The Agency has spent the year embracing the focus of the Triple Aim of health care. Our efforts have concentrated on improving the health of our population, reducing cost burdens to the system and enhancing the patient’s experience, while working collaboratively with our stakeholders. In recent years, the data system for the Santa Clara County EMS Agency has dramatically changed. The development of a data hub housed at the Agency has allowed the flow of data from all providers to this central location. This allows the Agency to provide an ongoing evaluation of our system’s performance and the care we provide to the community while employing the goals of the Triple Aim. The following report highlights our year’s activities, provides a system overview and evaluates our performance in various areas. The purpose of the data presented herein is to make data driven decisions which will improve patient outcomes and highlights the distinctiveness of emergency care.

**Calendar Year 2015 Statistics**

Population: 1,894,605 (July 2014 estimate)

- Fire Departments: 11
- Ground Ambulance Services: 10
- Air Ambulance Agencies: 2
- 9-1-1 Receiving Hospitals: 11

Emergency Department (ED) Visits: 482,770 (CY2014)

- 9-1-1 EMS Responses: 123,952
- 9-1-1 EMS Transports: 80,742
- EMS Aircraft Response: 136
- EMS Aircraft Transports: 67
**ST-Elevation Myocardial Infarction (STEMI)**

Our system has 8 STEMI Centers that focus on the care provided to patients that have myocardial infarctions (commonly known as heart attacks). These patients have time sensitive illnesses that require quick intervention by the STEMI centers’ cardiac teams. The following graph demonstrates that patients that arrive by EMS transport are treated by cardiac catheterization 12 minutes faster than those arriving by private vehicle. This is largely due to the early notification from EMS providers and the treatment provided prior to hospital arrival.

![Median D2B (minutes) by Transport Mode](image)

**D2B: Door-to-balloon**

<table>
<thead>
<tr>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS</td>
<td>Private Vehicle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>52</td>
<td>62</td>
<td>61</td>
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<tr>
<td>55</td>
<td>52</td>
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<td>61</td>
<td>58</td>
<td>66</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>67</td>
<td>71</td>
<td>70</td>
<td>66</td>
<td>69</td>
<td>69</td>
<td>66</td>
<td>66</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Median D2B</th>
<th>% D2B &lt; 90 mins</th>
</tr>
</thead>
<tbody>
<tr>
<td>62</td>
<td>96%</td>
</tr>
<tr>
<td>65</td>
<td>91%</td>
</tr>
<tr>
<td>62</td>
<td>96%</td>
</tr>
<tr>
<td>65</td>
<td>99%</td>
</tr>
<tr>
<td>62</td>
<td>98%</td>
</tr>
<tr>
<td>62</td>
<td>100%</td>
</tr>
</tbody>
</table>

98% of the time, facilities within the county are meeting the 90 minute benchmark for door-to-balloon times. This is well above the national 75% benchmark.
Sudden Cardiac Arrest

The Santa Clara County’s pre-hospital cardiac arrest data demonstrates a return of spontaneous circulation (ROSC) rate of 41% after cardiac arrest. This rate varies nationally from 10 to 60%, depending on the community. The rate is calculated off the number of Ventricular Fibrillation and (pulseless) Ventricular Tachycardia arrest patients, which is often considered a survivable rhythm with quick treatment. This type of arrest requires immediate defibrillation and high-quality emergency care.

VT/VF: Ventricular Tachycardia/Ventricular Fibrillation
ROSC: Return of Spontaneous Circulation
CPR: Cardiopulmonary resuscitation
AED: Automated External Defibrillators

The EMS prehospital quality and STEMI committees are working together to develop improvement strategies for these patients. Current sudden cardiac arrest initiatives are aimed at increasing our ROSC rate and decreasing mortality rates. The EMS Agency has trained over 3,600 community members in hands only CPR, contributed $250,000 for the purchase of Automatic External Defibrillator’s and have 2,670 AEDs registered with the agency.
Santa Clara County has 10 Stroke Centers in the system. In 2015, 2,639 patients were seen. Of those, 2,117 were ischemic strokes. Ischemic strokes have the potential to have a complete reversal of symptoms if treated in time with t-plasminogen activator (clot buster). As depicted in the adjacent chart, our percentage of strokes treated by IV tPA is 15%, well above the national average of 8%.

The treatment for strokes must begin within 3.5 hours from the onset of stroke symptoms. National benchmarks require that IV tPA is administered within 60 minutes from the patient’s arrival at the ED 50% of the time. Our stroke system currently has a median time of 55 minutes.
The EMS Agency has developed a task force to evaluate the system’s need for the designation of Comprehensive Stroke Centers. Approximately, 10% of our stroke population has a large vessel stroke. Current treatment for this type of stroke involves interventional radiology. This type of specialized care is only provided at a small number of facilities in our area. The task force is evaluating a prehospital triage methodology to provide direct transport of those select patients to those centers that provide this service to further improve outcomes for patients.
The EMS Agency and Behavioral Health Services Department collaborated with several system stakeholders to evaluate the rising number of 911 transports to the Emergency Psychiatric Services Department. Over a three year trend the EMS system has seen a 48% increase in transports to EPS. This data indicated a need to review the current process. The taskforce is working with law enforcement, hospitals as well as front line staff to improve safety for patients as
**911 Transports to Emergency Psychiatric Services (EPS)**

Dates: 2012-2015 – Data Availability

Total number of incidents: 1,225

Eighty-six percent (86%) of patients transported to EPS between 2012-2015 originated from the cities of San Jose and Gilroy. The most significant number of transports originated from the Gilroy area. Several of the improvement strategies instituted by the committee focused on reducing the call volume in this area. In this geographical area the only current option for transport of patients is to SCVMC. Review of appropriateness of evaluation is necessary.
A basic element of all emergency care is airway management. The intubation success rate for the Santa Clara EMS system is 57%. This compares to the California State median of 72%. While good ventilation is maintained to our patients by other methods, the quality improvement committee has focused its efforts on improving this skill among our paramedics. Through trust fund dollars, airway mannequins were purchased and hands-on training started in November 2015, and was completed in February 2016. The agency has also collaborated with several hospitals to provide simulation labs for our providers. Committee members have been instrumental in the development of an airway policy that will go into effect mid-2016. This policy has several facets to help address issues identified. It will mandate the bougie, (already stocked not being used) which in several studies this has demonstrated an increase in success rates, broadens the type of patients intubated, and will require the use of end-tidal CO₂ monitoring. Efforts to improve this skill are on-going. Considerations for the future include early intubation without stopping chest compression using the intubation guide, introduction of video laryngoscopy, continued skill-based education and practice, data collection in ImageTrend Elite on airway management decisions.
Regional Medical Center has surpassed Valley Medical Center in the number of ambulance transports they receive by almost 600 patients. Both facilities received over 15,000 ambulances in 2015. El Camino Mountain-View came in a distant third with 8,754 patients.

December and January continue to be our highest volumes by month.

With only three exceptions, diversion hours for the system stayed below the 37 hour benchmark.
In 2015, penetrating trauma was at its lowest level for trauma calls. It has dropped from 8% of our total trauma population, to 6%. Although lower in number, gunshot wounds (GSW) remain our highest case fatality. The system’s total trauma volume remains consistent at 7,796. The overall admission rate was 44.9% of the total volume.

Overall mortality rate is 2.00%, which is less than the current national rate of 4%, as reported by the National Trauma Data System.
Mechanism of Injury by Trauma Center Catchment Area

**COUNTYWIDE**

- **Motor Vehicle Crash**: 36% (N=2,768)
- **Other 6%**: (N=474)
- **Stabbing 3%**: (N=474)
- **Pedestrian/Bicycle 14%**: (N=1,121)
- **Motorcycle Crash 8%**: (N=609)
- **Assault 5%**: (N=355)
- **Fall 27%**: (N=2,066)

**N=7,796**

**SHC**

- **33.4% (N=2,606)**
  - **Motor Vehicle Crash**: 16% (n=424)
  - **Other 7%**: (n=190)
  - **Stabbing 1%**: (n=33)

**VMC**

- **39.8% (N=2,963)**
  - **Motor Vehicle Crash**: 39% (n=1,159)
  - **Other 8%**: (n=235)
  - **Stabbing 8%**: (n=244)
  - **Pedestrian/Bicycle 4%**: (n=116)
  - **Motorcycle Crash 2%**: (n=49)
  - **Assault 4%**: (n=128)

**RMC**

- **29.9% (N=2,227)**
  - **Other 4%**: (n=99)
  - **Motor Vehicle Crash 3%**: (n=64)
  - **Motorcycle Crash 13%**: (n=279)
  - **Pedestrian/Bicycle 8%**: (n=180)
  - **Other 7%**: (n=145)

**SHC: Stanford Health Care**
**VMC: Valley Medical Center**
**RMC: Regional Medical Center**

Santa Clara County EMS Agency

June 2016
Incidents of Trauma by Cause and Age Range

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>&lt;1 yr</th>
<th>1-4 yrs</th>
<th>5-14 yrs</th>
<th>15-24 yrs</th>
<th>25-44 yrs</th>
<th>45-64 yrs</th>
<th>&gt;65 yrs</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Vehicle Crash</td>
<td>18</td>
<td>47</td>
<td>140</td>
<td>794</td>
<td>942</td>
<td>577</td>
<td>250</td>
<td>2,768</td>
<td>36%</td>
</tr>
<tr>
<td>Fall</td>
<td>46</td>
<td>126</td>
<td>171</td>
<td>128</td>
<td>265</td>
<td>452</td>
<td>878</td>
<td>2,066</td>
<td>27%</td>
</tr>
<tr>
<td>Bicycle/Pedestrian</td>
<td>3</td>
<td>20</td>
<td>91</td>
<td>189</td>
<td>296</td>
<td>398</td>
<td>124</td>
<td>1,121</td>
<td>14%</td>
</tr>
<tr>
<td>Motorcycle Crash</td>
<td>8</td>
<td>138</td>
<td>282</td>
<td>161</td>
<td>20</td>
<td>609</td>
<td>36%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>23</td>
<td>74</td>
<td>83</td>
<td>142</td>
<td>107</td>
<td>40</td>
<td>474</td>
<td>6%</td>
</tr>
<tr>
<td>Assault</td>
<td>3</td>
<td></td>
<td></td>
<td>86</td>
<td>155</td>
<td>103</td>
<td>8</td>
<td>355</td>
<td>5%</td>
</tr>
<tr>
<td>Stabbing</td>
<td>1</td>
<td></td>
<td></td>
<td>89</td>
<td>101</td>
<td>47</td>
<td>10</td>
<td>248</td>
<td>3%</td>
</tr>
<tr>
<td>Gunshot Wound</td>
<td>3</td>
<td>62</td>
<td>70</td>
<td>18</td>
<td>2</td>
<td>155</td>
<td>2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td>75</td>
<td>217</td>
<td>487</td>
<td>1,569</td>
<td>2,253</td>
<td>1,863</td>
<td>1,332</td>
<td>7,796</td>
<td>% (age)</td>
</tr>
</tbody>
</table>

Trauma Deaths by Cause

<table>
<thead>
<tr>
<th>Cause of Injury</th>
<th>Number of Deaths</th>
<th>Number of Injuries</th>
<th>Case Fatality Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gunshot Wound</td>
<td>22</td>
<td>155</td>
<td>14.19%</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>27</td>
<td>461</td>
<td>5.86%</td>
</tr>
<tr>
<td>Fall</td>
<td>47</td>
<td>2,066</td>
<td>2.27%</td>
</tr>
<tr>
<td>Motorcycle Crash</td>
<td>13</td>
<td>609</td>
<td>2.13%</td>
</tr>
<tr>
<td>Bicycle</td>
<td>12</td>
<td>660</td>
<td>1.82%</td>
</tr>
<tr>
<td>Stabbing</td>
<td>4</td>
<td>248</td>
<td>1.61%</td>
</tr>
<tr>
<td>Other Blunt</td>
<td>4</td>
<td>402</td>
<td>1.00%</td>
</tr>
<tr>
<td>Motor Vehicle Crash</td>
<td>26</td>
<td>2,768</td>
<td>0.94%</td>
</tr>
<tr>
<td>Assault</td>
<td>1</td>
<td>355</td>
<td>0.28%</td>
</tr>
<tr>
<td>Impalement</td>
<td>0</td>
<td>5</td>
<td>0.00%</td>
</tr>
<tr>
<td>Other Penetrating</td>
<td>0</td>
<td>67</td>
<td>0.00%</td>
</tr>
<tr>
<td>Total</td>
<td>156</td>
<td>7,796</td>
<td>2.00%</td>
</tr>
</tbody>
</table>
Trauma Patient Overview Report

Total Trauma Patients
N=7,796

Interfacility Transfers
8.4% (N=651)

EMS TRANSPORTS
81.7% (N=6,366)

Police/Private Vehicle/Walk-In
9.1% (N=709)

Ground Ambulance
79.1% (N=515)

Air Ambulance
20.9% (N=136)

Ground Ambulance
94.7% (N=6,028)

Air Ambulance
5.3% (N=337)

Ground Ambulance
94.7% (N=6,028)

Air Ambulance
5.3% (N=337)

99.0% (N=510)

93.4% (N=127)

97.8% (N=5,897)

97.6% (N=329)

99.6% (N=706)

1.0% (N=5)

6.6% (N=9)

2.2% (N=131)

2.4% (N=8)

0.4% (N=3)

Lived

Died

Median Transport Time*

17 mins.

16 mins.

Median Transport Time*

12 mins.

14 mins.

*Time Transport Unit Left Scene to Time Transport Unit Arrived at Hospital
Trauma Patient Emergency Department Disposition

Ground Ambulance Transport
N=6,033

- Home, 50.3% (N=3,037)
- Floor, 23.6% (N=1,425)
- ICU, 14.3% (N=862)
- OR, 5.9% (N=357)
- Other, 3.3% (N=198)
- Transfer, 0.9% (N=53)
- Death, 0.9% (N=56)
- AMA, 0.7% (N=45)

Air Ambulance Transport
N=342

- Home, 32.5% (N=111)
- Floor, 21.1% (N=72)
- ICU, 28.9% (N=99)
- OR, 14.0% (N=48)
- Other, 2.0% (N=7)
- Transfer, 0.6% (N=2)
- Death, 0.3% (N=1)
- AMA, 0.6% (N=2)

AMA: Against Medical Advice
ICU: Intensive Care Unit
OR: Operating Room
**Emergency Medical Dispatch Task Force**

In late 2015, the EMS Agency began laying the groundwork for an Emergency Medical Dispatch Task Force. Task Force members were selected. The groups consist of stakeholders from the Public Safety Communication Managers Association, Santa Clara County Fire Chiefs Association, Santa Clara County private ambulance service providers, Santa Clara County Ambulance, and Santa Clara County Communications. Three working groups were formed to supplement the Task Force. The groups include Quality Improvement, Operations and Medical Control. Membership on the work groups is open to all system stakeholders. The purpose of the Task Force is to evaluate the Emergency Medical Dispatch process, using a continuous quality improvement method to ensure that the right resource is delivered to the right patient, at the right time, with the right disposition. This is consistent with the Triple Aim of improving the patient experience, improving the health of the population, and reducing the cost. A majority of the work will occur in 2016. Multiple new policies will be created as a result of this Task Force.

**Reporting Structure**

The reporting structure of the EMS Agency has seen significant changes in 2015. The Agency has moved out of Department of Public Health and now reports directly to the Health and Hospital System. This change comes with the Agency increasing leadership role in whole patient care and emergent population health. With this change, also came a new location for the Agency. Moving to our new home in the Medical Society building at 700 Empey Way, San Jose occurred in December after months of planning and packing.

**Training and Education**

From January 1, 2015, to December 31, 2015, the Santa Clara County EMS Agency provided 9,602 hours of continuing education to 1,287 EMS personnel. The EMS Agency provided training classes which included a Professional Development Symposium on Social Identity Theory related to Situational Awareness for first responders, hospital staff, and public safety personnel, a Designated Infection Control Officer class, a Six Sigma Black Belt class, and multiple Hazardous Materials First Responder Operations classes.

<table>
<thead>
<tr>
<th>EMS Training and Education</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training opportunities</td>
<td>32</td>
</tr>
<tr>
<td>Number of prehospital personnel in attendance</td>
<td>1,287</td>
</tr>
<tr>
<td>Number of continuing education hours provided</td>
<td>9,602</td>
</tr>
</tbody>
</table>

The annual EMS Update train-the-trainer course was held in October 2015. It is a class for EMS Program Managers from all of the fire departments, ambulance services, and hospitals. This course prepares trainers to teach field responders in their respective departments/companies about the EMS System policy updates, which took effect in February 2016. All training materials were provided at no cost to Santa Clara County EMS System Providers, based on available grants and the EMS Trust Fund.
Public Education

During 2015, the EMS Agency promoted 12 public education campaigns related to emergency medical services. These monthly campaigns included Carbon Monoxide Poisoning, Influenza, the Santa Clara County Emergency Alert System (AlertSCC), Pool Safety, Preventing Snake Bites, STROKE Awareness, Heart Attacks, Heart Attacks and Women, Heat Related Illness, Falls and Seniors, and “Pull to the Right for Sirens and Lights”. Each month the EMS Agency provides educational campaign materials to every fire department and ambulance service within the Santa Clara County EMS System. These materials include educational flyers, postcards, posters and pamphlets to distribute the community, and talking points for use during presentations. By coordinating the public education campaigns for all providers within the EMS System, the public message is consistent, regardless of which organization provides the message. This minimizes the possibility of misinformation and assures a coordinated message countywide.

Exercises

The EMS Agency conducts exercises to assess the capabilities of the Santa Clara County EMS System. Over 60 exercises were conducted during 2015 and ranged from drills, which test specific capabilities and functions of the EMS System (hospital bed availability and patient routing), to full-scale exercises designed to practice EMS response to multi-casualty incidents.

Data System

The EMS Agency, and its prehospital partners, continue to work towards the development and implementation of the new National EMS Information System (NEMSIS) 3 standards within all of EMS data solutions. This transition includes the EMS System’s credentialing system, electronic patient care record system, as well as the specialty center registry systems for STEMI, Stroke, and Trauma. This new system will also allow initial patient documentation to be transmitted directly to the hospitals enhancing patient care significantly. The targeted time to be fully moved over to the new standard will be Fall of 2016.
**County Ambulance (Operated by Rural/Metro)**

County Ambulance, operated by Rural/Metro, has continued to meet required performance standards during this period. The minimum response time standard is 90%; when Rural/Metro exceeds an adjusted per-zone and code of response (lights and siren/non-lights and siren) of 92%, liquidated damages are refunded on a monthly basis. During the January 2015 through December 2015 reporting period, Rural/Metro met contractual response time standards in each of the five subzones, every month.
First Responder Response Times to Emergency Calls

Fire departments are required to respond to call within 7.59 seconds in cities, those who achieve a response time of 95% or greater are exempted from any response time liquidated damages incurred during that month. The San Jose Fire Department did not comply with the 90th percentile response time performance standard for eleven of the twelve months, however are working to improve response time performance. All other first responder met the response time’s requirements from January 2015 through December 2015 to calls by month and code of response (emergency light and siren/non-lights and siren). Several fire departments choose to respond Code 3 to all incidents.
Medical Volunteers for Disaster Response (MVDR)

The MVDR Program currently has 948 members, of those 106 are Level 4 (ready to be deployed individually), 259 are Level 3 (ready to deploy to augment operations as a units) and 583 (Level 2) are available for disaster response support. The membership continues to be diverse and span a large range of medical capabilities and support functions including logistics personnel, physicians, pharmacist, nurses, paramedics, EMTs, dispatchers, and allied health personnel.

The MVDR Program current mission focuses on increasing the number of people trained to perform hands only CPR in the County. To date approximately 2,600 people have been trained by MVDR members and plans are in place to continue to increase these numbers over the next year. Recently the MVDR Program has transitioned to a new Program Manager that will oversee MVDR functions. The program continues to provide support to the EMS System; recent efforts include support of Super Bowl 50 operations, the Statewide Medical/Health Exercise and the annual three day Wildland Fire Exercise.

Countywide Multi-jurisdictional Multi-disciplinary Task Force (CMTF)

Three CMTF positions (fire, law enforcement and EMS) have been funded by the State Homeland Security Grant Program since 2003. These three positions serve as subject matter experts in their specific discipline and participate in all equipment purchased through the grant. They are responsible for maintaining central inventories and providing resources to all public safety partners within the County. In the past year, the EMS CMTF led medical/health planning and operational efforts related to Super Bowl 50, developed and submitted requests in response to State Homeland Security Grants Program, conducted equipment training and maintenance, facilitated the training of medical volunteers, led the weekly development and distribution of a EMS System Action plan that includes planned events occurring in each jurisdiction within the County, and participated in collaborative training.

In summary, the EMS Agency and its partners conducted a great deal of work in calendar year 2015 and is focused on continuing to make improvements to the system and patient outcomes to help further the SCVHHS vision of Better Health for All.