



**RIVERSIDE COUNTY EMS AGENCY  
PATIENT CARE CONTINUUM REPORT  
FISCAL YEAR 2019-2020**

AUGUST 17<sup>TH</sup>, 2020

PREPARED BY RIVERSIDE COUNTY EMS AGENCY, EMERGENCY MANAGEMENT DEPARTMENT

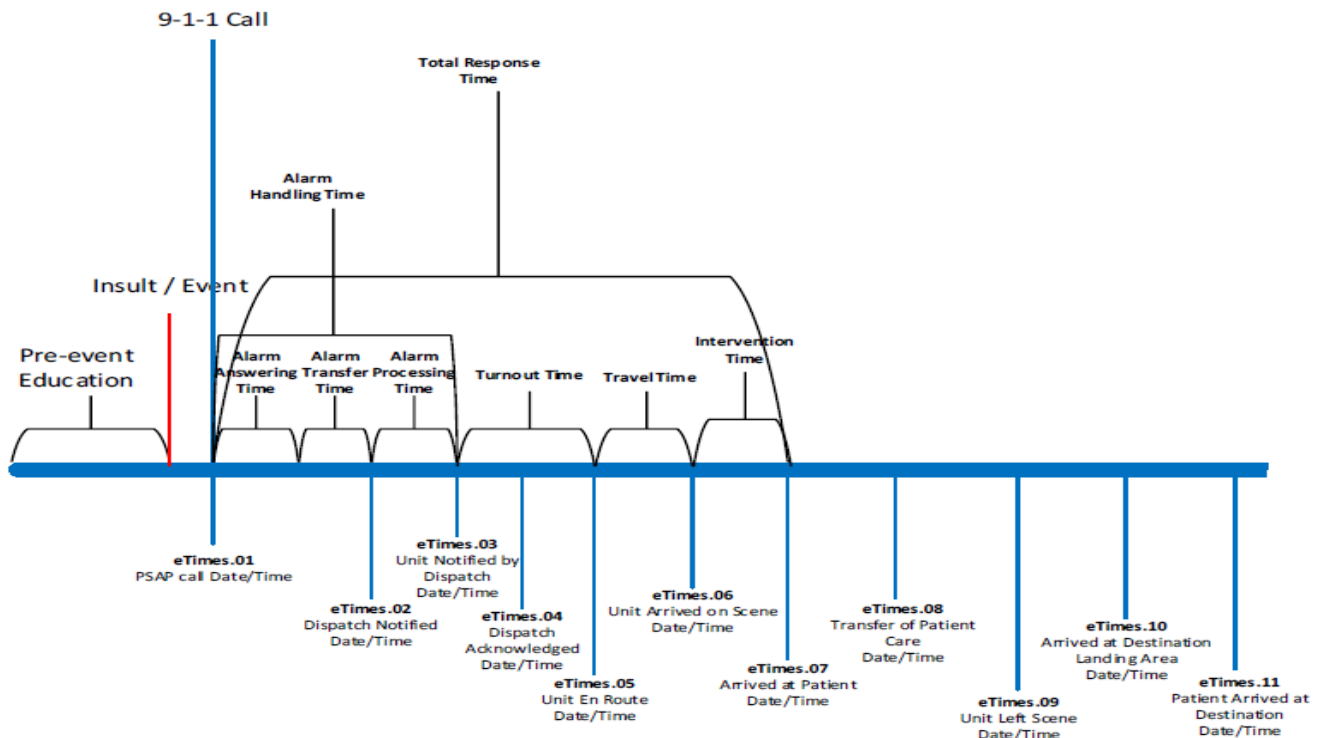
# PATIENT CARE CONTINUUM REPORT

The purpose of this report is to provide analysis of the prehospital time intervals identified in REMSA Policy 2203-Patient Care Continuum Time Standards. Additional time intervals were added to the analysis to further measure the prehospital continuum of patient care from dispatch to hospital arrival.

Below are time interval definitions and their corresponding NEMSIS 3.4 timestamps. Time intervals in italics are intervals not currently in Policy 2203.

- Alarm Answering Time – eTimes.01 to eTimes.02
- Alarm Transfer Time – eTimes.01 to eTimes.02 (when the call is transferred to another designated entity)
- Alarm Handling Time – eTimes.01 to eTimes.03
- Alarm Processing Time – eTimes.02 to eTimes.03
- Turnout Time – eTimes.03 to eTimes.05
- Travel Time – eTimes.05 to eTimes.06
- Intervention Time – eTimes.06 to eTimes.07
- *Unit Response Time – eTimes.03 to eTimes.06*
- Total Response Time – eTimes.01 to eTimes.07
- *Arrived On Scene To Arrived At Destination Time – eTimes.06 to eTimes.11*
- *Total On Scene Time – eTimes.06 to eTimes.09*
- *Total Time On Scene With Patient – eTimes.07 to eTimes.09*
- *Transport Time – eTimes.09 to eTimes.11*
- *Unit Prehospital Time With Patient – eTimes.07 to eTimes.11*
- *Total Unit Prehospital Time – eTimes.03 to eTimes.11*
- *Total Prehospital Time – eTimes.01 to eTimes.11*

**Pre-hospital Patient Care Continuum from dispatch to arrival at destination. Adapted from REMSA Policy 2203.**



## Methodology

### Data

**394,253 ePCRs** (electronic patient care reports) were initially identified on ImageTrend® Elite Report Writer between 7/1/2019 and 6/30/2020. *Fifty-three* fields were generated for each ePCR utilized, resulting in a possible **20,895,409 datapoints** for analysis. **268,703 (68.2% of total) ePCRs** were then identified for use in time interval analysis after downloading, compiling, and cleaning the raw data. The final dataset was created utilizing **14,241,295 datapoints**.

### Exclusions

**125,550 (31.8% of total) ePCRs** were excluded due to missing data points, incorrect times, disposition, or a combination of these. ePCRs were excluded for the following dispositions: Canceled Prior to Enroute, Canceled Enroute, Canceled at Scene by Another Unit, No Patient Contact, No Patient Found, Standby: No Services or Support Provided, Standby: Public Safety, Fire, or EMS Operational Support Provided, or for leaving the disposition field blank. ePCRs were excluded for missing time stamps for eTimes.01, eTimes.02, and eTimes.07. Additional ePCRs were excluded due to having any time interval greater than three standard deviations above the mean for each time interval.

### Inclusions:

Data from **8 timestamps** were included and used to create the time intervals from REMSA Policy 2203 as well as the additional intervals created. **Fifteen (15) time intervals** were included in this dataset. Data from 16 agencies were included in the dataset. To be included, the agency had to be a fire department or transport agency providing 9-1-1 services in Riverside County. Disposition and EMD card data were also included in the dataset.

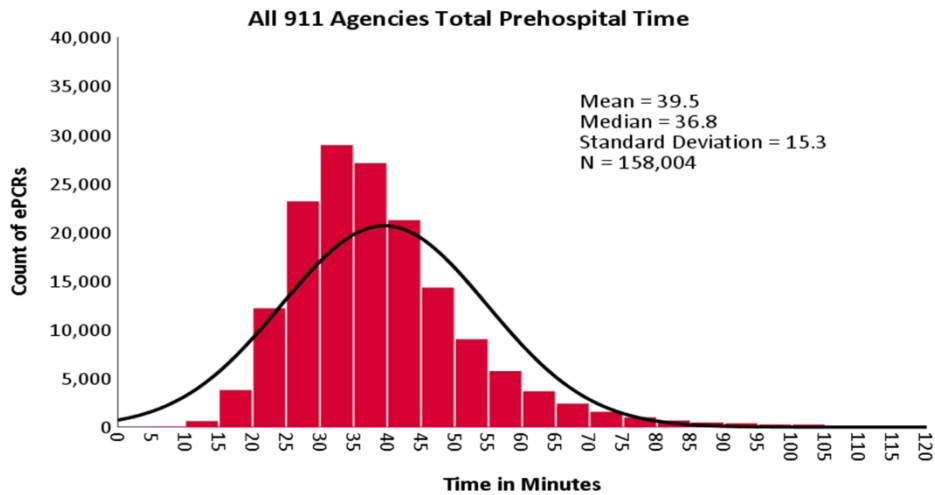
The tables below contain time interval statistics for all fire department and transport agencies providing 9-1-1 services in Riverside County. The intervals are listed at the top of the tables along with their corresponding NEMSIS 3.4 timestamps.

### Statistics Definitions Used

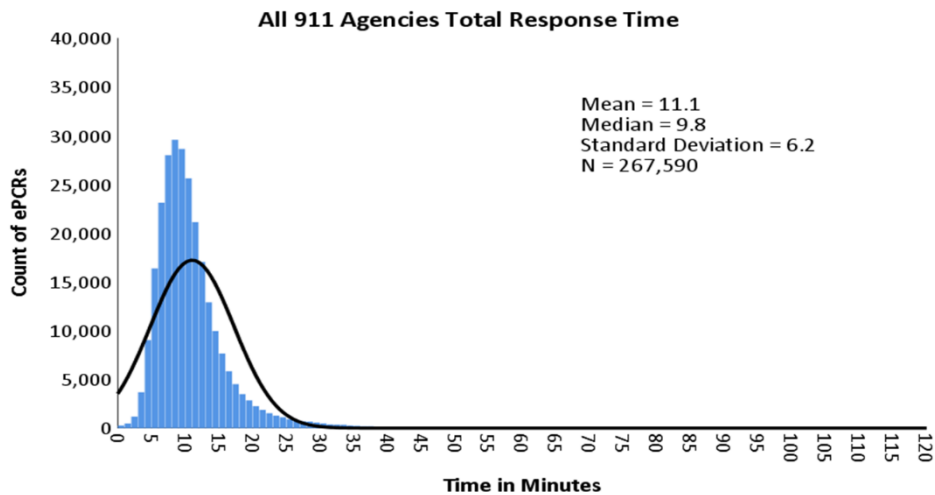
- **N Total** is the total number of ePCRs.
- **N Valid** is the number of cases which met criteria for the time interval analysis.
- **N Invalid** is the number of cases excluded from the **N Valid** cases for calculation of the time interval due to incorrect or erroneous data points.
- **N Missing** is the number of cases excluded from the **N Valid** cases for calculation of the time interval due to missing data points.
- **Mean** represents the average of the data in minutes.
- **Median** represents the midpoint in the data in minutes.
- **Standard Deviation (Std. Deviation)** measures distribution of the data in minutes.
- **90<sup>th</sup> Percentile (Percentile 90)** represents time in minutes at which 90% of the responses fall under.
- **95% Confidence Interval For Mean** is the range for which we are 95% confident the true value of the mean exists.

## Timeline and Findings

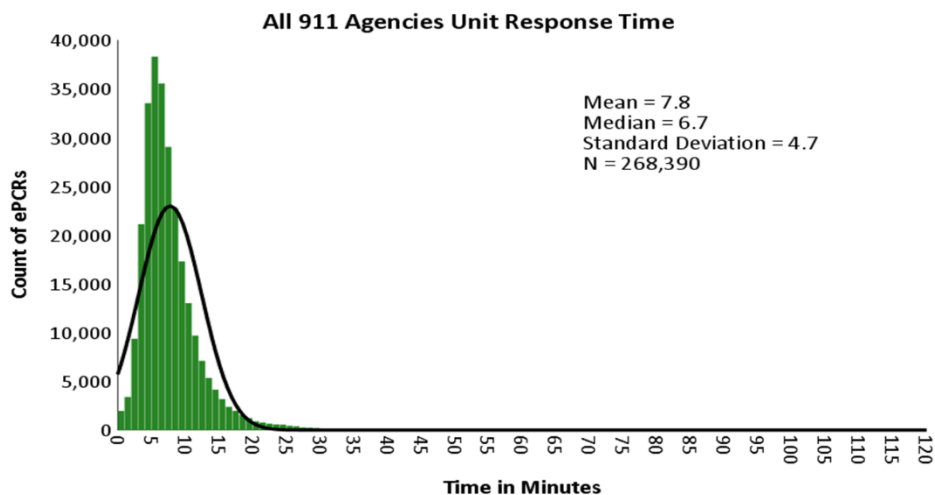
**Histogram I.** *Total Prehospital Time – eTimes.01 to eTimes.11* begins when a 9-1-1 call is made to a public safety answering point (PSAP) requesting an EMS unit response and ends when the responding EMS unit arrives with the patient at the hospital or alternate destination.



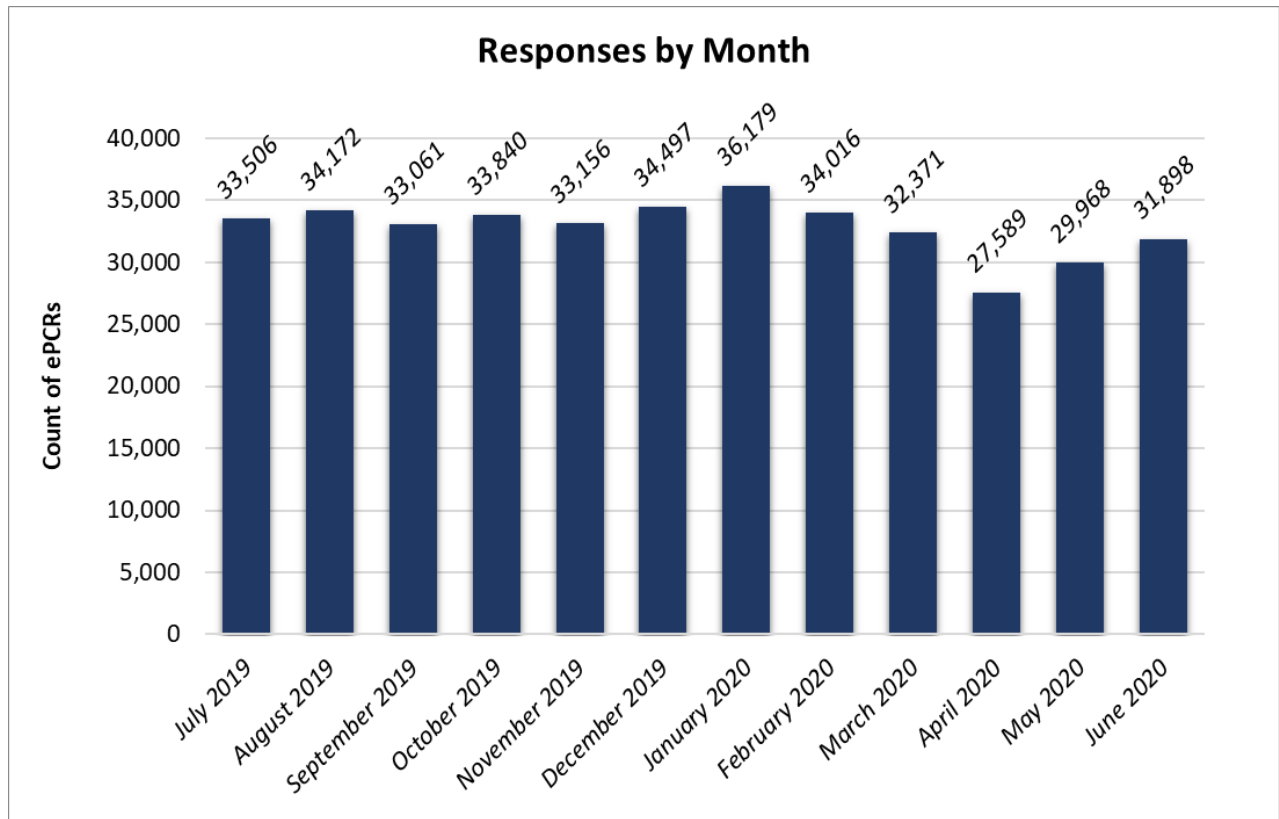
**Histogram II.** *Total Response Time – eTimes.01 to eTimes.07* begins when a 9-1-1 call is made to a public safety answering point (PSAP) requesting an EMS unit response and ends when the responding EMS unit arrive at the patient's side.



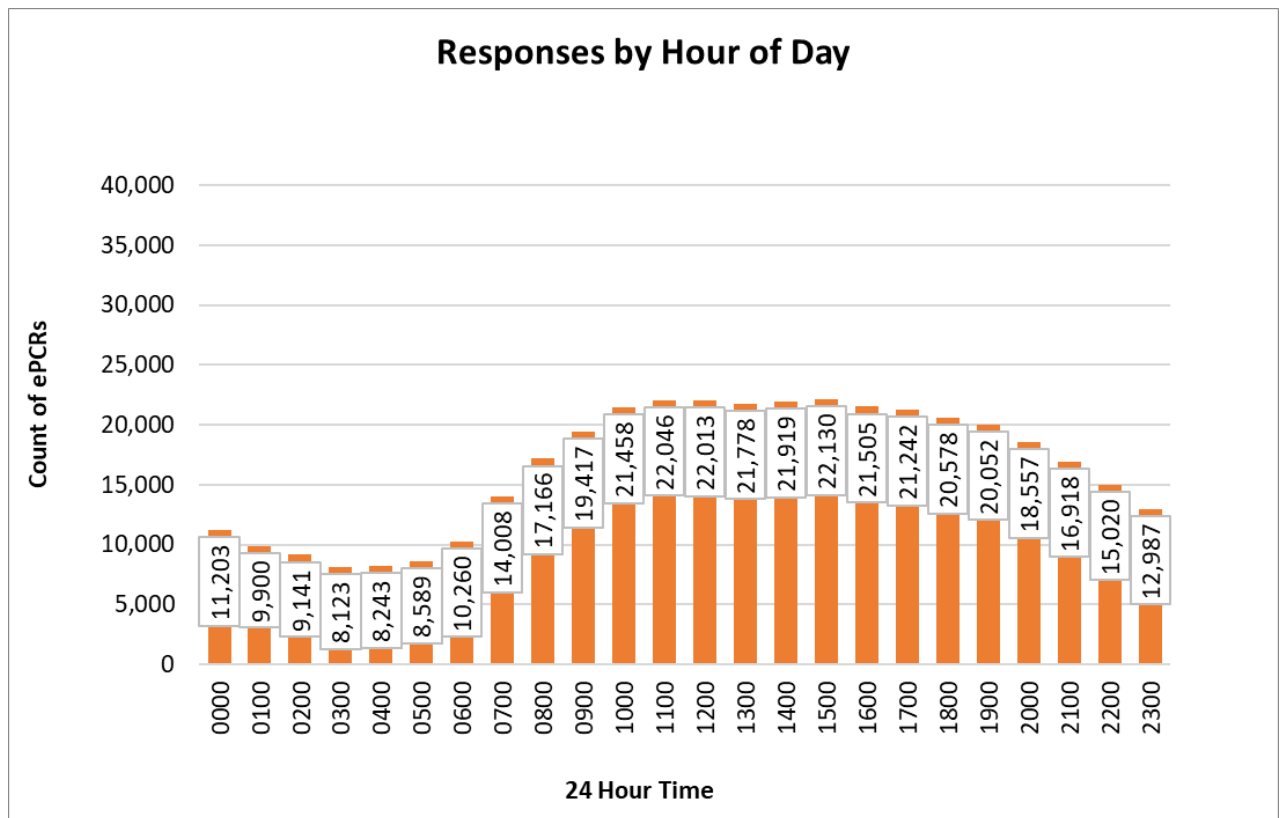
**Histogram III.** *Unit Response Time – eTimes.03 to eTimes.06* begins when the responding EMS unit is notified by dispatch and ends when the responding EMS unit arrives on the scene.



**Graph I. Responses by Month** shows ePCR volume by month and allows for a month-to-month comparison of volume.



**Graph II. Responses by Hour** shows call volumes by time-of-day and indicates which hours are busiest on average.



## Time Interval Analysis

**Tables I, II, & III.** All 9-1-1 Agencies shows the time interval statistics for all fire department and transport agencies providing 9-1-1 services in Riverside County. The intervals are listed at the top of the tables along with their corresponding NEMSIS 3.4 timestamps.

All 911 Agencies		Alarm Answering/Alarm Transfer Time (eTimes.01 to eTimes.02)	Alarm Handling Time (eTimes.01 to eTimes.03)	Alarm Processing Time (eTimes.02 to eTimes.03)	Turnout Time (eTimes.03 to eTimes.05)	Travel Time (eTimes.05 to eTimes.06)
N	Total	394,253	394,253	394,253	394,253	394,253
	Valid	247,316	267,752	267,407	268,660	268,350
	Invalid	64,119	73,395	124,760	124,477	104,827
	Missing	82,818	53,106	2,086	1,116	21,076
Mean		0.7	1.5	0.8	1.0	6.8
Median		0.0	0.5	0.3	0.7	5.7
Standard Deviation		1.3	3.1	2.2	1.0	4.7
90th Percentile		2.5	3.4	1.5	2.2	12.1
95% Confidence Interval for Mean		(0.69-0.70)	(1.52-1.54)	(0.83-0.85)	(0.96-0.97)	(6.79-6.82)

All 911 Agencies		Intervention Time (eTimes.06 to eTimes.07)	Unit Response Time (eTimes.03 to eTimes.06)	Total Response Time (eTimes.01 to eTimes.07)	Total On Scene Time (eTimes.06 to eTimes.09)	Total Time On Scene With Patient (eTimes.07 to eTimes.09)
N	Total	394,253	394,253	394,253	394,253	394,253
	Valid	268,097	268,390	267,590	158,456	158,339
	Invalid	28,371	104,801	3,821	7,236	5,670
	Missing	97,785	21,062	122,842	228,561	230,244
Mean		1.7	7.8	11.1	14.6	12.9
Median		1.2	6.7	9.8	13.6	12.0
Standard Deviation		1.9	4.7	6.2	6.6	6.3
90th Percentile		3.0	12.9	17.1	23.2	21.2
95% Confidence Interval for Mean		(1.70-1.71)	(7.76-7.79)	(11.02-11.07)	(14.55-14.62)	(12.83-12.89)

All 911 Agencies		Transport Time (eTimes.09 to eTimes.11)	Unit Prehospital Time With Patient (eTimes.07 to eTimes.11)	Arrived On Scene To Arrived At Destination Time (eTimes.06 to eTimes.11)	Total Unit Prehospital Time (eTimes.03 to eTimes.11)	Total Prehospital Time (eTimes.01 to eTimes.11)
N	Total	394,253	394,253	394,253	394,253	394,253
	Valid	157,442	157,601	157,563	157,308	158,004
	Invalid	4,930	4,732	4,853	5,108	509
	Missing	231,881	231,920	231,837	231,837	235,740
Mean		14.22	27.26	28.96	37.64	39.54
Median		12.50	25.60	27.20	35.67	36.83
Standard Deviation		8.37	10.90	11.12	12.73	15.26
90th Percentile		25.00	41.25	43.22	54.00	56.38
95% Confidence Interval for Mean		(14.18-14.26)	(27.21-27.32)	(28.91-29.01)	(37.57-37.70)	(39.46-39.61)

## Total Response Time by Agency Type

**Table IV.** *First Response Agencies* shows time interval statistics from *dispatch to patient contact* for all *fire departments* providing 9-1-1 services in Riverside County. The intervals are listed at the top of the tables along with their corresponding NEMSIS 3.4 timestamps.

First Response Agencies		Alarm Answering/ Alarm Transfer Time (eTimes.01 to eTimes.02)	Alarm Handling Time (eTimes.01 to eTimes.03)	Alarm Processing Time (eTimes.02 to eTimes.03)	Turnout Time (eTimes.03 to eTimes.05)	Travel Time (eTimes.05 to eTimes.06)	Intervention Time (eTimes.06 to eTimes.07)	Unit Response Time (eTimes.03 to eTimes.06)	Total Response Time (eTimes.01 to eTimes.07)
N	Total	219,012	219,012	219,012	219,012	219,012	219,012	219,012	219,012
	Valid	95,086	116,259	116,339	116,434	116,420	116,130	116,419	116,273
	Invalid	42,411	50,926	101,773	101,618	88,688	26,295	88,703	2,200
	Missing	81,515	51,827	900	960	13,904	76,587	13,890	100,539
Mean		1.8	2.1	0.7	1.5	4.8	1.8	6.3	10.2
Median		1.9	2.0	0.3	1.4	4.4	1.3	5.9	9.5
Standard Deviation		1.5	2.3	1.4	1.0	2.7	1.9	2.9	4.6
90th Percentile		3.3	3.8	1.4	2.6	7.9	3.3	9.6	14.8
95% Confidence Interval for Mean		(1.80-1.82)	(2.07-2.10)	(0.64-0.66)	(1.48-1.49)	(4.82-4.85)	(1.77-1.79)	(6.31-6.34)	(10.21-10.27)

**Table V.** *Transport Agencies* shows time interval statistics from *dispatch to patient contact* for all *transport agencies* providing 9-1-1 services in Riverside County. The intervals are listed at the top of the tables along with their corresponding NEMSIS 3.4 timestamps.

Transport Agencies		Alarm Answering/ Alarm Transfer Time (eTimes.01 to eTimes.02)	Alarm Handling Time (eTimes.01 to eTimes.03)	Alarm Processing Time (eTimes.02 to eTimes.03)	Turnout Time (eTimes.03 to eTimes.05)	Travel Time (eTimes.05 to eTimes.06)	Intervention Time (eTimes.06 to eTimes.07)	Unit Response Time (eTimes.03 to eTimes.06)	Total Response Time (eTimes.01 to eTimes.07)
N	Total	175,241	175,241	175,241	175,241	175,241	175,241	175,241	175,241
	Valid	152,230	151,493	151,068	152,226	151,930	151,967	151,971	151,317
	Invalid	21,708	22,469	22,987	22,859	16,139	2,076	16,098	1,621
	Missing	1,303	1,279	1,186	156	7,172	21,198	7,172	22,303
Mean		0.0	1.1	1.0	0.6	8.3	1.7	8.9	11.7
Median		0.0	0.3	0.3	0.3	7.2	1.0	7.7	10.0
Standard Deviation		0.1	3.5	2.7	0.8	5.2	1.9	5.4	7.1
90th Percentile		0.0	1.8	1.7	1.3	14.3	3.0	15.0	19.1
95% Confidence Interval for Mean		(0.00-0.00)	(1.09-1.12)	(0.97-1.00)	(0.56-0.57)	(8.29-8.34)	(1.64-1.66)	(8.86-8.92)	(11.63-11.70)

## Total Response Time by Agency

**Table VI, VII, & VIII.** Total Response Time – eTimes.01 to eTimes.07 begins when a 9-1-1 call is made to a public safety answering point (PSAP) requesting EMS services and ends when the responding EMS unit arrive at the patient's side. The tables below show Total Response Times by each agency providing 9-1-1 services in Riverside County.

Total Response Time (eTimes.01 to eTimes.07)	Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
Mean	11.9	10.8	11.9	7.6	11.6
Median	9.3	9.0	10.5	6.9	10.8
Standard Deviation	8.6	7.8	6.5	3.6	4.3
90th Percentile	22.3	17.2	19.0	10.8	15.9
95% Confidence Interval for Mean	(11.80-12.02)	(10.76-10.93)	(11.84-11.92)	(7.53-7.63)	(11.54-11.61)

Total Response Time (eTimes.01 to eTimes.07)	Agency 6	Agency 7	Agency 8	Agency 9	Agency 10
Mean	9.1	9.8	8.5	7.8	8.5
Median	8.3	8.4	8.1	7.3	7.7
Standard Deviation	4.2	6.2	3.6	3.1	4.4
90th Percentile	12.9	13.6	11.7	10.9	11.9
95% Confidence Interval for Mean	(8.99-9.23)	(9.68-9.97)	(8.36-8.68)	(7.73-7.89)	(8.35-8.57)

Total Response Time (eTimes.01 to eTimes.07)	Agency 11	Agency 12	Agency 13	Agency 14	Agency 15	Agency 16
Mean	11.0	11.3	5.6	12.9	11.3	10.5
Median	10.5	9.8	4.7	12.6	10.0	9.6
Standard Deviation	3.6	7.8	4.3	4.4	6.4	4.1
90th Percentile	15.4	19.0	8.9	16.5	14.8	14.6
95% Confidence Interval for Mean	(10.62-11.27)	(9.67-13.01)	(3.69-7.48)	(12.50-13.25)	(10.18-12.49)	(9.93-11.00)

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