



RIVERSIDE COUNTY EMS AGENCY
PATIENT CARE CONTINUUM REPORT
FY 2022-2023

OCTOBER 31ST, 2023

PREPARED BY RIVERSIDE COUNTY EMS AGENCY, EMERGENCY MANAGEMENT DEPARTMENT

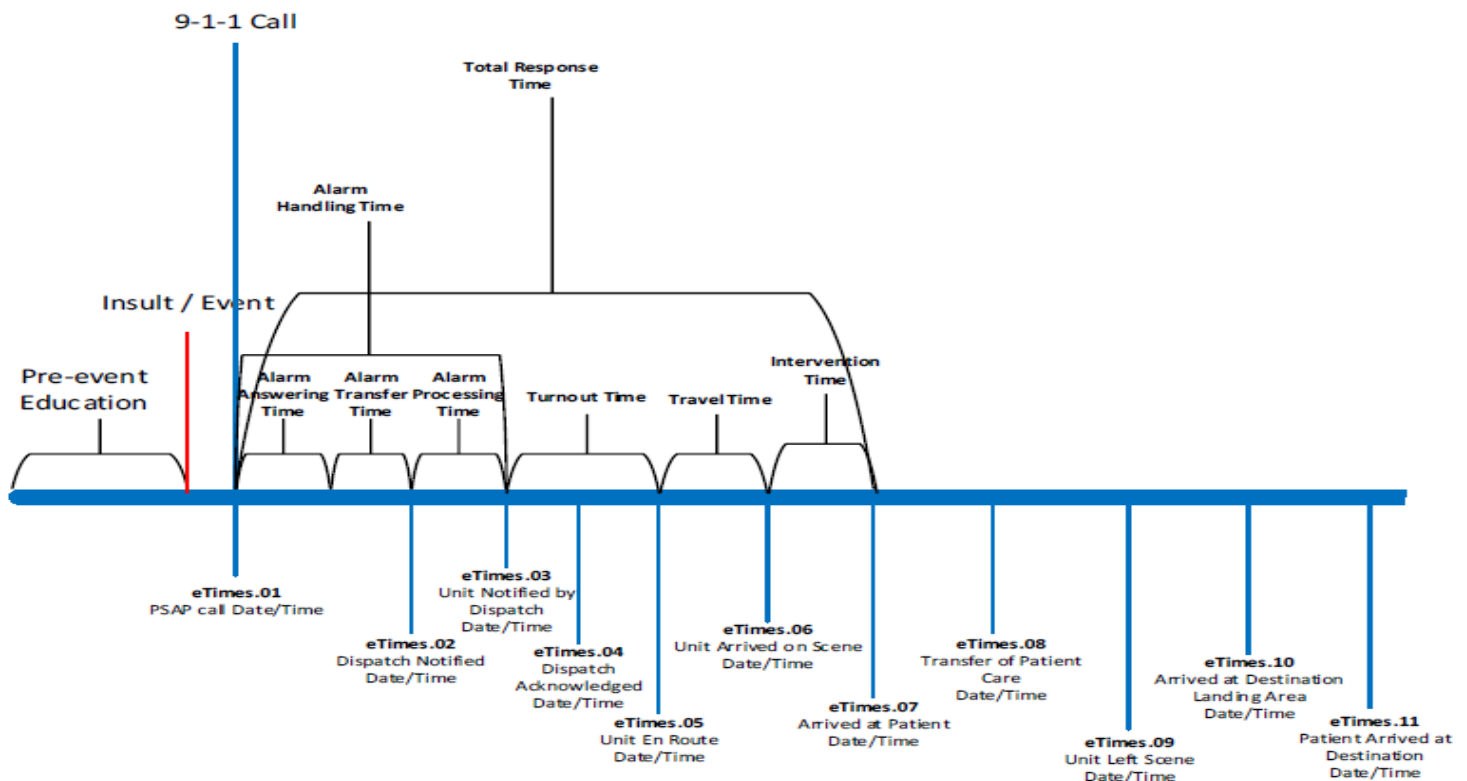
PATIENT CARE CONTINUUM REPORT

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

503,641 ePCRs (electronic patient care reports) were initially identified on ImageTrend® Elite Report Writer between 7/1/2022 and 6/30/2023. **320,798 (63.7% of total ePCRs)** were then identified for use in time interval analysis after downloading, compiling, and cleaning the raw data.

Exclusions

182,843 (36.3% 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** defined by the National Emergency Medical Information System (NEMSIS) were included and used to create the time intervals from REMSA Policy 2203 as well as additional relevant intervals. **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.

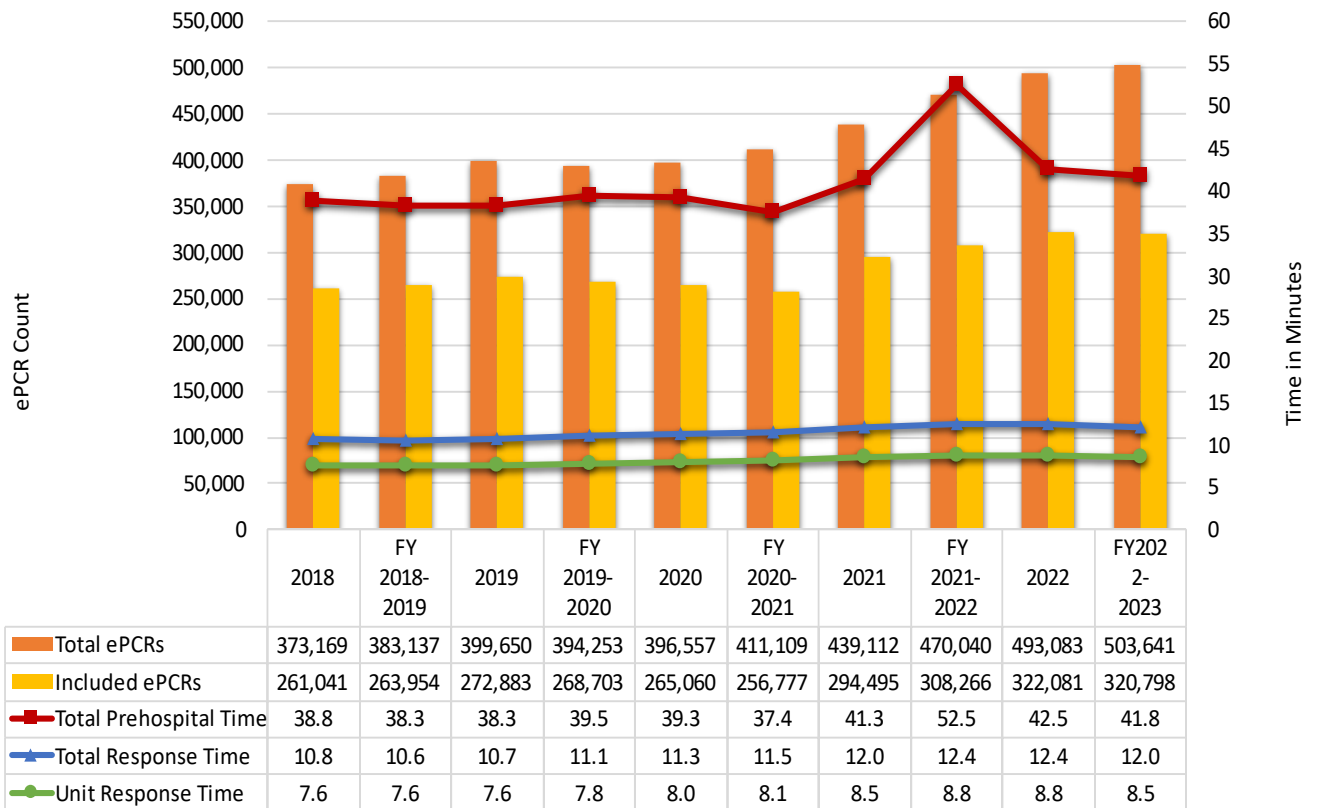
Change in Patient Care Continuum Reporting Over Time

Combination Chart I. This combination bar and line chart below shows change over time in key metrics as recorded in the semiannual Patient Care Continuum Reports.

The data shows that total ePCR count has increased by 35% between 2018 and FY2022-2023. This is due in part to County population growth but also influenced by closer adherence to policy guidelines around EMS response documentation.

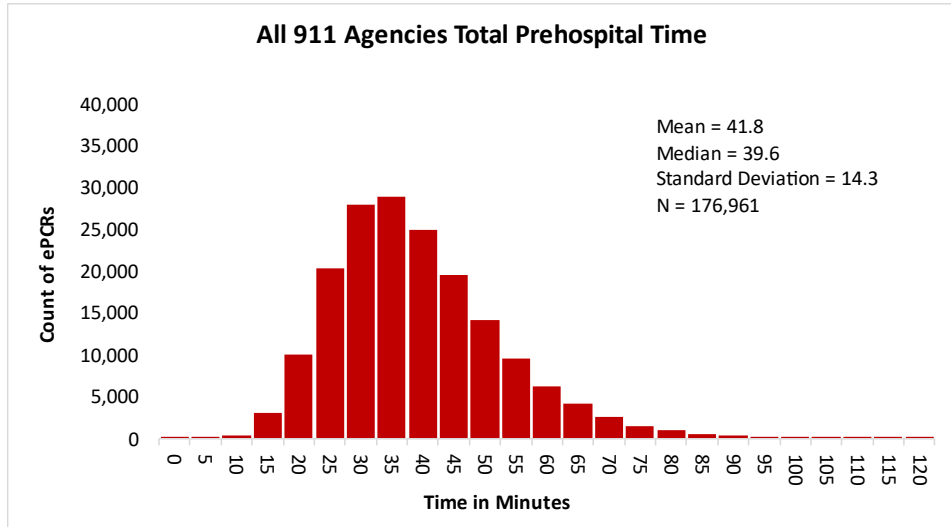
Mean Total Prehospital Time (NEMSIS eTimes.01 to eTimes.11), Total Response Time (NEMSIS eTimes.01 to eTimes.07) and Unit Response Time (NEMSIS eTimes.03 to eTimes.06) intervals remained mostly stable from 2018 through 2020; however, the Covid-19 pandemic marked a significant increase in these time intervals from 2021 through fiscal year 2021-2022. In FY2022-2023, these time intervals appear to be decreasing despite an increase in the overall volume of records.

Patient Care Continuum From 2018 to FY2022 -2023

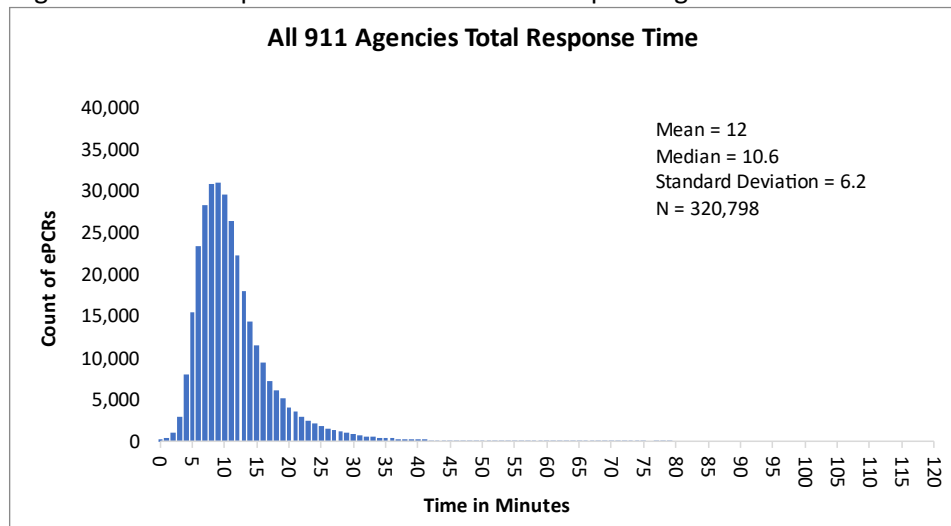


Timeline and Findings

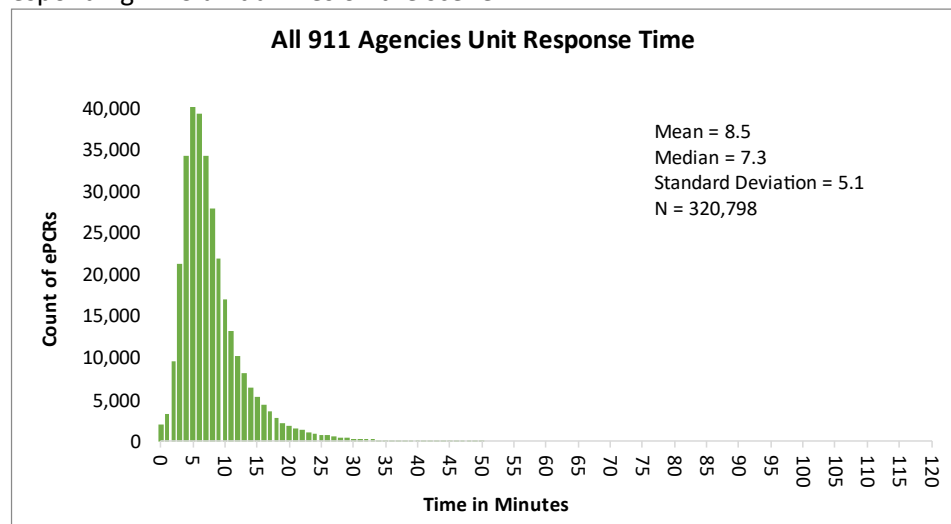
Histogram I. *Total Prehospital Time – eTimes.01 to eTimes.11* begins when a 9-1-1 call is made to a public safety answering point (PSAP) requesting an EMS unit response and ends when the responding EMS unit arrives with the patient at the hospital or alternate destination.



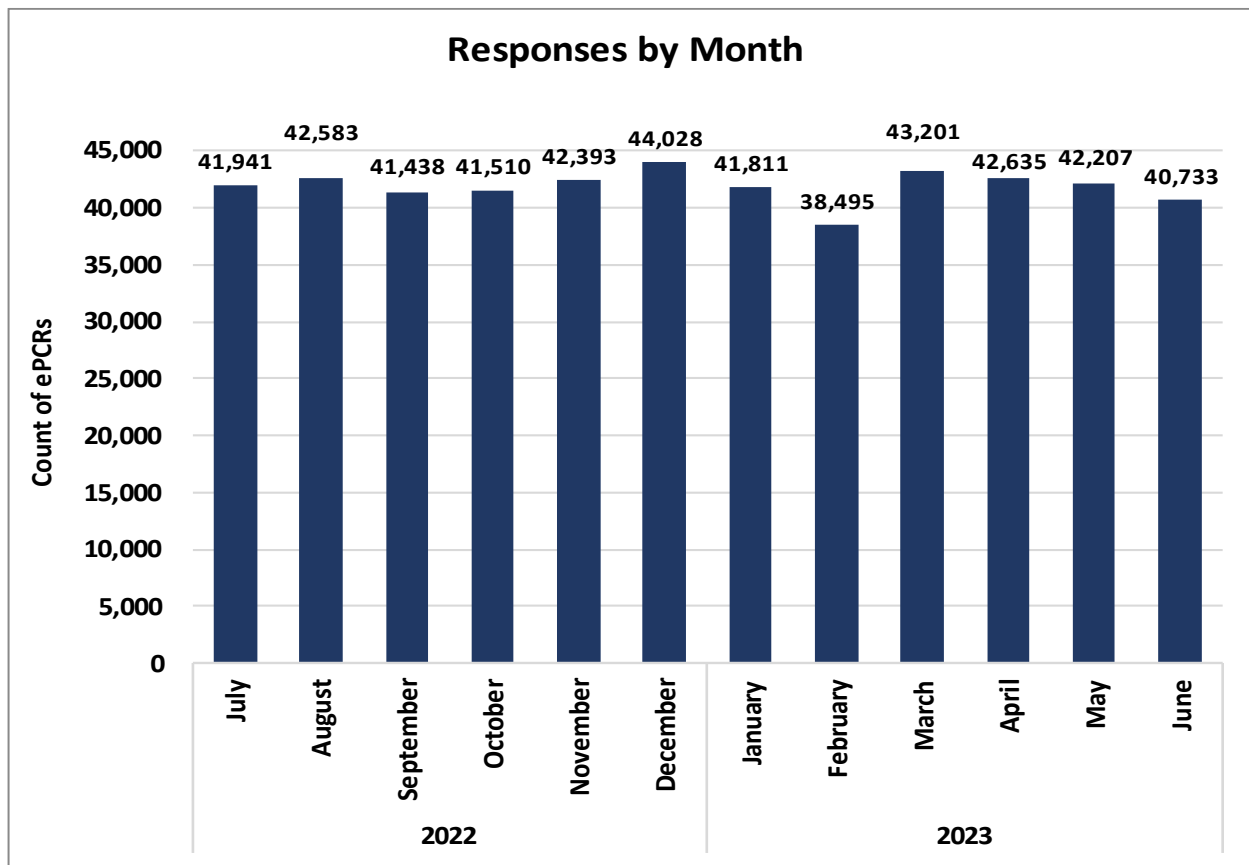
Histogram II. *Total Response Time – eTimes.01 to eTimes.07* begins when a 9-1-1 call is made to a public safety answering point (PSAP) requesting an EMS unit response and ends when the responding EMS unit arrive at the patient's side.



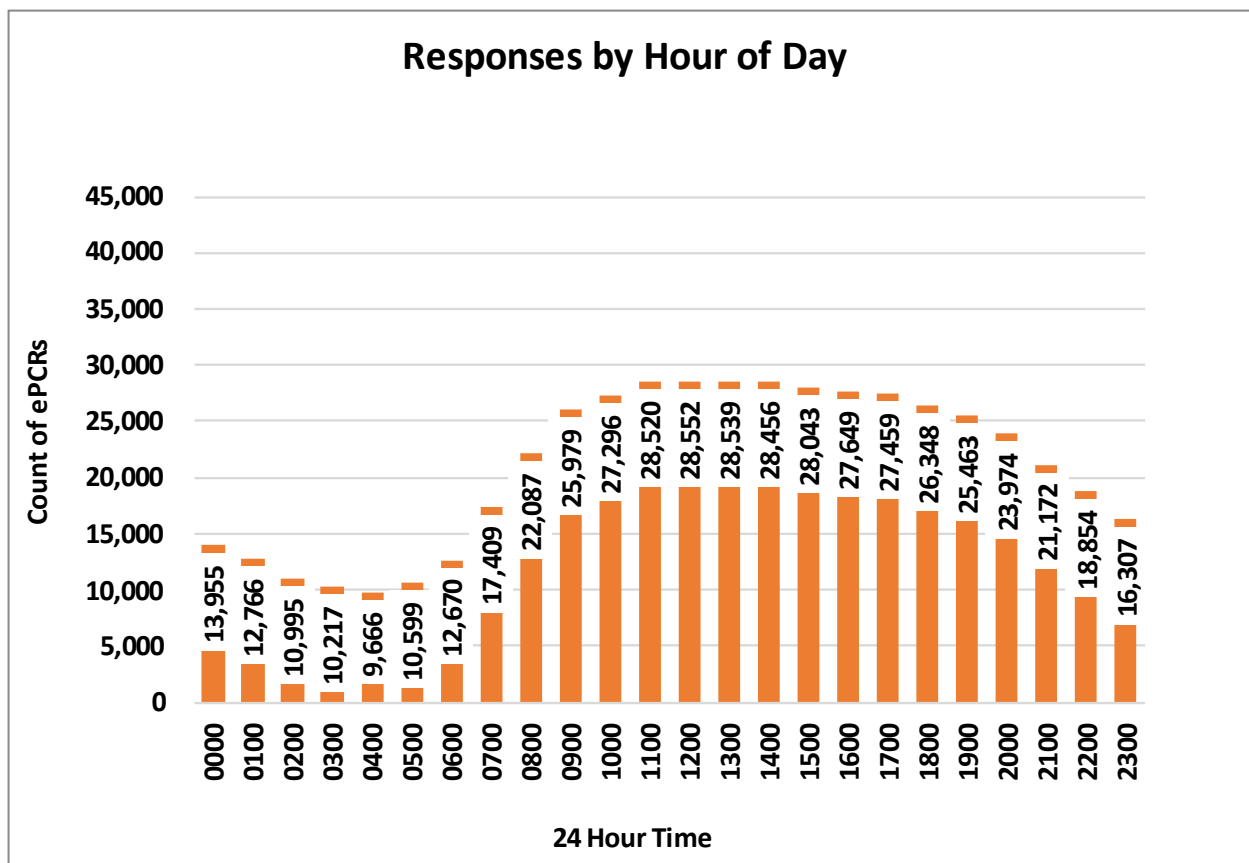
Histogram III. *Unit Response Time – eTimes.03 to eTimes.06* begins when the responding EMS unit is notified by dispatch and ends when the responding EMS unit arrives on the scene.



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	503,641	503,641	503,641	503,641	503,641
	Valid	320,798	320,798	320,798	320,798	320,798
	Invalid	117,843	174,870	118,005	180,670	144,974
	Missing	65,000	7,973	64,838	2,173	37,869
Mean		0.8	1.0	1.8	1.1	7.4
Median		0.0	0.4	0.8	0.8	6.0
Standard Deviation		1.3	2.6	2.8	1.2	5.1
90th Percentile		2.6	1.8	3.7	2.5	13.8
95% Confidence Interval for Mean		(0.78-0.79)	(0.99-1)	(1.77-1.79)	(1.09-1.1)	(7.36-7.4)

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	503,641	503,641	503,641	503,641	503,641
	Valid	320,798	320,798	320,798	177,727	177,724
	Invalid	36,162	145,013	5,277	10,904	9,602
	Missing	146,681	37,830	177,566	315,010	316,315
Mean		1.7	8.5	12.0	14.9	13.2
Median		1.2	7.3	10.6	13.8	12.1
Standard Deviation		2.0	5.1	6.2	7.0	6.9
90th Percentile		3.0	14.7	19.3	23.7	21.8
95% Confidence Interval for Mean		(1.72-1.73)	(8.46-8.49)	(11.96-12)	(14.9-14.97)	(13.14-13.21)

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	503,641	503,641	503,641	503,641	503,641
	Valid	176,845	176,960	176,960	176,961	176,961
	Invalid	9,734	9,440	9,738	9,736	2,108
	Missing	317,062	317,241	316,943	316,944	324,572
Mean		15.5	28.6	30.4	40.2	41.8
Median		13.5	26.7	28.4	38.1	39.6
Standard Deviation		9.5	12.0	12.1	13.9	14.3
90th Percentile		27.5	43.9	45.8	58.0	60.0
95% Confidence Interval for Mean		(15.4-15.49)	(28.56-28.67)	(30.31-30.43)	(40.14-40.27)	(41.76-41.89)

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	263,578	263,578	263,578	263,578	263,578	263,578	263,578	263,578
	Valid	132,530	132,530	132,530	132,530	132,530	132,530	132,530	132,530
	Invalid	77,955	128,819	77,982	129,579	109,242	25,302	109,278	2,629
	Missing	53,093	2,229	53,066	1,469	21,806	105,746	21,770	128,419
Mean		1.6	0.5	2.1	1.6	5.1	1.7	6.7	10.5
Median		1.7	0.2	2.1	1.5	4.6	1.2	6.2	9.9
Standard Deviation		1.4	1.3	1.9	1.1	2.9	2.1	3.1	4.4
90th Percentile		3.1	1.2	3.9	2.9	8.4	3.1	10.4	15.4
95% Confidence Interval for Mean		(1.59-1.6)	(0.53-0.54)	(2.12-2.14)	(1.62-1.63)	(5.08-5.11)	(1.68-1.7)	(6.71-6.74)	(10.51-10.56)

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	240,063	240,063	240,063	240,063	240,063	240,063	240,063	240,063
	Valid	188,268	188,268	188,268	188,268	188,268	188,268	188,268	188,268
	Invalid	39,888	46,051	40,023	51,091	35,732	10,860	35,735	2,648
	Missing	11,907	5,744	11,772	704	16,063	40,935	16,060	49,147
Mean		0.2	1.3	1.5	0.7	9.0	1.8	9.7	13.0
Median		0.0	0.4	0.5	0.3	7.6	1.1	8.4	11.4
Standard Deviation		0.8	3.2	3.2	1.1	5.7	2.0	5.7	7.1
90th Percentile		0.0	2.6	3.5	1.8	16.3	3.0	17.0	21.8
95% Confidence Interval for Mean		(0.21-0.22)	(1.3-1.33)	(1.52-1.55)	(0.72-0.73)	(8.96-9.01)	(1.74-1.76)	(9.69-9.74)	(12.96-13.03)

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	Agency 6
N	Total	33,848	45,781	128,775	93	1,122	940
	Valid	26,317	36,815	103,919	47	811	586
	Invalid	510	663	1,201	1	3	6
	Missing	7,021	8,303	23,655	45	308	348
Mean		11.6	11.9	14.0	14.6	12.1	10.4
Median		9.4	10.0	12.5	12.9	11.6	10.0
Standard Deviation		7.4	7.3	7.1	6.6	4.0	3.3
90th Percentile		20.7	20.6	23.0	24.7	16.7	13.5
95% Confidence Interval for Mean		(11.46-11.64)	(11.81-11.96)	(13.96-14.05)	(12.67-16.53)	(11.83-12.39)	(10.11-10.64)

Total Response Time (eTimes.01 to eTimes.07)		Agency 7	Agency 8	Agency 9	Agency 10	Agency 11	Agency 12
N	Total	11,850	8,747	12,346	592	45	4,104
	Valid	7,116	8,726	6,303	214	19	957
	Invalid	95	18	359	17	2	28
	Missing	4,639	3	5,684	361	24	3,119
Mean		9.3	7.6	9.8	11.8	8.6	12.8
Median		8.3	7.1	9.4	10.3	5.6	12.5
Standard Deviation		4.7	3.2	3.6	6.9	14.7	4.9
90th Percentile		13.2	10.5	13.6	17.4	7.0	18.5
95% Confidence Interval for Mean		(9.14-9.36)	(7.56-7.7)	(9.74-9.92)	(10.85-12.71)	(1.53-15.7)	(12.46-13.08)

Total Response Time (eTimes.01 to eTimes.07)		Agency 13	Agency 14	Agency 15	Agency 16	Agency 17	Agency 18
N	Total	8,977	10,397	897	34,485	199,676	966
	Valid	7,152	8,130	132	23,774	89,492	288
	Invalid	160	214	4	404	1,576	16
	Missing	1,665	2,053	761	10,307	108,608	662
Mean		8.9	7.9	11.5	8.1	12.2	12.0
Median		8.6	7.2	10.2	7.5	11.5	11.2
Standard Deviation		3.1	3.7	5.5	3.3	4.2	3.9
90th Percentile		11.9	11.5	16.6	11.2	16.9	17.0
95% Confidence Interval for Mean		(8.87-9.02)	(7.86-8.02)	(10.54-12.43)	(8.02-8.1)	(12.21-12.27)	(11.57-12.46)

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

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