



**RIVERSIDE COUNTY EMS AGENCY
PATIENT CARE CONTINUUM REPORT
FY 2021-2022**

AUGUST 9TH, 2022

PREPARED BY RIVERSIDE COUNTY EMS AGENCY, EMERGENCY MANAGEMENT DEPARTMENT

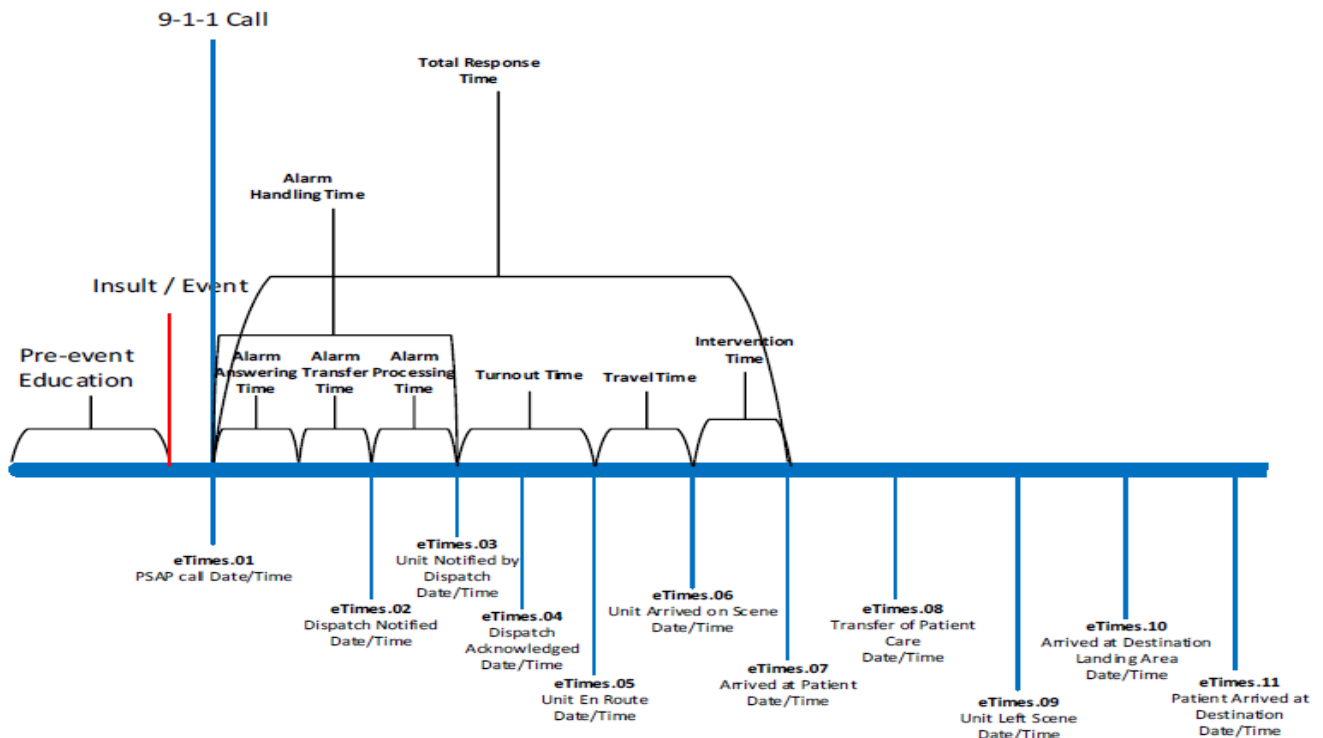
PATIENT CARE CONTINUUM REPORT

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

470,040 ePCRs (electronic patient care reports) were initially identified on ImageTrend® Elite Report Writer between 7/1/2021 and 6/30/2022. **308,266 (65.6% of total ePCRs)** were then identified for use in time interval analysis after downloading, compiling, and cleaning the raw data.

Exclusions

161,774 (34.4% 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. Any response outside of Riverside County was excluded. 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 17 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.

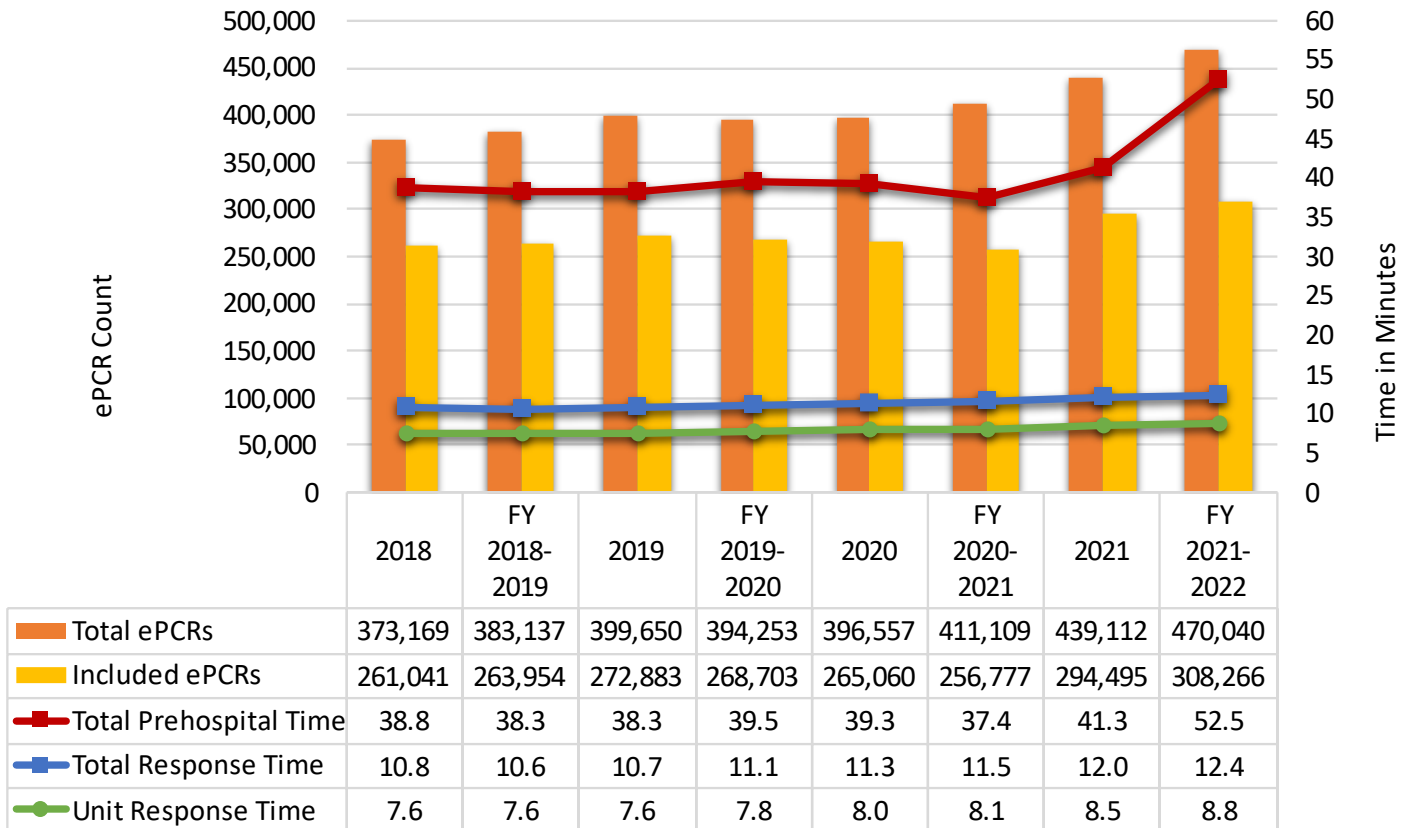
Statistics Definitions Used

- **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.

RESULTS: Change Over Time

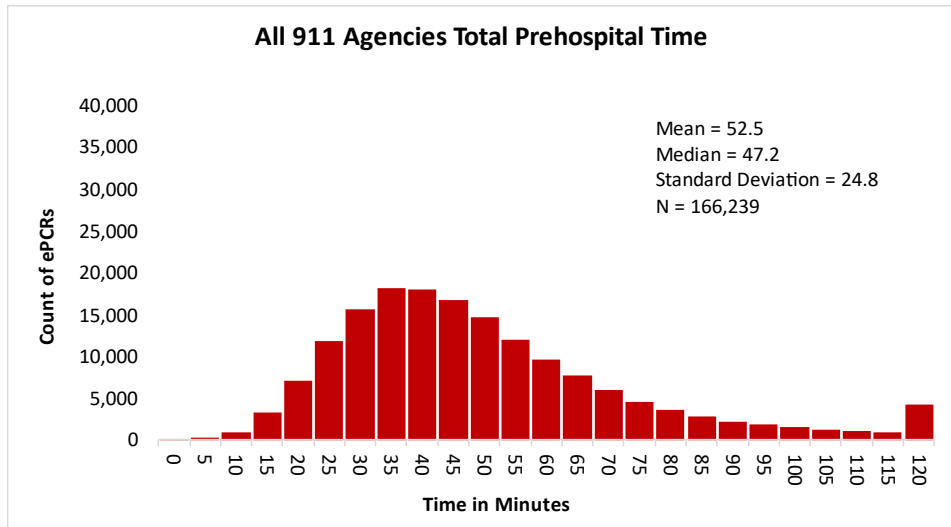
Combination Chart I. This combination bar and line chart show change in measured time intervals across reporting periods. Total ePCR count has grown by 26% between 2018 and FY 2021-2022. Mean Total Prehospital Time increased by over 10 minutes in FY 2021-2022 compared to all previous timepoints. Mean Total Response Time has shown slight incremental increases since 2019 with the highest recorded average time of 12.4 minutes in FY 2021-2022. Mean Unit Response Time recorded has also increased by approximately 1 minute since 2019.

Patient Care Continuum From 2018 to FY 2021 -2022

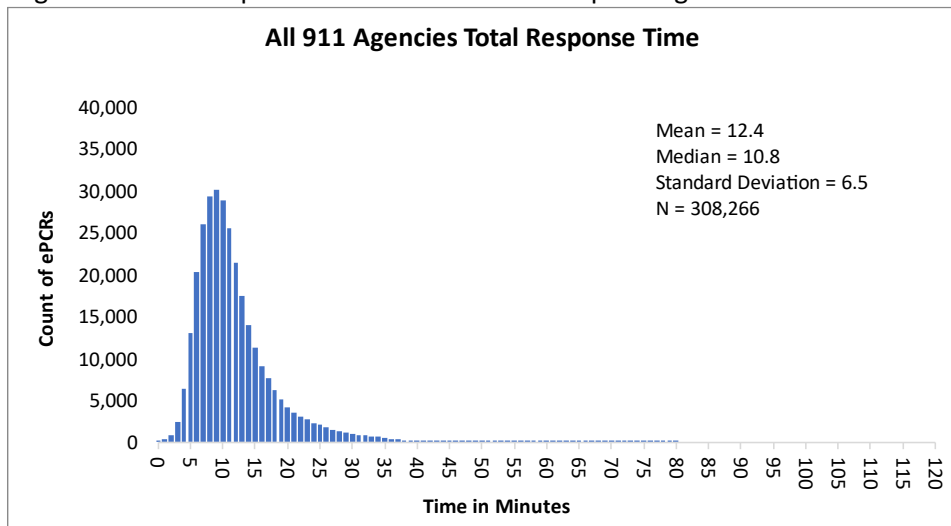


Timeline and Findings

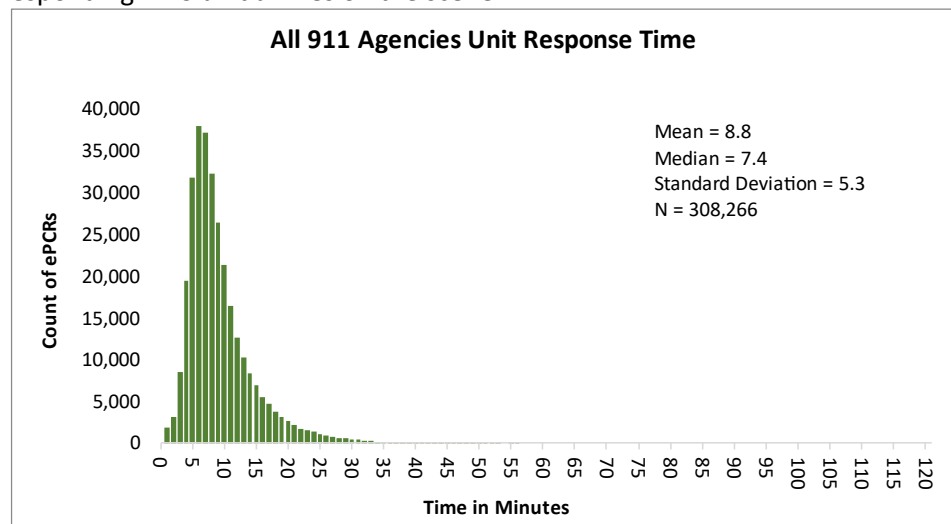
Histogram I. Total Prehospital Time – eTimes.01 to eTimes.11 begins when a 9-1-1 call is made to a public safety answering point (PSAP) requesting an EMS unit response and ends when the responding EMS unit arrives with the patient at the hospital or alternate destination.



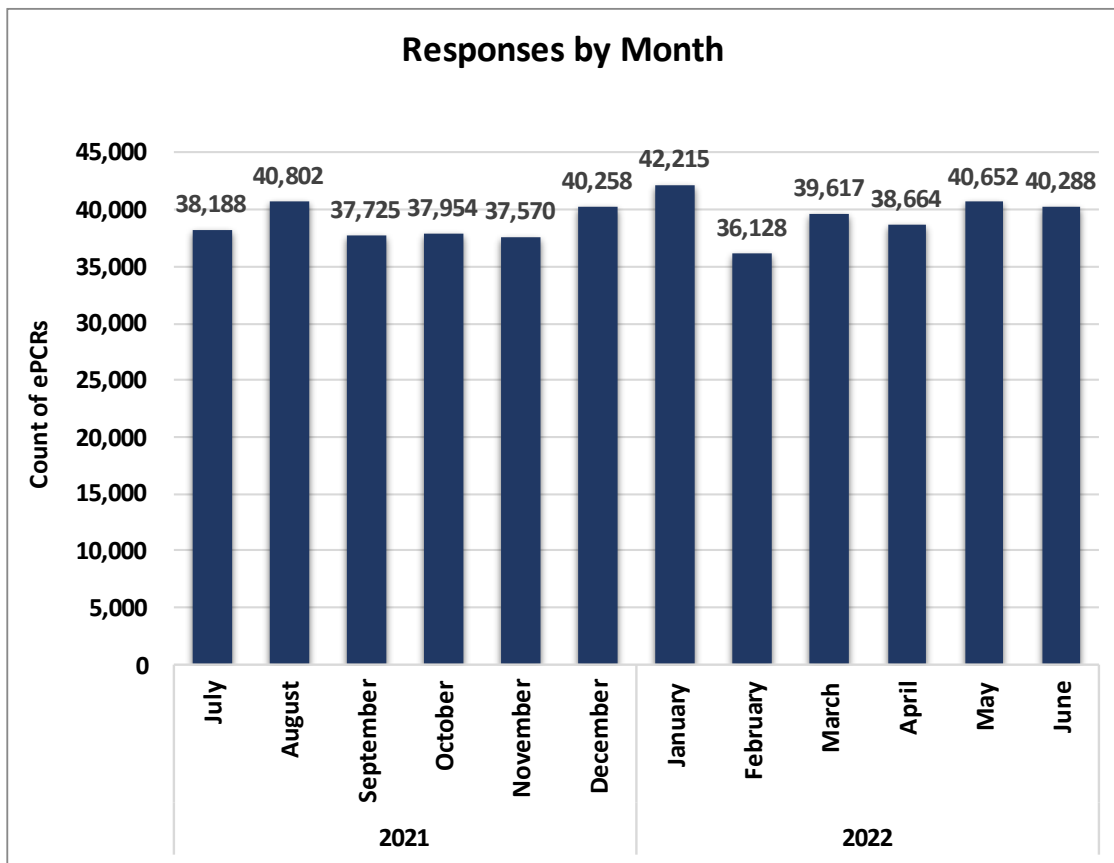
Histogram II. Total Response Time – eTimes.01 to eTimes.07 begins when a 9-1-1 call is made to a public safety answering point (PSAP) requesting an EMS unit response and ends when the responding EMS unit arrive at the patient's side.



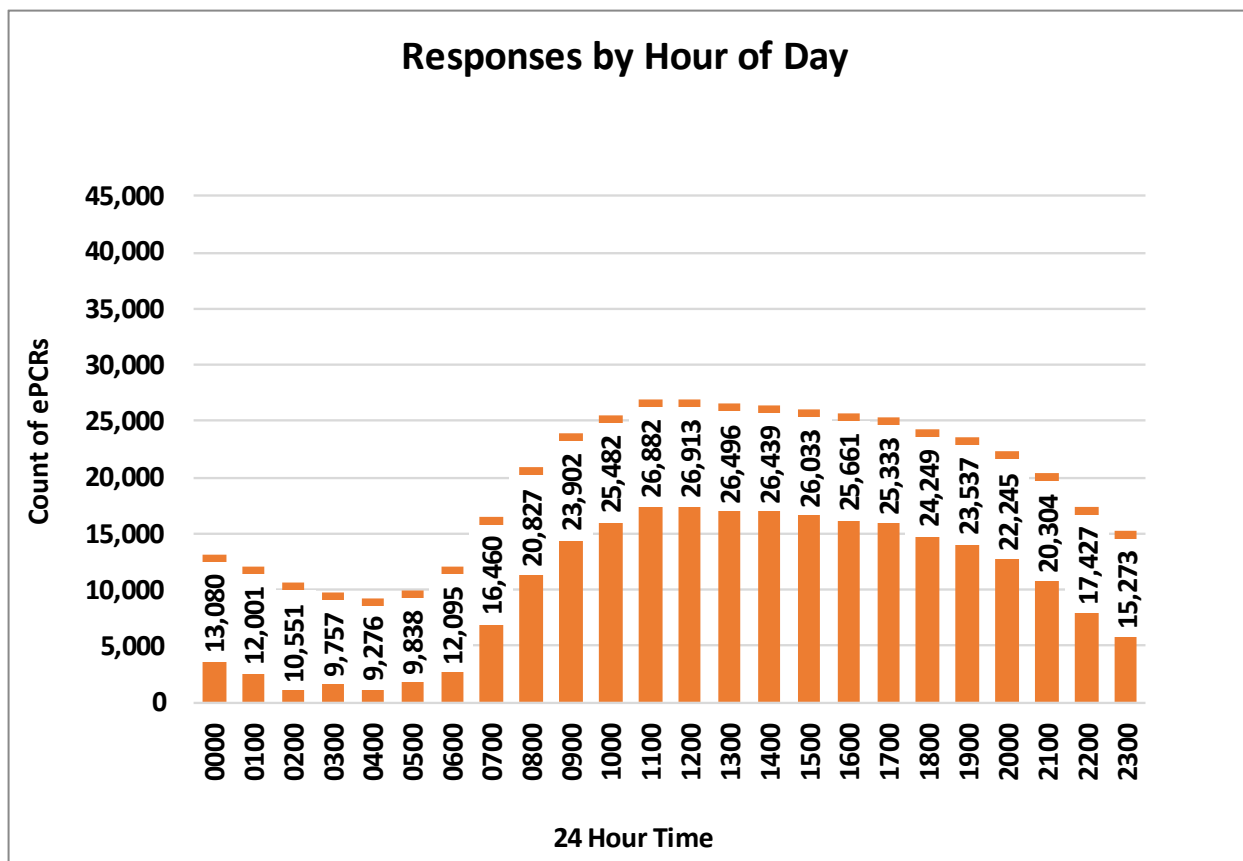
Histogram III. Unit Response Time – eTimes.03 to eTimes.06 begins when the responding EMS unit is notified by dispatch and ends when the responding EMS unit arrives on the scene.



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 NEMIS 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	470,040	470,040	470,040	470,040	470,040
	Valid	308,266	308,266	308,266	308,266	308,266
	Invalid	106,687	158,008	106,737	160,245	129,540
	Missing	55,087	3,766	55,037	1,529	32,234
Mean		0.8	1.1	1.9	1.1	7.7
Median		0.0	0.3	1.0	0.7	6.2
Standard Deviation		1.2	2.8	2.9	1.2	5.4
90th Percentile		2.5	2.1	3.8	2.5	14.6
95% Confidence Interval for Mean		(0.78-0.79)	(1.1-1.12)	(1.88-1.9)	(1.08-1.09)	(7.66-7.7)

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	470,040	470,040	470,040	470,040	470,040
	Valid	308,266	308,266	308,266	167,326	167,326
	Invalid	38,270	129,575	10,328	12,155	11,324
	Missing	123,504	32,199	151,446	290,559	291,390
Mean		1.7	8.8	12.4	14.6	13.0
Median		1.2	7.4	10.8	13.6	12.0
Standard Deviation		2.1	5.3	6.5	6.6	6.5
90th Percentile		3.0	15.4	20.2	23.4	21.5
95% Confidence Interval for Mean		(1.73-1.74)	(8.74-8.78)	(12.36-12.41)	(14.6-14.66)	(12.93-12.99)

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	470,040	470,040	470,040	470,040	470,040
	Valid	166,571	166,688	166,690	166,690	166,239
	Invalid	11,373	11,136	11,379	11,381	10,988
	Missing	292,096	292,216	291,971	291,969	292,813
Mean		15.2	28.1	29.8	40.2	52.5
Median		13.4	26.5	28.1	38.4	47.2
Standard Deviation		8.8	11.1	11.2	13.2	24.8
90th Percentile		27.1	43.0	44.8	57.9	84.4
95% Confidence Interval for Mean		(15.15-15.24)	(28.09-28.2)	(29.76-29.87)	(40.15-40.28)	(52.4-52.63)

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	238,181	238,181	238,181	238,181	238,181	238,181	238,181	238,181
	Valid	130,194	130,194	130,194	130,194	130,194	130,194	130,194	130,194
	Invalid	61,036	105,916	61,060	107,065	92,866	25,981	92,893	3,092
	Missing	46,951	2,071	46,927	922	15,121	82,006	15,094	104,895
Mean		1.6	0.5	2.1	1.6	5.1	1.8	6.7	10.6
Median		1.6	0.2	2.0	1.5	4.6	1.3	6.2	9.9
Standard Deviation		1.3	1.1	1.7	1.0	2.9	2.3	3.1	4.3
90th Percentile		3.0	1.3	3.7	2.9	8.4	3.2	10.3	15.3
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	231,701	231,701	231,701	231,701	231,701	231,701	231,701	231,701
	Valid	178,072	178,072	178,072	178,072	178,072	178,072	178,072	178,072
	Invalid	45,921	52,331	45,947	53,032	36,561	12,231	36,569	7,531
	Missing	7,708	1,298	7,682	597	17,068	41,398	17,060	46,098
Mean		0.2	1.5	1.8	0.7	9.6	1.7	10.3	13.7
Median		0.0	0.4	0.5	0.3	8.1	1.1	8.8	11.9
Standard Deviation		0.8	3.5	3.5	1.1	6.0	1.9	6.0	7.5
90th Percentile		0.2	3.6	4.1	1.8	17.4	3.0	18.2	23.3
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 (de-identified).

Total Response Time (eTimes.01 to eTimes.07)		Agency 1	Agency 2	Agency 3	Agency 4	Agency 5
N	Total	33,775	44,891	122,962	34,245	178,055
	Valid	25,438	35,249	97,196	24,887	87,136
	Invalid	977	2,474	3,997	457	1,835
	Missing	7,360	7,168	21,769	8,901	89,084
Mean		12.5	13.0	14.7	8.2	12.1
Median		10.3	10.8	13.1	7.5	11.4
Standard Deviation		7.7	7.8	7.6	3.7	4.2
90th Percentile		22.6	23.1	24.5	11.6	16.6
95% Confidence Interval for Mean		(12.36-12.55)	(12.91-13.08)	(14.67-14.76)	(8.18-8.27)	(12.08-12.13)

Total Response Time (eTimes.01 to eTimes.07)		Agency 6	Agency 7	Agency 8	Agency 9	Agency 10	Agency 11
N	Total	456	10,277	8,314	12,148	8,751	9,900
	Valid	288	6,636	8,135	6,573	6,931	7,750
	Invalid	6	185	178	344	177	201
	Missing	162	3,456	1	5,231	1,643	1,949
Mean		10.0	9.2	8.8	10.1	9.2	8.2
Median		9.6	8.3	8.2	9.6	8.9	7.4
Standard Deviation		2.9	4.3	3.5	3.6	3.1	4.4
90th Percentile		13.2	13.0	11.6	13.9	12.4	11.6
95% Confidence Interval for Mean		(9.61-10.29)	(9.12-9.32)	(8.68-8.83)	(10-10.17)	(9.16-9.31)	(8.1-8.29)

Total Response Time (eTimes.01 to eTimes.07)		Agency 12	Agency 13	Agency 14	Agency 15	Agency 16	Agency 17
N	Total	1,053	583	43	3,422	877	1,006
	Valid	819	128	12	644	119	325
	Invalid	3	150	3	25	12	22
	Missing	231	305	28	2,753	746	659
Mean		12.1	11.6	7.2	12.5	10.8	10.9
Median		11.7	9.9	4.9	12.6	10.3	10.2
Standard Deviation		4.0	6.7	6.1	4.2	4.0	4.1
90th Percentile		16.5	22.4	19.1	15.9	14.7	15.5
95% Confidence Interval for Mean		(11.8-12.35)	(10.43-12.77)	(3.32-11.06)	(12.13-12.78)	(10.09-11.53)	(10.44-11.34)

-----END OF REPORT-----

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.

Report prepared by Sean Hakam & Catherine Borna Farrokhi, Data & Reporting Unit, Riverside County EMS Agency. For more information, please contact Riverside County EMS Agency, Emergency Management Department (951) 358-5029.
