%)*	
	CMT36	*N/A*	
	Follow-up Visits, number (%)	1,699 (100%)	N/A
	CARE71	*1,398 (100%)*	
	CMT63	*215 (100%)*	
	CMT36	*86 (100%)*	
	Top Dispatches by IDC Level		
	Y, number (%)	*2,611 (72.9%)*	*4,182 (88.0%)*
	T, number (%)	*84 (2.3%)*	*481 (10.1%)*
	R, number (%)	*783 (21.9%)*	*59 (1.2%)*
	M, number (%)	*45 (1.3%)*	*0 (0%)*
	Other, number (%)	*60 (1.6%)*	*29 (0.6%)*

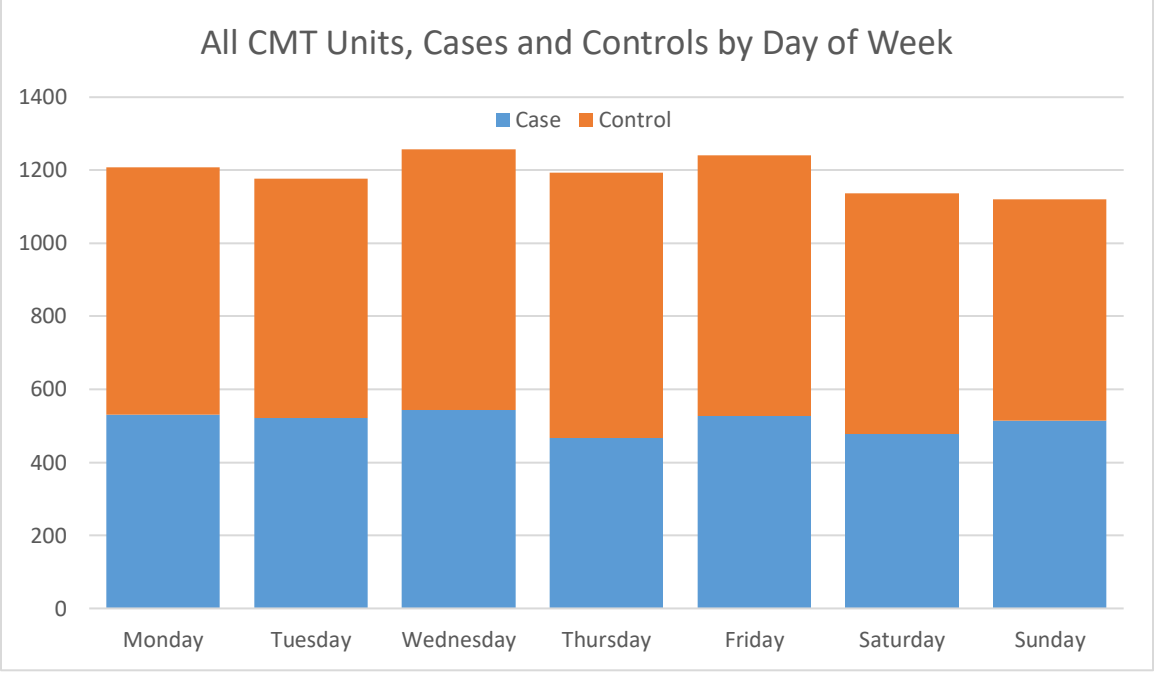


Figure 1. Distribution of cases and controls by day of the week, all CMT units

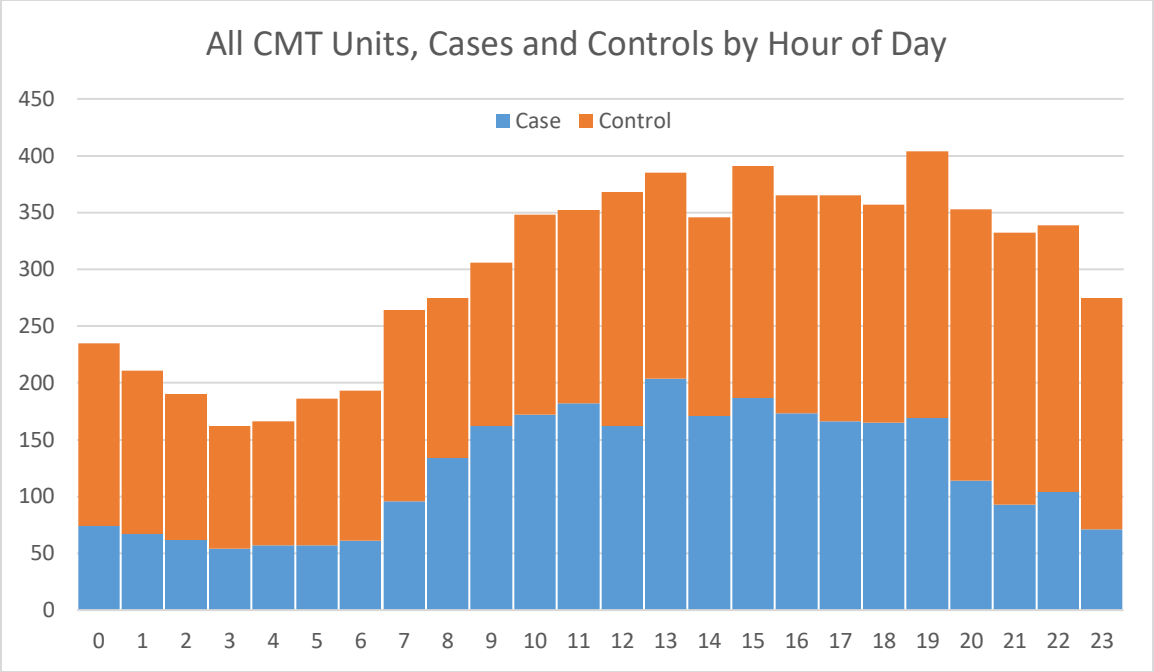


Figure 2. Distribution of cases and controls by hour of day, all CMT units

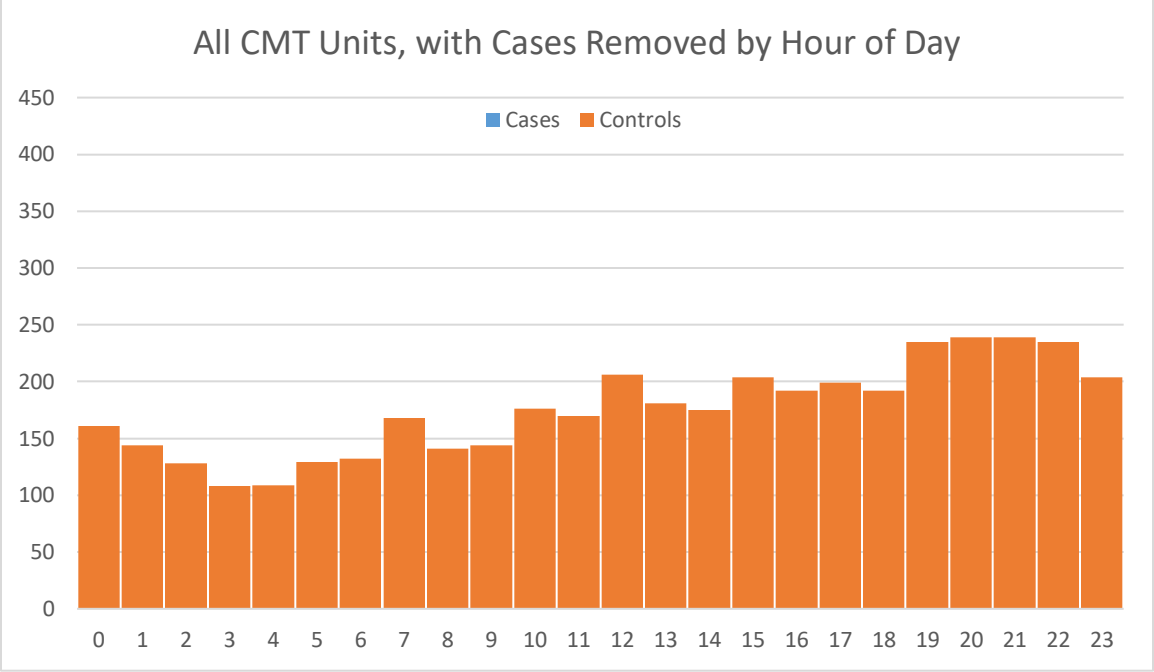


Figure 3. Distribution of controls by hour of day, with cases removed, for all CMT units

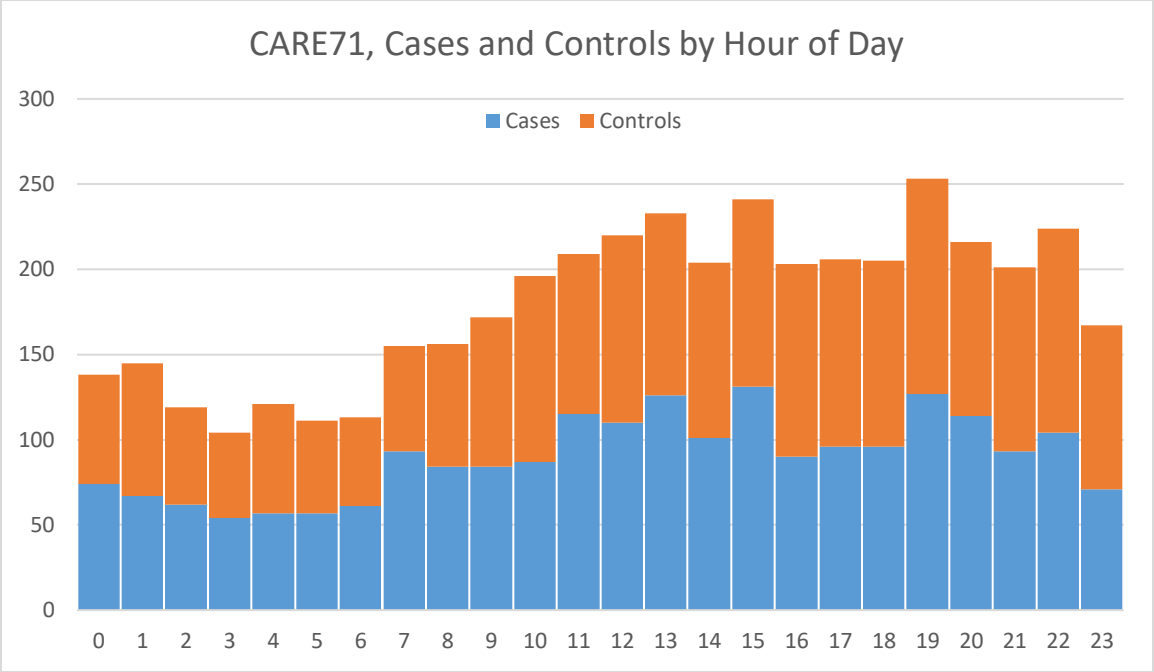


Figure 4. Distribution of cases and controls by hour of day, CARE71 unit only

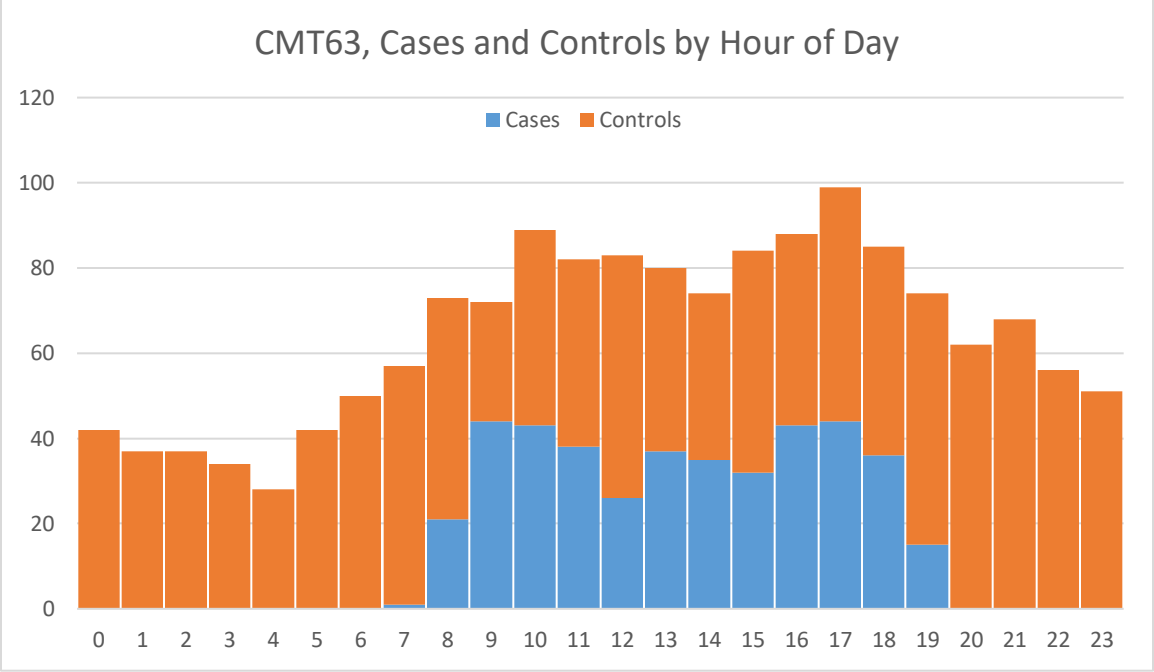


Figure 5. Distribution of cases and controls by hour of day, CMT63 unit only

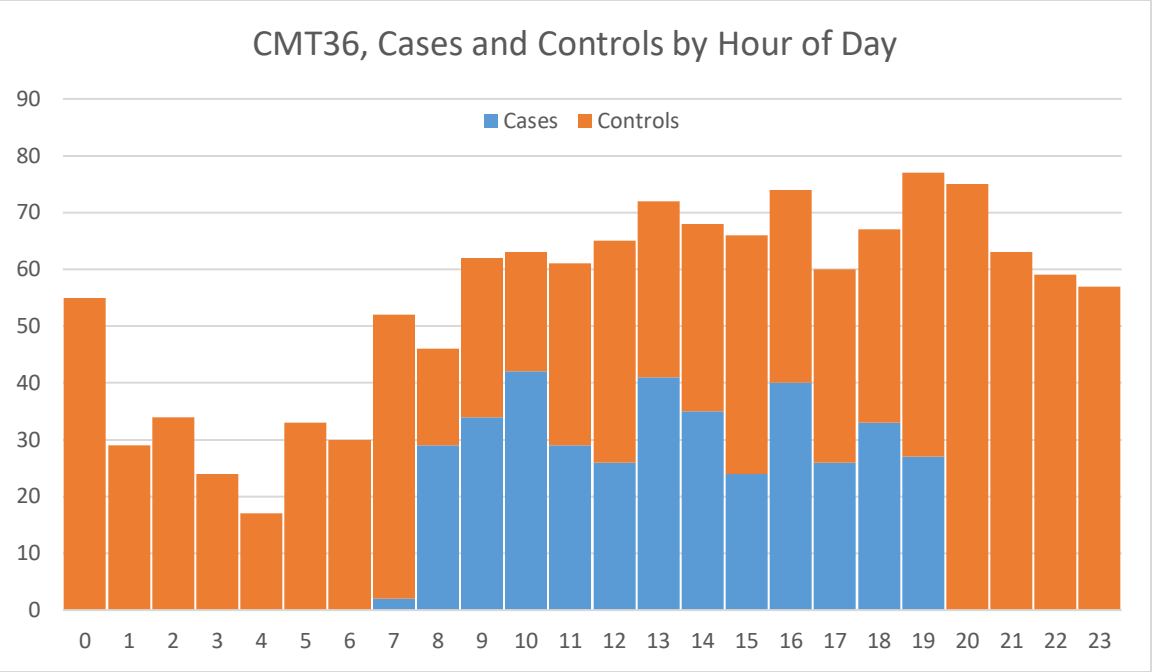


Figure 6. Distribution of cases and controls by hour of day, CMT36 unit only

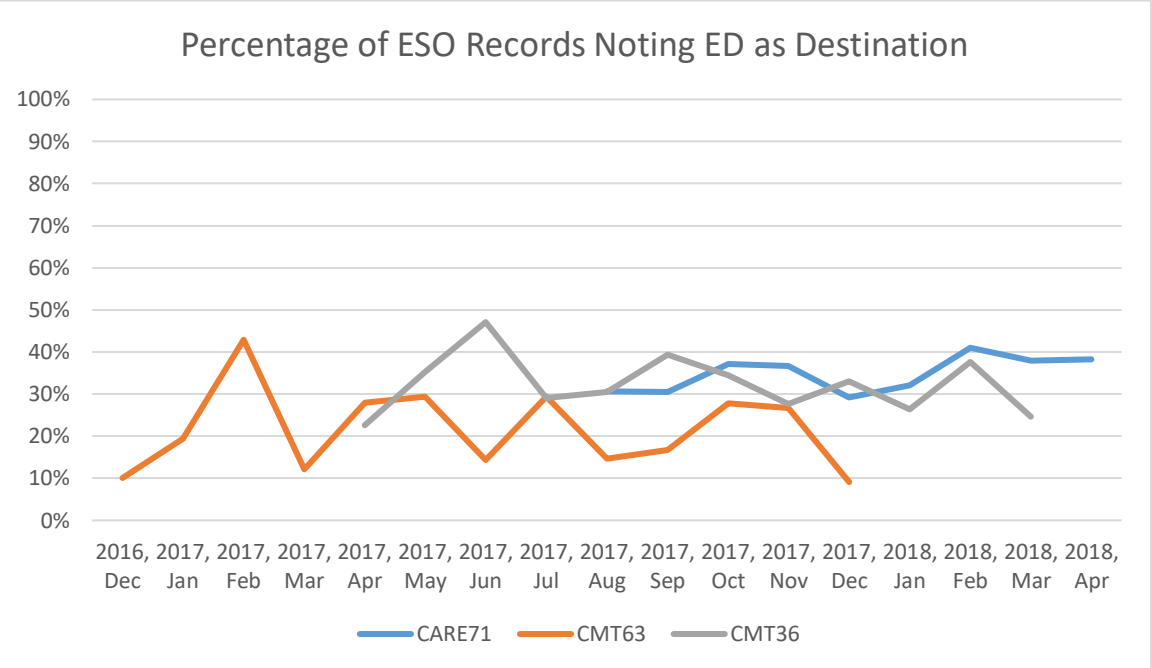


Figure 7. Percentage of ESO records listing emergency department as destination, over time by unit

In Figure 1, there is little variation in the distribution of cases and controls by day of the week, and furthermore there is no variation in the percentage split between cases and controls by day of week. Overall, there are slightly more total records (cases and controls) on each weekday compared to the weekend days. As expected, there is greater variation in the cases and controls by time of the day, shown in Figure 2. A large increase in the

number of total records occurs during the middle portion of the day, with overnight having fewer total incidents. One interesting visual is to remove the cases by time of day, which effectively shows the "burden" of handling low-acuity 9-1-1 calls by the BLS units; Figure 3 shows the temporizing impact the CMT units has on the low-acuity call load to BLS units. This is an interesting analysis to include as this does support one of the foundational goals of the CMT program – to offload the burden of low-acuity calls to a dedicated resource, therefore allowing BLS units to handle other (likely higher acuity) 9-1-1 incidents.

For each of the CMT units, Figures 4, 5, 6 show the effective "capture rate" of the calls by the CMT unit throughout the day. CARE71, shown in Figure 4, is the only 24-hour unit, and as expected the other two units, in Figures 5 and 6, respectively, are in service largely during the hours of day resulting in the most overall low-acuity calls to 9-1-1, again showing the impact of offloading these types of calls to a dedicated resource.

In Figure 7, the percentages of the ESO records indicating a transportation destination of the emergency department is shown by CMT unit. As the ESO implementation date was variable for each unit, a direct cross-comparison is limited to only the short duration of available date for all 3 units, approximately August through December of 2017. During this time, and for time before and afterwards where applicable, the average percentage of ESO records transported to the ED is approximately 30%. The majority of the other records are left on scene or no transportation noted, with a small portion of the calls resulting in transportation to other locations including medical offices, urgent care facilities, or police stations.

Patient Satisfaction Interviews

A subset of the records were identified as eligible for a follow-up interview by King County EMS staff. The interviews were not performed on instances involving minors (under 18 years old), instances involving law enforcement officers, or instances coded as involving a mental or behavioral crisis as the chief complaint. In total, 772 interviews were attempted. If not reached on the first call, up to 6 attempts were made by staff, resulting in a total 1,789 calls made during the course of the pilot (average of 2.3 calls per interview). Of the 772 interviews, 343 (response rate of 44.4%) were completed with all (313, 91.3%) or some (30, 8.7%) of the questions answered. Eight of the completed interviews were subsequently removed from analysis as they were found to have not met initial eligibility criteria, resulting in a final 335 responses included in the analysis and a final response rate of 43.4%. For partial-response interviews, none were excluded from analysis included in this preliminary report as the questions not answered did not impact any metric or measurement in this report.

Table 3. Demographics, patient interviews

		Case	*Control*
	Age, mean	69.9 years	70.5 years
	Sex, percent female	60.5%	65.3%
	Hispanic, percent	5.6%	2.6%
Race	White	84.4%	75.9%
	Black	3.1%	11.8%
	Asian	5.5%	3.1%
	American Indian/Alaskan Native	2.3%	3.1%
	Native Hawaiian or Other Pacific Islander	0%	0%
	Other	2.3%	2.1%
	Declined to Answer	2.3%	4.1%

As shown, the demographics of the interviewed individuals were slightly older and slightly more female compared to the demographics of the overall cases and controls of Pilot III.

Table 4. Overall satisfaction rates, by cases vs. controls for each CMT unit and by totals. Weighted satisfaction score formula provided in Appendix A.

N=322 (13 missing)		*Very Satisfied*	*Satisfied*	*Neutral*	*Dissatisfied*	*Very Dissatisfied*	*Weighted Satisfaction Score*
Cases	CARE71	72 (83.7%)	10 (11.6%)	2 (2.3%)	2 (2.3%)	0 (0%)	90.7
	CMT63	28 (96.6%)	1 (3.4%)	0 (0%)	0 (0%)	0 (0%)	98.9
	CMT36	15 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	100
	Total	**115 (88.5%)**	**11 (8.5%)**	**2 (1.5%)**	**2 (1.5%)**	**0 (0%)**	**93.6**
Controls	CARE71	55 (80.9%)	11 (16.2%)	1 (1.5%)	1 (1.5%)	0 (0%)	91.2
	CMT63	97 (96.0%)	4 (4.0%)	0 (0%)	0 (0%)	0 (0%)	98.7
	CMT36	22 (95.7%)	1 (4.3%)	0 (0%)	0 (0%)	0 (0%)	98.6
	Total	**174 (90.6%)**	**16 (8.3%)**	**1 (0.5%)**	**1 (0.5%)**	**0 (0%)**	**96.0**

Nearly identical high satisfaction ratings were observed when satisfaction was focused on elements of the overall EMS interaction, including how long it took for crews to arrive (95.6% vs. 98.5%, cases vs. controls respectively) and for how long crews stayed on scene (93.4% vs. 96.9%, cases vs. controls respectively).

Responder Survey

A survey following the CMT Pilot III was completed, allowing anonymous feedback across a variety of elements from the pilot. While overall participation was low (20 completed responses), the feedback is valuable to include in this evaluation report.

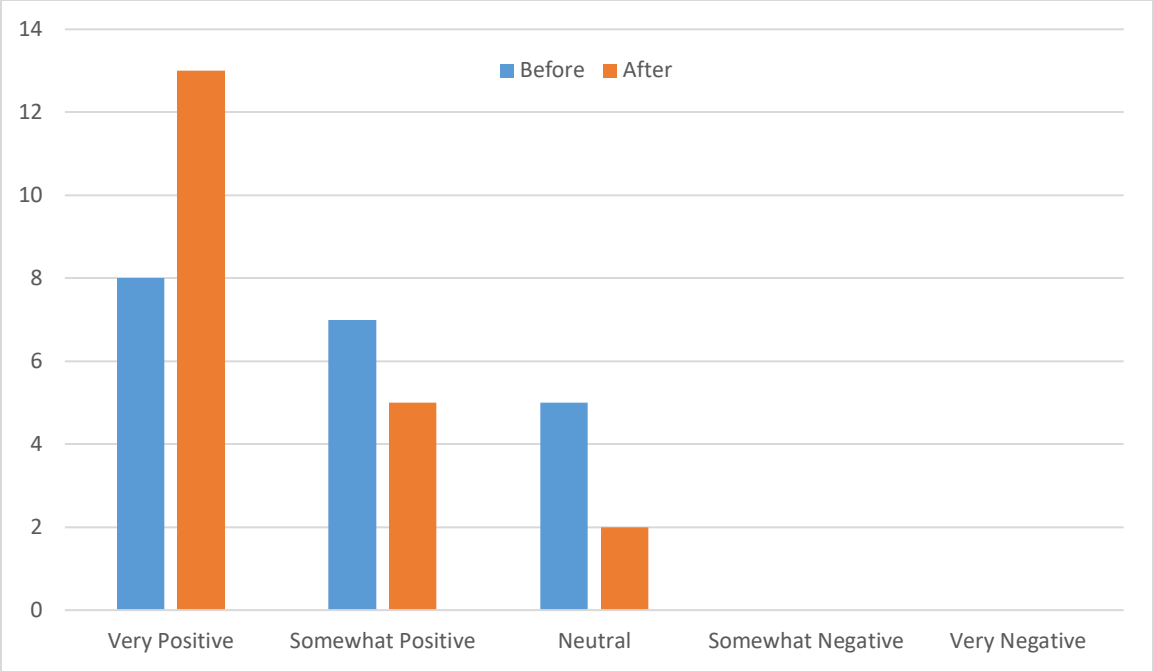


Figure 8. Thoughts and impressions of the CMT program before and after involvement as a responder

Additionally, respondents to the survey noted that when responding to the low-acuity incidents as the CMT unit, they found the CMT response to be appropriate either always (9, 45%) or usually (11, 55%), and therefore the respondents did not feel the CMT response was ever inappropriate. The survey asked respondents to note particular positive and negative experiences while staffing the CMT unit, and these can be found in appendix B. In summary, some of the positives included themes of being able to address longer-term issues and connect people with various resources, while for negative experiences in general the theme was that many of the respondents did not have any negative experiences or had Zone-specific negative experiences (limitations of dispatching the CMT63 unit in Zone 1 due to rapid dispatch).

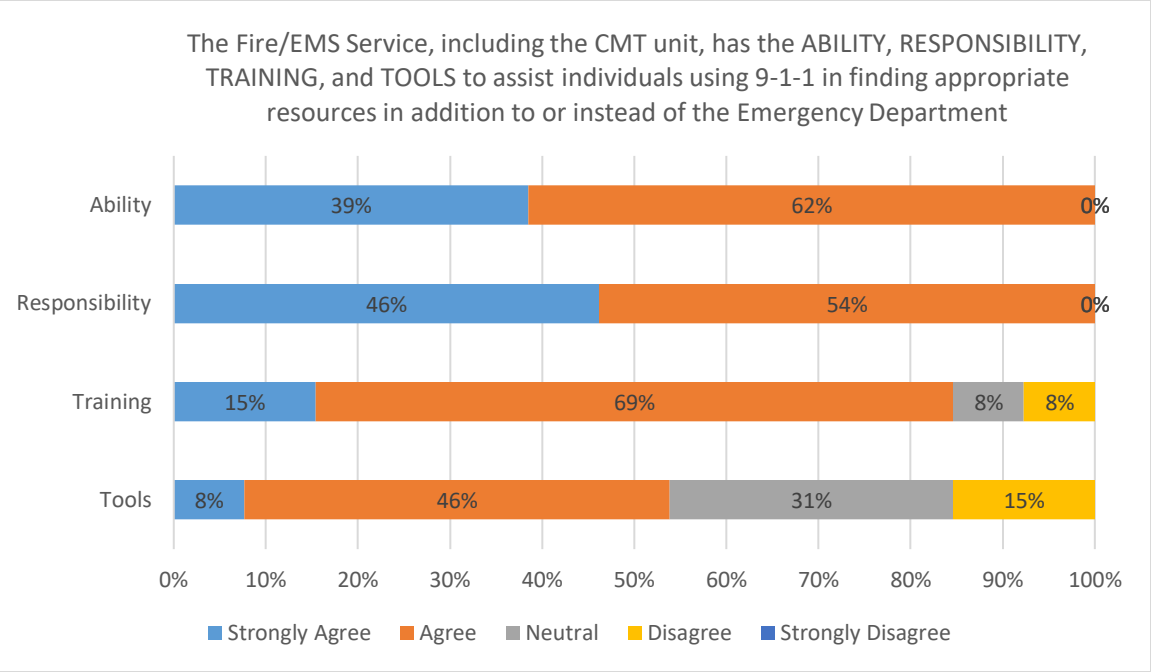


Figure 9. Degree of agreement with a statement on the purpose of CMT providing resources to individuals

The above figure illustrates that overall the respondents agree that the EMS service has the ability and responsibility to assist individuals using 9-1-1 in finding appropriate resources in addition to or instead of the Emergency Department; however, there is less agreement that they have the right training or tools to accomplish this task.

Discussion

There are several notable barriers not otherwise reflected in the data or analysis. One of the barriers for the North King County CMT unit was the effect of rapid dispatch on the total number of calls to which the CMT unit was successfully dispatched. While undoubtedly rapid dispatch maintains a significant benefit for responding to critical calls, the process is a hindrance to the overall success of identifying the CMT unit as an eligible unit for the 9-1-1 call early in the call. Due to the process in place, the CMT unit was added to the call after another BLS unit had already been dispatched on the call. Without significant structural changes to the dispatching process, efforts in EMS agencies operating within the NORCOM dispatch area are likely to see greatest benefit in programs operating from the primary perspective of identifying individuals and following-up on their needs to identify long-term solutions and connecting them with other health and social systems.

One other significant barrier that is outside of the direct control of EMS is the widespread availability of facilities and resources for navigating patients away from the Emergency Department at the time of the call. Without easily accessible services that are available locally and at the time of the 9-1-1 call, efforts to significantly reduce the number of 9-1-1 calls transported to the ED will be at a disadvantage. To partially address this, the State of Washington applied for and was awarded a Medicaid Transformation Demonstration Project that will incentivize significant structural changes to the health and social landscape in King County and across Washington State over the course of the five-year demonstration between 2017-2022. To assist with this fundamental structural change, EMS should participate in the process and work to deepen connections with health and social services.

In King County, this means greater working relationships with behavioral health providers, urgent care facilities, clinics with walk-in or just-in-time appointments, crisis diversion facilities, sobering clinics, federally-qualified health centers, and, additionally, working with a greater number of allied health professionals, including nurses, social workers, community health workers, behavioral health specialists, pharmacists, among many others.

Conclusion

The EMS system is a foundational, fundamental partner in the overall healthcare system. As such, the linkages are many for the EMS system to be included in the context of the overall health and social system. It is because of these cross-linkages and interdependencies that EMS should be considered fundamental to the overall objective of creating a collaborative system to transform the way we deliver care to individuals throughout King County.

This evaluation illustrates the potential impact that the CMT units had on call-demand – particularly during peak mid-day hours where calls for BLS services increases. This mitigation is an important element of the initial concept and aim of the CMT program as a low-acuity management resource. This is best illustrated by the call volume leveling seen when removing the low-acuity calls handled by the CMT units throughout the three response areas covered by the CMT units. Additionally, the CMT units were able to maintain a high level of patient satisfaction, which is an important element to consider when introducing a change to the broader EMS system. Apart from patient satisfaction it is also important to have buy-in and the positive experience from the responders participating in the program. Certainly not all experiences can be positive, however, the return surveys were generally positive and illustrated that this type of response and connection work is something the responders wish to do and feel they are capable of doing. While they rated having the training and tools lower, this does point to the fact that EMS is a part of the broader healthcare spectrum.

Of particular note for this Pilot III project and the evaluation, consistency of a data source was not achievable. As electronic patient care record systems changed for each of the CMT units during the course of the pilot project period, there was significant difficulty in finding common data elements in order to develop and report the metrics throughout the entire span of operation for each CMT unit. Therefore, great caution should be taken in reviewing the metrics in this report. Due to this, one recommendation is to identify a common recording platform for data as the CMT program transitions into MIH, as ESO is likely insufficient to gather data on elements outside of the traditional EMS response, such as follow-up calls and longitudinal activities resulting in referrals to other agencies and organizations.

Acknowledgements

King County EMS is comprised of an astounding number of committed individuals all working towards providing exceptional prehospital care to the broad community. Within the King County EMS Division, the authors would like to thank Linda Culley (retired, 2016), Mary Alice Allenbach, and Lindsey Hergert for their time and contributions to the project. Within partnering agencies, the authors would like to thank John Nankervis, Assistant Chief, Shoreline Fire Department; Jodi Denney, Lead CMT, Shoreline Fire Department; Mitch Snyder, Division Chief, FDCARES, Puget Sound Regional Fire Authority; Kevin Olson, Assistant Chief, Valley Regional Fire Authority; Melina Kuzaro, EMS Captain, Valley Regional Fire Authority; and Jeff Bellinghausen, Captain, South King Fire and Rescue, for their time and contributions on the project.

Appendix A.

Methodology for "Weighted Satisfaction Score"

Very Satisfied = 3, Satisfied = 2, Neutral = 1, Dissatisfied = -1, Very dissatisfied = -2, Other = Not scored

Formula: Sum of (count, very satisfied * 3) + (count, satisfied * 2) + (count, neutral * 1) + (count, dissatisfied * -1) + (count, very dissatisfied * -2)) divided by (total of counts)) divided by maximum scale score (3)

Table A1. Overall satisfaction rates, by cases vs. controls for each CMT unit and by totals

N=322 (13 missing)		*Very Satisfied*	*Satisfied*	*Neutral*	*Dissatisfied*	*Very Dissatisfied*	*Weighted Satisfaction Score*
Cases	CARE71	72 (83.7%)	10 (11.6%)	2 (2.3%)	2 (2.3%)	0 (0%)	90.7
	CMT63	28 (96.6%)	1 (3.4%)	0 (0%)	0 (0%)	0 (0%)	98.9
	CMT36	15 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	100
	Total	**115 (88.5%)**	**11 (8.5%)**	**2 (1.5%)**	**2 (1.5%)**	**0 (0%)**	**93.6**
Controls	CARE71	55 (80.9%)	11 (16.2%)	1 (1.5%)	1 (1.5%)	0 (0%)	91.2
	CMT63	97 (96.0%)	4 (4.0%)	0 (0%)	0 (0%)	0 (0%)	98.7
	CMT36	22 (95.7%)	1 (4.3%)	0 (0%)	0 (0%)	0 (0%)	98.6
	Total	**174 (90.6%)**	**16 (8.3%)**	**1 (0.5%)**	**1 (0.5%)**	**0 (0%)**	**96.0**

Table A2. Satisfaction with time to arrival

N=330 (5 missing)		*Very Satisfied*	*Satisfied*	*Neutral*	*Dissatisfied*	*Very Dissatisfied*	*Weighted Satisfaction Score*
Cases	CARE71	73 (80.2%)	14 (15.4%)	2 (2.2%)	2 (2.2%)	0 (0%)	89.7
	CMT63	28 (96.6%)	1 (3.4%)	0 (0%)	0 (0%)	0 (0%)	98.9
	CMT36	15 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	100
	Total	**116 (85.9%)**	**15 (11.1%)**	**2 (1.5%)**	**2 (1.5%)**	**0 (0%)**	**92.8**
Controls	CARE71	59 (84.3%)	9 (12.9%)	0 (0%)	1 (1.4%)	1 (1.4%)	90.5
	CMT63	99 (97.1%)	2 (2.0%)	0 (0%)	1 (1.0%)	0 (0%)	97.7
	CMT36	21 (91.3%)	2 (8.7%)	0 (0%)	0 (0%)	0 (0%)	97.1
	Total	**179 (91.8%)**	**13 (6.7%)**	**0 (0%)**	**2 (1.0%)**	**1 (0.5%)**	**95.0**

Table A3. Satisfaction with time spent on scene

N=321 (14 missing)		*Very Satisfied*	*Satisfied*	*Neutral*	*Dissatisfied*	*Very Dissatisfied*	*Weighted Satisfaction Score*
Cases	CARE71	70 (78.7%)	16 (18.0%)	3 (3.4%)	0 (0%)	0 (0%)	91.8
	CMT63	25 (92.6%)	2 (7.4%)	0 (0%)	0 (0%)	0 (0%)	97.5
	CMT36	14 (93.3%)	1 (6.7%)	0 (0%)	0 (0%)	0 (0%)	97.8
	Total	**109 (83.2%)**	**19 (14.5%)**	**3 (2.3%)**	**0 (0%)**	**0 (0%)**	**93.6**
Controls	CARE71	52 (78.8%)	12 (18.2%)	0 (0%)	1 (1.5%)	1 (1.5%)	88.4
	CMT63	97 (96.0%)	2 (2.0%)	0 (0%)	2 (2.0%)	0 (0%)	96.0
	CMT36	23 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	100
	Total	**172 (90.5%)**	**14 (7.4%)**	**0 (0%)**	**3 (1.6%)**	**1 (0.5%)**	**93.9**

Appendix B.

What positive experience(s) did you have while staffing the CMT unit?

- To see long term tax paying citizens that only needed help up. Knowing we were there with smiles and happy to help. After all they paid taxes for many years.
- Being able to minimize repeat callers, following up on incidents to address any long term needs
- Assisting the elderly and providing information on many different options available
- work along side of vrfa firefighters to trouble shoot problems and help people to get what they need.
- See how it worked
- Working with Jodi Denney was excellent. She is made for this job and hopefully she can continue to improve the program as she has.
- Referring patient to King county services I did not know existed
- freeing up BLS units for more emergent calls 2) ALL of the four leads were VERY committed to the program
- helping elderly fall Patients
- help patients find more long term solutions to their health challenges
- There was a definite need for some level of low acuity support for our general population. Most individuals were grateful for your help.
- Could spend significant time with patients, discussing treatment options. If I was on a BLS unit, we would have spend 15 minutes and sent them to a hospital ER, which may hot have helped them.
- The time to get to know patients and understand their situations. Also, a greater understanding of community resources.
- While working the CMT unit, I saw a gap in the system that I had never seen before. It was a positive experience to see the way the CMT unit is able bridge the gap and provide care and resources to people who would otherwise slip through the cracks.
- Learning the CMT role outside of the immediate call.
- Attending a meeting to bring together people and resources from different agencies to help someone. Visiting people who need services to check in on them.
- Helping people that didn't know how to begin getting help. They didn't know where to start. Also helping their families find help for their loved ones.
- Too many to name; helping people do the little things that equate to big things; often in elderly.
- Opened my eyes to a significant need we have in our communities. There are so many vulnerable adults/people in our communities that just get ignored, are off the radar, that desperately need help, and don't receive it. We also had so many individuals that were abusing/overusing the 911 system that we were able to connect to services that greatly reduced the number of times they would call 911.

What negative experience(s) did you have while staffing the CMT unit?

- The people who you see that aren't going to help themselves and expect us to take carte of very need. We then become their care givers instead of solving their own needs.
- I thought it was a waste of resources (money) when both positions were fill in positions and not staffed by regular folks.
- some people you just can't help
- None
- Being on a call for two hours and having to use the restroom.
- sometimes the Human condition is Bad
- none
- none

- Limitations of our resources. For instance, homeless crisis. Also, did not feel current rig was right for transport.
- Canceled in route numerous times because the BLS crew was already inroute due to rapid dispatch. Recommend changing dispatch protocol to cancel BLS unit, even if CMT is 20 - 30 minutes out.
- The time it takes for a CMT unit to arrive on scene compared to the time it would take the closest BLS unit to arrive. It doesn't seem like saving a BLS unit 5-10 minutes per call really does do much to change our system wide resource availability.
- I did not have any negative experiences.
- None
- None.
- I would say when the elderly patients you came to know and care for died.
- Zero
- Literally, some of the grossest calls in my career happened on the CMT unit (sorry that's the first thing that came to mind). Tough question as part of our job is going to be negative just by the nature of what we do, but I would say some of the politics that go into these type of programs. I know I got frustrated a few times about decisions that were made that effected our program that were not the best choice but necessary for "political reasons". Sometimes you have high level chiefs in meetings making decisions that the CMT is not invited to attend making decisions that might look good on the surface, but are not best for the program. For example, my partner before I retired, should be in every meeting that occurs. She is awesome, knowledgeable, articulate, and knows this program better than anyone in our organization. She should have input in every decision that is made, or at least heard before a Chief that just has a ten thousand foot overview of the program, that effects what is going on at ground level. One of the other negatives that comes to mind is that we had to big of an area to cover. Thank God Woodinville does not have the same demographics that Shoreline has because there would have been many times a patient would have had to wait entirely too long for us to arrive. Not all "non emergency" calls are created equal and some patients should not have to wait as long as they did for assistance. Lastly, and this is not a CMT issue, but a State and Federal issue. The roadmap our vulnerable adults/individual need to go down to get help in our social system is incredibly confusing and complicated. One of our jobs was to connect these vulnerable individual to social services, and it was confusing and complicated for us. No wonder so many individuals are drowning out their, they can't navigate the system. Obviously this is something that needs to be fixed at the State and Federal levels, but I thought because it effected us, I would mention it here.