



RIVERSIDE COUNTY EMS AGENCY
PATIENT CARE CONTINUUM REPORT
2021

APRIL 5TH, 2022

PREPARED BY RIVERSIDE COUNTY EMS AGENCY, EMERGENCY MANAGEMENT DEPARTMENT

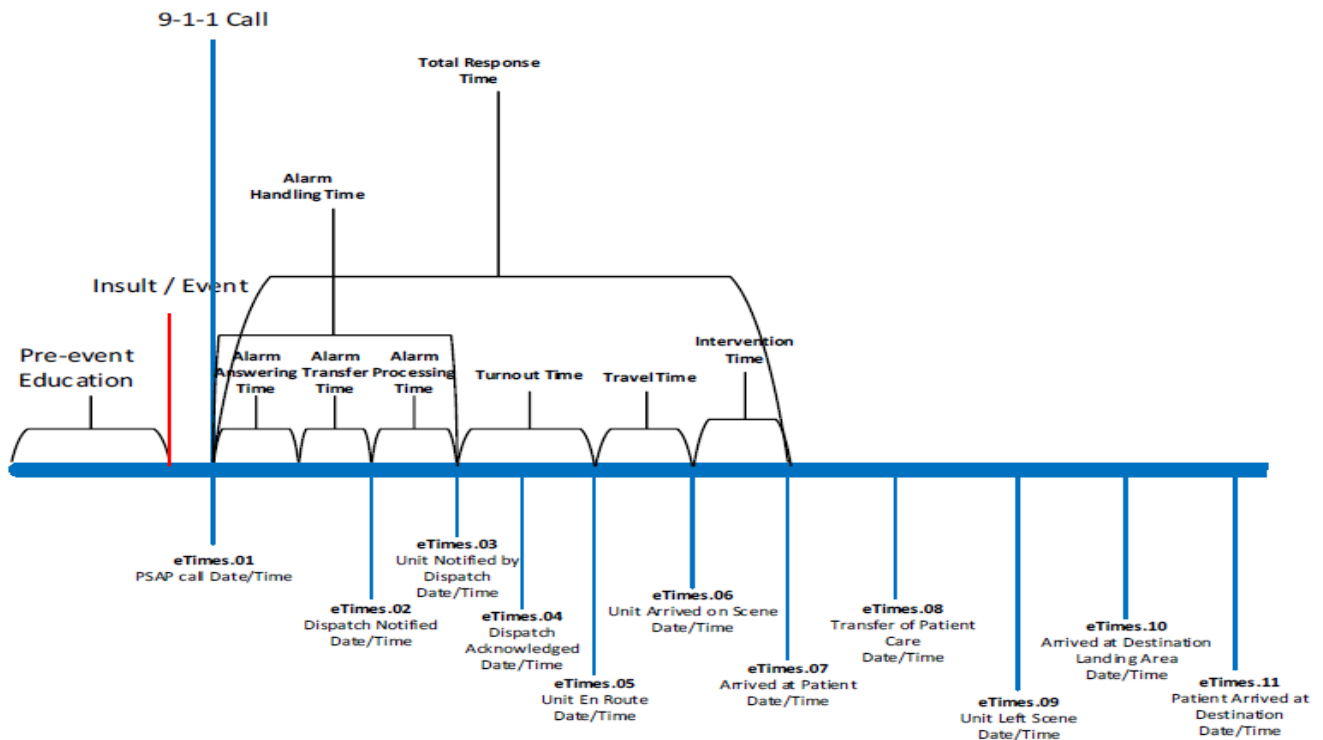
PATIENT CARE CONTINUUM REPORT

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

439,112 ePCRs (electronic patient care reports) were initially identified on ImageTrend® Elite Report Writer between 1/1/2021 and 12/31/2021. *Sixty-seven* fields were generated for each ePCR utilized. **294,495 (67.1% of total ePCRs)** were then identified for use in time interval analysis after downloading, compiling, and cleaning the raw data.

Exclusions

144,617 (32.9% 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 **10 timestamps** were included and used to create the time intervals from REMSA Policy 2203 as well as the additional intervals created. **Sixteen (16) 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.

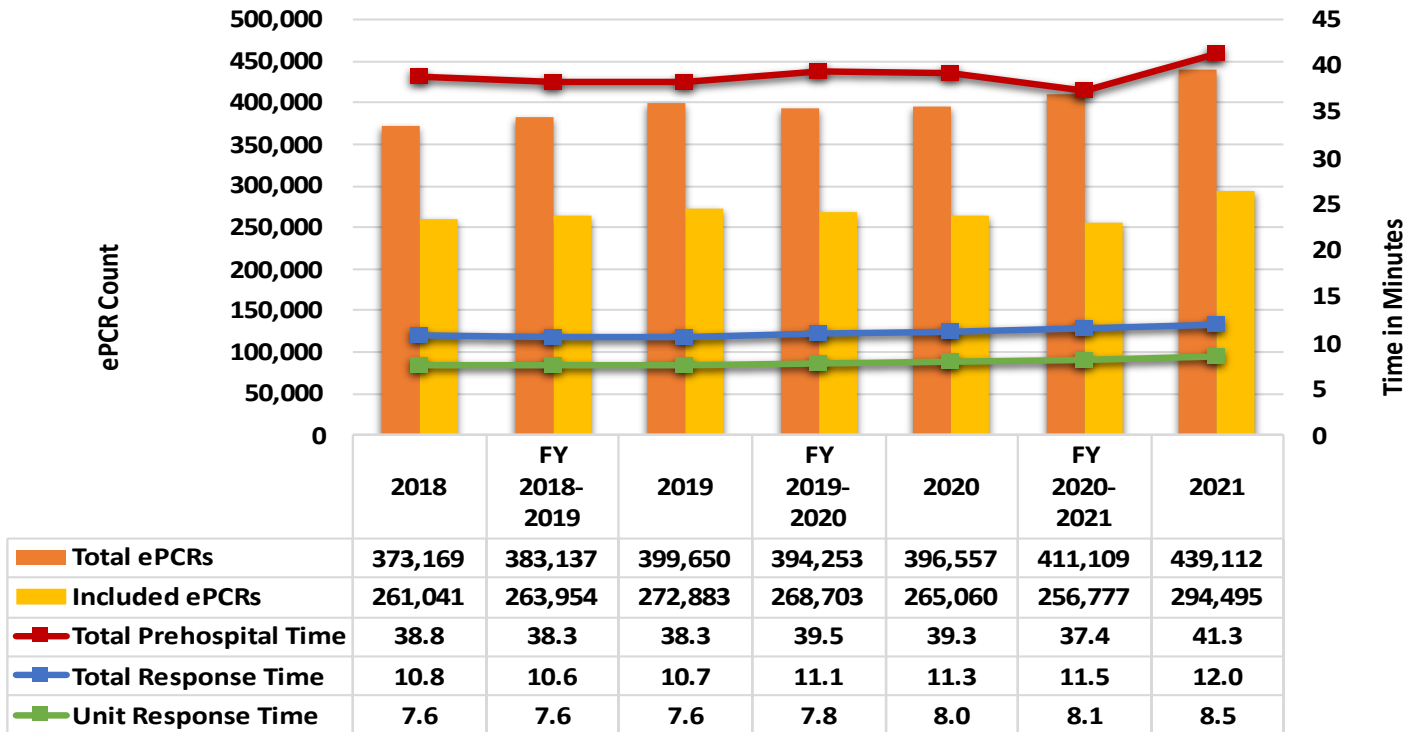
Statistics Definitions Used

- **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** measures distribution of the data in minutes.
- **90th Percentile** 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.

Change in Patient Care Continuum Over Time

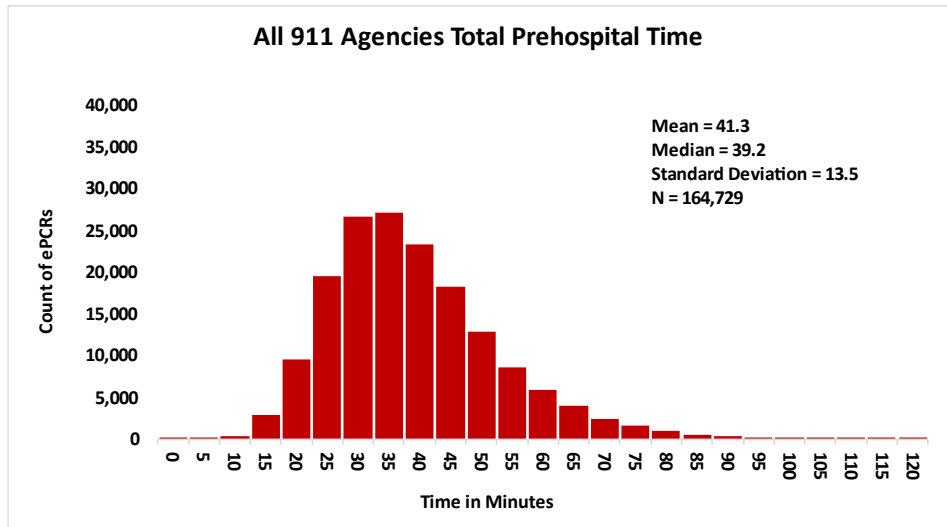
Combination Chart I. This combination bar and line chart show the change over time in key metrics as recorded in our semiannual Patient Care Continuum Reports. Total ePCR count has grown by 17.7% between 2018 and 2021. Mean Total Prehospital Time decreased by 0.5 minutes (1.3%) between 2018 and 2019, increased by 1 minute (2.6%) between 2019 and 2020, and increased by 2 minutes (5.1%) between 2020 and 2021. Mean Total Response Time decreased by 0.1 minutes (0.9%) between 2018 and 2019 and increased by 1.3 minutes (12.1%) between 2019 and 2021. Mean Unit Response Time stayed consistent between 2018 and 2019 and increased by 0.9 minutes (11.8%) between 2019 and 2021.

Patient Care Continuum From 2018 to 2021

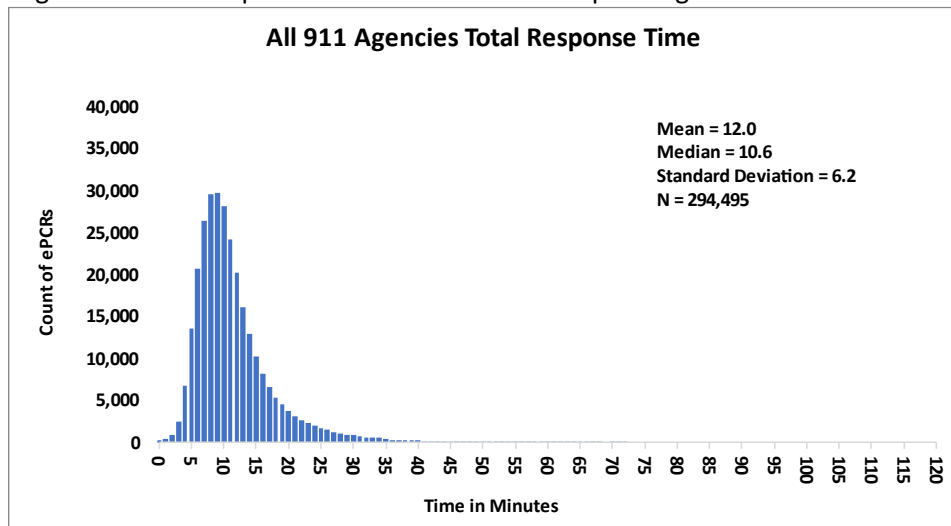


Timeline and Findings

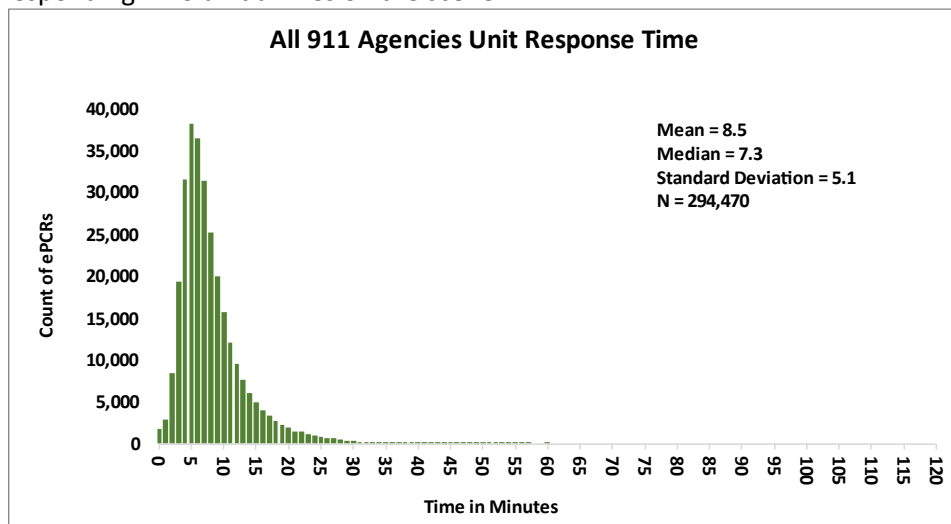
Histogram I. *Total Prehospital Time – eTimes.01 to eTimes.11* begins when a 9-1-1 call is made to a public safety answering point (PSAP) requesting an EMS unit response and ends when the responding EMS unit arrives with the patient at the hospital or alternate destination.



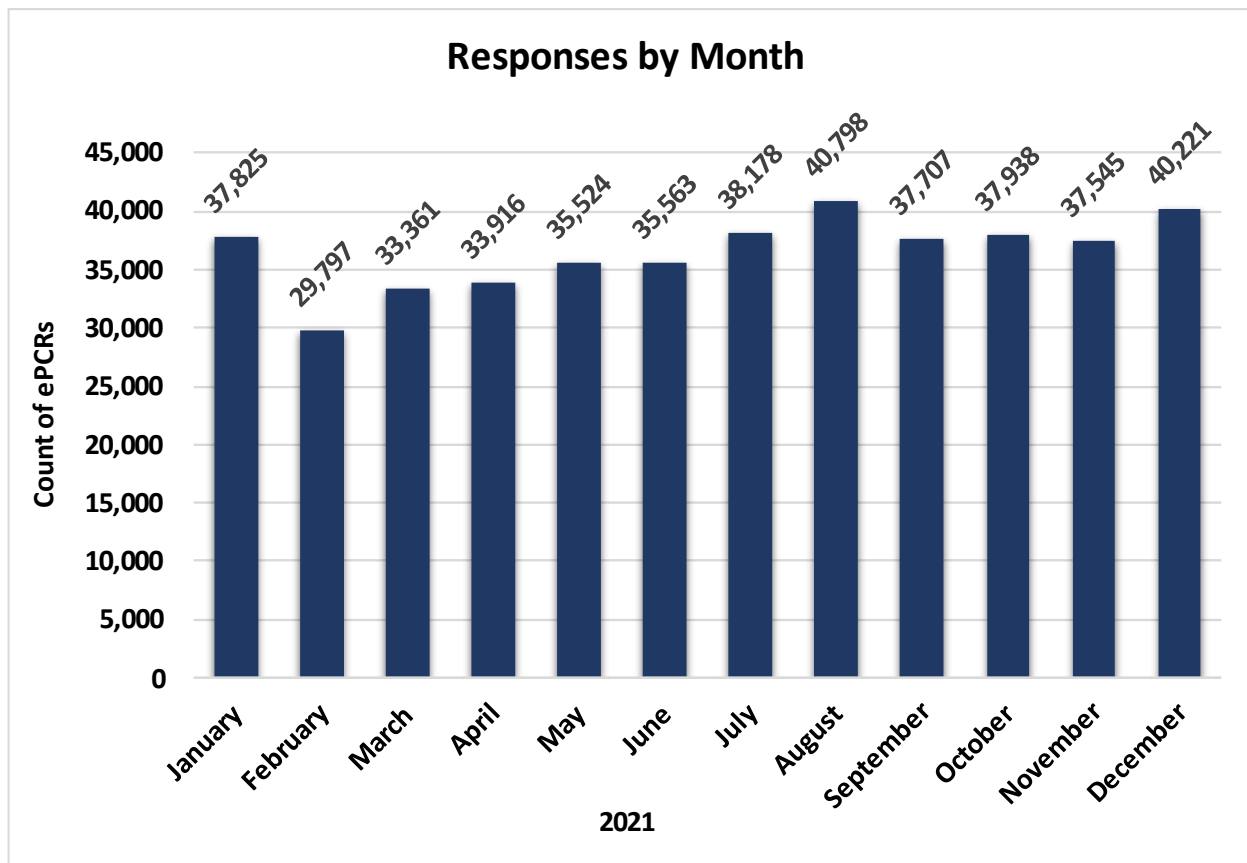
Histogram II. *Total Response Time – eTimes.01 to eTimes.07* begins when a 9-1-1 call is made to a public safety answering point (PSAP) requesting an EMS unit response and ends when the responding EMS unit arrive at the patient's side.



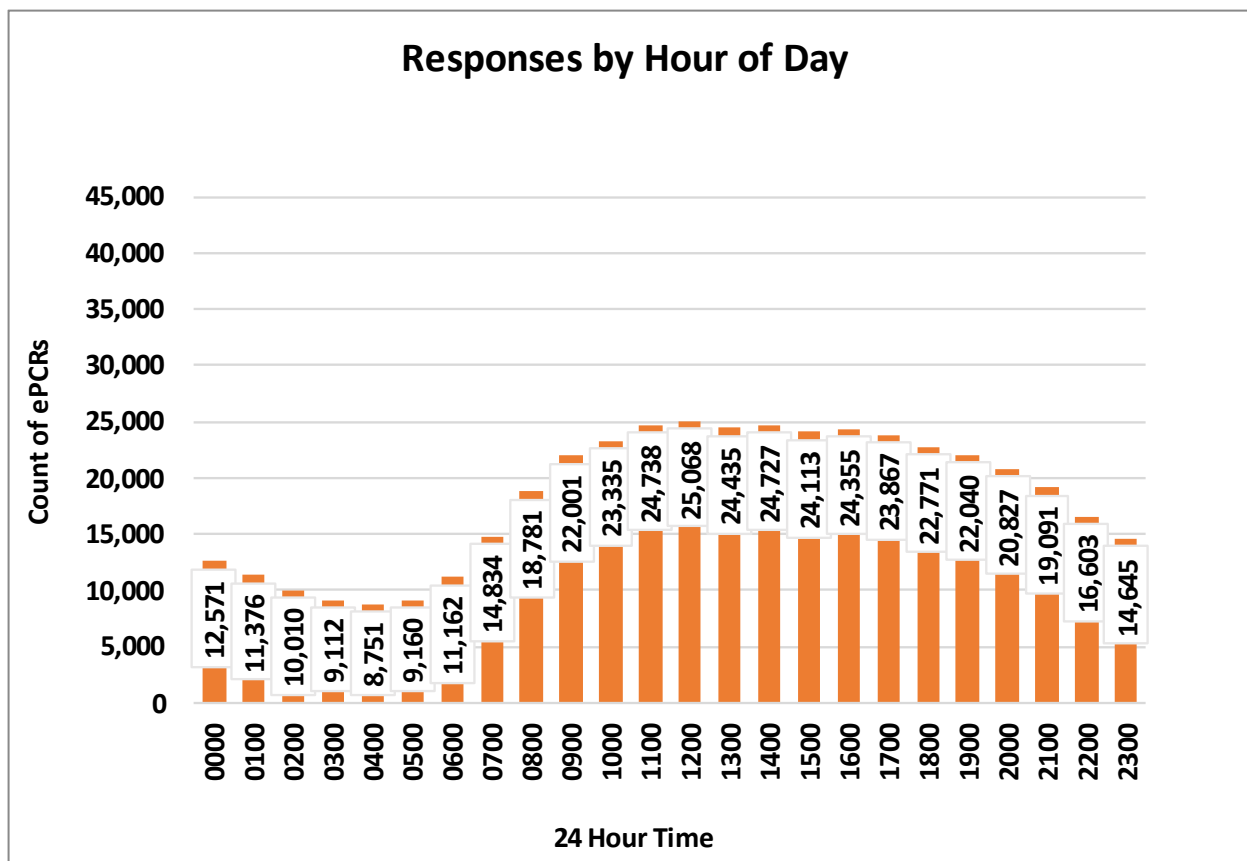
Histogram III. *Unit Response Time – eTimes.03 to eTimes.06* begins when the responding EMS unit is notified by dispatch and ends when the responding EMS unit arrives on the scene.



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/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	439,112	439,112	439,112	439,112	439,112
	Valid	283,945	294,495	294,427	294,492	294,468
	Invalid	84,185	140,359	88,605	143,536	118,337
	Missing	70,982	4,258	56,080	1,084	26,307
Mean		0.8	1.0	1.7	1.0	7.5
Median		0.0	0.3	0.8	0.7	6.1
Standard Deviation		1.2	2.6	2.7	1.1	5.2
90th Percentile		2.5	1.9	3.6	2.4	14.0
95% Confidence Interval for Mean		(0.75-0.76)	(1-1.02)	(1.72-1.74)	(1.02-1.03)	(7.49-7.53)

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	439,112	439,112	439,112	439,112	439,112
	Valid	294,283	294,470	294,495	165,356	165,356
	Invalid	36,218	118,354	6,881	9,341	8,634
	Missing	108,611	26,288	137,736	264,415	265,122
Mean		1.7	8.5	12.0	14.8	13.1
Median		1.2	7.3	10.6	13.8	12.1
Standard Deviation		1.9	5.1	6.2	6.7	6.5
90th Percentile		3.0	14.8	19.3	23.5	21.7
95% Confidence Interval for Mean		(1.72-1.73)	(8.52-8.55)	(11.96-12)	(14.73-14.79)	(13.08-13.15)

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	439,112	439,112	439,112	439,112	439,112
	Valid	164,636	164,727	164,729	164,729	164,729
	Invalid	8,446	8,281	8,451	8,453	3,631
	Missing	266,030	266,104	265,932	265,930	270,752
Mean		15.0	28.1	29.8	39.7	41.3
Median		13.3	26.5	28.1	37.9	39.2
Standard Deviation		8.7	11.1	11.2	13.1	13.5
90th Percentile		26.8	42.9	44.7	57.2	59.4
95% Confidence Interval for Mean		(14.99-15.07)	(28.08-28.19)	(29.72-29.83)	(39.66-39.79)	(41.24-41.37)

Total Response Time by Unit Type

Table IV. *Non-Transport Units* shows time interval statistics from *dispatch to patient contact* for all *units* that respond to 9-1-1 calls but do not provide transport services in Riverside County. The intervals are listed at the top of the tables along with their corresponding NEMSIS 3.4 timestamps.

Non-Transport Units		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	219,754	219,754	219,754	219,754	219,754	219,754	219,754	219,754
	Valid	107,937	118,450	118,406	118,447	118,425	118,240	118,427	118,450
	Invalid	48,216	99,169	52,608	100,634	88,760	27,209	88,772	2,644
	Missing	63,601	2,135	48,740	673	12,569	74,305	12,555	98,660
Mean		1.7	0.6	2.0	1.6	5.1	1.9	6.6	10.5
Median		1.7	0.2	2.0	1.5	4.5	1.4	6.1	9.8
Standard Deviation		1.3	1.2	1.8	1.0	2.9	2.1	3.1	4.2
90th Percentile		3.1	1.3	3.7	2.8	8.3	3.3	10.2	15.2
95% Confidence Interval for Mean		(1.84-1.87)	(2.00-2.02)	(0.62-0.64)	(1.52-1.54)	(4.94-4.97)	(1.90-1.93)	(6.47-6.51)	(10.37-10.42)

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

Transport Units		Alarm Answering/ 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	219,358	219,358	219,358	219,358	219,358	219,358	219,358	219,358
	Valid	176,008	176,045	176,021	176,045	176,043	176,043	176,043	176,045
	Invalid	35,969	41,190	35,997	42,902	29,577	9,009	29,582	4,237
	Missing	7,381	2,123	7,340	411	13,738	34,306	13,733	39,076
Mean		0.2	1.3	1.5	0.7	9.2	1.6	9.8	13.0
Median		0.0	0.4	0.5	0.3	7.8	1.1	8.5	11.3
Standard Deviation		0.7	3.2	3.2	1.0	5.8	1.8	5.8	7.0
90th Percentile		0.0	2.8	3.5	1.7	16.6	3.0	17.2	21.9
95% Confidence Interval for Mean		(0.19-0.20)	(1.20-1.23)	(1.01-1.04)	(0.65-0.66)	(8.30-8.35)	(1.63-1.65)	(8.95-9.00)	(11.80-11.86)

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	12.2	12.2	13.8	8.1	11.9
Median	9.9	10.2	12.2	7.4	11.2
Standard Deviation	7.6	7.3	7.1	3.5	4.0
90th Percentile	22.1	21.6	22.8	11.5	16.4
95% Confidence Interval for Mean	(12.06-12.25)	(12.14-12.3)	(13.71-13.79)	(8.06-8.15)	(11.88-11.94)

Total Response Time (eTimes.01 to eTimes.07)	Agency 6	Agency 7	Agency 8	Agency 9	Agency 10
Mean	9.3	9.0	10.1	9.3	8.3
Median	8.3	8.4	9.6	8.9	7.6
Standard Deviation	4.5	3.7	3.4	3.0	3.8
90th Percentile	13.4	12.0	13.8	12.7	11.9
95% Confidence Interval for Mean	(9.17-9.41)	(8.92-9.08)	(9.96-10.17)	(9.21-9.34)	(8.26-8.43)

Total Response Time (eTimes.01 to eTimes.07)	Agency 11	Agency 12	Agency 13	Agency 14	Agency 15	Agency 16
Mean	11.6	11.5	6.0	12.8	11.6	11.1
Median	11.4	10.1	5.0	12.7	11.1	10.0
Standard Deviation	3.6	6.2	4.9	4.4	3.9	5.8
90th Percentile	16.1	21.1	11.7	16.6	16.0	15.7
95% Confidence Interval for Mean	(11.36-11.87)	(10.44-12.65)	(3.05-8.99)	(12.45-13.13)	(10.93-12.21)	(10.41-11.84)

Data in this report is provided by the efforts of the Riverside County EMS System and its Providers in ensuring quality care and documentation of patient encounters.

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