RIVERSIDE COUNTY EMS AGENCY

POLICY 7701
ELECTRONIC PATIENT CARE RECORD REPORT
2021

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The 2021 year presented unique challenges and trends in the provision of Emergency Medical Services (EMS). Compared to the previous year which included Covid-19 shutdowns and stay at home orders, the volume of EMS electronic patient care records and overall responses increased. This report aims to create a comprehensive view into the EMS system from the perspective of electronic patient care report (ePCR) submission.

REMSA policy 7701 requires patient records to be completed in compliance with the California Code of Regulations Title 22, (Chapter 4, Article 7, Section §100170(6A); Article 8, Sections §100171) and uploaded in a timely manner following a response or patient transfer to an emergency department. To get a more in depth look at the efficiency of ePCR entry for the Riverside County EMS system, data was pulled in 1-day increments, and mean changes of ePCR totals were calculated and evaluated based on changes in record count. The data was also evaluated for total count of ePCR submissions, hour of day, day of week, transport type, location, and response type.

For the 2021 year, a total of **491,587** ePCRs were generated. Approximately 95% of those records were entered the same day as the incident, 3% were entered the following day, and little change was observed beyond Day 7. This change in ePCR count was stable when observed 6 months later. December displayed the greatest number of ePCRs generated for the 2021 year with 45,352 reports in that month. 2PM was the busiest hour of day accounting for approximately 5.8% of all reports (28,445 records). Fridays generated the greatest volume of incidents according to ePCR submissions with 15.1% (74,231 records) of total ePCRs occurring on that day. Ambulance transports made up the majority of reports submitted each month. Emergency responses compared to non-emergency transport (interfacility/medical) also accounted for most, nearly 90%, of all ePCRs for the 2021 year (87.5%; 430, 188 records). Riverside County Fire Department and AMR-Riverside combined account for about 60% of all ePCRS submitted in 2021 (61.2%; 300,815 reports). According to EMS zone analysis, the Northwest zone of Riverside County carried the highest number of responses with 27.9% (136,706 records) of all ePCRs generated within this zone.

METHOD

Data between January 1st, 2021, and December 31st, 2021, was extracted from the Riverside County Imagetrend® Elite system using Imagetrend® Reportwriter. Record fields extracted were Incident Date, Disposition (eDisposition.19), Agency Name (dAgency.03), Response Type of Service Requested (eResponse.05), Incident Patient Disposition (eDisposition.12), Scene Incident Location Type (eScene.09), Transport Type as determined by EMS Vehicle Unit Number (eResponse.13), and Incident Patient Care Record Number (e.Record.01). Data was then de-duplicated by Patient Care Record Number. Incidents originating outside of Riverside County were excluded from the analyses. Additional categories were developed and collapsed as follows:
- Response Type
  - *Emergency* = 911 Response
  - *Non-Emergency* = Interfacility Transport & Medical Transport;
  - *Other* = Intercept, Mutual Aid, Public Assistance, and Standby)
- "Scene Incident Location Type" was collapsed based on variable consistencies and detailed in Appendix, Sections A-B

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Figure 1: Total Number of ePCRs Generated in 2021 by Month

ePCRs Generated by Month
(January 1st, 2021-December 31st, 2021)

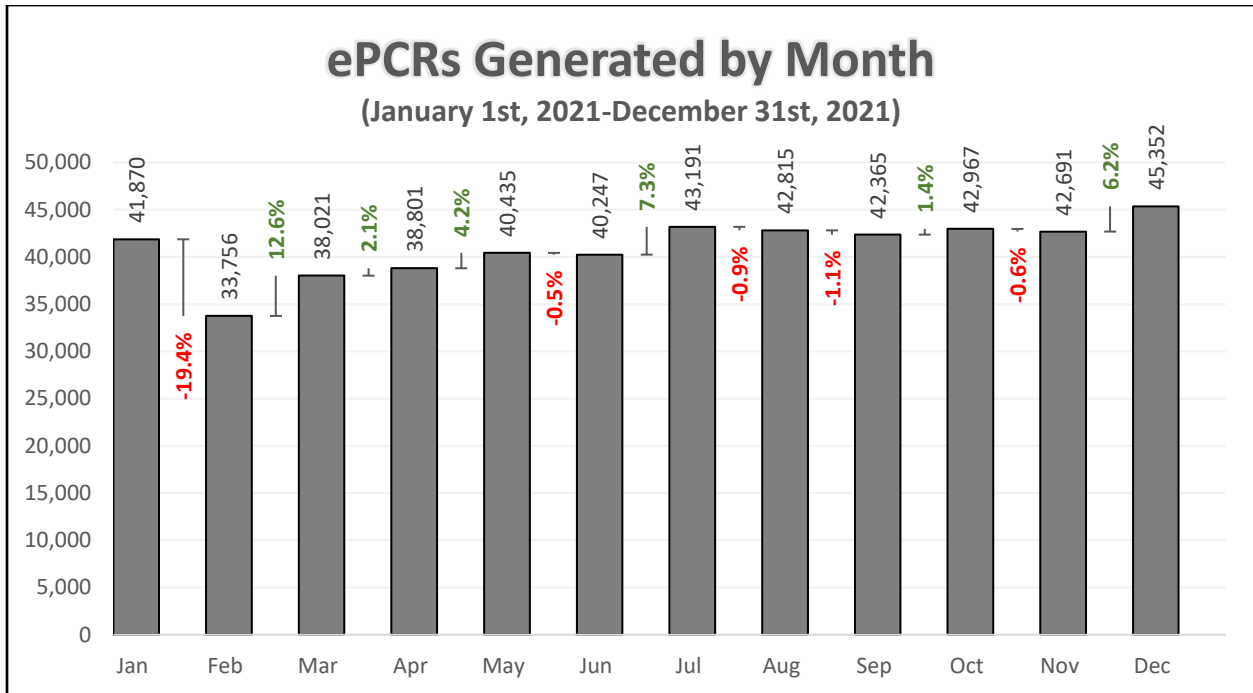*Figure 1 above displays the counts of ePCRs that were generated each month and the variation from month to month. The greatest decrease in ePCR volume occurred from January 2021 to February 2021 (-19.4%). This decline in volume followed the COVID-19 epidemic spikes which correlated with an overall increase in EMS services. The greatest increase occurred from the month of February to March in 2021 (+12.6%).*

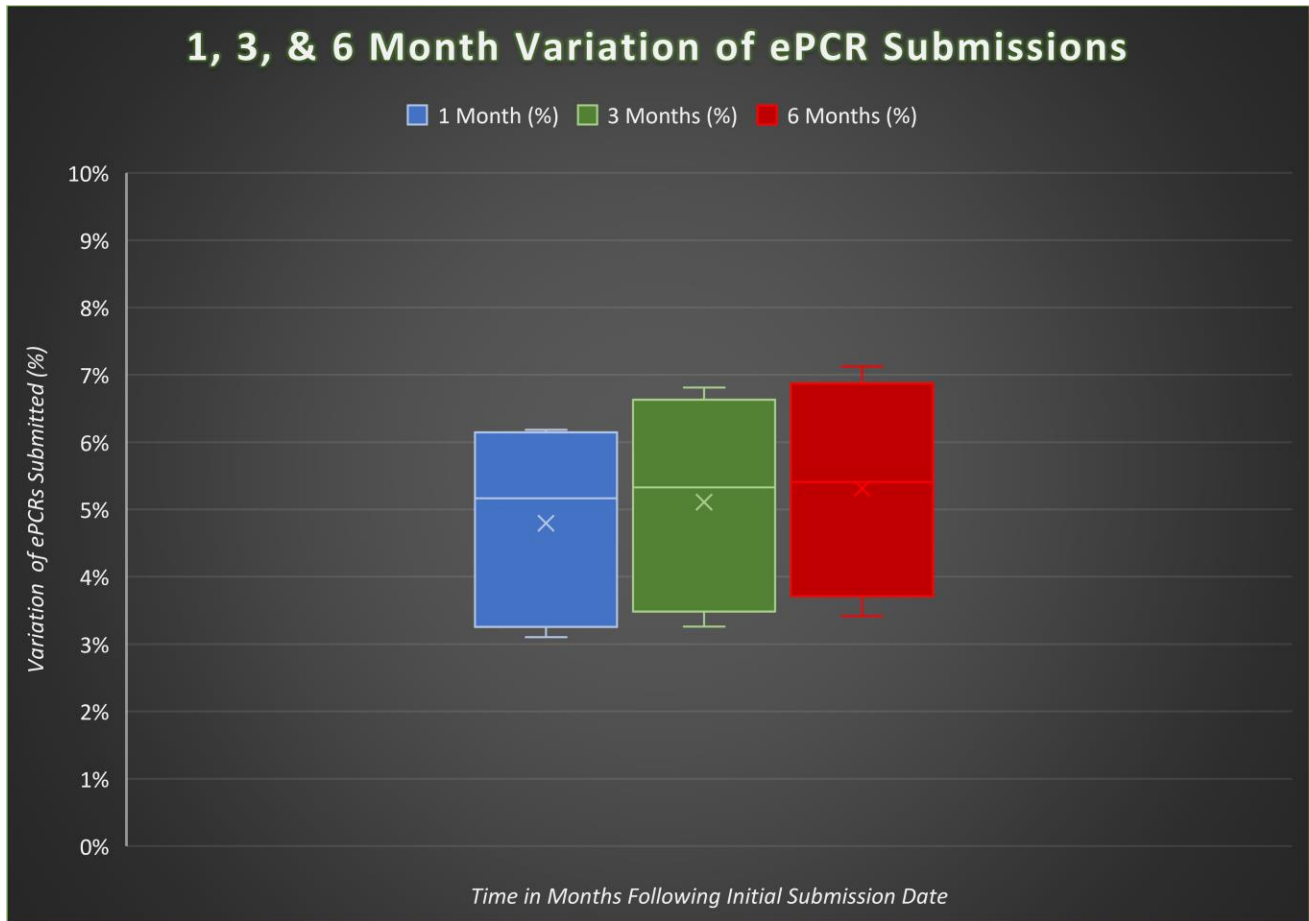# *Figure 2: Variation of ePCR Submission by Month Increments*

Figure 2 represents the mean variation in ePCR submission within 1, 3, and 6 months. Each day at 10 am records were collected for the previous day (12:00 AM-11:59 PM), then again in month increments. This data collection was done at the same time each day to increase the validity of measure. A total of 7 days were collected to calculate mean variations over time. After 6 months there was an average increase of 5.3% delayed submissions (~40-80 records) from the original date it was submitted for. There were no significant differences in delayed submissions from one month to six month; however, a nominal increase in ePCR volume is observed.

Figure 3: Total ePCRs Generated in 2021 by Incident Hour of Day

Total ePCRs Generated by Incident Hour of Day

Legend: Count, Proportion

Proportion values by hour: 12 AM 2.9%, 1 AM 2.6%, 2 AM 2.3%, 3 AM 2.1%, 4 AM 2.0%, 5 AM 2.1%, 6 AM 2.5%, 7 AM 3.3%, 8 AM 4.1%, 9 AM 4.9%, 10 AM 5.2%, 11 AM 5.6%, 12 PM 5.7%, 1 PM 5.6%, 2 PM 5.8%, 3 PM 5.7%, 4 PM 5.7%, 5 PM 5.6%, 6 PM 5.2%, 7PM 5.0%, 8 PM 4.7%, 9 PM 4.3%, 10 PM 3.8%, 11 PM 3.3%
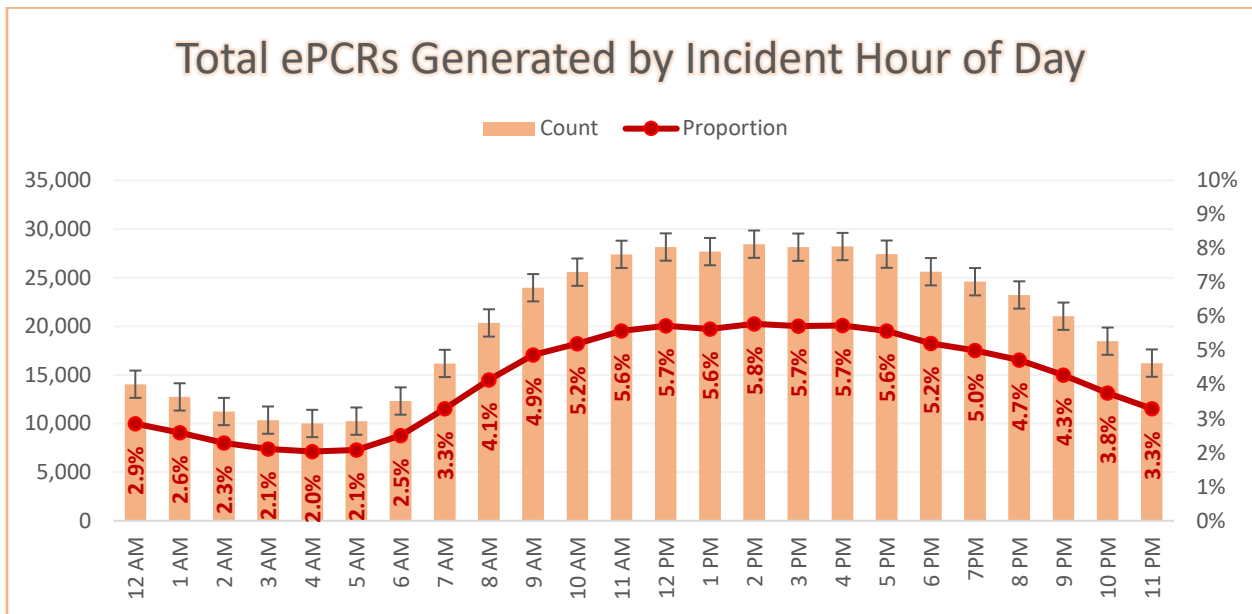
Figure 3 above represents the distribution of EMS incidents by the hour of day reported in each ePCR generated. It can be seen that the majority of incidents occurred between the hours of 9AM-9PM (69%). The error bars that do not overlap show significant difference among those hours. For instance, there is a significant difference in EMS incidents that occurred at 7AM and 8AM.

Figure 4: Total ePCRs Generated in 2021 by Incident Day of Week

Total ePCRs Generated by Day of Week

Legend: PCR Count, Proportion

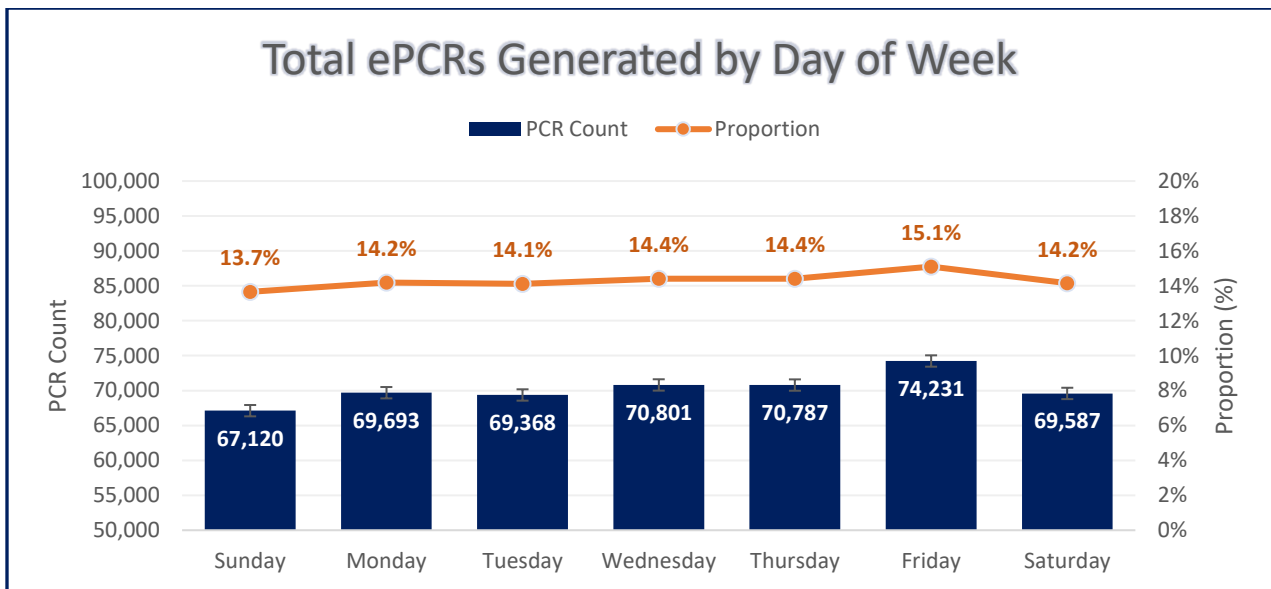| Day	PCR Count	Proportion
Sunday	67,120	13.7%
Monday	69,693	14.2%
Tuesday	69,368	14.1%
Wednesday	70,801	14.4%
Thursday	70,787	14.4%
Friday	74,231	15.1%
Saturday	69,587	14.2%

Figure 4 above represents the distribution of EMS incidents by the day of the week reported in each ePCR generated. It can be seen that the majority of incidents occurred on Friday with 15.1% of the ePCR distribution respectively. Sunday represents the day of the week with the fewest ePCRs generated at 13.7%. The error bars that do not overlap show significant difference among those days. For example, there is a significant difference in EMS incidents that occurred on Friday (15.1%) compared to Saturday (14.2%).

Figure 5: Total ePCRs Generated in 2021 by EMS Transport (Monthly Aggregate)
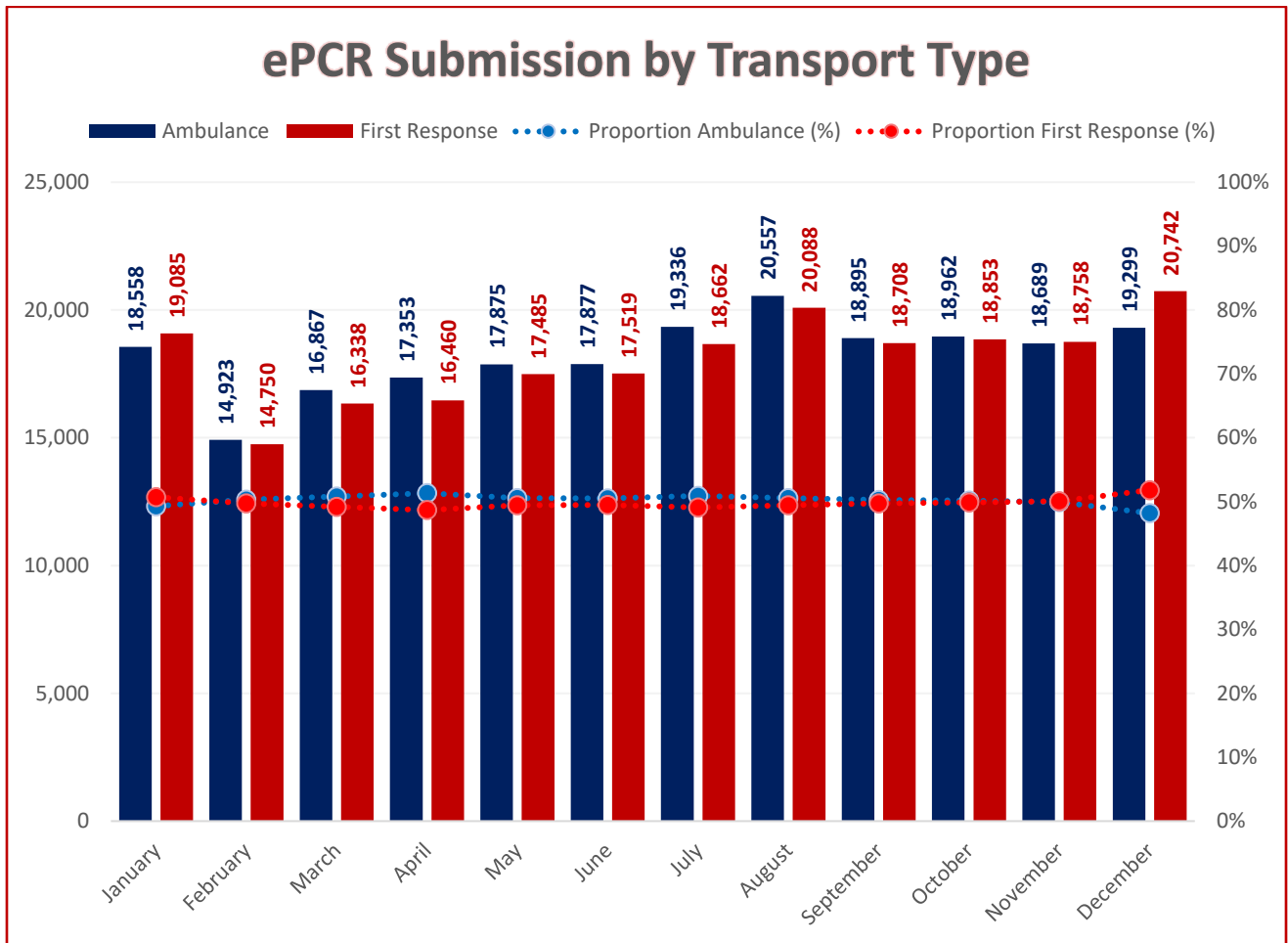

Figure 5 above represents the total number of electronic patient care records generated by EMS transports. December was the month with the greatest number of ePCRs for First Response transports (20,742 records; 51.8%). August was the month with the greatest number of ePCRs for Ambulance transports (20,557 records; 50.6%). December and January represent the months with the least difference ePCR submissions for ambulance (53.5%,53.7%) and first responders (46.5%,46.3%). February was the month with the lowest number of ePCRs generated for both Ambulance and First Response transports (18,792 and 14,911 reports respectively).

Figure 6: ePCRs Generated in 2021 by Response Type

Total ePCRs Generated by Response Type

■ Emergency ■ Non-Emergency ■ Other

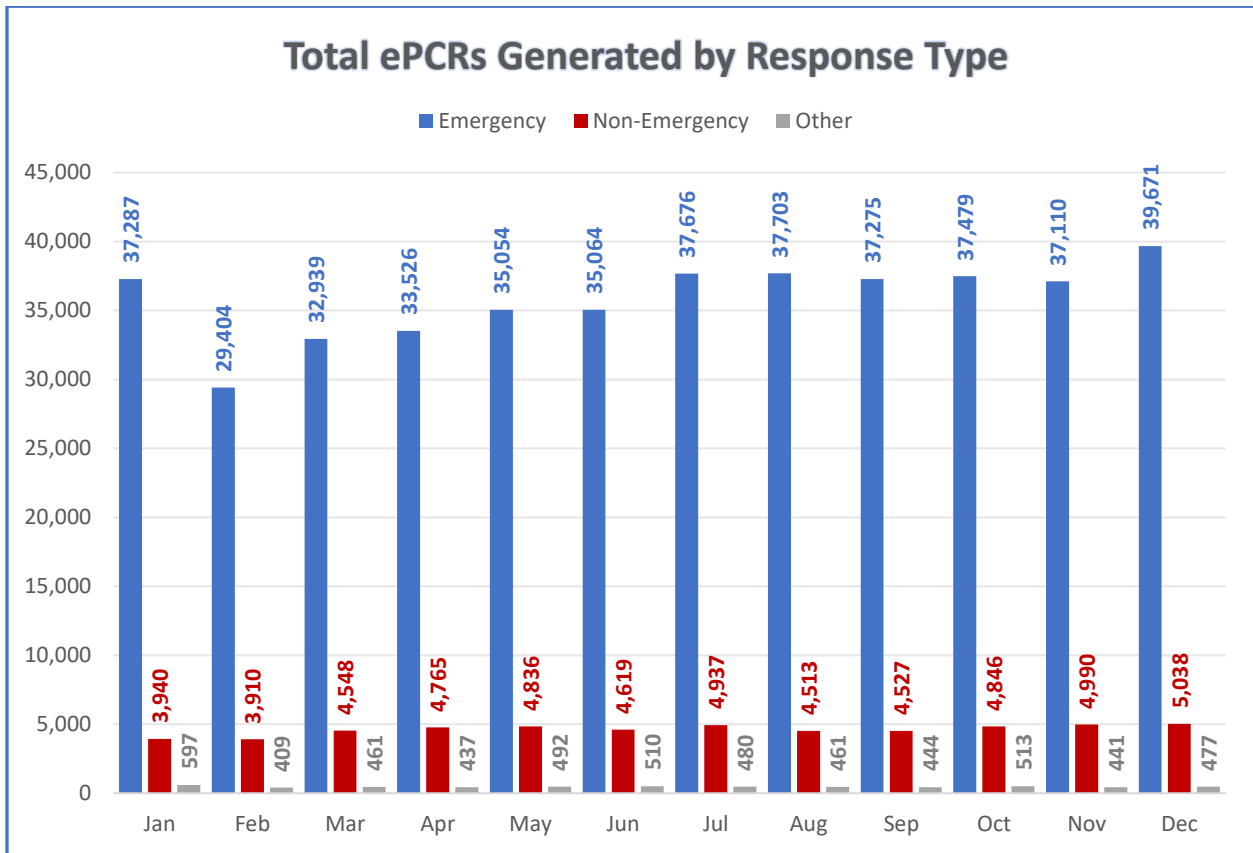| Month	Emergency	Non-Emergency	Other
Jan	37,287	3,940	597
Feb	29,404	3,910	409
Mar	32,939	4,548	461
Apr	33,526	4,765	437
May	35,054	4,836	492
Jun	35,064	4,619	510
Jul	37,676	4,937	480
Aug	37,703	4,513	461
Sep	37,275	4,527	444
Oct	37,479	4,846	513
Nov	37,110	4,990	441
Dec	39,671	5,038	477

Figure 6 above represents the distribution of ePCRs generated by each type of EMS response. Emergency responses made up the majority of ePCRs generated throughout the 2021 year (430,188 records; 87.5%). December displayed the greatest number of emergency responses (39,671; 9.2%) and the greatest number of non-emergency responses according to ePCRs generated (5,038 records;9.1%).

**Figure 7: Total ePCRs Generated in 2021 by Incident Patient Disposition**
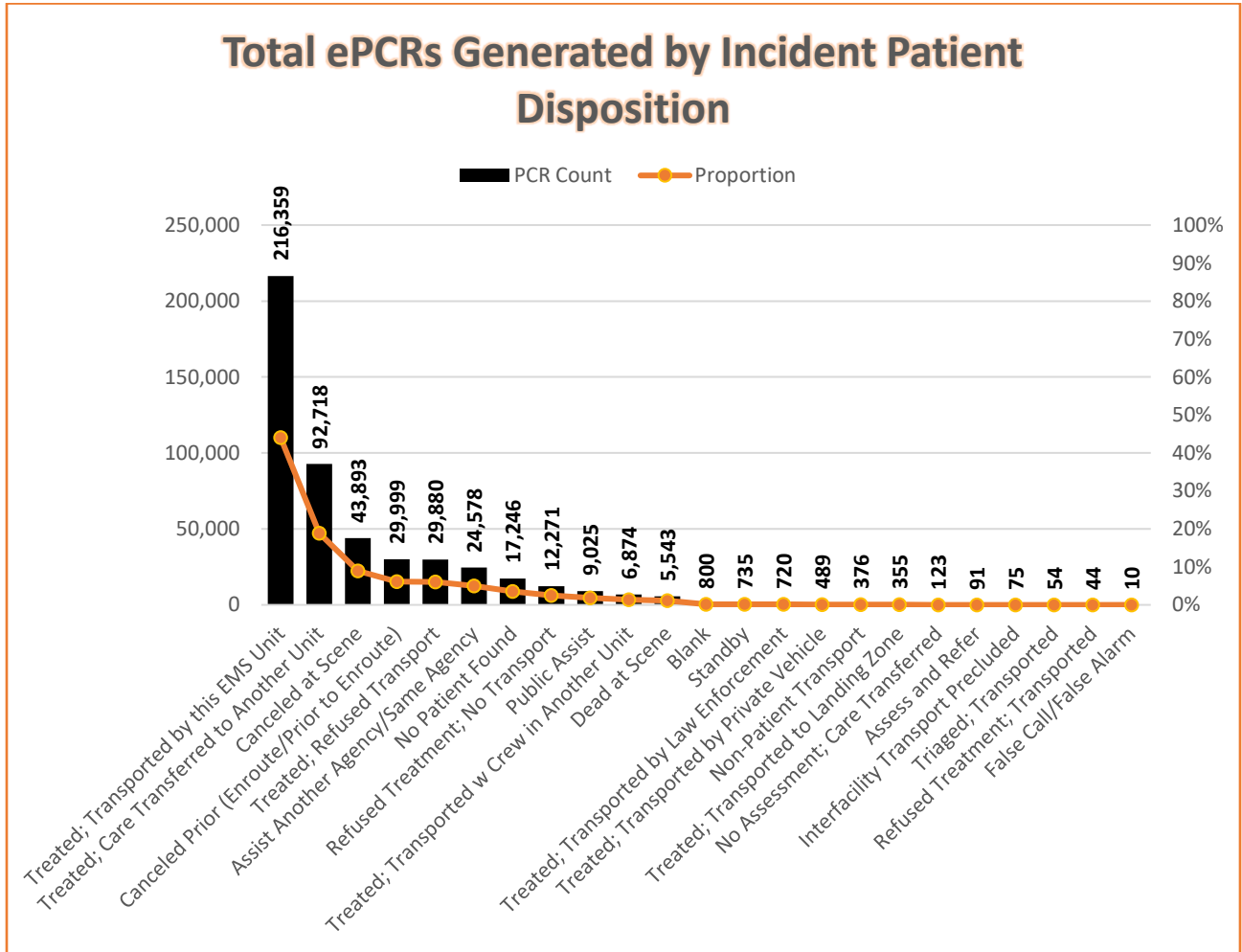
The figure above represents the total number and proportion of ePCRs in 2021 by Incident Patient Disposition. Patient incident disposition is taken from ImageTrend NEMSIS value eDisposition.12. From the data, it can be seen that the majority of patients encountered were treated and transported by the same EMS unit (216,359 records; 44%). Approximately, 15% of the reports submitted were due to calls that were canceled at the scene or prior to EMS arrival. Records that did not include an incident patient disposition were removed from this analysis (N=208).

## Figure 8: Total Number of ePCRs Generated in 2021 by Agency
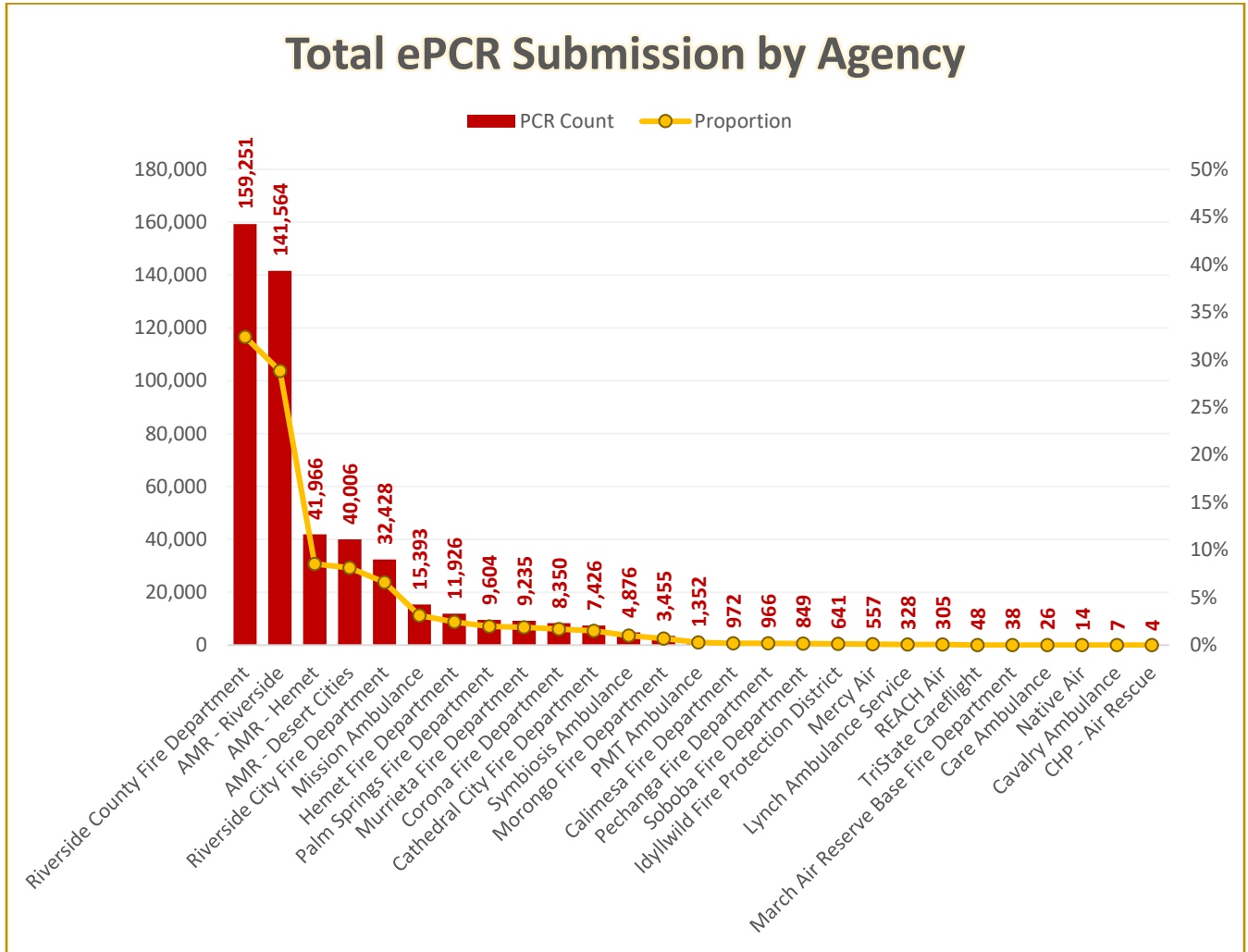
The figure above shows the distribution of EMS patient care reports submitted by each provider agency from Jan 2021-Dec 2021. Riverside County Fire Department represents the agency that makes up the largest proportion of ePCRs received during this time with 159,251 reports (32.4%). AMR Riverside was the second agency with the most ePCRs generated during that time with 141,564 reports (28.8%).

Figure 9: Total ePCR Count by Scene Incident Location Type
(see Appendix for Breakdown)
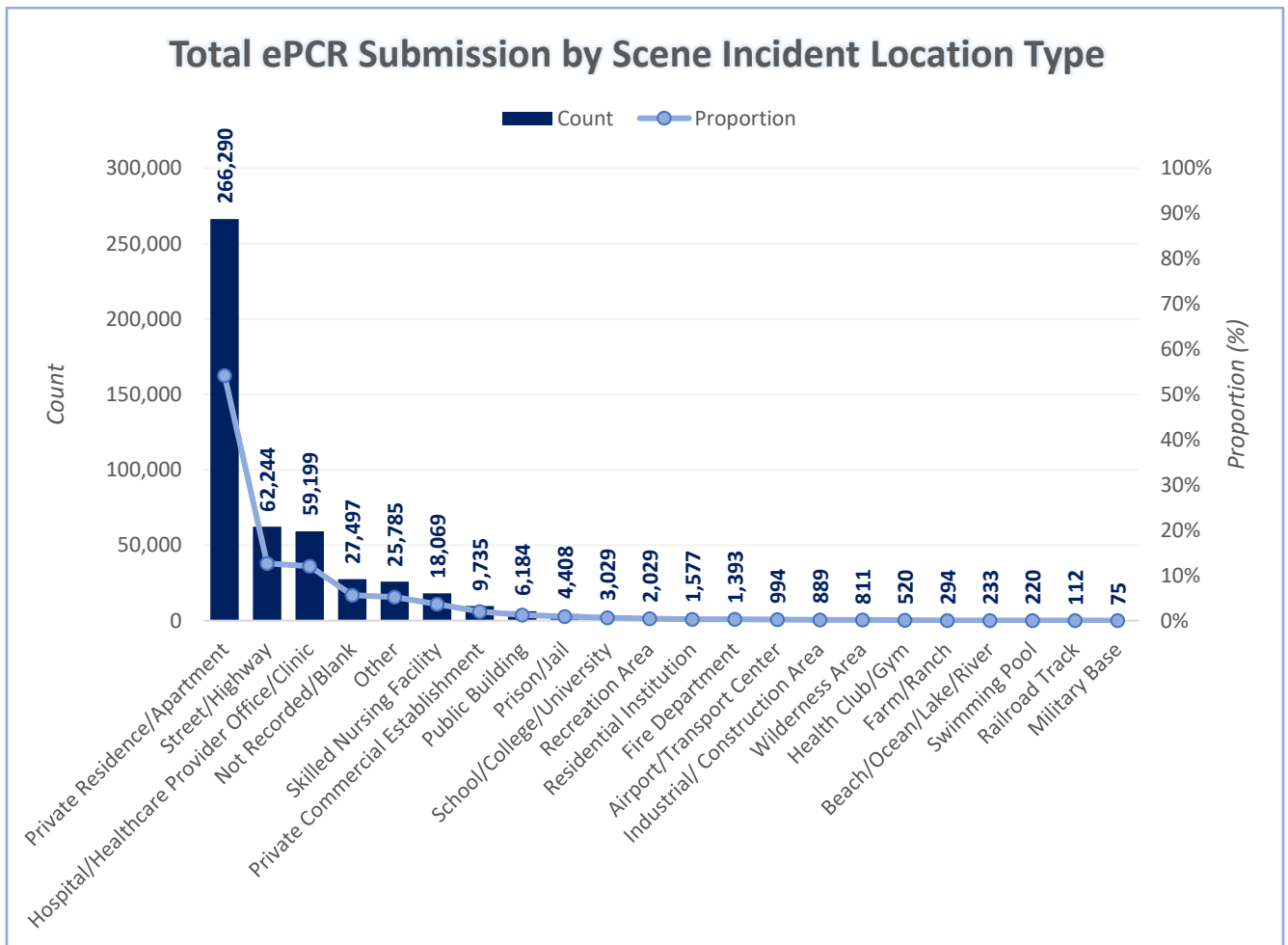
The figure above displays the total number and proportion of ePCRs by Scene Incident Location Type in 2021. The 15 scene incident location types with greatest frequency of records are shown in this figure. There were a total of 25 different location types then collapsed into 22 categories (shown in Appendix A). The scene incident location types from non-emergency transports are also shown (Appendix B) and it was found that 81.8% (45,390 incidents) come from hospital settings).Most of the incidents that were reported occurred in a private residence or apartment (266,290 records, 54.2%). 5.6% (27,497 records) of the total ePCRs submitted did not include a scene incident location type, shown as "Not Recorded/Blank".

Figure 10: Total Number of ePCRs Generated in 2021 by EMS Zone
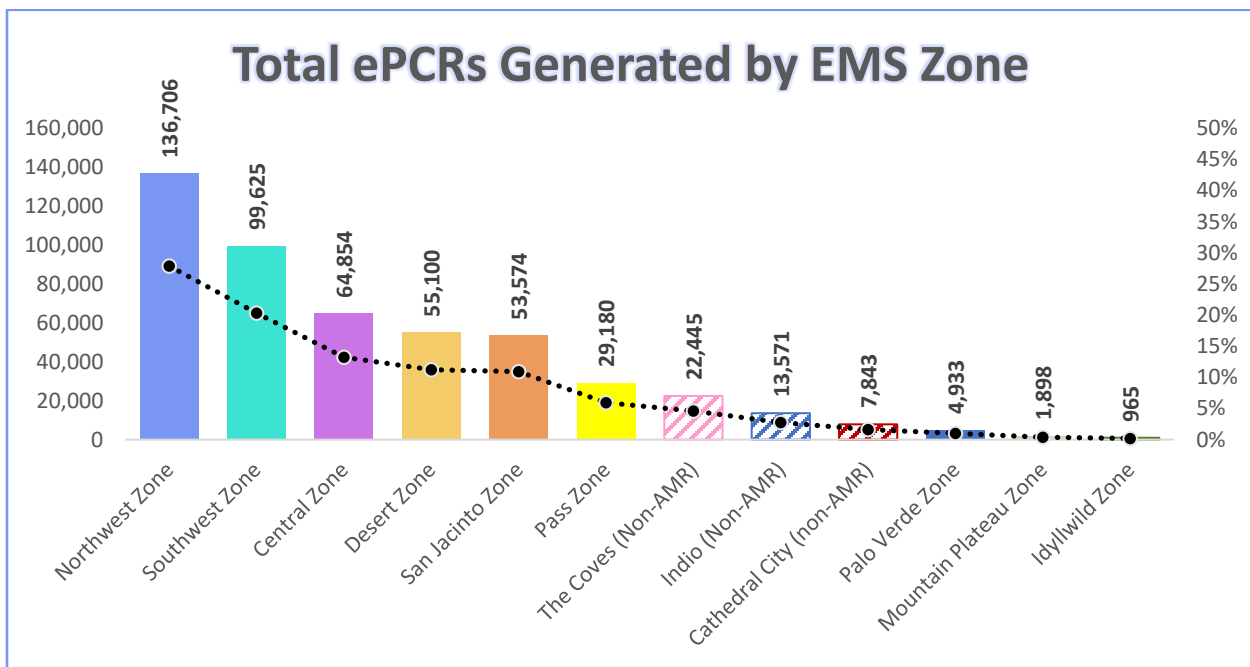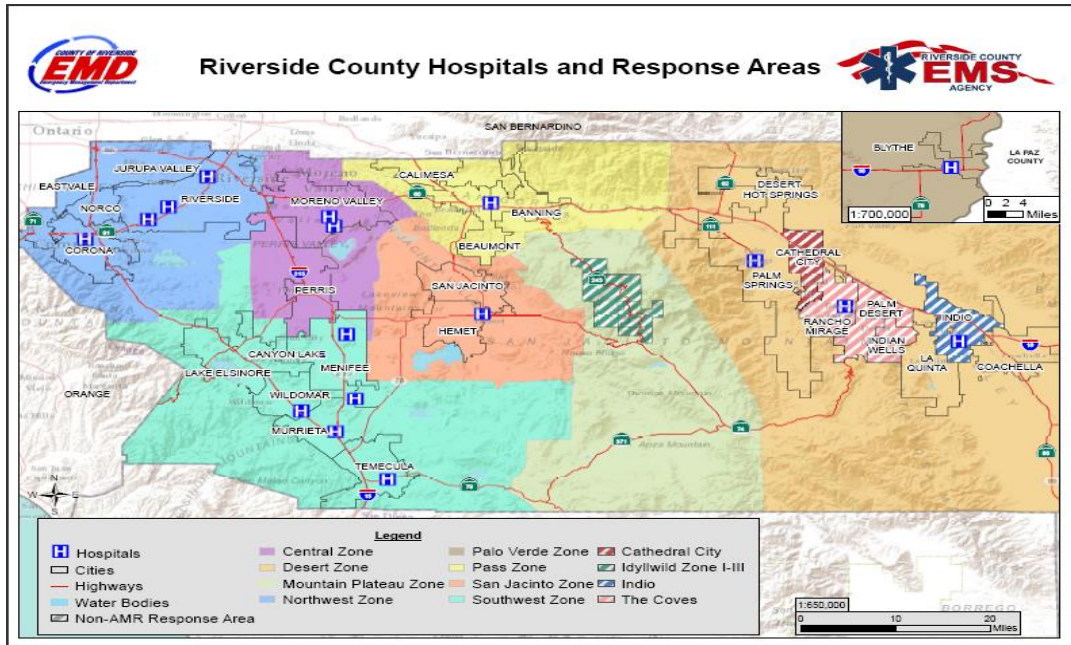
The figure above represents the number and proportions of ePCRs generated within each EMS Zone from January 1st, 2021-December 31st, 2021. The majority of records originated within the Northwest EMS Zone with 136,706 records (27.9%). The EMS zone with the lowest frequency of generated records was the Idyllwild Zone (Non-AMR) with 965 records. This analysis was done using data extracted from ImageTrend Elite using the scene incident city name (escene.17) and matched to corresponding zones. Less than 1% (893) of the records were removed from this analysis due to occurrences within unincorporated areas or incident city was missing/blank.

Appendix A- *Scene Location Breakdown for All Incidents*

Original Scene Location Type	Count	Scene Location Type	Count	Proportion
Private Residence/Apartment	266,290	Private Residence/Apartment	266,290	54.17%
Street and Highway	62,244	Street/Highway	62,244	12.66%
Hospital	46,182	Hospital/Healthcare Provider Office/Clinic	59,199	12.04%
Healthcare provider office/clinic	11,058			
Urgent Care	1,959			
(blank)	27,324	Not Recorded/Blank	27,497	5.59%
Not Recorded	173			
Other	25,785	Other	25,785	5.25%
Skilled Nursing Facility	18,069	Skilled Nursing Facility	18,069	3.68%
Private Commercial Establishment	9,735	Private Commercial Establishment	9,735	1.98%
Public Building	6,184	Public Building	6,184	1.26%
Prison/Jail	4,408	Prison/Jail	4,408	0.90%
School/College/University	3,029	School/College/University	3,029	0.62%
Recreation area	2,029	Recreation Area	2,029	0.41%
Residential institution	1,577	Residential Institution	1,577	0.32%
Fire Department	1,393	Fire Department	1,393	0.28%
Airport/Transport Center	994	Airport/Transport Center	994	0.20%
Industrial or construction area	889	Industrial/ Construction Area	889	0.18%
Wilderness area	811	Wilderness Area	811	0.16%
Health Club/Gym	520	Health Club/Gym	520	0.11%
Farm/Ranch	294	Farm/Ranch	294	0.06%
Beach/Ocean/Lake/River	233	Beach/Ocean/Lake/River	233	0.05%
Swimming Pool	220	Swimming Pool	220	0.04%
Railroad Track	112	Railroad Track	112	0.02%
Military base	75	Military Base	75	0.02%

Appendix B- *Scene Location Breakdown for Non-Emergency Responses*

Original Scene Location Type	Count	Scene Location Type	Count	Proportion
Hospital	43,485	Hospital/Healthcare Provider Office/Clinic	45,390	81.83%
Healthcare provider office/clinic	1,737			
Urgent Care	168			
Skilled Nursing Facility	3,956	Skilled Nursing Facility	3,956	7.13%
Private Residence/Apartment	2,082	Private Residence/Apartment	2,082	3.75%
Other	1,269	Other	1,269	2.29%
Prison/Jail	1,067	Prison/Jail	1,067	1.92%
(blank)	522	Not Recorded/Blank	522	0.94%
Airport/Transport Center	500	Airport/Transport Center	500	0.90%
Street and Highway	341	Street/Highway	341	0.61%
School/College/University	89	School/College/University	89	0.16%
Public Building	74	Public Building	74	0.13%
Residential institution	69	Residential Institution	69	0.12%
Private Commercial Establishment	43	Private Commercial Establishment	43	0.08%
Fire Department	15	Fire Department	15	0.03%
Industrial or construction area	14	Industrial/Construction Area	14	0.03%
Recreation area	12	Recreation Area	12	0.02%
Health Club/Gym	9	Health Club/Gym	9	0.02%
Farm/Ranch	7	Farm/Ranch	7	0.01%
Military base	4	Military Base	4	0.01%
Wilderness area	3	Wilderness Area	3	0.01%
Swimming Pool	3	Swimming Pool	3	0.01%

References

- Riverside County Emergency Medical Services Agency (REMSA) Policy 7701
  https://www.remsa.us/policy/7701.pdf
- State of California. California Code of Regulations, Title 22. Social Security,
  Division 9. Prehospital Emergency Medical Services. State of California
  Emergency Medical Services Authority / Health and Human Services
  Agency. 2021.
  https://emsa.ca.gov/wp-content/uploads/sites/71/2021/01/EMSA-REGS-
  2020-12-15.pdf

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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