

# Santa Clara County Emergency Medical Services Agency



## 2020 Annual Report

## **Message from the Director**

I am pleased to present the Santa Clara County Emergency Medical Services Annual Report for calendar year 2020. Our staff and stakeholders have accomplished much in the face of an unprecedented operational environment. Much like an observer is only able to see just 10% of an iceberg, this report offers only the highlights of a comprehensive effort by a small but comprehensive County department. At the beginning of 2020, we all watched keenly as counties across California grappled with how to handle this novel coronavirus. Communications and coordination with our partners were key to ensuring our prehospital system was appropriately engaged. As anticipated, people from every tier of our system stepped up to help, offering a cross section of perspective and experience. In the initial weeks, regional means of communication were established, clinical directives and rules of engagement were developed, and ongoing medical quality improvement surveillance was highlighted. In the months to come, our EMS partners and EMS staff would rise to the occasion time and time again as the virus presented new challenges. 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. 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 standards and best practices will be key to maintaining our proactive COVID-19 response throughout Santa Clara County. 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.

Our report showcases the activities and accomplishments from this past year. These achievements are the result of the collective effort by Santa Clara County EMS and multiple stakeholders. We want to express our appreciation to all of you for your hard work, collaboration, and commitment to our system. We hope you will find the information in this year's report informative and inspiring. We remain committed to continuously finding ways to improve our EMS system and emergency response through evidence-based medicine and innovative solutions for the healthcare of our community.

*Jackie M. Lowther, RN*

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## Disaster Preparedness & Response

### **Santa Clara County EMS Agency COVID-19 Response**

On January 21, 2020, the Centers for Disease Control and Prevention (CDC) confirmed what is believed to be the first case of COVID-19 in the United States in Washington State. These events prompted the Santa Clara County Public Health Department to activate their Department Operations Center (DOC) on January 23 to prepare for local impacts of COVID-19. It was quickly determined that additional resources would be needed to manage this incident and on January 28, 2020, the County activated the Medical-Health Joint Operations Center (MHJOC) which was supported by County Public Health, County Counsel, Office of Emergency Management, County of Santa Clara Health System (Health System), County Fire Department and County Emergency Medical Services (EMS) Agency. On January 31, 2020, the U.S. Department of Health and Human Services declared a Public Health Emergency for the United States.

This began what will be the one of the County's longest incidents managed in its history. The EMS Agency supported the MHJOC with two agency staff members working 12-hour operational periods seven (7) days a week. During this activation, EMS Agency staff served in the roles of DOC Deputy Director, Operations Section Chief and Medical-Health Mutual Aid Coordinator.

On February 3, 2020, the Santa Clara County Public Health Officer declared a Local Public Health Emergency, which prompted the County Executive to proclaim a local state of emergency to allow the County to properly respond to the impacts of COVID-19. These actions were ratified by the County Board of Supervisors on February 10, 2020. As a result, the County determined the need for coordination across the operational area and therefore activated the County Emergency Operations Center (EOC) on March 2, 2020. At that time, the EMS Agency was tasked with management of the Operations Section of the EOC that consisted of four branches, which included the Public Safety Branch, Public Health Branch, Health Care Surge Branch, and the Housing and Human Services Branch as well as their respective units. The EMS Agency dedicated four full-time staff members to fill the role of Operations Section Chief and a dual role of Medical-Health Branch Director/Medical-Health Operational Area Coordinator (MHOAC) at the EOC seven (7) days a week, working 12-hour operational periods through 2020 and into 2021.

The primary responsibilities of the Operations Section Chief were to coordinate and supervise activities of branches directly involved with achieving primary response objectives. Their tasks include development of the Operations portion of the Incident Action Plan (IAP); briefing and assigning Operations Section personnel; determining

the needs and requesting additional resources for the Section; providing support to EOC Director and reporting information about special activities, events, and occurrences that could affect the mission.

During the activation, the entire EOC was faced with not only the management of COVID-19 response operations but three other significant incidents which included acts of civil unrest, evacuations related to SCU (Santa Clara Unit) and CZU (San Mateo and Santa Cruz Unit) Fire Complexes and Pacific Gas & Electric (PG&E) Public Safety Power Shutoff within the County.

The primary responsibilities of the Medical Health Branch Director were coordination and prioritization of requests from local responders, obtaining additional medical and health personnel, supplies, and equipment. The Medical Health Operational Area Coordinator (MHOAC) coordinates medical and health mutual aid, including both emergency medical and public health resources.

Over the course of the COVID-19 activation, the Medical Health Branch Director / MHOAC managed deployment of a Federal Medical Station which was jointly staffed by the Health and Hospital Systems personnel and Team Rubicon. Team Rubicon is a response organization that was provided by the State that provides rapidly deployable emergency response teams. This was the first of these deployments within the County. This resource was used to treat and care for lower acuity COVID-19 positive patients within the operational area. This was only one of many assets or requests that the Branch would manage during the year. In total, the Branch managed over 93 medical-health mutual aid requests that could not be filled within the operational area and were submitted to the Region and State for fulfillment. These requests were primarily for medical goods and supplies that were essential in providing personal protection to our healthcare providers, first responders and other critical infrastructure personnel. A total of 10 of the mutual aid requests submitted were for facilities experiencing significant staffing shortages due to COVID-19 outbreaks. This resulted in over 100 personnel from the State being deployed to our operational area to assist with care in those facilities.

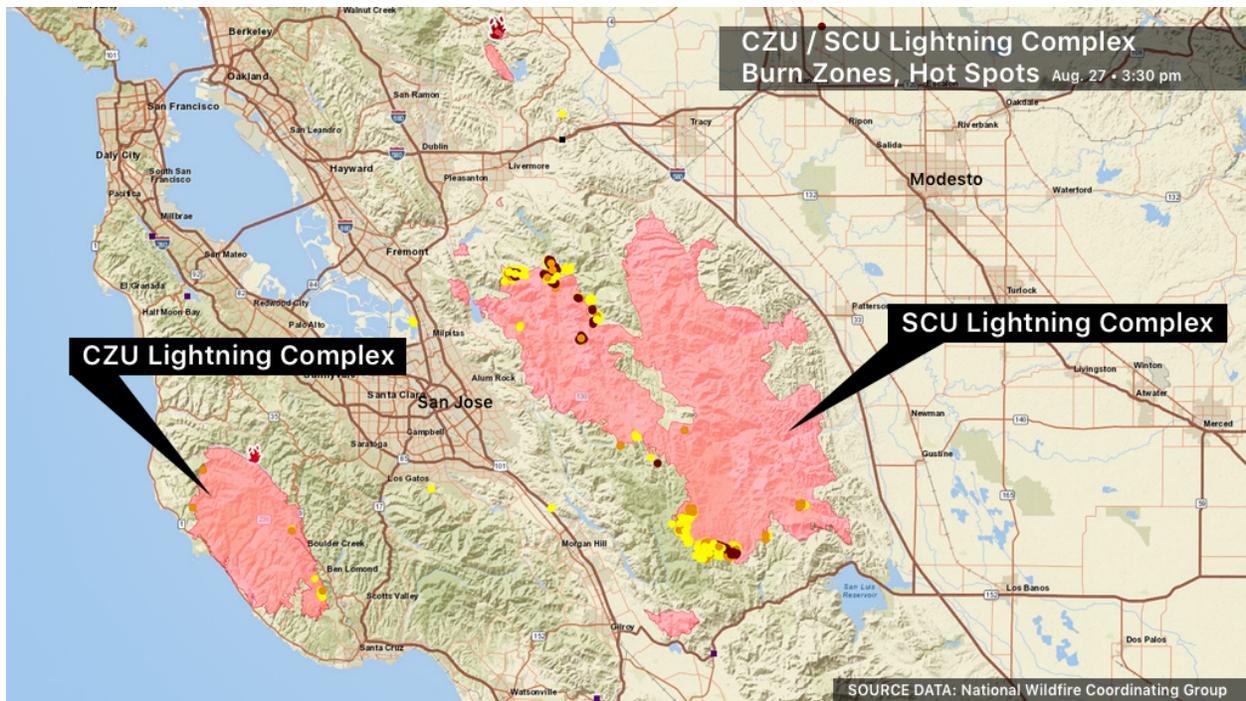
The EMS Agency provided over 7,296 staff hours to EOC COVID-19 operations during 2020. This established the Agency as a strong partner within the County and ultimately has led to the fostering of strong relationships with other local, county, regional, and state agencies. The Agency has remained dedicated and committed to supporting operations into 2021.



### **Civil Unrest Incident Responses**

While actively engaged in response to COVID-19, the nation, state and county faced yet another challenge as we responded to widespread civil unrest due to the death of George Floyd while in police custody on May 25, 2020. Video footage released days after the arrest showed a white police officer, with the Minneapolis Police Department, had knelt on Floyd's neck for over nine minutes after he was handcuffed and lying face down, leading to his ultimate death.

Beginning on Friday, May 29 and ending on Tuesday, June 2nd the City of San Jose was faced with widespread civil unrest mainly focused on the downtown area that led to several mutual aid requests. These events lead to destruction of property, vandalism, fires, injuries to officers, citizens, and protesters in the area. EMS supported response to these events by providing command staff to the County EOC, Law Enforcement Command Post and by providing standby ambulance resources to immediately address any medical needs within the perimeter established by law enforcement in this area, over the course of the five (5) days. Over 180 people were arrested in San Jose during these events and several cities, including San Jose, instituted mandatory curfews to attempt to combat these incidents.



## **SCU and CZU Wildfire Response**

The SCU (Santa Clara Unit) Lightning Complex fires were wildfires that burned in the Diablo Range in August and September 2020. The fire complex consisted of fires in Santa Clara, Alameda, Contra Costa, San Joaquin, Merced, and Stanislaus counties. The SCU complex fires burned a total of 393,624 acres from August 16 to October 1, 2020, making it the third-largest wildfire recorded in California's history. These fires also resulted in six (6) non-fatal injuries.

The CZU Lightning Complex fires were wildfires that burned in San Mateo and Santa Cruz counties starting in August 2020. These fires started because of thunderstorms that produced bolts of lightning and started hundreds of fires throughout California. These fires burned a total of 86,509 acres from August 16 to September 22, 2020. These fires resulted in one fatality and one non-fatal injury.

During these two complex fire incidents, the EMS Agency supported the County's Emergency Operations Center (EOC) Activation with the multi-incident management of these fires and COVID-19 response. EMS Agency personnel assignments included Operations Section Chief and Medical-Health Branch Director. These assignments required twenty-four coverage for a ten-day period. Personnel were assigned to twelve-hour operational periods.

During their assignments, EMS Agency staff developed and managed incidents objectives, processed medical-health mutual aid requests and provided situation awareness briefings to operational area partners. As part of the response to the SCU Fire, the Medical-Health Branch coordinated two advanced life support (ALS) ambulances to support fire ground operations and rehabilitation. In response to the CZU Fire, the Medical Health Branch coordinated the medical-health mutual aid deployment of seven licensed behavioral health staff members from the County to support the mental health needs of those evacuated and sheltered. These staff deployed supported operations in Santa Cruz County for 12-hour operational periods, for over 14 days.

Coordination, response and management to both these incidents through the EOC Operations Section was accomplished through established partnerships, collaboration and the dedicated efforts of the County Sheriff's Office, County Fire Department, EMS Agency, Public Health Department, Behavioral Health Services Department and Social Services Agency.

### **PG&E Public Safety Power Shutoff (PSPS) Events**

During the year's first PG&E PSPS event that occurred on October 14, the EMS Agency and Public Health Department worked collaboratively to address the needs of PG&E customers who had been identified in the Baseline Medical Equipment Program (BMEP). The original notification prior to the start of de-energization from PG&E stated that a total of 102 BMEP customers identified would be in the affected area of the de-energization. During this event, the EMS Agency and Public Health Department leveraged access to EmPower data, which gives appropriate agencies the ability to discover the electricity-dependent Medicare population in their state, territory, county,

and ZIP Code. A total of four (4) electricity-dependent durable medical equipment (DME) users were identified in the impacted areas. These impacted users were then prioritized based on the level of life-saving support provided by their equipment. Only one (1) of these four individuals obtained from the EmPower list was not already listed on the PG&E list.

After review of all information prior to de-energization, four individuals were unable to be contacted by PG&E and required follow up contact by the County to address any needs. This was completed in a coordinated effort by the EMS Agency, County Public Health Department and County Sheriff's Office via phone calls and direct contact door knocks by Deputies. This resulted in all but one individual being contacted prior to de-energization. It was later determined that the remaining individual was out of town prior to the event.

The final PG&E PSPS event occurred on October 25, when the EMS Agency and Public Health Department were notified that a total of 261 BMEP and DME customers resided in the affected areas based upon PG&E and EmPower data. After review, only 13 of these individuals required follow-up by the County. This was completed in a coordinated effort by the EMS Agency, County Public Health Department and County Sheriff's Office via phone calls and direct contact door knocks by Deputies. This resulted in all but three individuals being contacted directly. Those three individual addresses were monitored for 911 calls over the course of the event and resulted in no additional activity.

These events were all managed successfully through the collaboration, dedication and commitment of the Operations Section at the County Emergency Operations Center, Medical-Health Branch and Field Personnel. During these PSPS events, the EMS Agency dedicated four of its full-time staff members to planning, response and mitigation efforts.

### **Medical-Health Operational Area Coordinator (MHOAC) Program**

The Medical-Health Operational Area Coordinator (MHOAC) was a shared role between the County Public Health Officer/Public Health and EMS Director/EMS Agency or assigned designee. In 2020, the EMS Agency took over management of this program with the EMS Director and Special Operations Program Manager handling day to day operational oversight. The MHOAC, in cooperation with local public health, local EMS Agency, local office of environmental health and local department of mental health are responsible for ensuring Medical-Health disaster planning, response, mitigation, and recovery for their respective operational area. During 2020, the program

managed medical-health response operations for several significant events including the County's COVID-19 Response beginning in January, civil unrest events in May, SCU and CZU wildfires in August and September and PG&E Public Safety Power Shutoffs in October.

### **Medical Volunteers for Disaster Response (MVDR) Program**

In 2020, the MVDR Program did not see a significant increase in volunteer numbers, as onboarding was affected by our countywide COVID-19 response as well as efforts by the State of California to recruit volunteers to assist with response. The outreach efforts by the State of California caused significant challenges for local Medical Reserve Corps. These challenges were mainly due to the use of the State of California Disaster Health Volunteers (DHV) database for recruitment and sign-up. Most, if not all Medical Reserve Corps are volunteers, the State's recruitment process for the California Health Corps offered salaried positions to those seeking to volunteer with the State. This caused confusion for individuals seeking paid opportunities versus volunteer opportunities to misregister with local programs, when in fact they were seeking the salaried positions with the State.

The County of Santa Clara currently has two sets of rostered volunteers active in the State of California Disaster Health Volunteers (DHV) database. The first set of 50 volunteers are typically referred to as spontaneous and elect only to be activated and vetted during a significant disaster. The second roster contains 85 MVDR Program members. The membership continues to be diverse and span a large range of medical capabilities and support functions including logistics personnel, physicians, pharmacists, nurses, paramedics, emergency medical technicians (EMTs), dispatchers, and allied health personnel.

During the response efforts related to COVID-19, MVDR Program members that were licensed vocational nurses (LVNs) or registered nurses (RNs) were activated to assist the County with two separate missions. The first was with the delivery of flu vaccines at scheduled vaccine fairs and the second was with the delivery of the COVID-19 vaccine at County operated vaccine sites. This resulted in 14 members of the program assisting with these efforts. The determination was made early on, during the countywide COVID-19 response, not to utilize MVDR Program members in direct patient care settings. This decision was made after consulting with the County Public Health Officer and because the program is predominantly made up of individuals who fall in the age range determined to be most at risk for contracting COVID-19.

## **All Hazards Coordinator (EMS)**

In 2020, the EMS All Hazards Coordinator executed the following:

- Served as the Operations Section Chief at the County Emergency Operations Center for the following incidents:
  - County COVID-19 Response
  - City of San Jose Civil Unrest Event
  - SCU and CZU Wildfires
  - PG&E PSPS Events
- Coordinated Medical-Health Situational Status Reporting to the Region and State.
- Increased visibility/knowledge about the Medical Health Operational Area Coordinator Program to include medical goods, supplies and personnel resource requests.
- Developed and submitted requests in response to State Homeland Security Grants Program.
- Conducted equipment training and maintenance.
- Coordinated Public Safety Agency Personnel Reporting for Vaccine Outreach.

The EMS All Hazards Coordinator was also able to successfully procure ballistic helmets and carriers (vests) with ballistic plates through the State Homeland Security Grants Program. These ballistic carriers and helmets were identified as a personal protective equipment gap for EMS after the 2019 Gilroy Garlic Festival shooting. A total of 150 sets of carriers and helmets were obtained for use by the 911 Ambulance Service Provider and EMS Agency. This equipment provides added protection to personnel who may respond to an active shooter, large scale or high-risk incident.

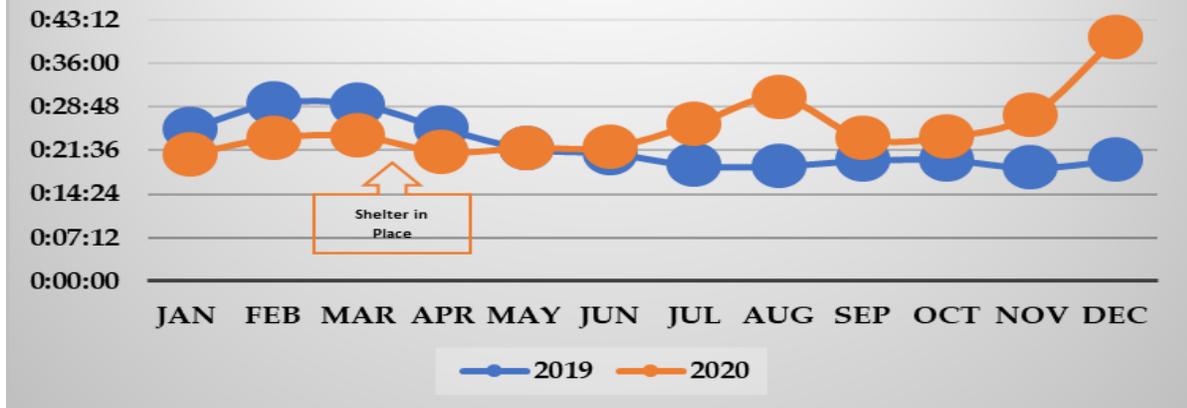
## Performance Insights

### **Ambulance Patient Offload Time (APOT)**

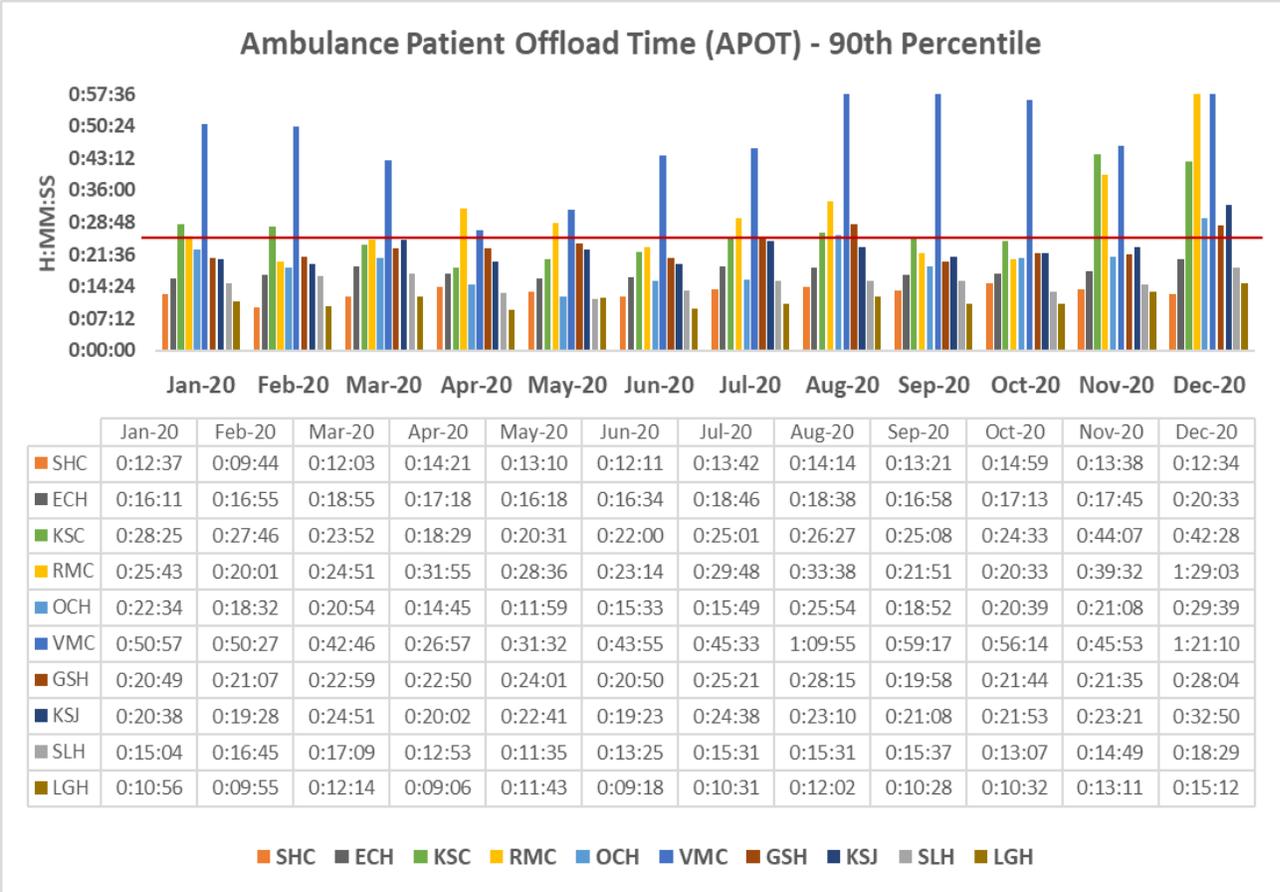
Ambulance offload delays, the time it takes to transfer a patient to an Emergency Department stretcher for the Emergency Department staff to assume responsibility for the care of the patient, may have more impact on ambulance turnaround time than ambulance bypass. Ambulance patient offload times are calculated for all hospitals that receive patients in Santa Clara County. In 2015, the Health and Safety Code 1797.120 required the California Emergency Medical Services Authority to develop a standard methodology for calculation of, and reporting by, a Local EMS Agency of ambulance patient offload time. The EMS Agency has placed significant effort into working with hospital administrators focusing on the time it takes to get ambulances back into service once they have arrived in the Emergency Departments. Decreases in offload delays should improve the time patients receive definitive care, better pain control and antibiotics when needed. The role hospitals play in ensuring that 9-1-1 ambulances are available for the next 9-1-1 call is critical.

While offload delays aren't a new hurdle for EMS, they did become increasingly challenging as COVID-19 cases continued to rise. Before the March 16, 2021 County Shelter-In-Place Order began, APOT statistics mirrored data from 2020. As fewer people began commuting to work and school, and avoiding hospitals, ambulance transport volume significantly decreased. Conversely, a stressed healthcare system with fewer staff and significantly more patients led to APOT in 2020 exceeding APOT in 2019, per the chart below. This trend continued for the duration of 2020 until its peak in December with the third surge of COVID-19 cases. Scarce hospital resources combined with increasing cases of COVID-19 resulted in the highest aggregated 90<sup>th</sup> percentile APOT time (in minutes) for the year as well as the agency's archival APOT data.

## Aggregated APOT Biannual Comparison



Although COVID-19 exacerbated the problem, offload delays existed prior to the pandemic and will continue to challenge EMS services and hospitals. The demand will likely only increase the need for technologies that use available data to provide more visibility into hospital capacity and allow EMS systems to better manage resources and improve response times. In October 2020, to help hospitals facilitate compliance with APOT, a daily report was sent to designated personnel of all patients held greater than 20 minutes.



When comparing the emergency departments’ 90<sup>th</sup> percentile APOT times in the chart above, you can see the individual impact of the surges of COVID-19 throughout the year. Surge 2 can be seen in the months of July through August with increased APOT times. Five EDs exceeded the county benchmark during surge 3’s peak. Surge 3 can be seen in the months of November and December. Six EDs exceeded the county benchmark during the final surge of 2020. The period of surge 3 was responsible for the highest aggregated APOT time recorded since data has been collected.

**Hospital Bypass**

Ambulance bypass occurs when an ED is temporarily closed to incoming ambulance traffic. Temporary ED closures can be triggered by overcrowding, a lack of resources, as well as other contributing factors.

During the late 1990s and early 2000s, overcrowding, including the practice of "boarding," or retaining admitted patients in the ED as they waited for a hospital bed, became a chronic problem in most EDs. In turn, ED patients experienced longer wait times, and some left the hospital without being seen to receive services.

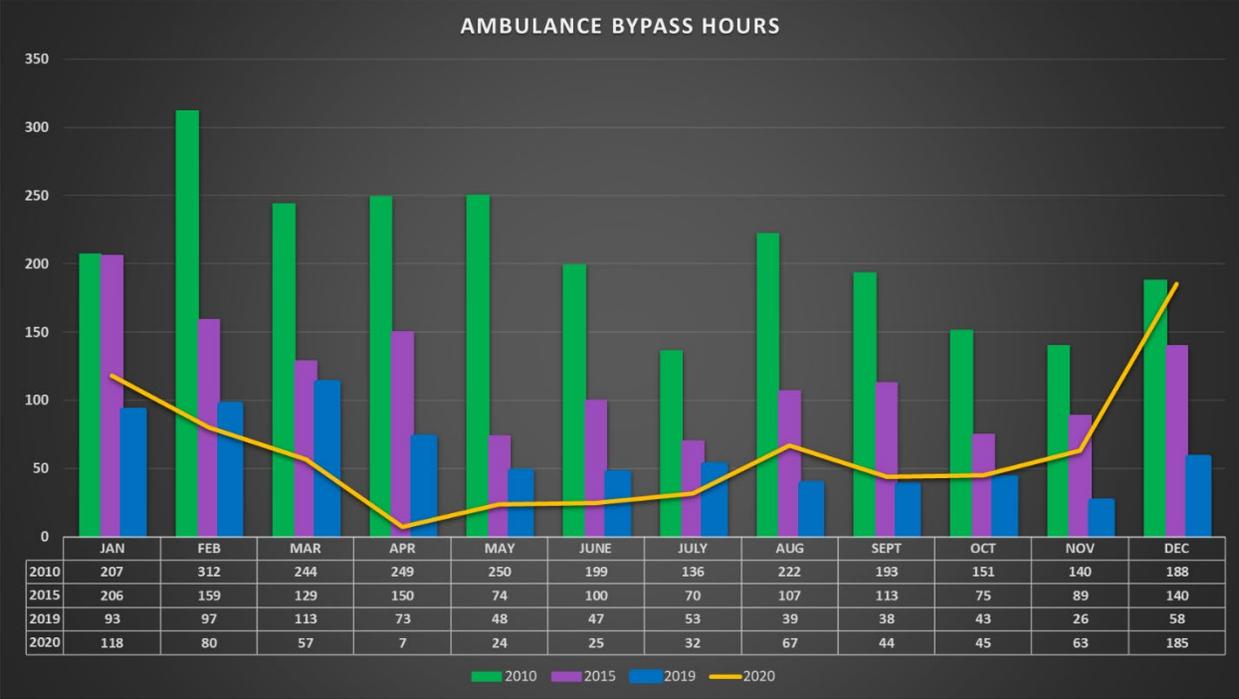
According to the Robert Wood Johnson Foundation, in the short term, ambulance bypass provides breathing room to the ED that invokes bypass status, allowing it to return to optimal functioning as it processes the overflow of patients. If the situation continues for an extended period, however, it can create a domino effect, triggering nearby facilities--now clogged with the bypassed patients--to themselves go on bypass status. It can also lead to delays in medical care for patients elsewhere in the healthcare system. If an ambulance cannot bring people to the nearest facility, they must be transported longer distances to receive necessary treatment. This increased travel time can reduce the availability of ambulances for new calls for other patients awaiting emergency medical service.

The Healthcare system was not designed to contend with pandemics or public health emergencies of the magnitude that we experienced at the rate in 2020. The COVID-19 pandemic disrupted the healthcare system in ways that affected patient and hospital-level decisions, behavior, and performance and bypass was no exception.

In the early weeks and months of the COVID-19 pandemic, hospitals reported that they were largely focused on enhancing their capacity to respond to the pandemic. Hospitals reported challenges such as significant shortages in personal protective equipment (PPE) and other supplies as demand increased across the county. Hospitals also spoke of the challenge of needing to rapidly expand facility and staffing capacity.

The EMS Agency has strategized consistently with ED Directors, Managers and Hospital Administrators to assist in monitoring patient offload times, and bypass hours for the last several years. Hospitals have fervently worked to avoid diversions and ongoing dialogue has continued toward mutual solutions which have resulted in a sustained decline of bypass hours since 2010.

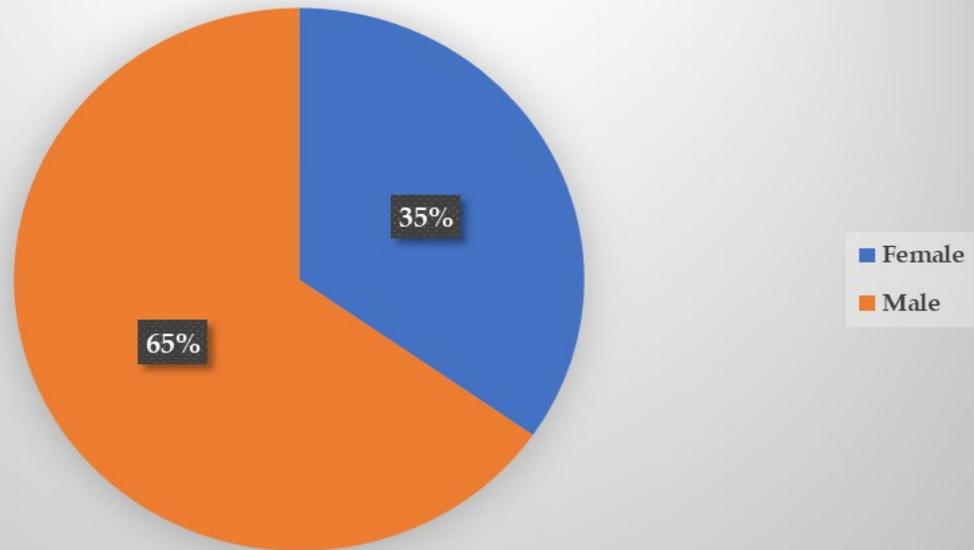
In this 2020 Annual Report, we compared the diversion hours in 2010, 2015 and 2020 to assess trends. There had been a steady decline in the number of hours of diversion over the last decade until the last month of 2020 when the hospitals saw a marked increase in capacity with a third wave of coronavirus patients, as well as increase in EMS transport volume.



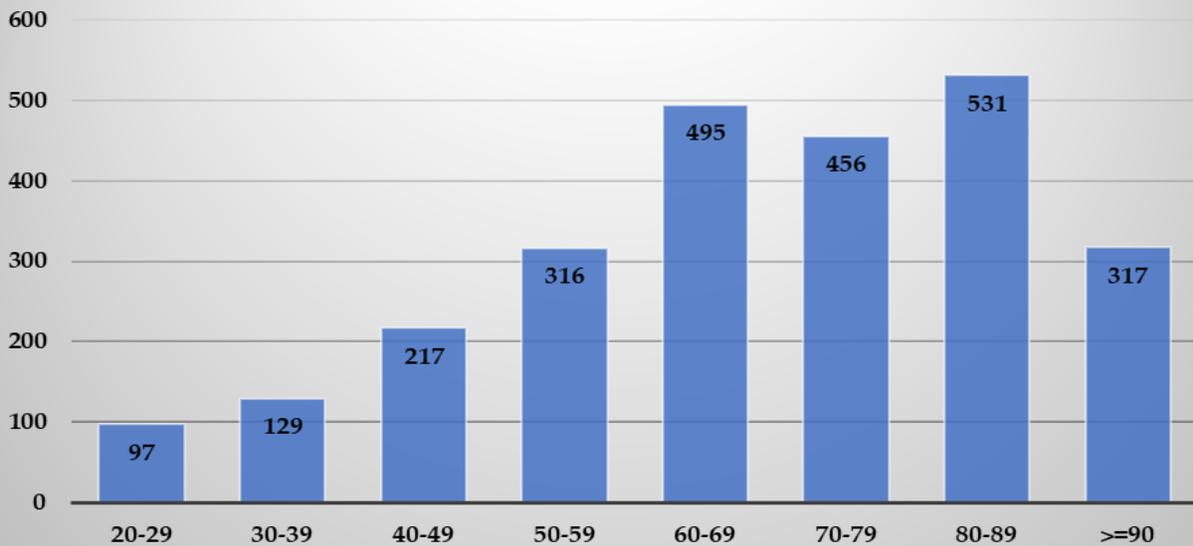
### **Cardiac Arrest**

In 2020, the Santa Clara County EMS System cared for 2,642 non-traumatic cardiac arrest patients. The patient breakdown by gender was two-thirds male (65%) and one-third female (35%), as displayed in the first chart, below. The second chart shows the highest number of patients by age were observed in the 60–69-year-old (n=495) and 80–89-year-old (n=531).

## Cardiac Arrest by Gender, 2020



## Cardiac Arrest by Age Groups, 2020



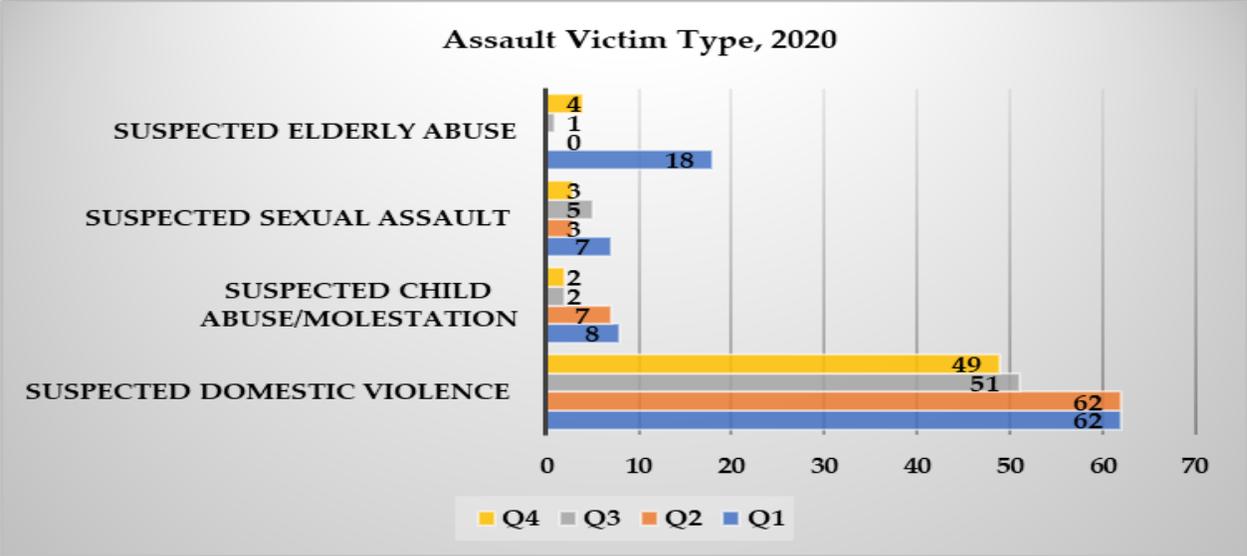
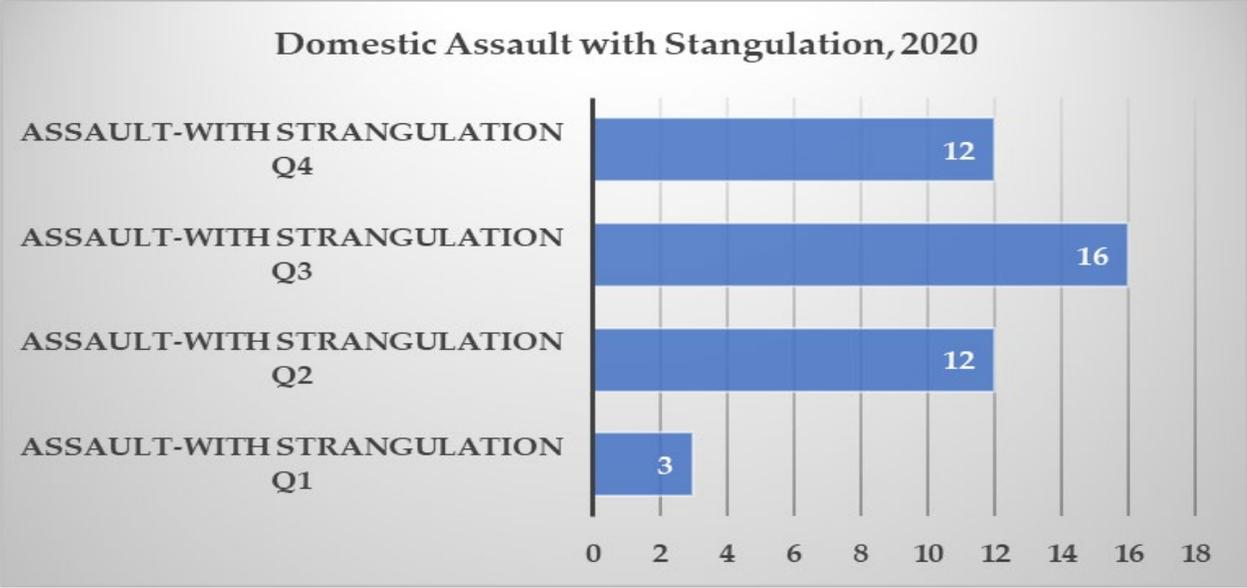
Cardiopulmonary Resuscitation (CPR) is a life-saving medical procedure performed to restore the blood circulation of a person who has suffered cardiac arrest. Over half of the cardiac arrest patients did not receive CPR (53%). The importance of public education on CPR procedures is substantiated by the frequency of CPR being administered by a family member (21%) or a lay person (5%).

<b>CPR to Patient</b>	<b>Frequency</b>	<b>Percent</b>
<b>EMS-Witnessed</b>	156	6%
<b>Family Member</b>	541	21%
<b>Healthcare Professional</b>	256	10%
<b>Law Enforcement</b>	132	5%
<b>Lay Person</b>	122	5%
<b>None</b>	1410	53%
<b>TOTAL</b>	2617	100%

## **Abuse**

Emergency Medical Services (EMS) providers, who perform initial assessments of ill and injured patients, often in a patient’s home are uniquely positioned to identify potential victims of abuse, neglect or self-abuse. The EMS Agency had a meeting with EMS stakeholders beginning in June 2019 to discuss the critical role that EMS has in responding to victims of domestic violence (DV) including sexual assault by conducting health and safety assessments, interventions, documentation, referrals, and data collection. Training of all system providers was completed by December 31, 2019, and the EMS Agency began to receive data in February 2021. Total domestic violence cases for 2020 were 224.

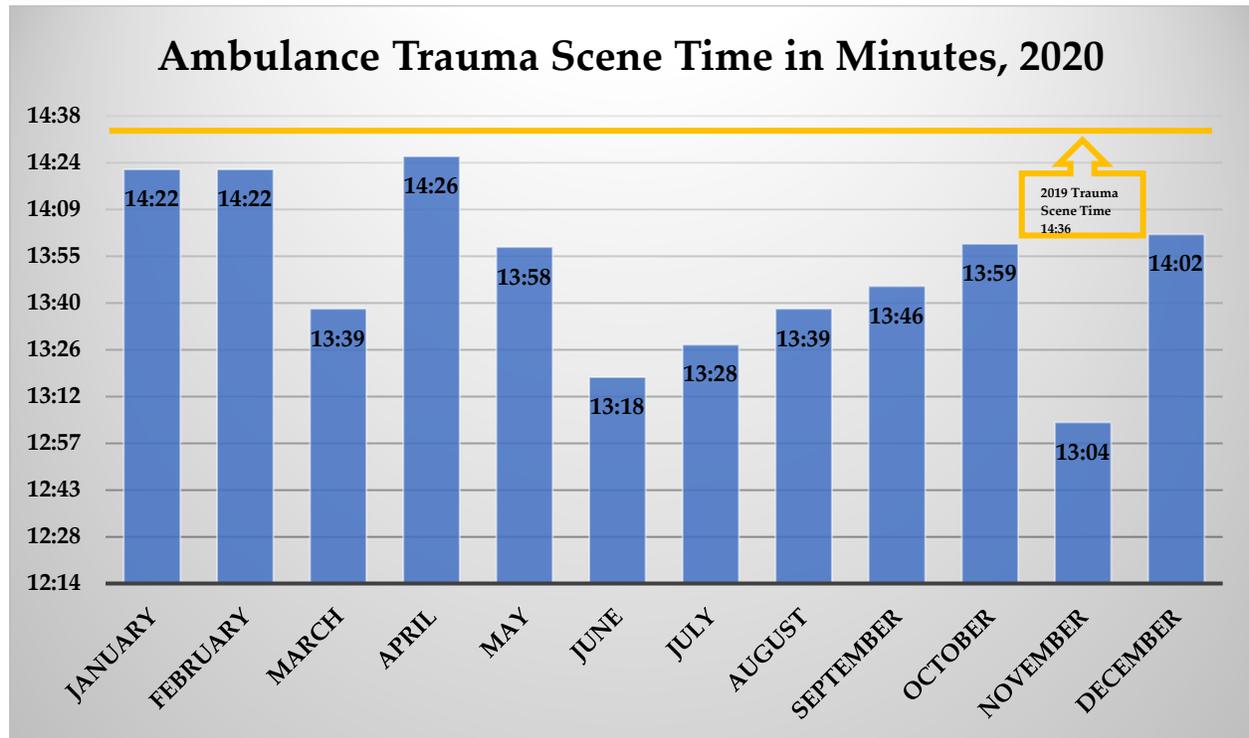
After a complete year of data collection, an increase in strangulation incidents was observed from Quarter 1 to Quarter 2, as seen in chart, below. This increase could be correlated with a change in the methodology for data collection. We can extrapolate that Quarter 1 probably had similar values to Quarter 2. Domestic Assault with strangulation saw a 25% reduction from Quarter 3. The average age of the victims was 31 years old, with the youngest victim being age 12 and the oldest victim being 52 years old. All the victims were female.



Quarter 4 showed the lowest occurrence of domestic violence during the year, marking nearly a 21% reduction from Quarter 1 and a 4% reduction from Quarter 3. After collecting data for the past year, the high totals seen in Quarter 1 for elderly abuse, sexual assault and child abuse appear to be outliers to the trends seen the rest of the year. Social adjustment to sheltering in place could account for the high totals seen in Quarter 1. Conversely, we did not experience similarly high values with the return of sheltering in place in Quarter 4, supporting the theory of social adjustment.

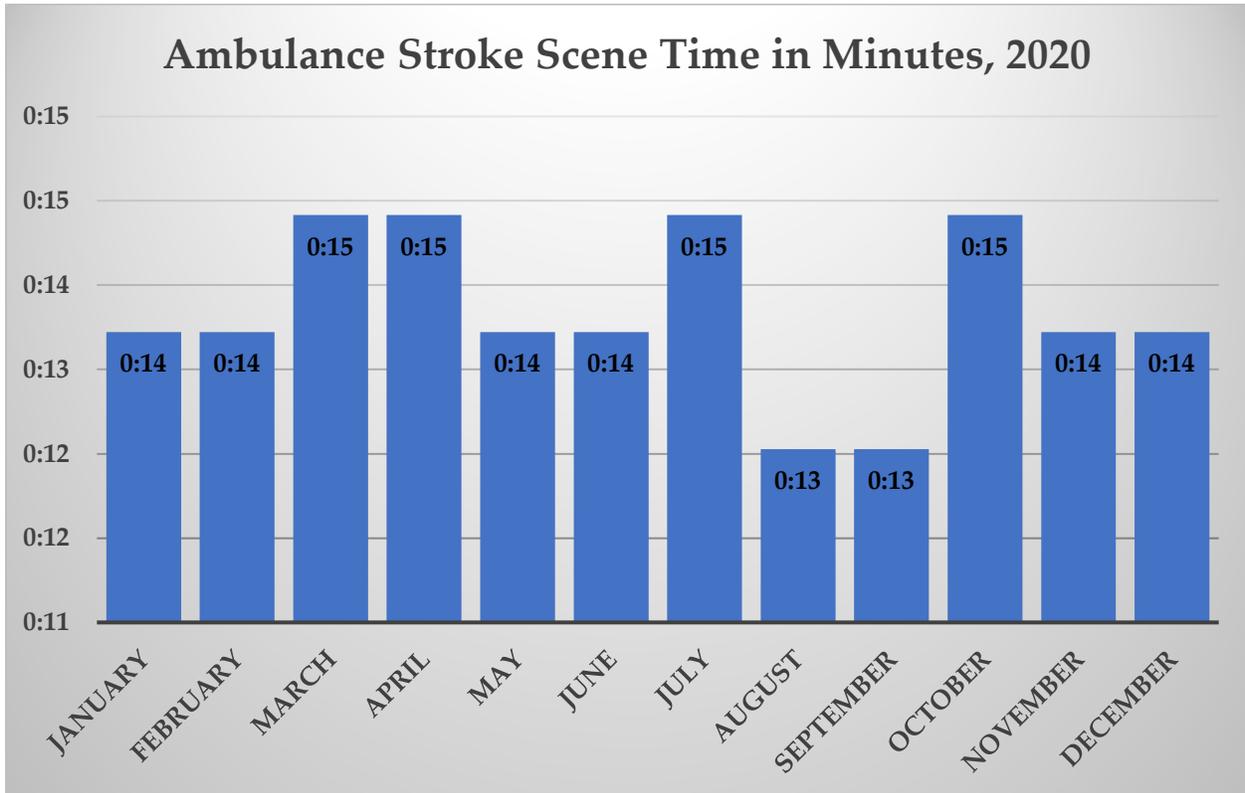
## Scene Times

### Trauma



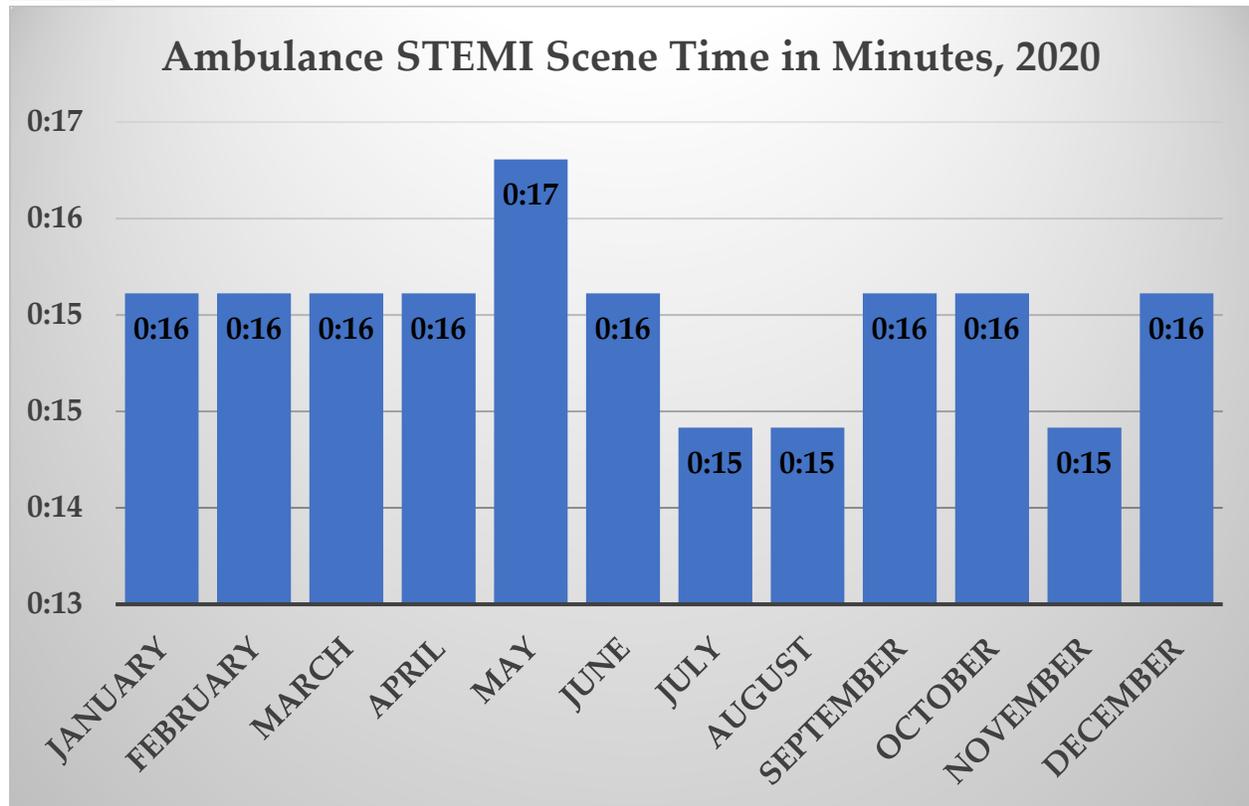
To discourage an increase in prehospital scene times, the EMS Agency has been tracking and reviewing trauma scene times. This was accomplished by creating reports that display incidents with scene times over 15 minutes for major trauma victims. The EMS Agency reviewed the corresponding Patient Care Records and looked for reasonable explanations for delays. If none were found, then communication occurred with the crew members and the Program Manager to educate and prevent future delays. The goal was to lower average trauma scene time and keep it below 15 minutes.

## Stroke



Time on scene with a stroke patient is critical to the follow-up care received and the overall health of the patient after treatment. When a stroke patient arrives to a hospital via ambulance, they spend less time in traffic and subsequently receive care quicker than arriving via a private vehicle. Therefore, the less time on scene with the stroke patient is essential to the patient's arrival time at the ED. Stroke scene times varied between 13 minutes and 15 minutes, with the highest times occurring during Shelter in Place orders (March and April) and during times of less stringent COVID-19 restrictions (July and October).

## STEMI



For optimal health outcomes, a ST-Elevation Myocardial Infarction (STEMI) patient will be assessed and treated in a “30-30-30” time frame model. Thirty minutes with the ambulance crew, thirty minutes in the ED and 30 minutes in the Catheterization Lab. Inclusive in the first 30 minutes is the time on scene. Throughout 2020, the STEMI scene time ranged between 15 and 17 minutes each month. The highest scene time (17 minutes) occurred in May, two months after the COVID-19 Shelter in Place order. The lowest scene times were recorded in July, August, and November. The total number of STEMI patients, specifically the number of patients transported by ambulance, are directly correlated with the increase, and decrease in scene times.

## Quality Improvement

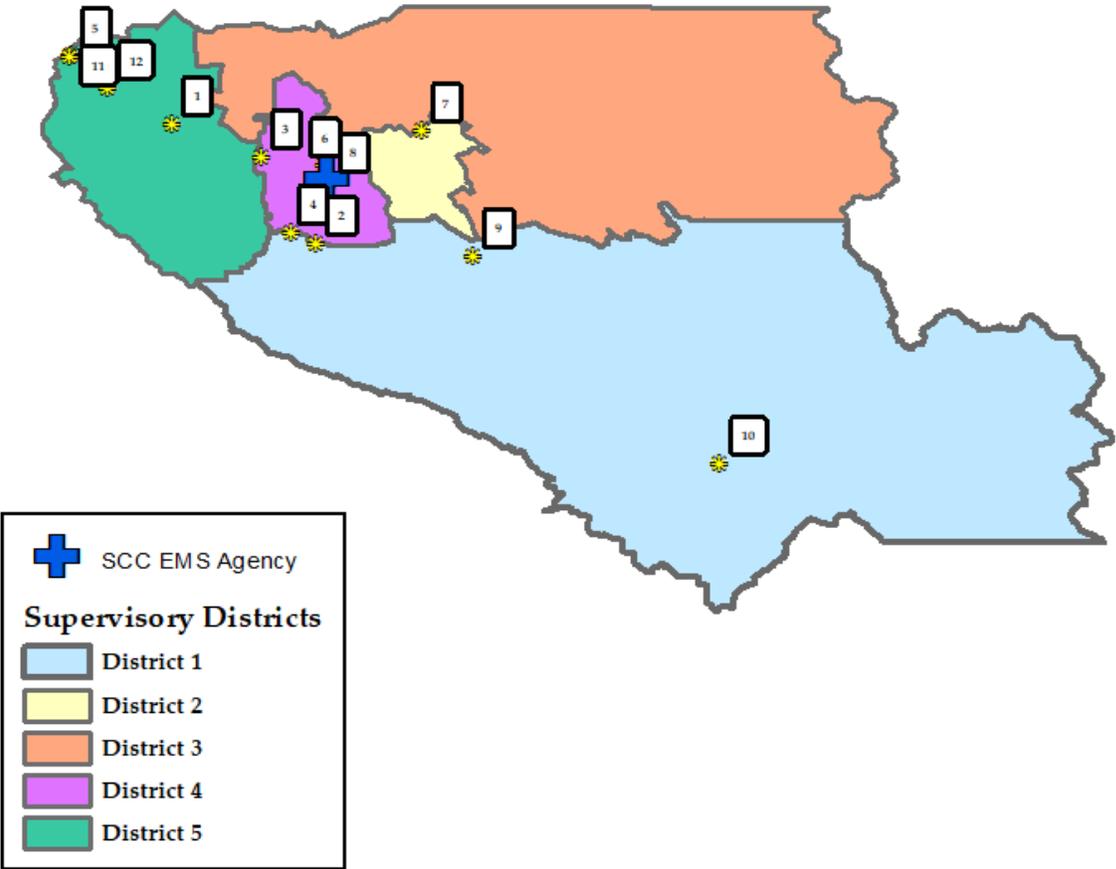
### Prehospital Quality Indicators

The 2020–2021 indicators were selected by a volunteer committee of prehospital stakeholders. The indicators selected by the committee will focus on the monitoring of new treatment protocols introduced for 2021, monitoring of prehospital specialty care performance and data collection for EMS for Children system initiatives as well as monitoring the system wide STEMI training initiative. The 2021 indicators are as follows:

- **Respiratory Assessment for Pediatric Patients:** This indicator will assist in EMS for Children data collection and improve documentation for State Core Measure Collection.
- **Behavioral Sedation:** This indicator will be used to monitor the new treatment protocol to ensure intended use and efficacy.
- **Intravenous (IV) Acetaminophen Usage:** This indicator will be used to monitor the new treatment protocol to ensure intended use and efficacy.
- **Stroke and GFAST Assessment/Treatment:** These indicators will be used to monitor stroke assessment reliability, triage of stroke patients, treatment efficacy, and proper documentation for State Core Measure Collection.
- **Trauma (All Best Practices):** These indicators will be used to monitor trauma scene times, triaging trauma destinations and a focused look at Pulseless Electrical Activity (PEA) in traumatic cardiac arrest patients. All these data components are collected for State Core Measure Collection.
- **Base Station Call Review:** This indicator will be used to monitor the appropriate usage of Base Hospital contact for either additional protocol approval or consultation.
- **Acute Coronary Syndrome:** The EMS system will focus on the training, electrocardiogram (EKG) interpretation and treatment of cardiac related chest pain for all its providers. Training will be rolled out quarterly, working through a systematic progression. Each Program Manager will maintain surveillance, utilizing unified reports from the EMS data system.

Santa Clara County Hospitals, Supervisory Districts, and Emergency Medical Services Agency

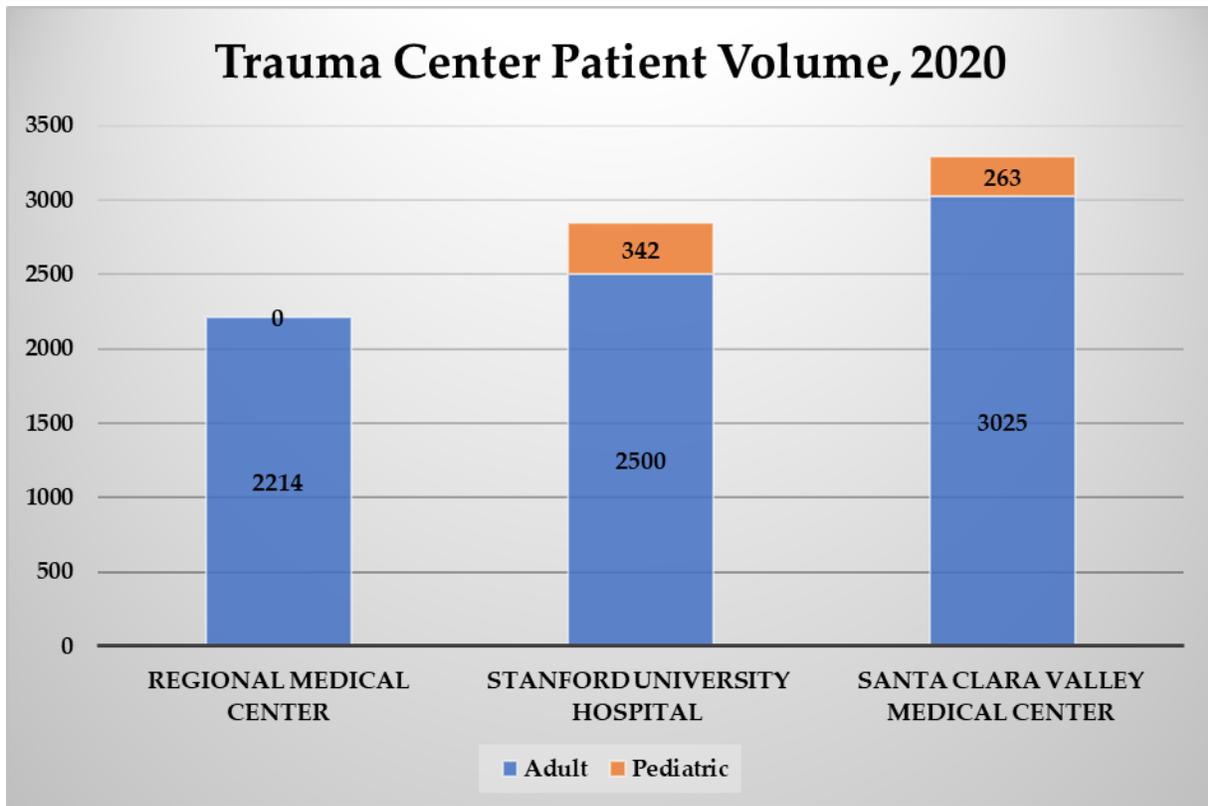
- Santa Clara County Hospitals**
1. El Camino Hospital Mountain View
  2. Good Samaritan Hospital
  3. Kaiser Permanente Santa Clara Medical Center
  4. El Camino Hospital Los Gatos
  5. Lucille Packard Children's Hospital
  6. O'Connor Hospital
  7. Regional Medical Center of San Jose
  8. Santa Clara Valley Medical Center
  9. Kaiser Permanente San Jose Medical Center
  10. Saint Louise Regional Hospital
  11. Stanford University Hospital
  12. VA Palo Alto Health Care System



## Specialty Care Centers

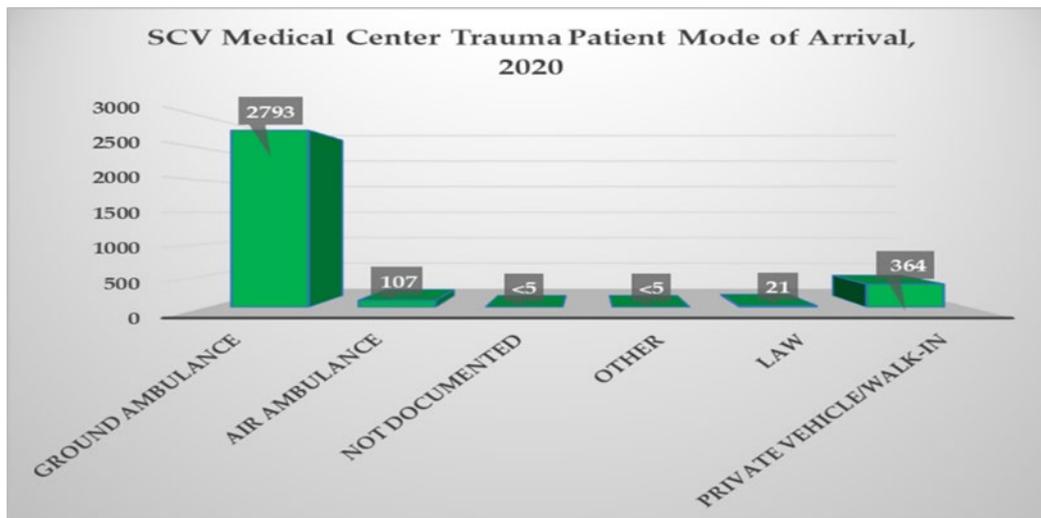
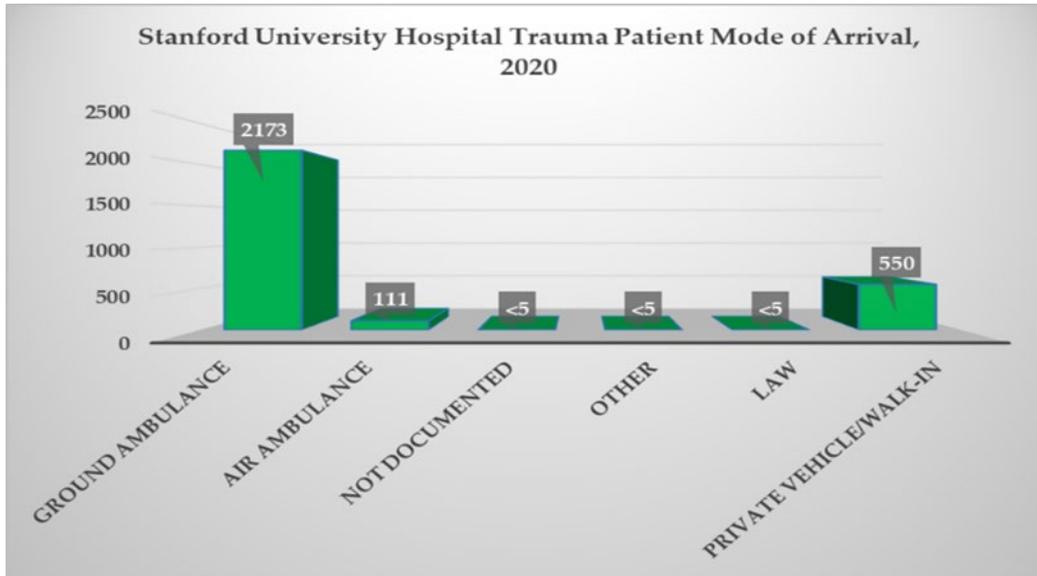
### **Trauma**

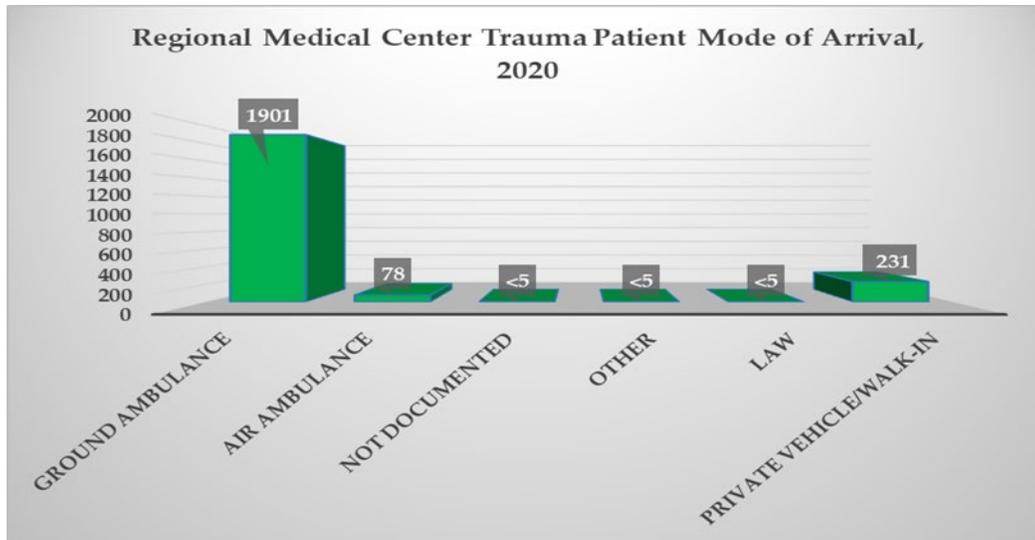
Santa Clara County's three trauma centers worked to maintain patient safety and infection control while mitigating the impact of the COVID-19 pandemic on facility operations and staffing. Each of the trauma centers' patient volumes slightly decreased from 2019 to 2020.



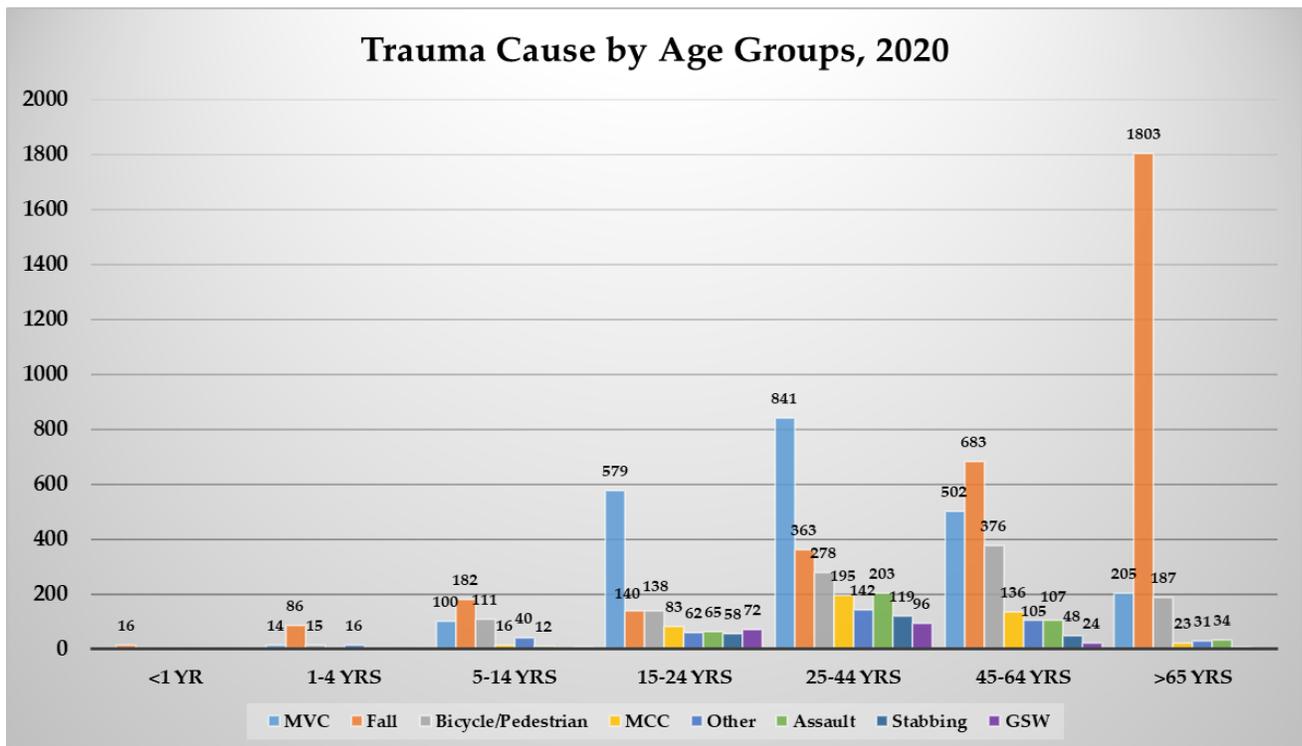
## Trauma Patient Mode of Arrival

While the preferred method of arrival for trauma patients to a trauma center is an ambulance, the percent of patients arriving via private vehicles fluctuated between 10%–20% in 2020.



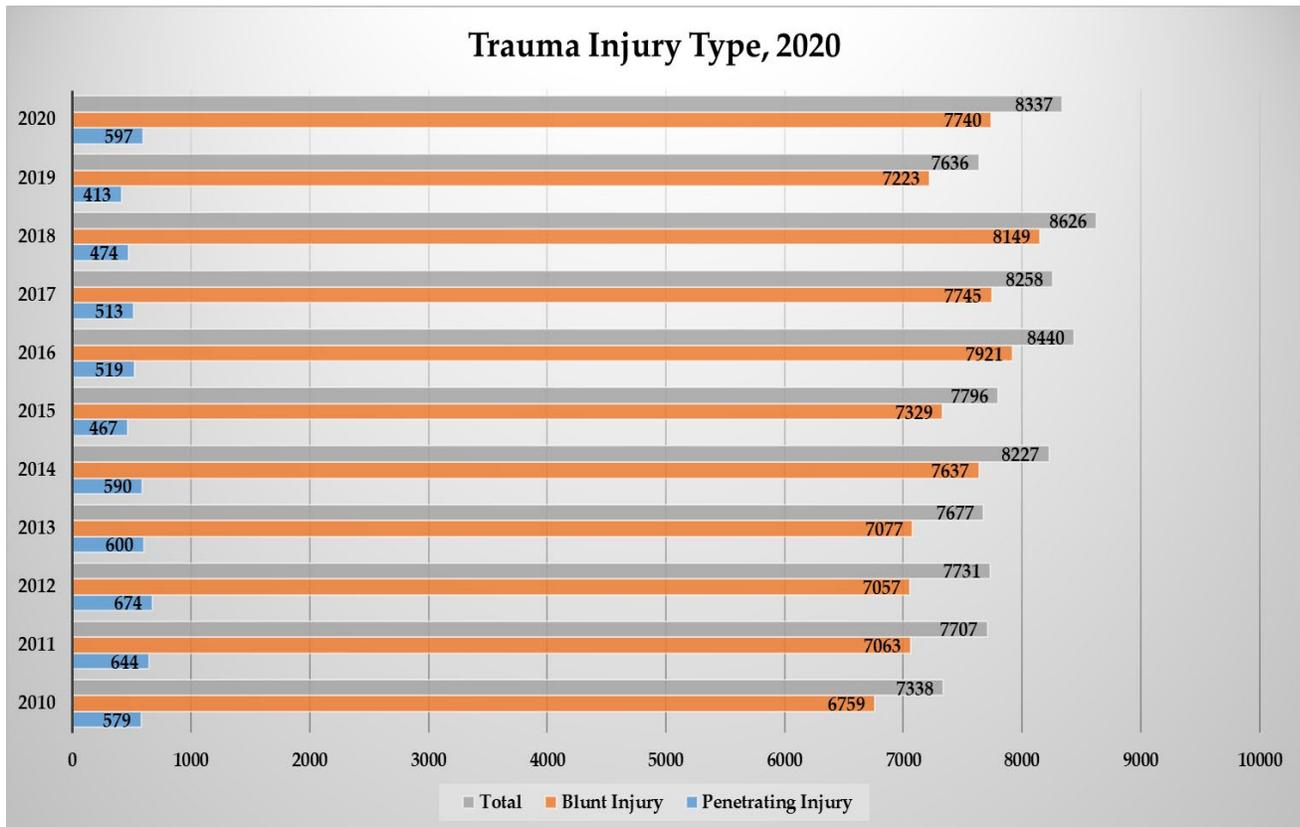


### Trauma Cause by Age Groups



Falls are the leading cause of injury for older patients in Santa Clara County. During 2020, the prevalence of injury from falls increased threefold from the 45-64-year age group to the >65-year age group. Motor vehicle crashes (MVC) continue to be the leading cause of injury among patients between the ages of 15-44.

## Trauma Injuries by Type



Gunshot wounds (GSW) have remained the highest in case fatalities (12.8%) for the past five years. Incidents involving pedestrians had the second leading case fatality rate (8.6%). While falls have the highest number of injury incidents, they have one of the lowest case fatality rates (2.5%).

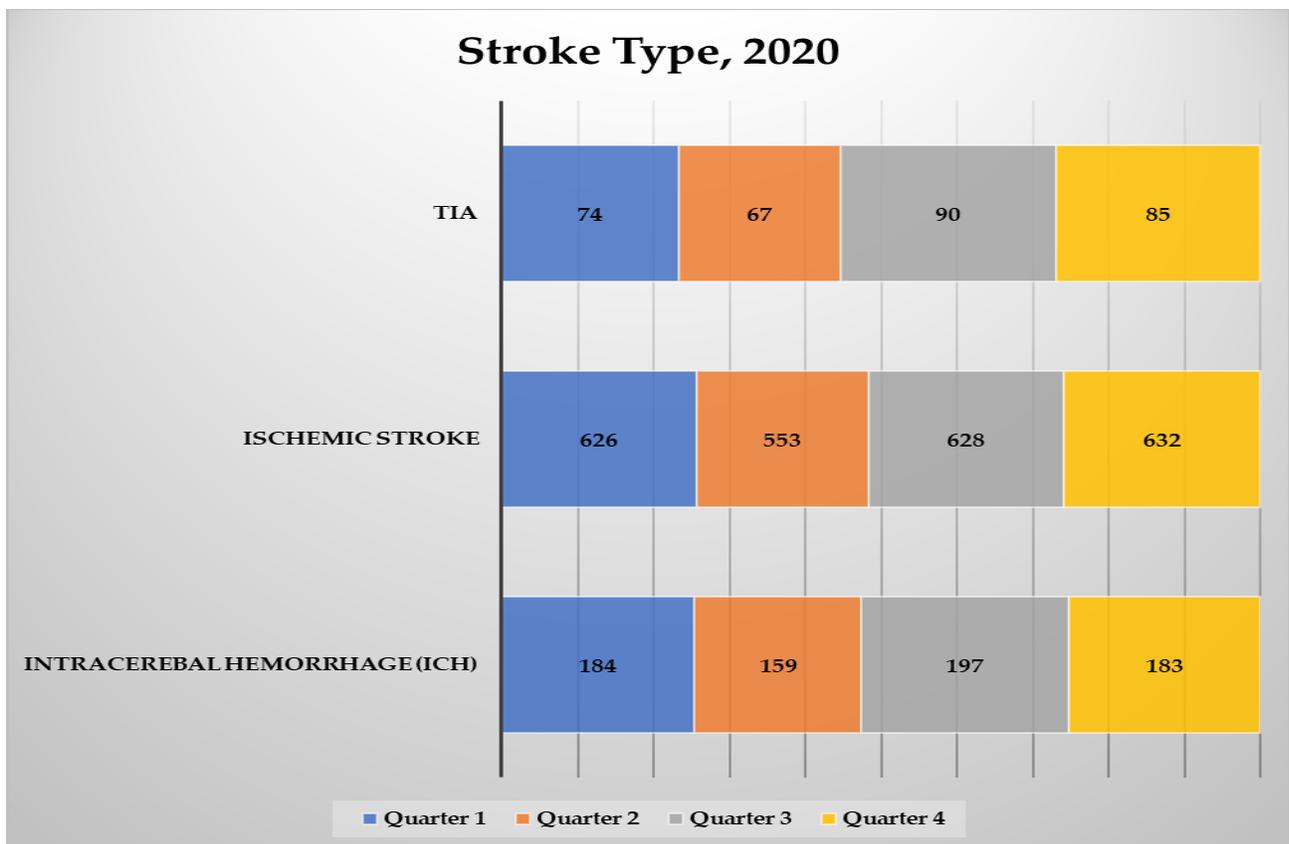
## Trauma Injuries, Deaths, and Case Fatality Rates by Mechanism

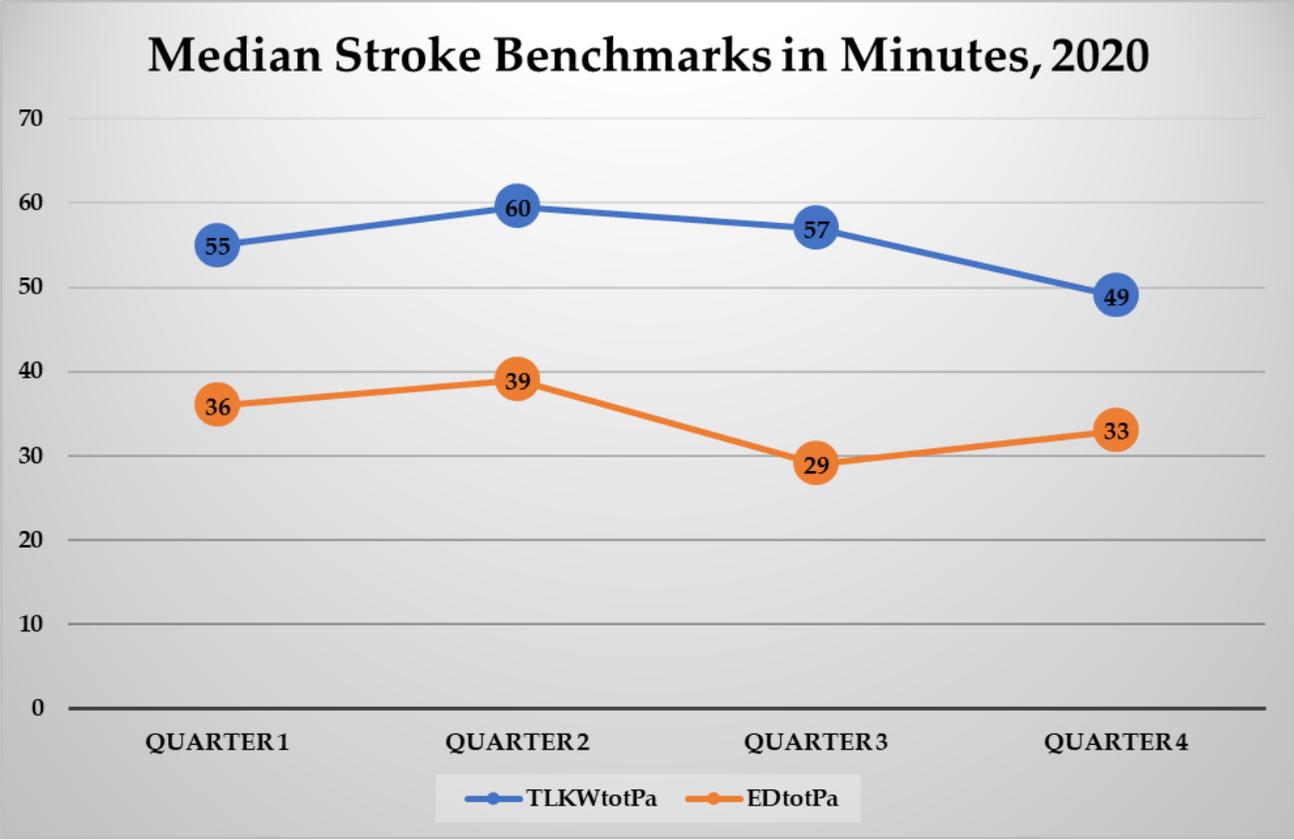
Cause of Injury	Number of Deaths	Number of Injuries	Case Fatality Rate (%)
Gunshot Wound	26	203	12.81%
Pedestrian	35	406	8.62%
Stabbing	11	234	4.70%
Fall	83	3,275	2.53%
Other Blunt	9	248	3.63%
Motorcycle Collision (MCC)	8	454	1.76%
MVC	22	2,244	0.98%
Assault	7	424	1.65%
Other Penetrating	2	149	1.34%
Bicycle	9	700	1.29%
Impalement	0	4	0.00%
<b>Total</b>	<b>208</b>	<b>8,258</b>	<b>2.52%</b>

## **Stroke**

One key factor in hospital care for a stroke patient is determining the type of stroke. The type of stroke is correlated with the location of the blocked vessel, thereby indicating the severity of the stroke and the type of treatment needed. All nine stroke centers in Santa Clara County are capable of thrombolysis, the administration of drugs to dissolve blood clots that have blocked major veins or arteries. As illustrated by the graph below, most strokes are caused by a blockage in a blood vessel that impedes oxygen delivery to the affected part of the brain, also called ischemic stroke. The second most common type of stroke is a blood vessel bleeding into the brain, also called hemorrhagic stroke. A transient ischemic attack is a brief blockage of blood supply to the brain and often a warning sign of an ischemic stroke.

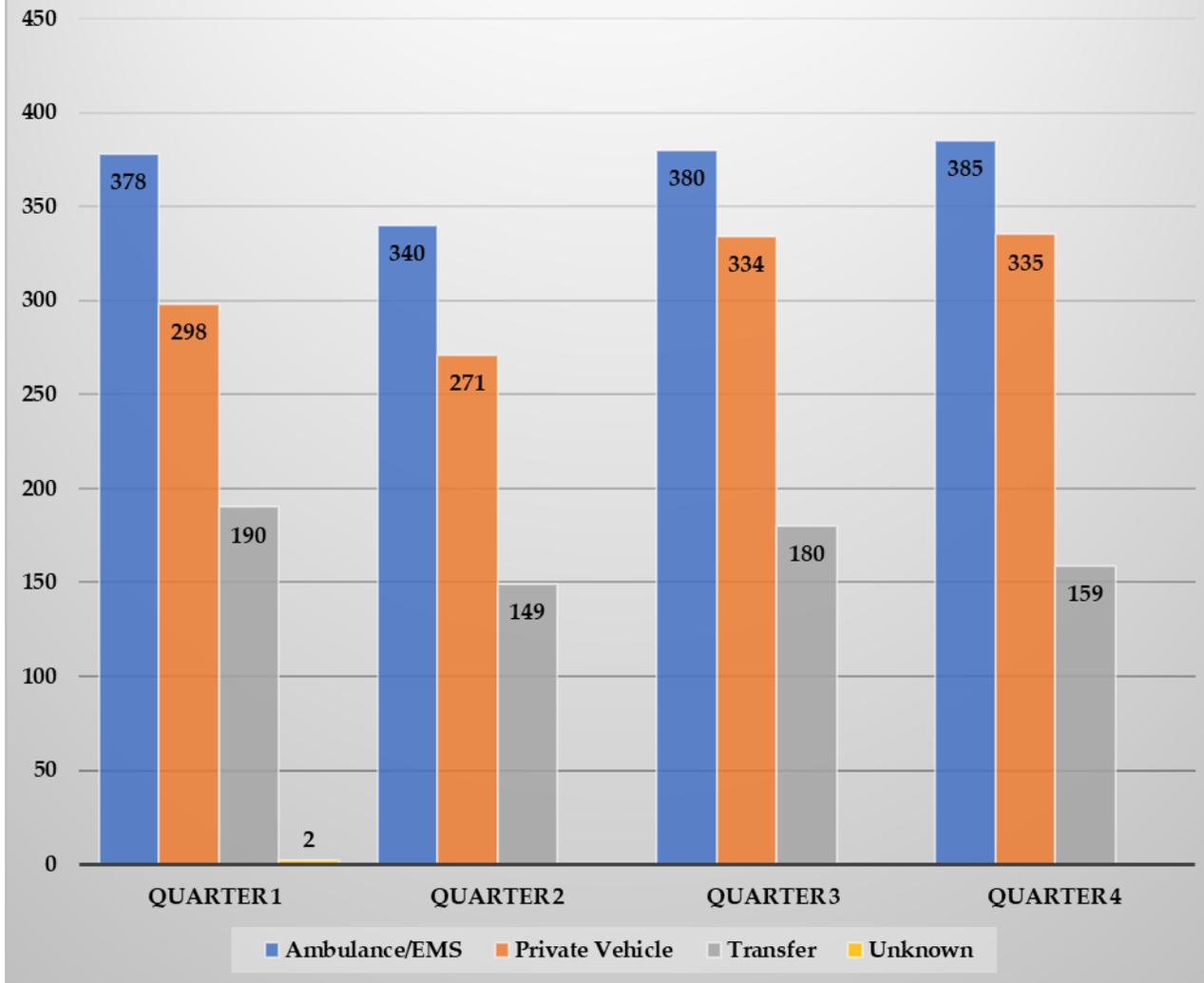
According to the Centers for Disease Control (CDC), Ischemic Strokes account for 87% of stroke patients in the United States. In 2020, 70% of stroke patients in the Santa Clara County EMS system suffered from Ischemic Stroke. While Transient Ischemic Attack (TIA) accounted for only 9% of stroke patients, it is critically important for these patients to understand this is an early warning sign of a future stroke.





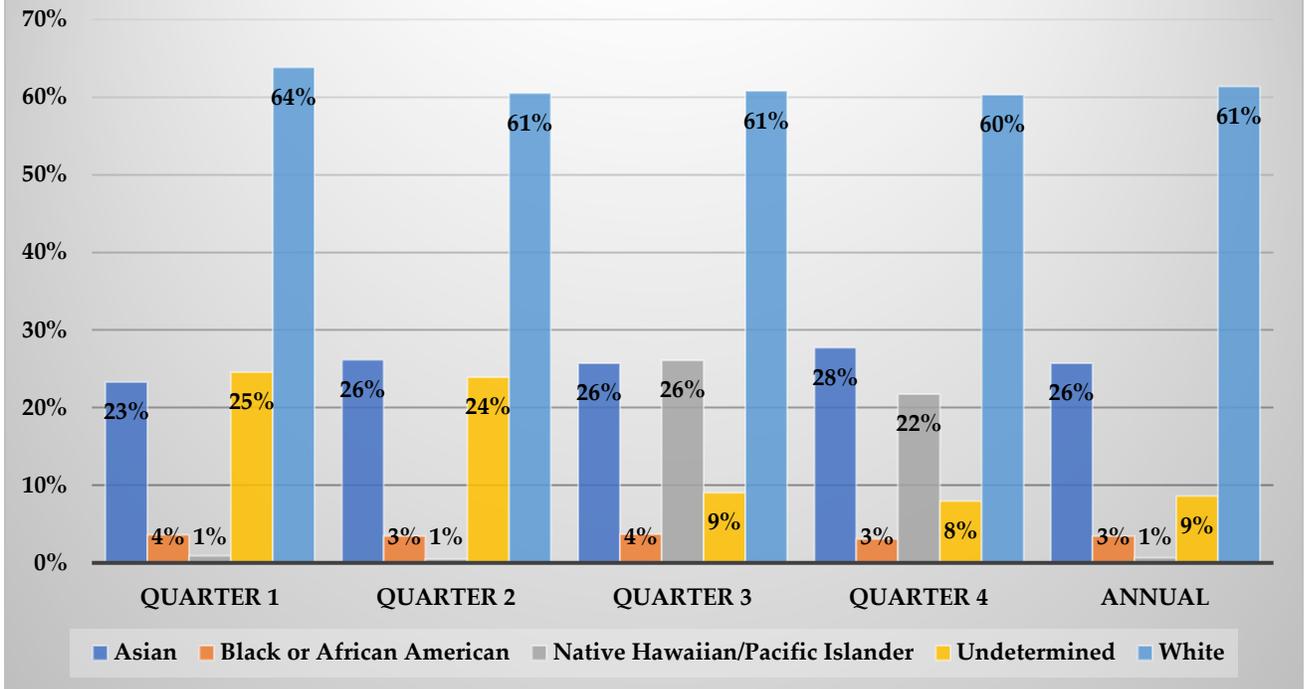
The median door to needle (Tissue Plasminogen Activator) time peaked at 39 minutes during Quarter 2 of 2020. The needle contains Tissue Plasminogen Activator, or tPa, a medication administered to break up a clot in veins and arteries. As our county stroke centers continued to pivot throughout the pandemic, door to needle times remained well below the national benchmark of 60 minutes. The interval between time last known well (TLKW) and tPa should not exceed 270 minutes (4.5 hours). Aside from outliers resulting from interfacility transfers or data entry errors, the median time last known well to tPa did not exceed 60 minutes and reached its lowest point in Quarter 4 at 49 minutes.

## Stroke Patient Method of Arrival, 2020 N= 3401

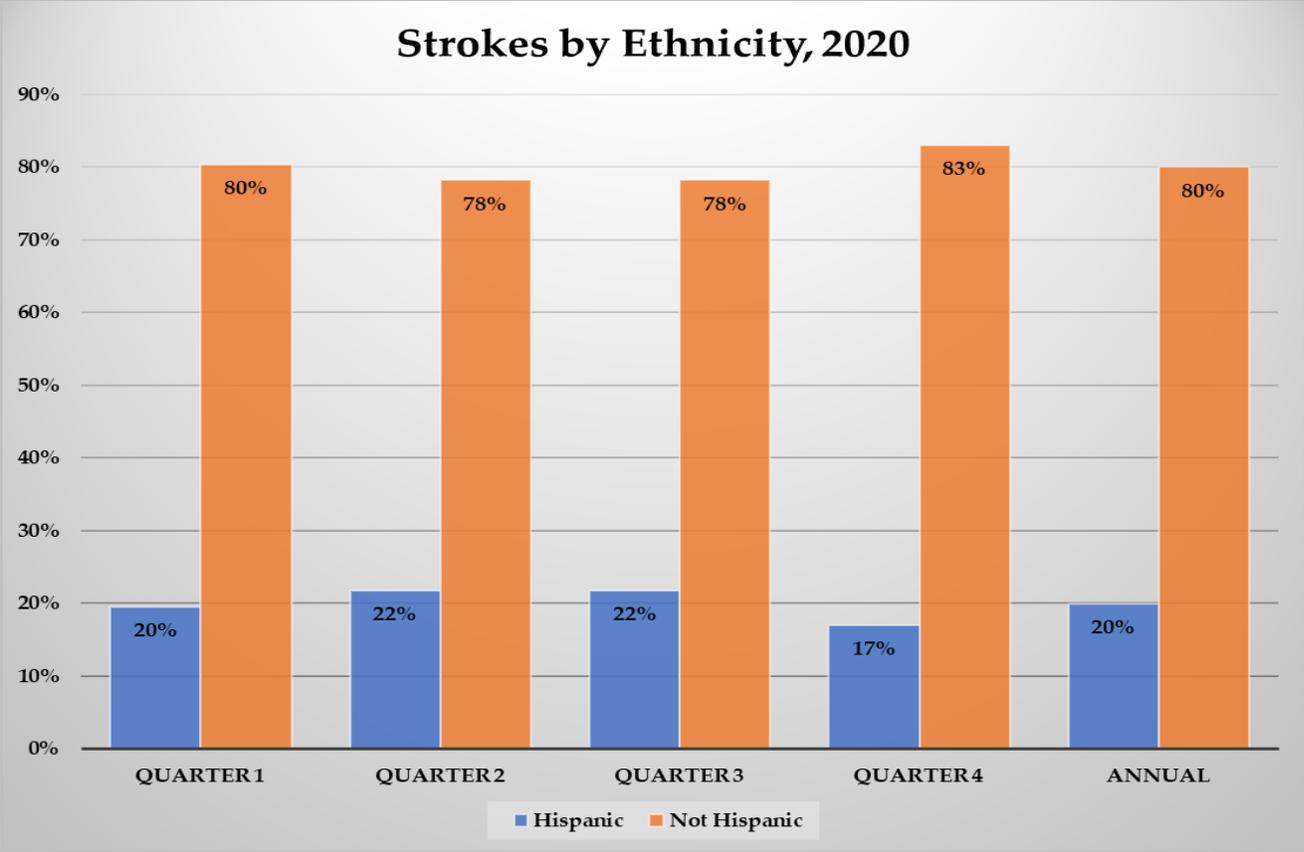


Like previous years, EMS services were more heavily utilized by stroke patients than other methods of transport to the hospital. Stroke patients arrived at the hospital by emergency ambulance 1,483 times or 44% of the time in 2020. Earlier medical treatment can be administered and increase the likelihood of survival and better recovery from a stroke if the patient is transported to the hospital via ambulance.

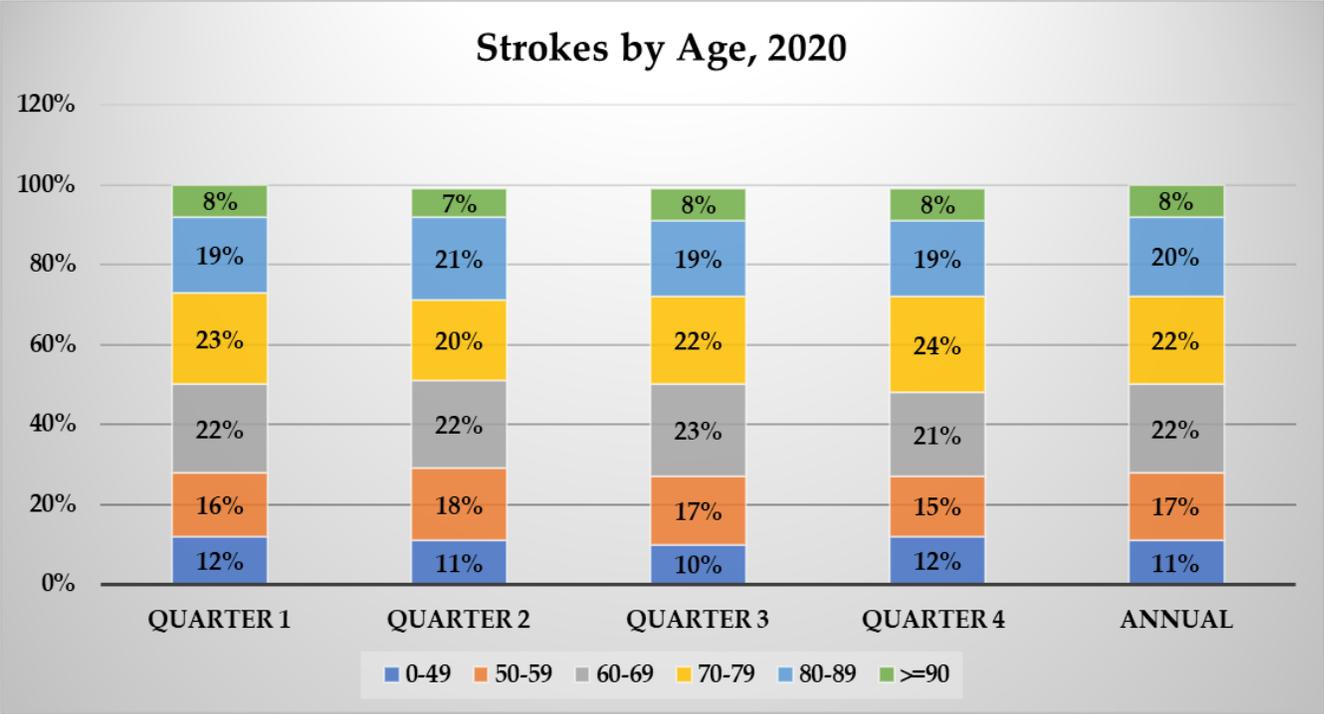
## Strokes by Race, 2020



The racial and ethnic demographics of Santa Clara County are dominated by three groups: White, Asian and Hispanic. Similarly, almost 90% of strokes occurred among residents of Santa Clara County who identified as White (61%) or Asian (26%). A notable increase in cases among Native Hawaiian/Pacific Islander was observed between Quarter 2 and Quarter 3 (1% to 26%). In accordance with demographic data where Hispanics represent 25% of the total population, 17% to 22% of stroke patients identified as Hispanic in 2020.



While a stroke can occur at any age, nearly 80% of strokes occur in people 70-79 years old and the likelihood of stroke increases every 10 years after the age of 55.



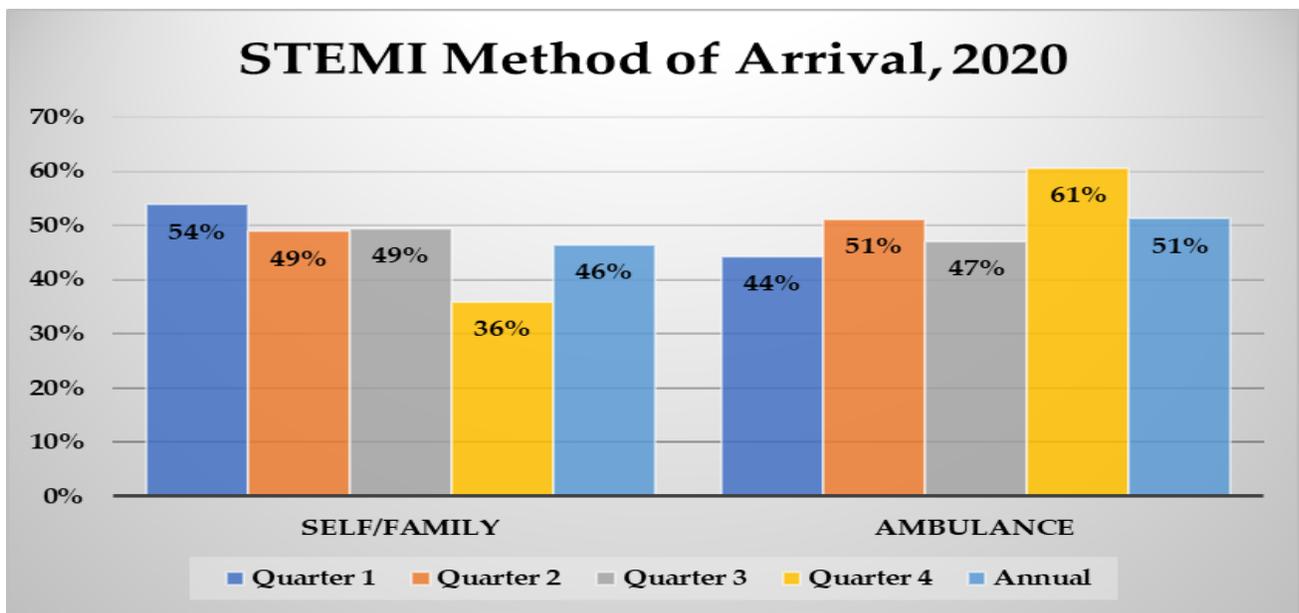
## ST Elevated Myocardial Infarction (STEMI)

When a major artery of the heart is completely blocked, the result is a massive heart attack known as a ST-Elevation Myocardial Infarction (STEMI). STEMI often leads to cardiac arrest, and subsequently fatality 95% of the time.

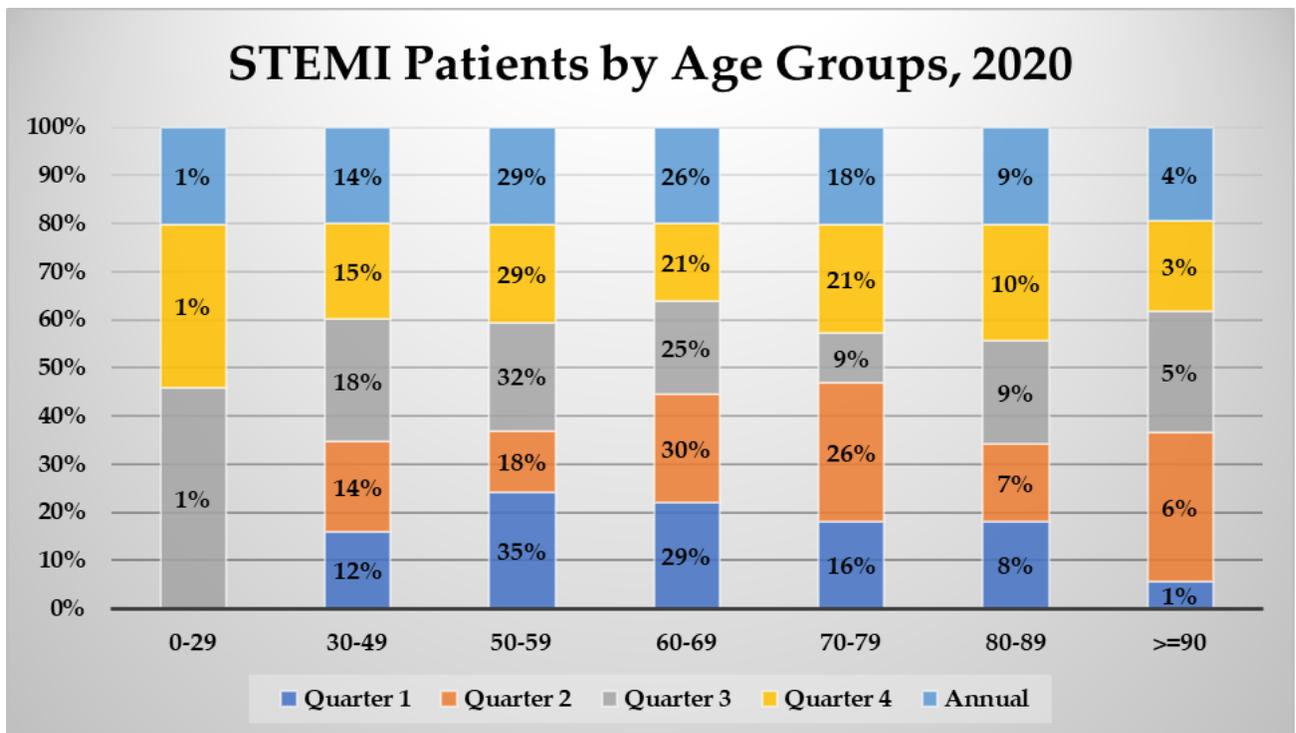
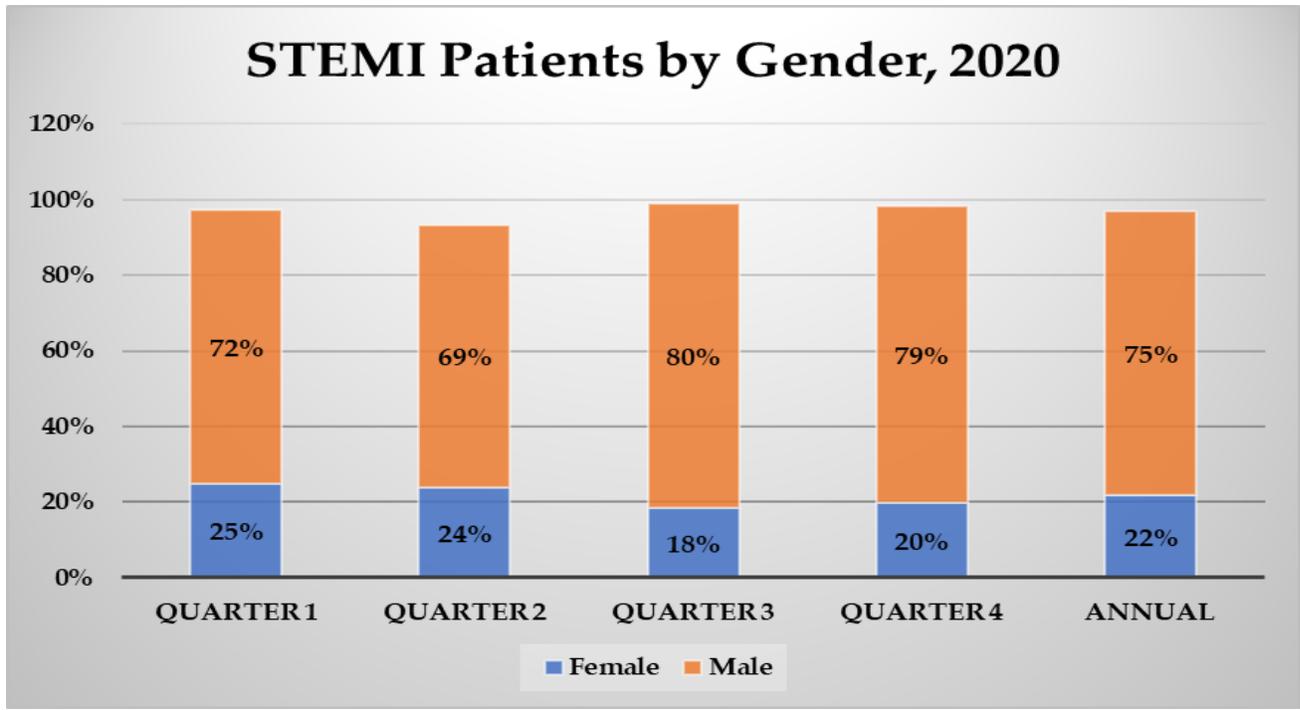
ST-segment elevation myocardial infarction (STEMI) is a type of heart attack that results in clot formation within a coronary artery leading to oxygen and nutrient deprivation of the downstream heart muscle. ST-elevation refers to the characteristic waveform finding on an electrocardiogram (EKG). Early recognition of a STEMI should set in motion decision making, drug and procedure preparations for this time-sensitive disease. The sooner blood flow is restored to the affected coronary artery by clot dissolving or direct removal the less injury there will be to the downstream muscle and the less likely long-term compromise of heart function will occur.

The American Heart Association recommends a Door to Balloon (D2B) interval of 90 minutes upon arrival at the ED or a STEMI center. To achieve these timeframes, there needs to be close coordination between the EMS system and the STEMI receiving center.

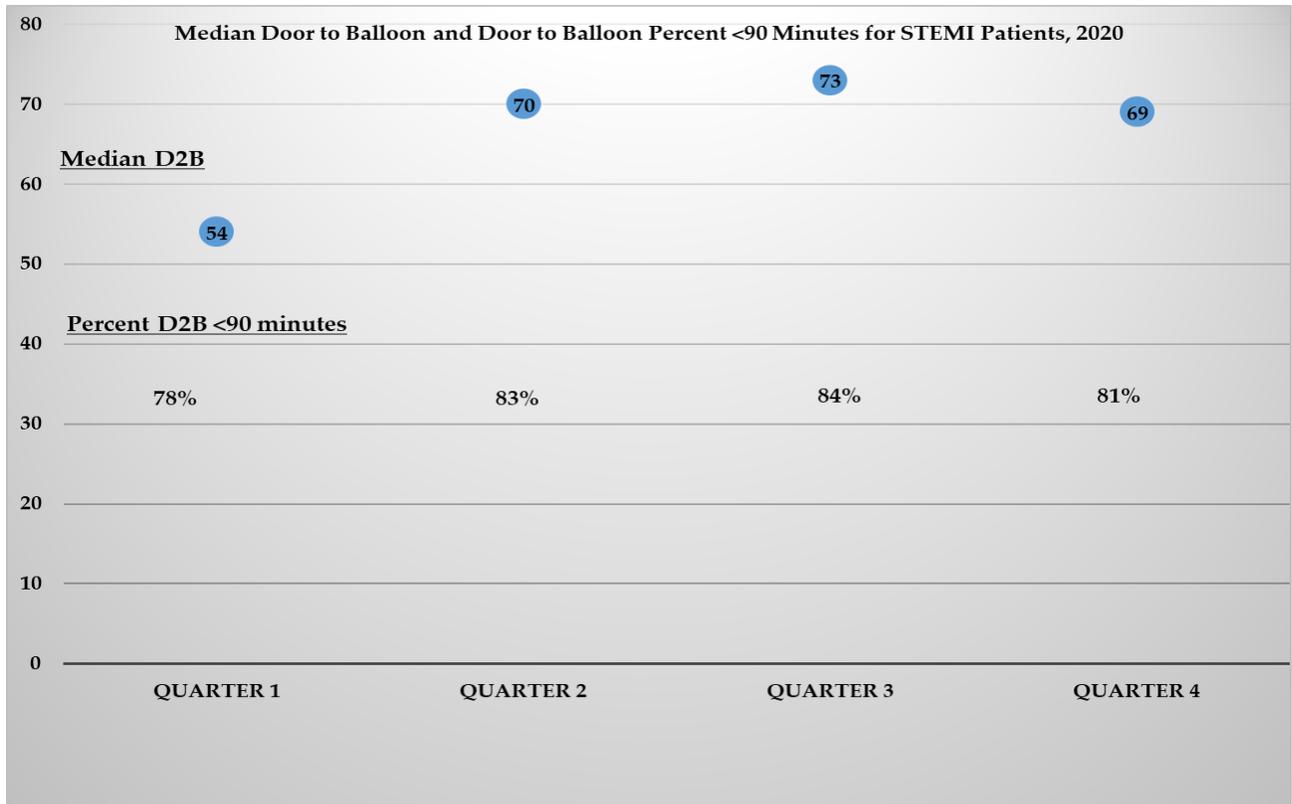
Like stroke, the preferred method of arrival to a hospital for STEMI is via ambulance. Throughout 2020, the method of arrival for STEMI patients was almost evenly split between private vehicle and ambulance. In Quarter 4, the method of arrival drastically shifted to two-thirds via ambulance and one-third via private vehicle.



Males accounted for approximately 75% of STEMI patients throughout 2020, similar to national statistics. In Quarter 3, the ratio of male to female STEMI patients reached its highest disparity at 4:1.



The median door to balloon time moderately increased throughout 2020 as STEMI specialty centers adjusted to the ongoing burden of COVID-19. During Quarter 3, when shelter in place restrictions began to ease, the median door to balloon time rose to its peak at 73 minutes. In all four quarters of 2020, the percent of door to balloon times less than 90 minutes exceeded 75%. These statistics reflect the continued valiant efforts of STEMI specialty center health professionals to provide stellar healthcare regardless of the impact of novel viruses.



## **EMS for Children**

In the Fourth Quarter of calendar year 2020, the EMS Agency began work on drafting policies and protocols related to Emergency Medical Services for Children (EMSC). EMSC is a specialty care program and a subdivision of the EMS System. The goal of an EMSC program is to ensure that acutely ill and injured children have access to high quality, coordinated and comprehensive emergency and critical care services appropriate for the special needs of children. The EMSC model provides a continuum of care beginning with the detection of sick or injured children and transport to the most appropriate emergency department all the way through rehabilitation. Designation of Pediatric Receiving Centers in Santa Clara County will help ensure that pediatric patients are transported to the most appropriate facility, which is staffed, equipped and prepared to administer care appropriate to the needs of pediatric patients. This will also help reduce the number of transfers of pediatric patients from one facility to another, which can be costly to the hospital, the patient's family or both, and can delay definitive care.

### **Pediatric patients (less than 15 years old) received via 911 ambulance**

Hospital	2020 (911)
Good Samaritan Hospital	180
Regional Medical Center	206
Kaiser Santa Clara	171
Kaiser San Jose	185
Stanford University Hospital	161
El Camino Hospital - Los Gatos	25
El Camino Hospital - Mountain View	153
Valley Medical Center	403
O'Connor Hospital	135
St. Louise Hospital	98



## Agency Operations

### Ambulance Service Providers

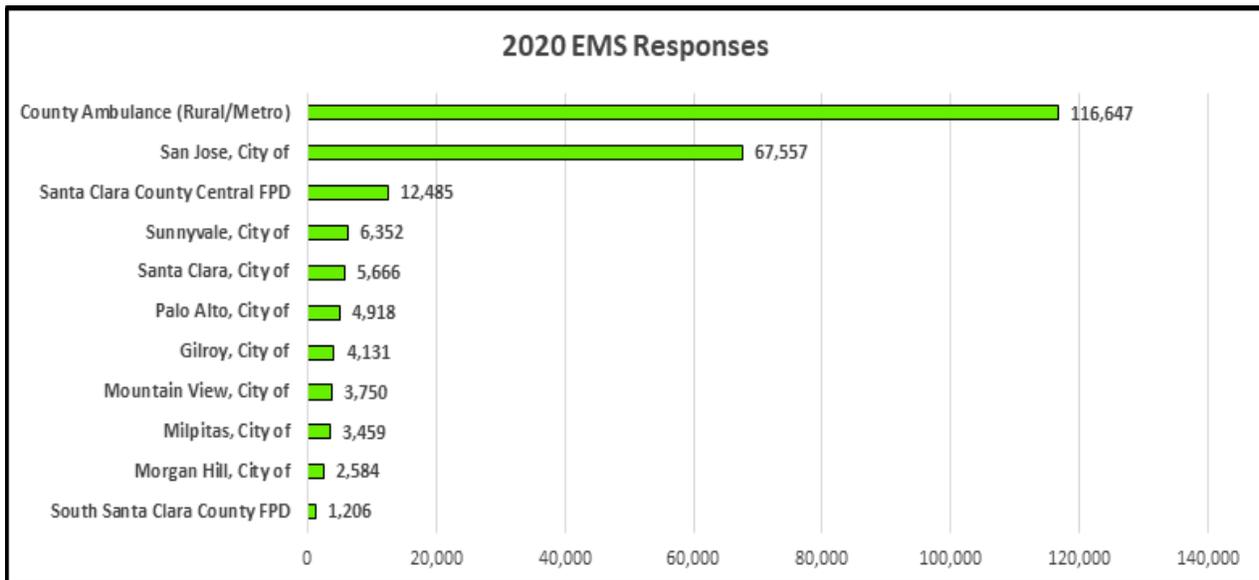
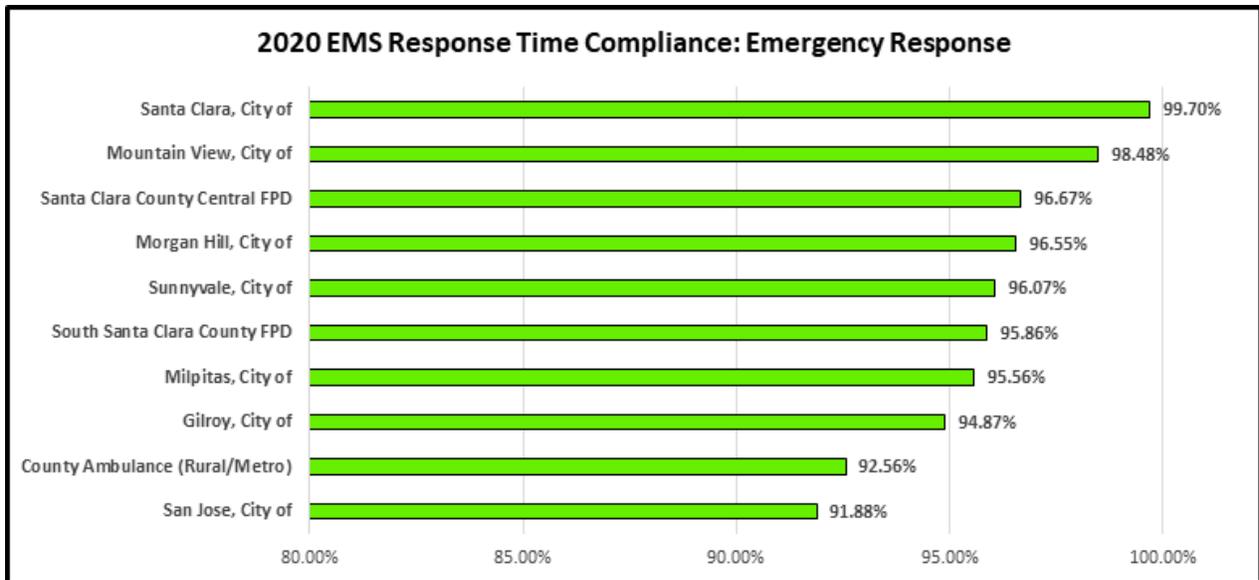
<b>Santa Clara County Ambulance Service Providers</b>				
<b>SERVICE PROVIDER</b>	<b>LEVEL OF SERVICES</b>			<b>NO. OF AMBULANCES</b>
CALSTAR	AIR			3
Gilroy Fire Department	ALS			1
NORCAL Ambulance Service	BLS	CCT		10
Royal Ambulance	BLS	CCT		32
American Medical Response	BLS	CCT		6
Rural Metro 9-1-1	ALS			64
ProTransport-1	ALS	BLS	CCT	30
Milpitas Fire Department	ALS			1
San Jose Fire Department	ALS			5
Santa Clara City Fire Department	ALS			4
Silicon Valley Ambulance	ALS	BLS		9
Stanford Life Flight	AIR			1
Falcon Critical Care Transport	BLS	CCT		9
Westmed Ambulance	ALS	BLS	CCT	22
				197

## **Vehicle Permitting**

The Permit Officer is responsible for ensuring Fire apparatus or EMS resource compliance with all the provisions of Chapter XVI of Division A18 of the County of Santa Clara Ordinance Code. Having all agencies self-inspect their apparatus alone is not sufficient. Conducting an audit of the emergency medical fleet helps ensure compliance. ImageTrend License Management lists all vehicle inspections that have been conducted by Agency staff and the date of each inspection. The database can be used to find the total number of inspections conducted each year. Emergency Medical Service providers must pay for permits on an annual basis. If the EMS Agency discovers an unpermitted apparatus that is operating in the county, providers will be subject to a financial penalty. When auditing providers, the EMS Agency can point out any issues to providers that may subject them to penalty. The cost of a permit includes County audits/inspections at no additional charge. When the EMS Agency staff inspects emergency vehicles, the inspector ensures that all the necessary supplies and equipment are on the vehicle to provide the best possible care for the people of Santa Clara County in a medical emergency. The EMS Agency had a goal of inspecting at least 15% of all permitted emergency medical vehicles in the county on a yearly basis. In 2020, the Agency was able to physically inspect 69 out of 439 permitted vehicles or 16%.

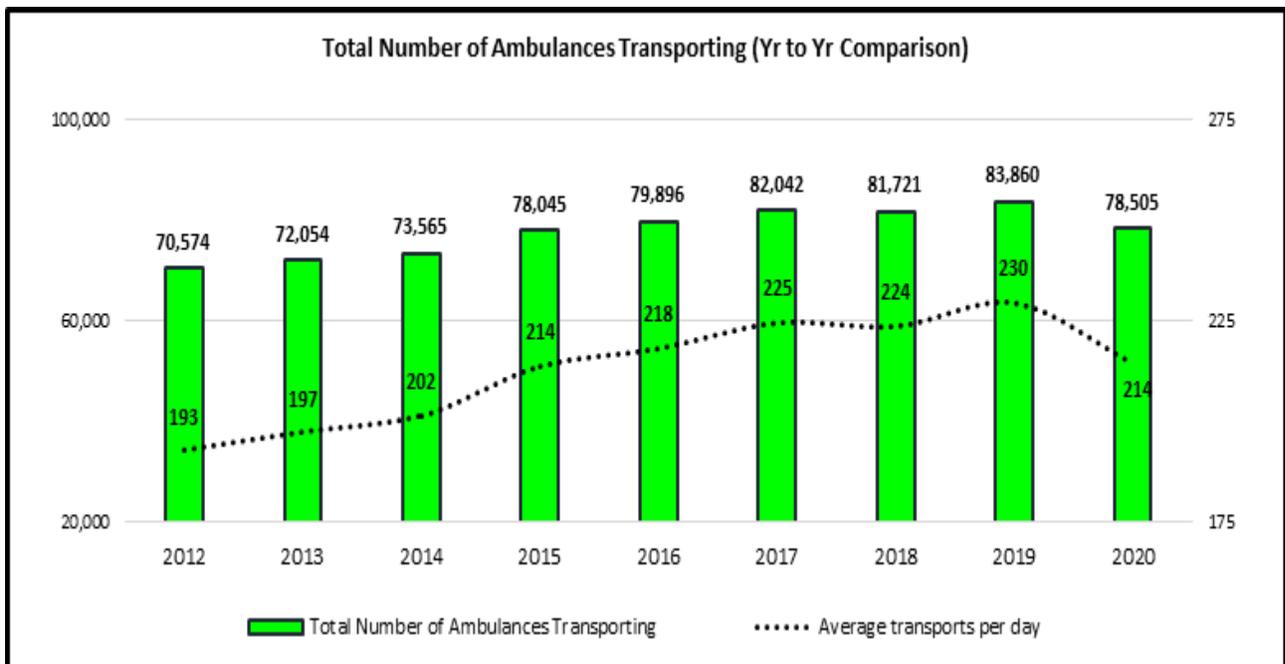
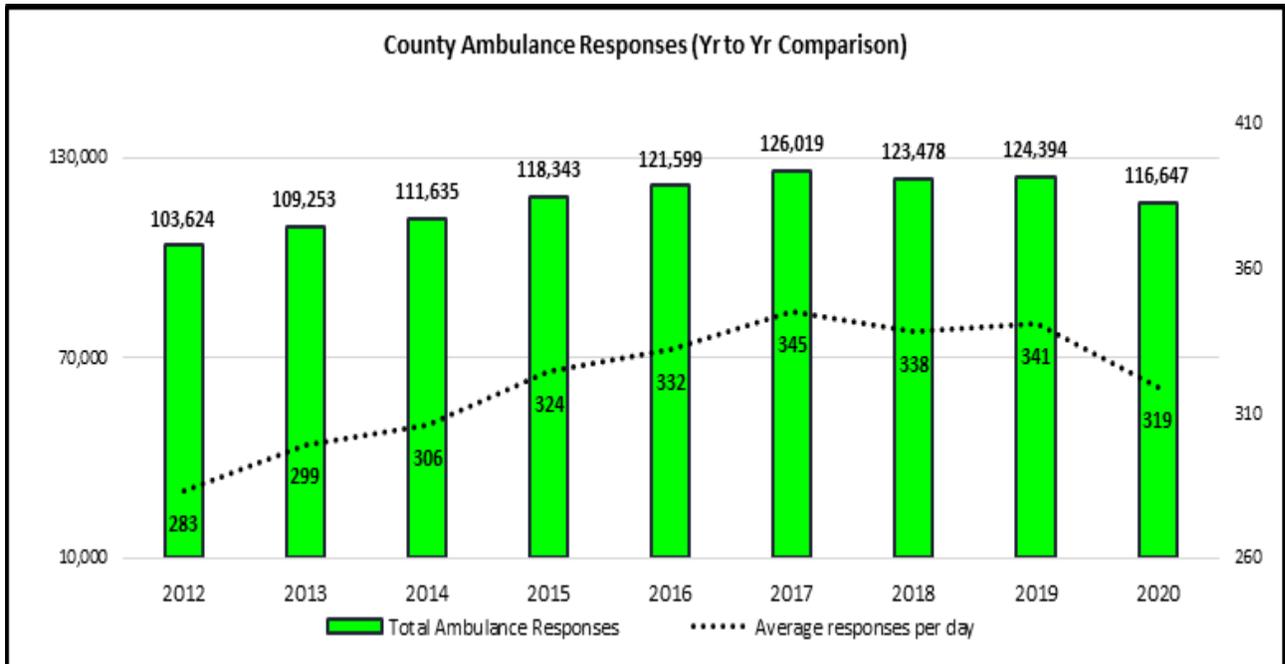
## **Response and Transport Performance**

The County currently maintains ten (10) agreements for emergency medical services. Response time performance is a key performance indicator for assessing compliance with the agreement requirements. Response time performance is measured monthly. The minimum performance standard for response time performance is 90.00%. The following chart measured month-to-month average Code 3 (lights and sirens) response performance for 2020.



Another key performance indicator used to measure system performance is response and transport utilization. In 2020, the County Emergency Ambulance Provider responded to 116,647 calls for service as shown in the above chart – 2020 EMS Responses. Those responses resulted in 78,505 patients being transported to local hospitals, which averaged to 214 transports per day. From an average daily perspective (24 hour), the County Emergency Ambulance Provider responded to 319 calls for service. From a narrower frequency perspective, there were 13 responses per hour or one response every four and a half (4.5) minutes. In 2020, responses and transports decreased slightly as compared to the previous year. The decrease in responses and transports was attributed to the COVID-19 pandemic and related public health officer orders.

The two charts below display year-to-year comparisons of the County’s ambulance responses including average responses per day (first chart), and the total number of ambulances transporting, along with the average transports per day (second chart).



## **Policy**

The following policies and protocols were released or updated by the County of Santa Clara EMS Agency in calendar year 2020.

Policy #	Policy Name	Date	Change
301	Supplemental EMS System Resources	1/1/2020	Updated
302	Prehospital Care Asset - Minimum Inventory Requirements	1/1/2020	Updated
500	Electronic Patient Care Record (ePCR) Documentation	1/1/2020	Replaced 311 and 314
503	EMS Patient Care Data System Overview	1/1/2020	Replaced 309 and 312
505	Command Event Record Documentation	1/1/2020	New Policy
509	EMS Elite Field Documentation User Guide	1/1/2020	New Reference Guide
602	911 EMS Patient Destination	1/1/2020	Replaced 403
602A	Trauma Center Service Areas	1/1/2020	Replaced 403
603	Hospital Bypass	1/1/2020	Updated
607	Non-Emergency Ambulance Utilization in the 911 EMS System	1/1/2020	Updated
610	Hazardous Material Incidents – EMS Response & Transport	1/1/2020	Updated
610A	Patient Decontamination Survey Sheet for Transport to Hospital	1/1/2020	New Policy
611	EMS Air Resource Utilization	1/1/2020	Updated
700-A02	Seizure	1/1/2020	Updated
700-A03	Hypoglycemia	1/1/2020	Updated
700-A07	Cardiac Arrest	1/1/2020	Updated
700-A08	Chest Pain	1/1/2020	Replaced 700-X04
700-A13	Stroke	1/1/2020	Updated
700-A15	Poisoning and Overdose	1/1/2020	Replaced 700-X03
700-A20	Excited Delirium	1/1/2020	Updated
700-M17	Traumatic Hemorrhage Control	1/1/2020	Updated
700-P02	Pediatric Seizure	1/1/2020	Updated
700-P03	Pediatric Altered Mental Status	1/1/2020	Updated
700-P15	Pediatric Poisoning and Overdose	1/1/2020	Replaced 700-X03
700-S04	Routine Medical Care Adult	1/1/2020	Updated
700-S05	Routine Medical Care Pediatric	1/1/2020	Updated
700-S11	Ventricular Assist Devices	1/1/2020	Updated
700-S14	Respiratory Viral Syndrome Transport Decision	4/13/2020	New Policy

614A	Fire Department Emergency Ambulance Use	4/15/2020	Replaced 902
700-X07	COVID-19 Specimen Collection Program	4/21/2020	New Policy
700-S12	Medical Priority Dispatch System (MPDS) Card Approval	5/4/2020	Updated
602	911 EMS Patient Destination	5/31/2020	Updated
507	Provider Codes	6/3/2020	Replaced 101
615	Operational Area Medical-Health Mutual Aid	6/3/2020	Updated
623	911 Emergency Ambulance Use	6/3/2020	Replaced 310
623A	Medical Priority Dispatch System (MPDS) Protocol 36 – Ambulance Dispatch Criteria	6/3/2020	New Policy
620A	Interfacility Transfer - Ground Ambulance	6/3/2020	Updated
623A	Medical Priority Dispatch System (MPDS) Protocol 36 – Ambulance Dispatch Criteria	8/24/2020	Updated
214	EMS Personnel Training Standards	9/1/2020	Updated
700-X08	Paramedic Vaccine Administration Approval	9/23/2020	New Policy
309	Private Ambulance Service EMS Personnel Markings & Protective Gear	10/5/2020	Replaced 613
309A	Protective Helmets	10/5/2020	Replaced 613
309B	Protective Jackets	10/5/2020	Replaced 613
309C	Ballistic Carriers/Helmets	10/5/2020	Replaced 613
653	County EOA Emergency Ambulance Low Level Mitigation Plan	10/5/2020	Updated
919	Standard Dispatch Orders	10/5/2020	Updated
507	Provider Codes	10/8/2020	Updated
620A	Interfacility Transfer - Ground Ambulance	10/8/2020	Updated

## Training & Education

Due to COVID-19, in person education that the Agency typically hosts was greatly impacted during 2020. Prior to the pandemic, the EMS Agency hosted an Ambulance Strike Team Leader (AST-L) training course in February with 37 attendees representing EMS Systems across Northern California. This course turned out to be significant during 2020 as ambulance strike team requests increased due to the multitude of wildfires throughout the State. With the increase in requests for Ambulance Strike Teams, northern California had more ambulance strike team leaders to organize and lead the teams. In efforts to help prepare Santa Clara County Ambulance personnel and strike team leaders for potential responses, multiple ambulance strike team exercises were conducted throughout the year. These exercises are designed to randomly select ambulances throughout the system and dispatch the crews to a location as they would for a real deployment. The crews are responsible for preparing themselves and their equipment for a deployment and obtain a briefing on the fictitious assignment. Working with their AST-L, a travel plan is developed including logistics (fuel, food, restrooms) and a communications plan for the deployment. By exercising regularly, our system is better prepared to respond to an immediate need Strike Team request in a safe, efficient and timely manner.

The EMS System public education campaigns made a pivot from our EMS related campaigns to support the Santa Clara County Public Health Department during the COVID-19 response. This included sharing of social media posts, providing data and feedback on impacts the EMS System was experiencing due to COVID-19, and providing personnel to take part in education campaigns produced by the Public Health Department.



Example of one of the campaigns the EMS System helped to promote for the Public Health Department. This campaign was focused on encouraging the Vietnamese community to wear a mask.

As COVID-19 impacted the Agency’s ability to host in person classes, the virtual classroom became the primary tool for education. Our EMS Agency hosted the annual EMS Update Train the Trainer course using a virtual platform. The course was offered in September 2020 with 41 EMS providers in attendance. The course covered updates to pediatric protocols, adult protocols, policy updates, and an introduction to 12-Lead training.

### **EMS Exam**

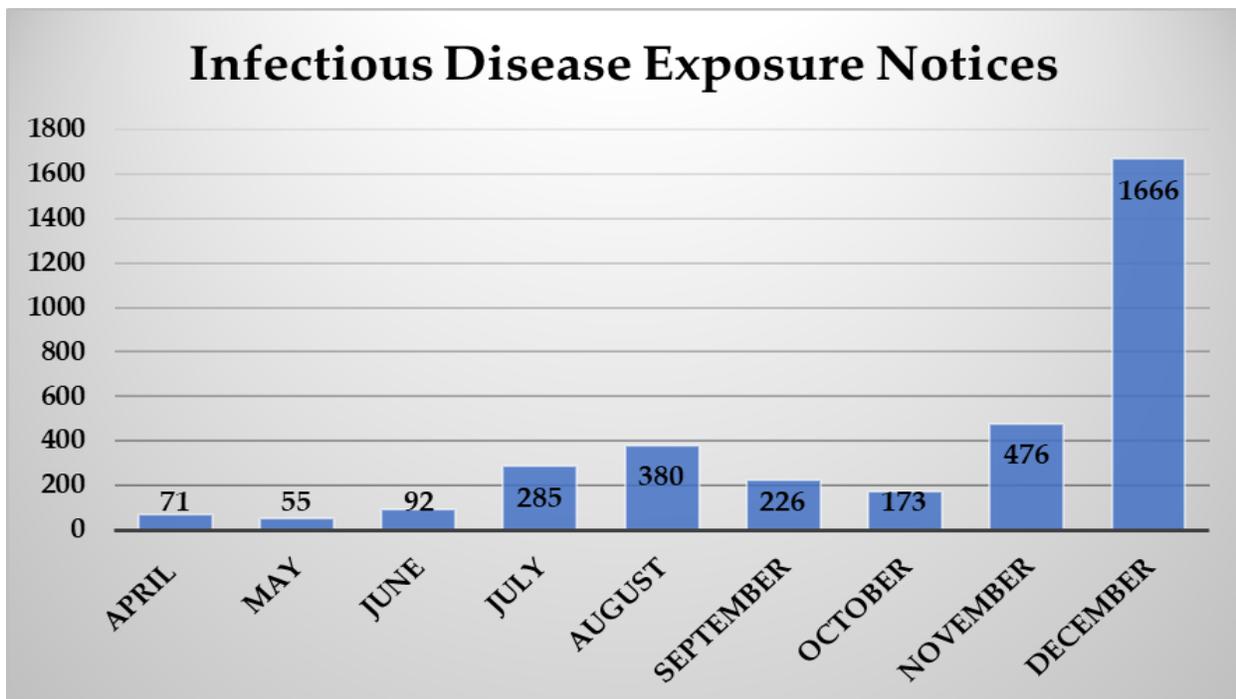
The County of Santa Clara EMS Agency also needed to re-think and adjust how the EMS system orientation exam was offered and administered due to the COVID-19 pandemic. With closing all conference rooms, training rooms and cancelling large gatherings the EMS Agency began testing reduced numbers of applicants in a socially distanced environment. Several exam times and dates were added to the schedule to accommodate the EMTs and paramedics entering the Santa Clara County EMS system. Data for the number of exams offered, and passing rates are listed below.

#### 2020 EMS Certification Exam Pass/Fail Results

Test 1	Pass	Fail	Pass %	Fail %
EMT	332	273	55%	45%
Medic	87	31	74%	26%
Test 2	Pass	Fail	Pass %	Fail %
EMT	210	41	84%	16%
Medic	22	2	92%	8%
Test 3	Pass	Fail	Pass %	Fail %
EMT	35	3	92%	8%
Medic	4	1	N/A	N/A
Test 4	Pass	Fail	Pass %	Fail %
EMT	4	0	100%	0%
Medic	0	0	N/A	N/A
Totals	Pass	Fail	Pass %	Fail %
EMT	581	317	65%	35%
Medic	113	34	77%	23%

## EMS Designated Infection Control Officer

In April of 2020, the EMS Agency implemented the EMS Designated Infection Control Officer (DICO) notification process as part of the Agency's response to COVID-19. Existing law requires all health facilities to notify prehospital emergency medical care personnel who have provided emergency medical or rescue services and have been exposed to a person afflicted with a reportable disease or condition that they have been exposed and should contact the county health officer under specified conditions. The law also requires a county health officer to immediately notify prehospital emergency medical care personnel that they have been exposed to a reportable disease or condition that the county health officer determines can be transmitted through oral contact or bodily secretions. In efforts to ensure all first responders that were involved on a call are notified, a single point of contact for all required reporting to any emergency medical care personnel was established. All reports were made via email to a new email address created solely for exposure notifications. The EMS DICO then investigated the event and ensured that any first responder verified to be on scene and involved in patient care was notified of the potential exposure. From the implementation of this program to December 31, 2020, the EMS DICO processed over 3,425 exposure notifications. The graph below depicts notifications from April through December 2020.



## Communications

In 2010, Santa Clara County entered into a Joint Powers Agreement (JPA) with 14 cities to form the Silicon Valley Regional Interoperability Authority (SVRIA). With significant collaboration, County Communications and the EMS Agency implemented and rolled out the new communications system in September of 2020. All Santa Clara County permitted ambulances are using the new communications system. All hospitals will have the new ambulance ring down radios installed by mid-2021 allowing for better communications with the hospitals within Santa Clara County.

Interoperability between law enforcement, fire departments and EMS has been greatly improved with the new communications system.

<b>Radio Distribution</b>	
<b>Non-911 Ambulance Provider</b>	<b>Radios Issued</b>
American Medical Response Sutter	10
Falcon Critical Care	8
NORCAL Ambulance	10
Pro Transport-1	31
Royal Ambulance	25
Silicon Valley Ambulance	9
United Ambulance	3
Westmed Ambulance	31
<b>Air Ambulance Providers</b>	<b>Radios Issued</b>
CALSTAR	3
Stanford Life Flight	1
<b>Hospitals</b>	<b>Radios Issued</b>
	22
<b>Total Radios Issued</b>	<b>153</b>



### **CAD (Computer Aided Dispatch)**

The Santa Clara County EMS Agency has been working with County Communications to determine the needs of EMS and build a new CAD system to replace the current outdated system. The new CAD system will improve the ability for dispatching and tracking all EMS resources. The CAD system is expected to be rolled out in early 2022.

## Achievements

### Employee Excellence Award

The Employee Excellence Awards Program is an opportunity for Santa Clara County to acknowledge outstanding employees who represent extraordinary public service consistently through exemplary leadership, demonstration of the County's core values, and outstanding contributions to their agencies/departments/districts. There are 10 honorees selected to receive an Outstanding Employee of the year award. The EMS Agency is proud that Daniel Franklin was selected as one of these Outstanding Employees for 2020.

Daniel served in our Emergency Operations Center for most of the pandemic not only as the Medical Health Unit Leader, but also as the Operations Chief when needed. Throughout this very challenging time, Daniel served the County of Santa Clara by his dedicated service and continued to work behind the scenes to perform many of his regular duties at the EMS Agency while working on an advanced degree.

Daniel fosters an environment of open and honest communication that has allowed people to challenge him and each other as they work through complex problems and opportunities. He recognizes the strengths of people, technical and personal style, and empowers people across the organization to make decisions. Congratulations Daniel!



## Summary

The annual report cannot include every positive contribution, but we have strived to highlight the exceptional service Santa Clara County EMS Agency provides to those we serve. We are honored to serve our community and remain dedicated to providing the highest level of emergency service.

2020 presented some unique challenges, some of which we will continue to face well into 2021 and beyond. The COVID-19 pandemic has highlighted the importance of planning, coordination, communication, and collaboration with all our community and EMS system stakeholders. It has allowed us to strengthen existing partnerships and forge new partnerships with our colleagues from around the region in public safety, public health and healthcare. Together, we have worked hard to ensure the health and safety of our personnel and our community and to follow and implement best practices while maintaining a proactive response to COVID-19.

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 do continuous quality improvement, 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 Agency here in Santa Clara County.

## Acknowledgements

A special thank you to our dedicated EMS Agency Staff for all their hard work and dedication throughout 2020.

Jackie Lowther, Director

Dr. Kenneth Miller, Medical Director

Patricia Natividad, Senior Management Analyst

Ramona Aguilar, Executive Assistant I

Richard Alameda, EMS Specialist

John Blain, EMS Specialist

Michael Cabano, EMS Specialist

Michael Clark, EMS Specialist

Ashanti Corey, Senior Epidemiologist

Ben Cortes, Office Specialist III

Christopher Duncan, EMS Specialist

Manuel Elias, Office Specialist III

Daniel Franklin, EMS Specialist

Aaron Herrera, EMS Specialist

Evangelina Ortiz, Administrative Assistant

Daniel Peck, EMS Specialist

Isaac Quevedo, EMS Specialist

John Sampson, EMS Specialist

David Sullivan, EMS Specialist

Jason Weed, EMS Specialist



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