RIVERSIDE COUNTY EMS AGENCY

ELECTRONIC PATIENT RECORD REPORT

FY 2021-2022

OCTOBER 10TH, 2022

PREPARED FOR RIVERSIDE COUNTY EMS AGENCY, EMERGENCY MANAGEMENT DEPARTMENT

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The 2021-2022 fiscal year displayed an overall increase in the volume of EMS responses which corresponded with an uptick in electronic patient care records. This followed the unique challenges and trends in the provision of Emergency Medical Services (EMS) from previous years. The COVID-19 shutdowns and stay at home orders implemented in 2020 led to an overall decline in EMS calls, and since then, the volume of EMS electronic patient care records and overall responses have 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, validation score, and response type. Validation scores were analyzed to represent the quality of documentation for each record. For this analysis, records that did not involve patient contact were removed.

For the 2021-2022 fiscal year, a total of **538,679** ePCRs were generated. Approximately 98% of those records were entered within one day of the incident, 0.42% were entered the following day, and little change was observed beyond Day 3 (less than 0.42%). January 2022 displayed the greatest number of ePCRs generated for the 2021-2022 fiscal year with 47,352 reports in that month. 2PM was the busiest hour of day accounting for approximately 5.8% of all reports (31,163 records). Fridays generated the greatest volume of incidents according to ePCR submissions with 14.7% (79,414 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 2021-2022 fiscal year (86.9%; 467,742 records). Riverside County Fire Department and AMR-Riverside combined account for about 60% of all ePCRs submitted in FY 2021-2022 (60.6%; 326,367 reports). According to EMS zone analysis, the Northwest zone of Riverside County carried the highest number of responses with 27.5% (143,818 records) of all ePCRs generated within this zone.

METHOD

Data between July 1st, 2021, and June 30th, 2022, 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 Agency Type, 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: Yearly Comparison of Total Number of ePCRs Generated

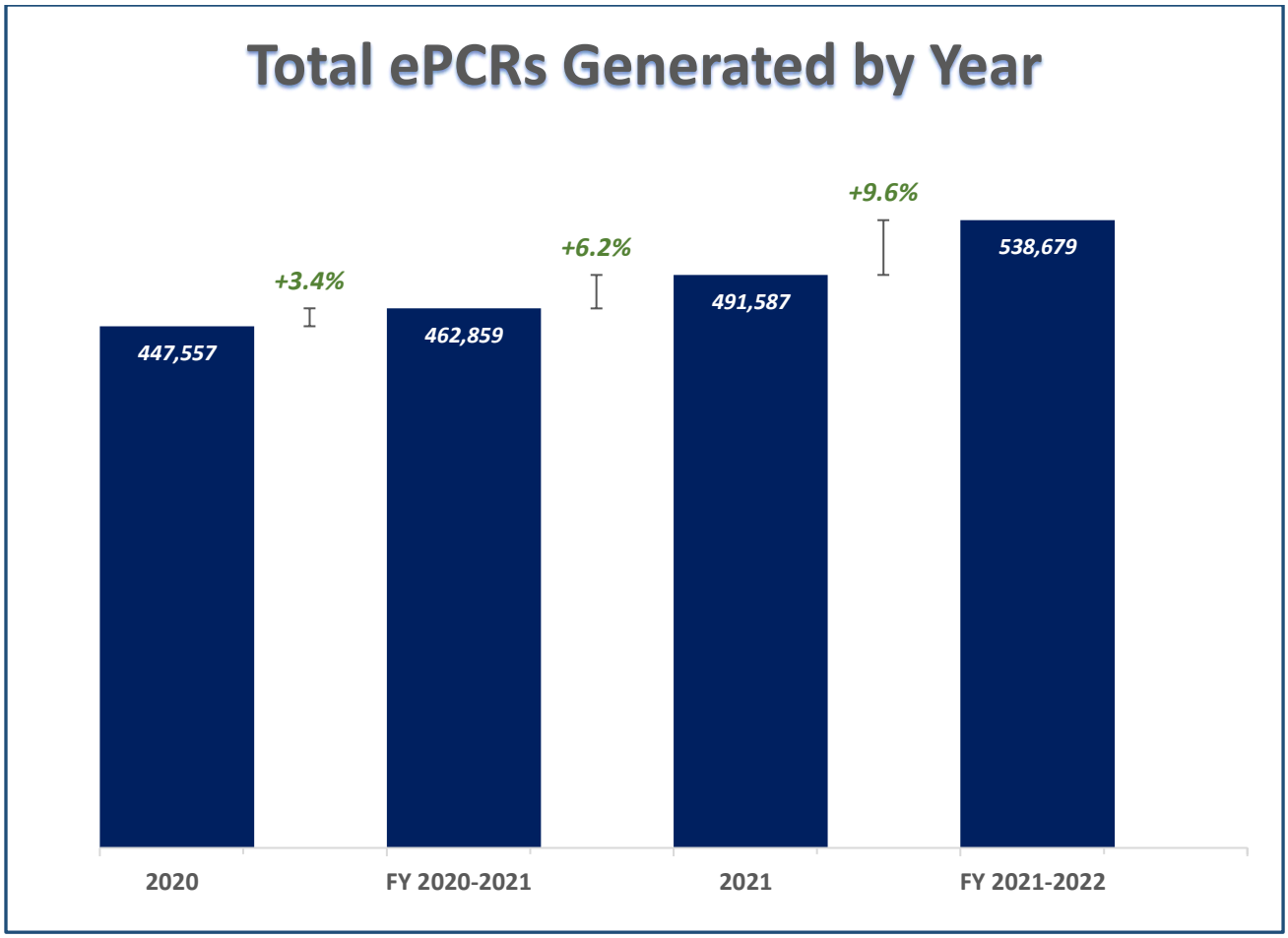


Figure 1 above displays the counts of ePCRs that were generated each year and the variation from year to year. The volume of ePCRs submitted has been steadily increasing each year. The greatest increase in ePCR volume occurred from the 2021 calendar year (491,587 records) to the 2021-2022 fiscal year (538,679 records). This was a proportionate increase of nearly 10%.

Figure 2: Total Number of ePCRs Generated in FY 2021-2022 by Month

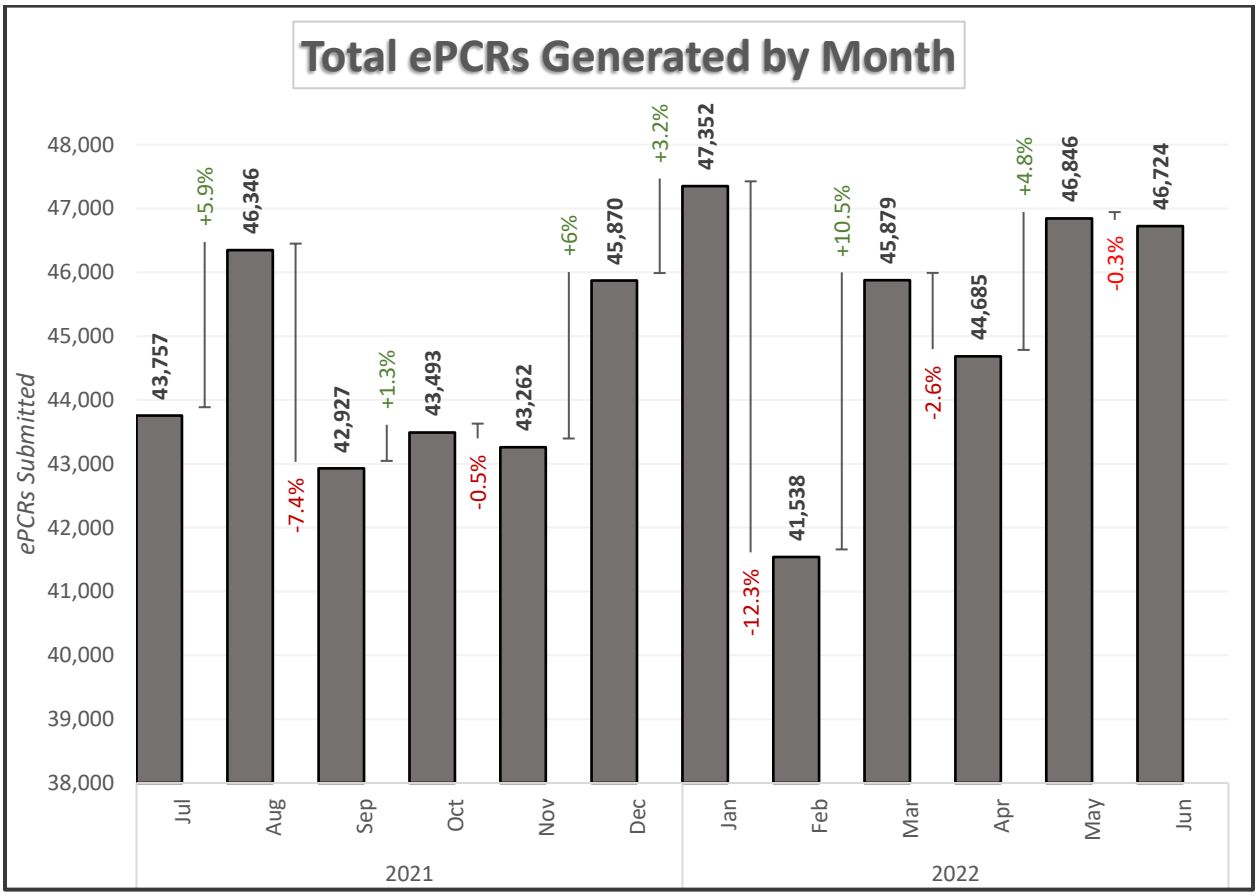


Figure 2 above displays the counts of ePCRs that were generated each month and the variation from month to month. The greatest decrease in ePCR volume occurred from January 2022 to February 2022 (-12.3%). This decline in volume is consistent with the shorter number of days within the month of February (28) compared to January (31). The greatest increase occurred from the month of February to March in 2022 (+10.5%).

Figure 3: ePCR Completeness in FY 2021-2022 by Validation Score

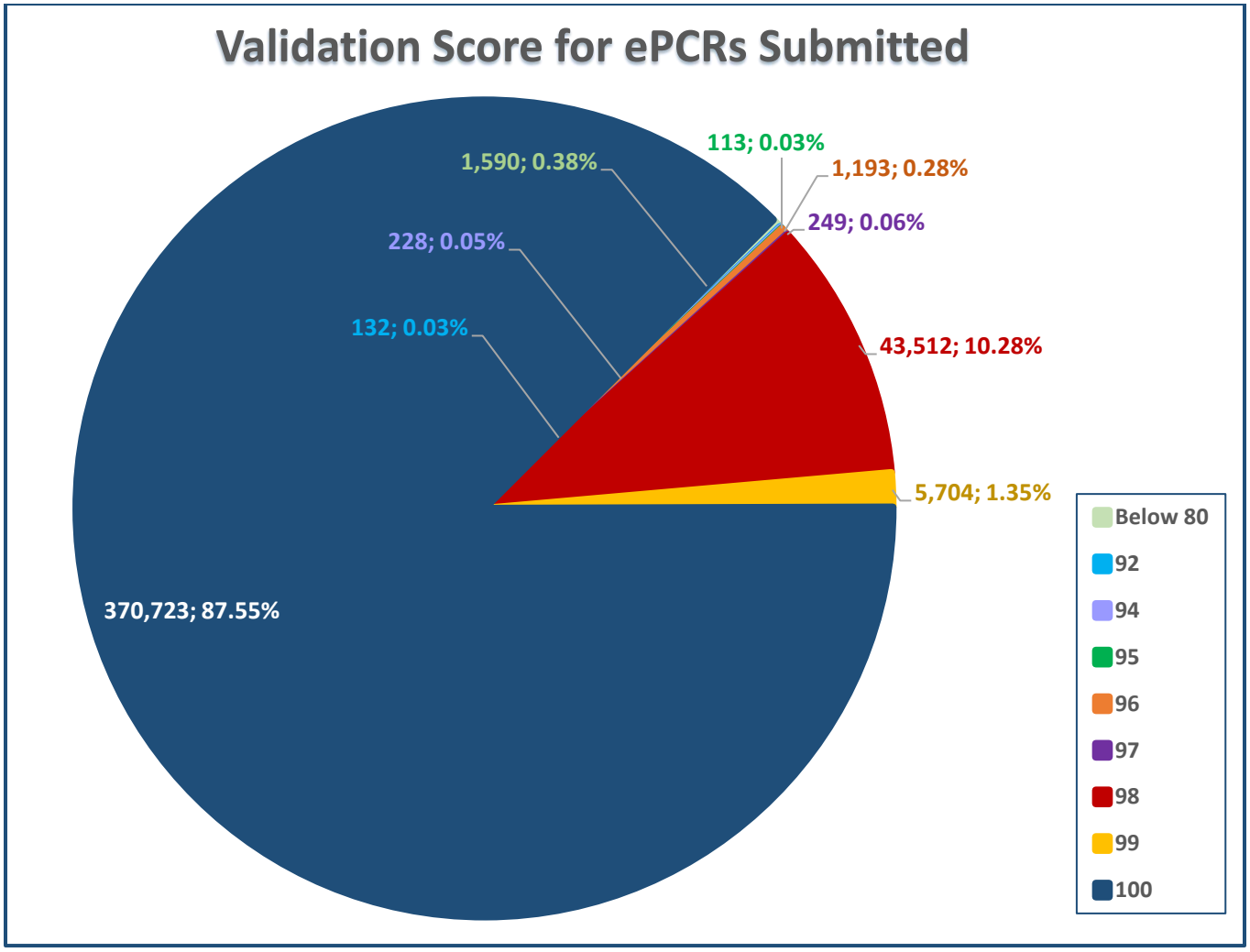


Figure 3 above displays the distribution of validation scores for ePCRs for incidents that consist of patient contact. Each record generates a validation score based on quality of documentation. Nearly 88% of ePCRs generated a validation score of 100. Less than 1% (0.38; 1,590 records) generated validation scores below 80.

Figure 4: Variation of ePCR Submission by Daily Increments

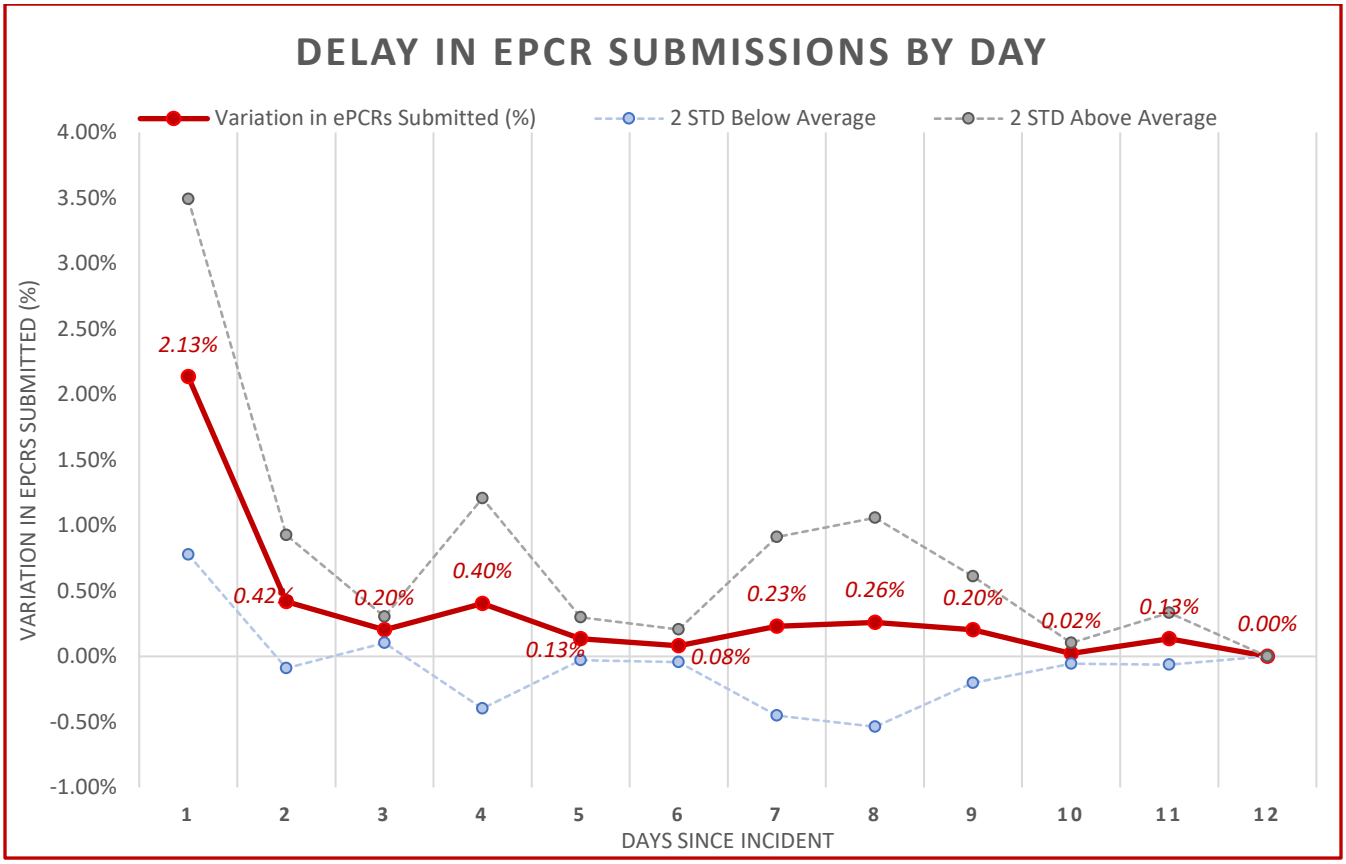


Figure 4 represents the mean variation in ePCR submission within 1-12 days of the incident. Each day at 9 am records were collected for the previous day (12:00 AM-11:59 PM), then again each day for two weeks. There were no changes noted following 12 days. This data collection was done at the same time each day to increase the validity of measure. A total of 7 days were collected to calculate mean variations over time. Within 24 hours, there was an average of 97.87% of patient care records submitted. There was a slight increase in delayed record submissions on the 4th (0.40%), 7th (+0.23%), and 11th (+0.13%) days after the incident. However, nearly all electronic patient care records were submitted within the first day of the incident (~98%), and there was a nominal increase observed for delayed submissions over the next 11 days. In all, 100% were submitted by day 12.

Figure 5: Total ePCRs Generated in FY 2021-2022 by Incident Hour of Day

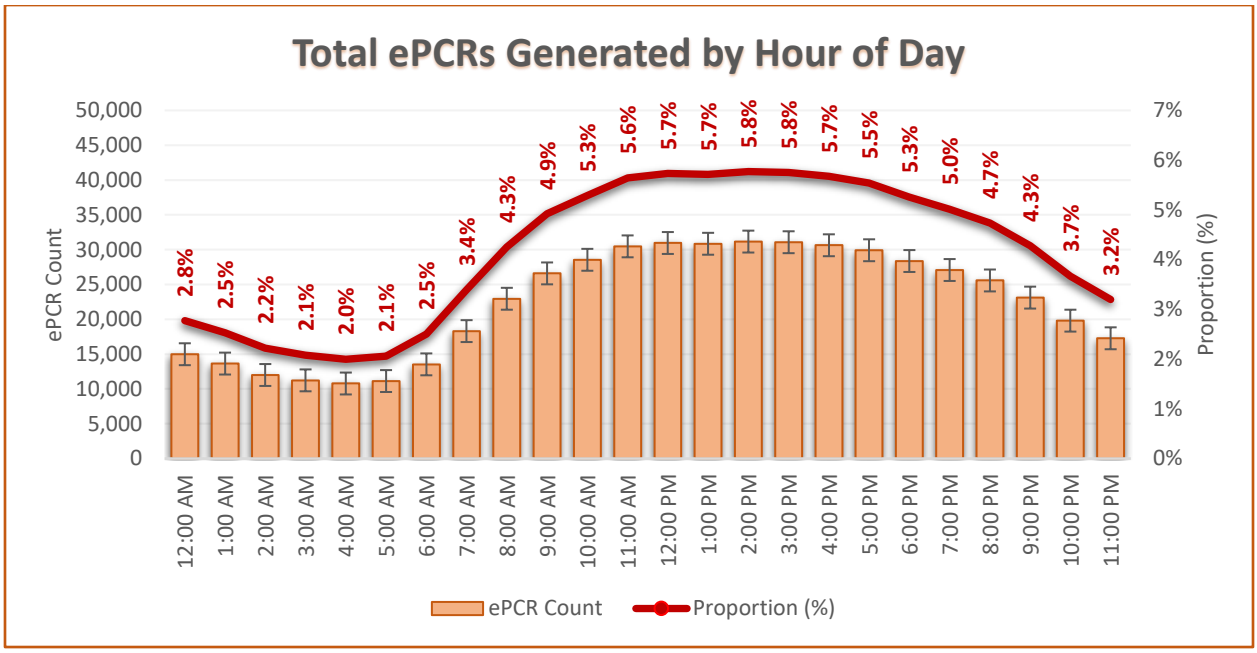


Figure 5 above represents the distribution of EMS incidents by the hour of day reported in each ePCR generated. It can be seen that the majority of incidents occurred between the hours of 9AM-9PM (69.3%). The error bars that do not overlap show significant difference among those hours. For instance, there is a significant difference in EMS incidents that occurred at 7AM and 8AM.

Figure 6: Total ePCRs Generated in FY 2021-2022 by Incident Day of Week

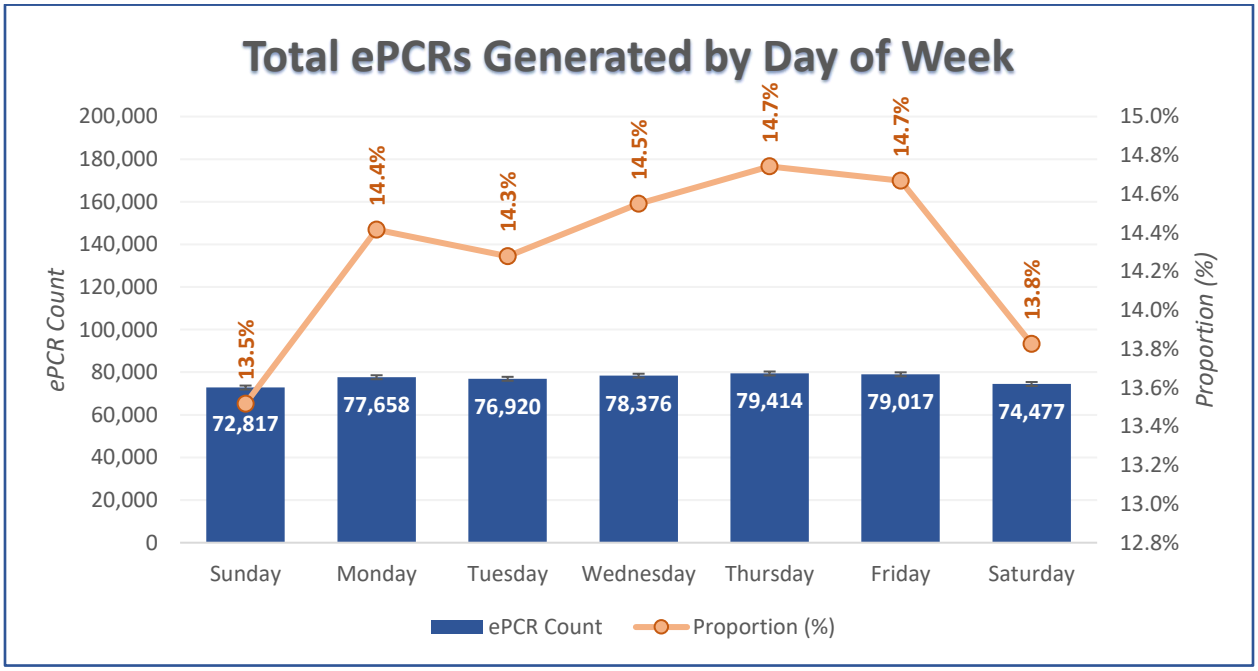


Figure 6 above represents the distribution of EMS incidents by the day of the week reported in each ePCR generated. It can be seen that the majority of incidents occurred on Thursday with 14.7% of the ePCR distribution respectively. Sunday represents the day of the week with the fewest ePCRs generated at 13.5%. However, there was no significant difference in EMS incidents that occurred on any day of the week.

Figure 7: Total ePCRs Generated in FY 2021-2022 by EMS Transport

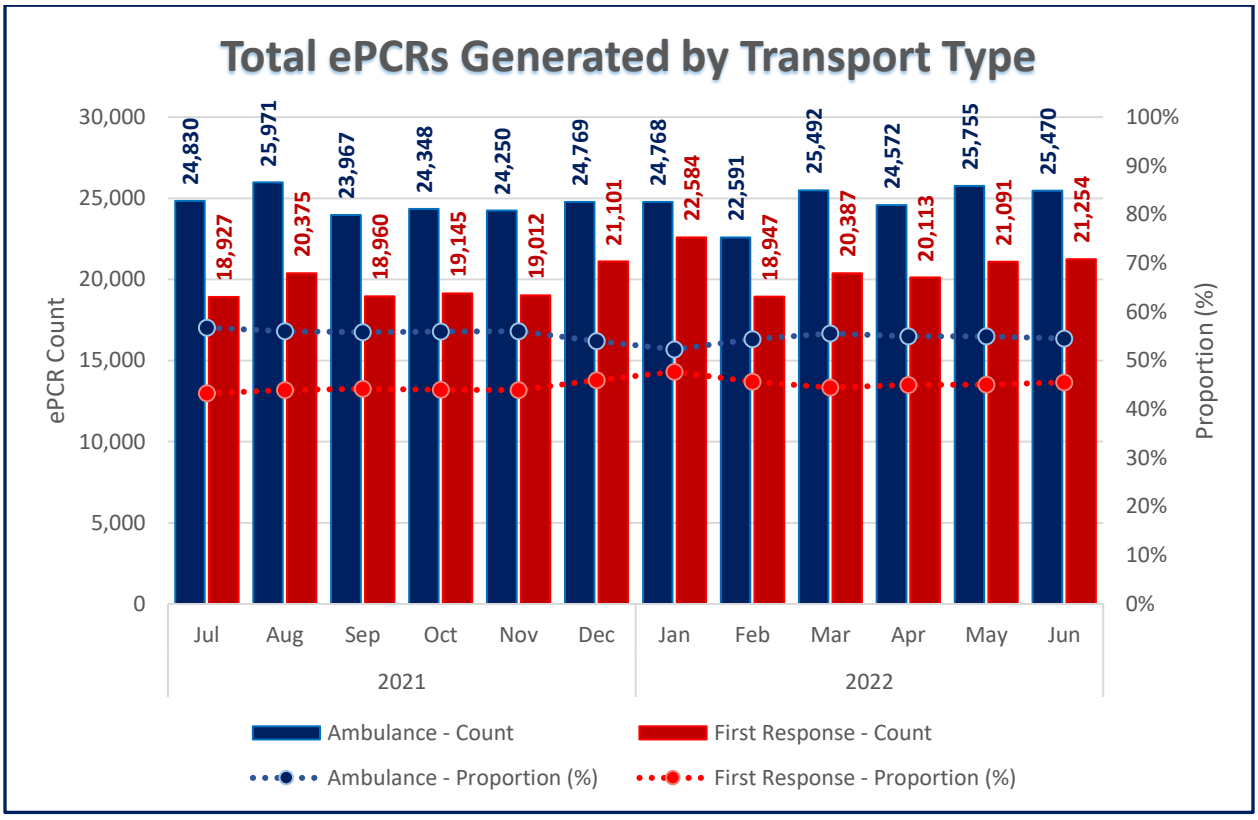


Figure 7 above represents the total number of electronic patient care records generated by EMS transports. January 2022 was the month with the greatest number of ePCRs for First Response transports (22,584 records; 47.7%). August 2021 was the month with the greatest number of ePCRs for Ambulance transports (25,971 records; 56%). January 2022 represent the month with the least difference ePCR submissions for ambulance (52.3%) and first responders (47.7%). February was the month with the lowest number of ePCRs generated for both Ambulance and First Response transports (22,591 and 18,947 reports respectively).

Figure 8: ePCRs Generated in FY 2021-2022 by Response Type

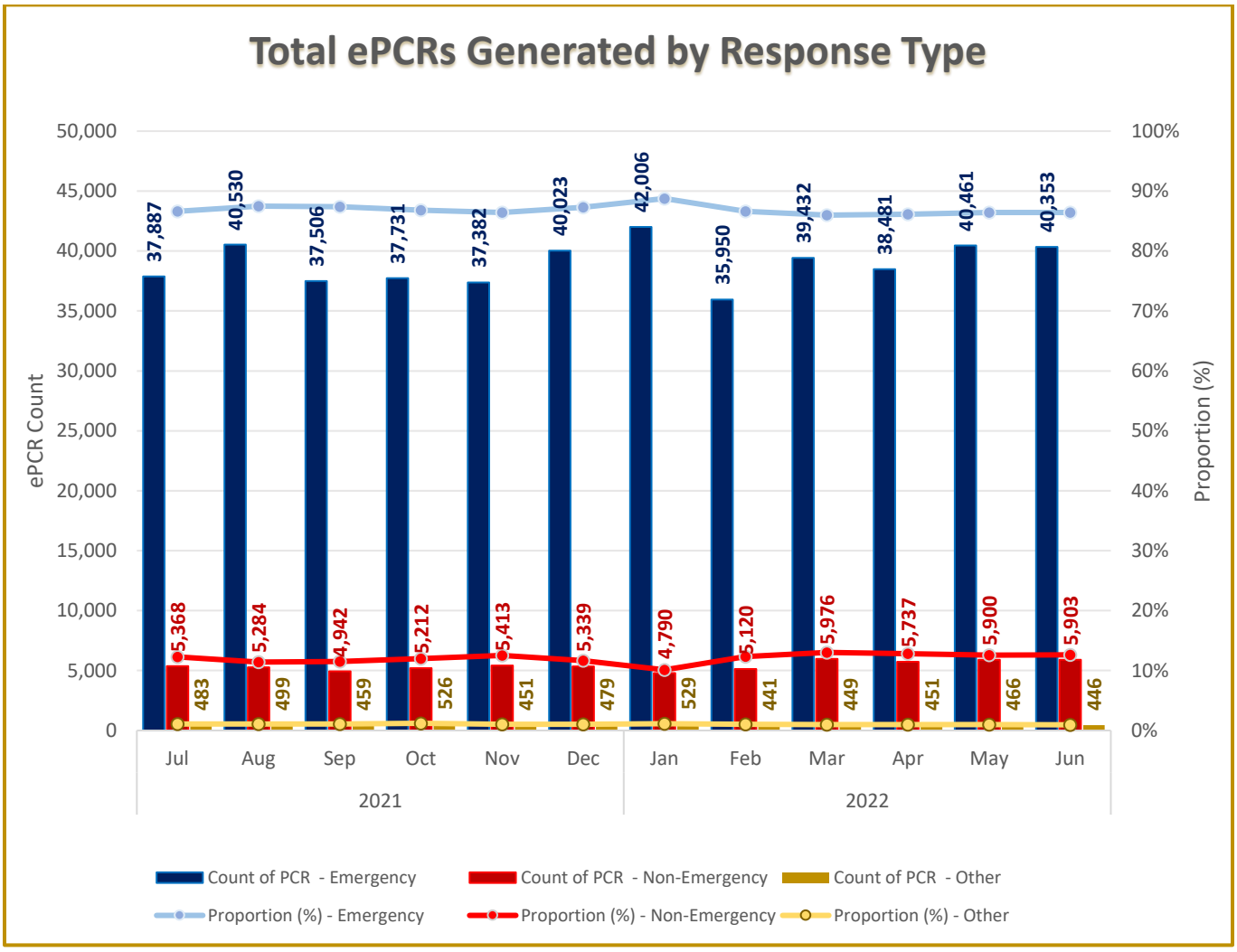
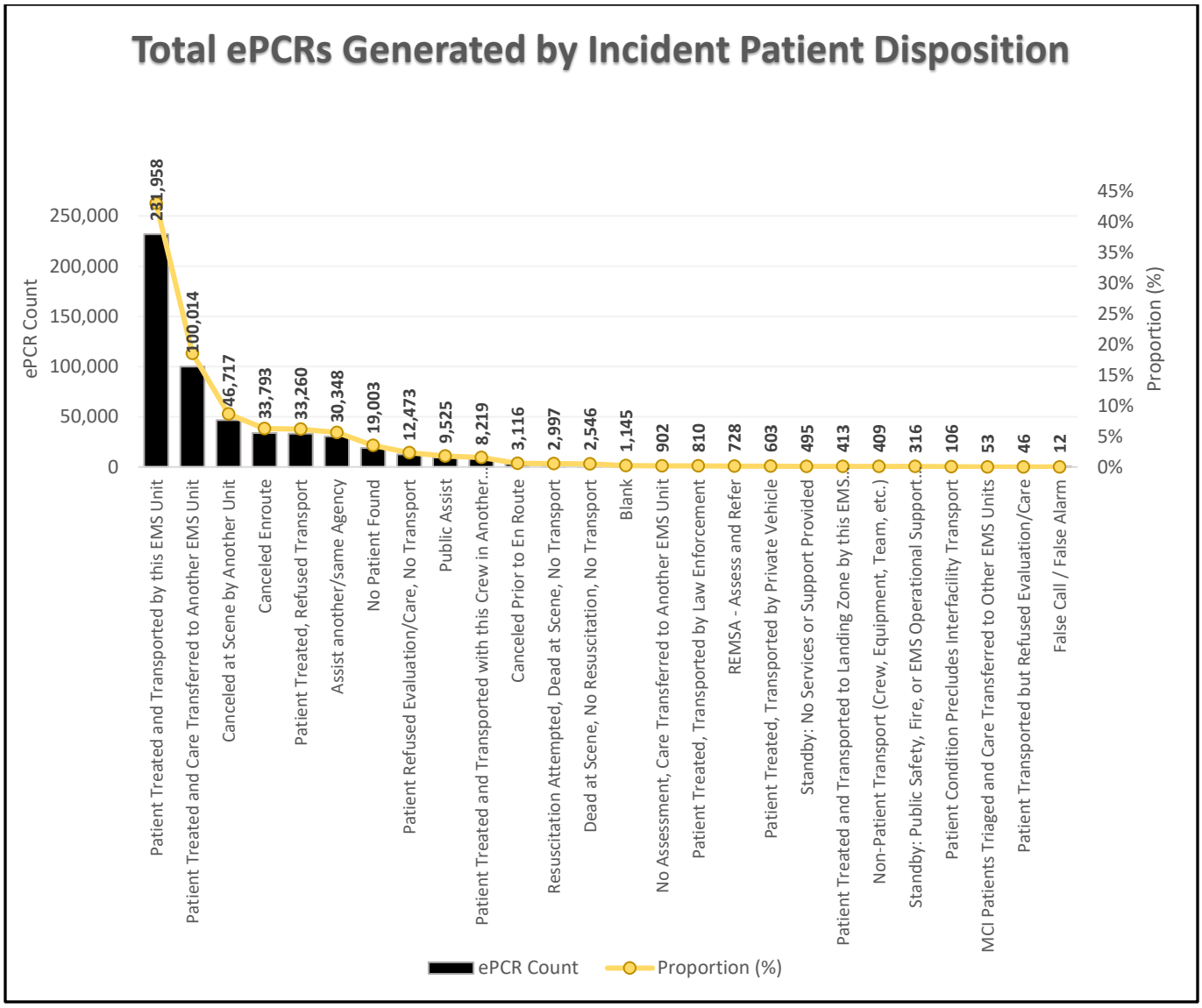


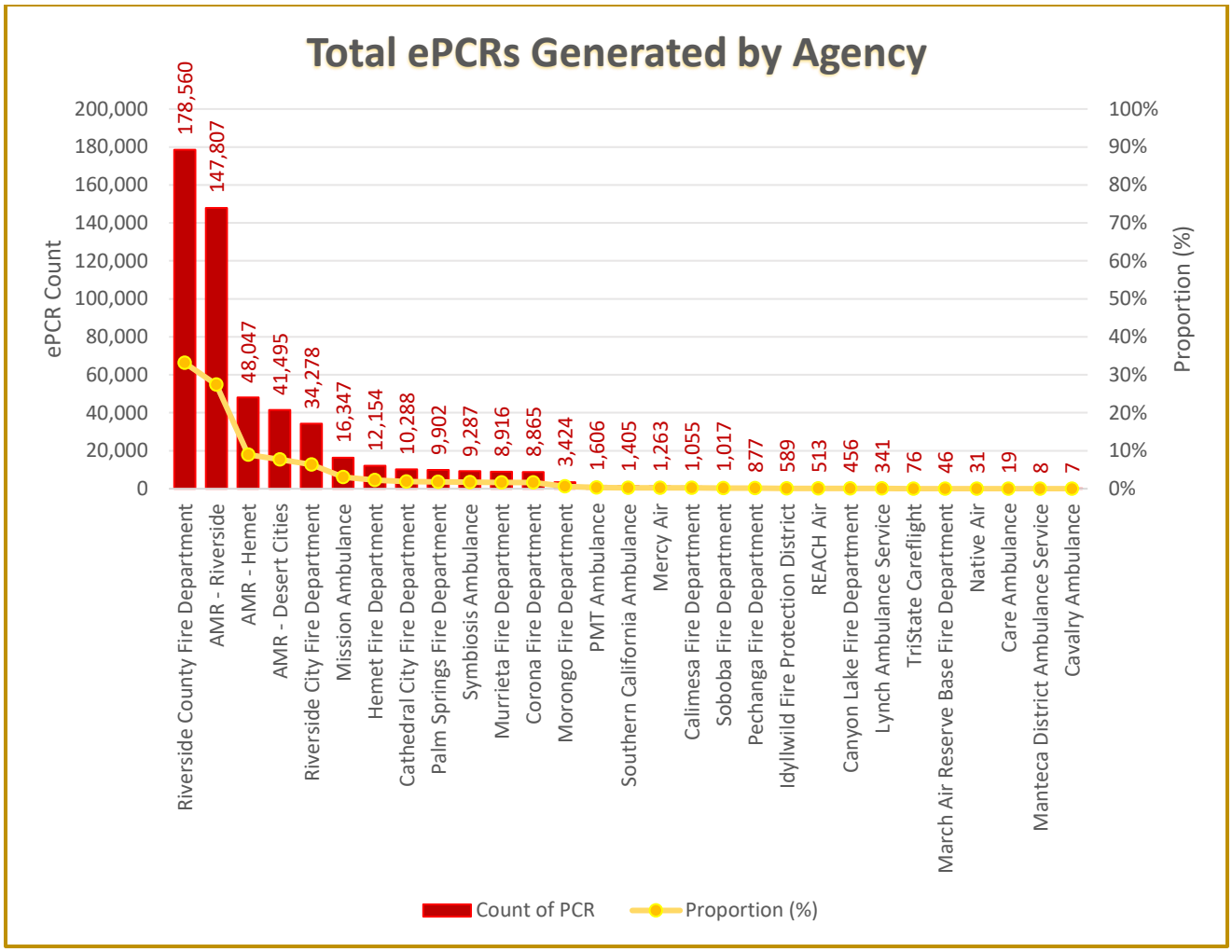
Figure 8 above represents the distribution of ePCRs generated by each type of EMS response. Emergency responses made up the majority of ePCRs generated throughout the 2021-2022 fiscal year (467,742 records; 86.9%). January 2022 displayed the greatest number of emergency responses (42,006; 88.8%) and March 2022 showed the greatest number of non-emergency responses according to ePCRs generated (5,976 records;13%).

Figure 9: Total ePCRs Generated in FY 2021-2022 by Incident Patient Disposition



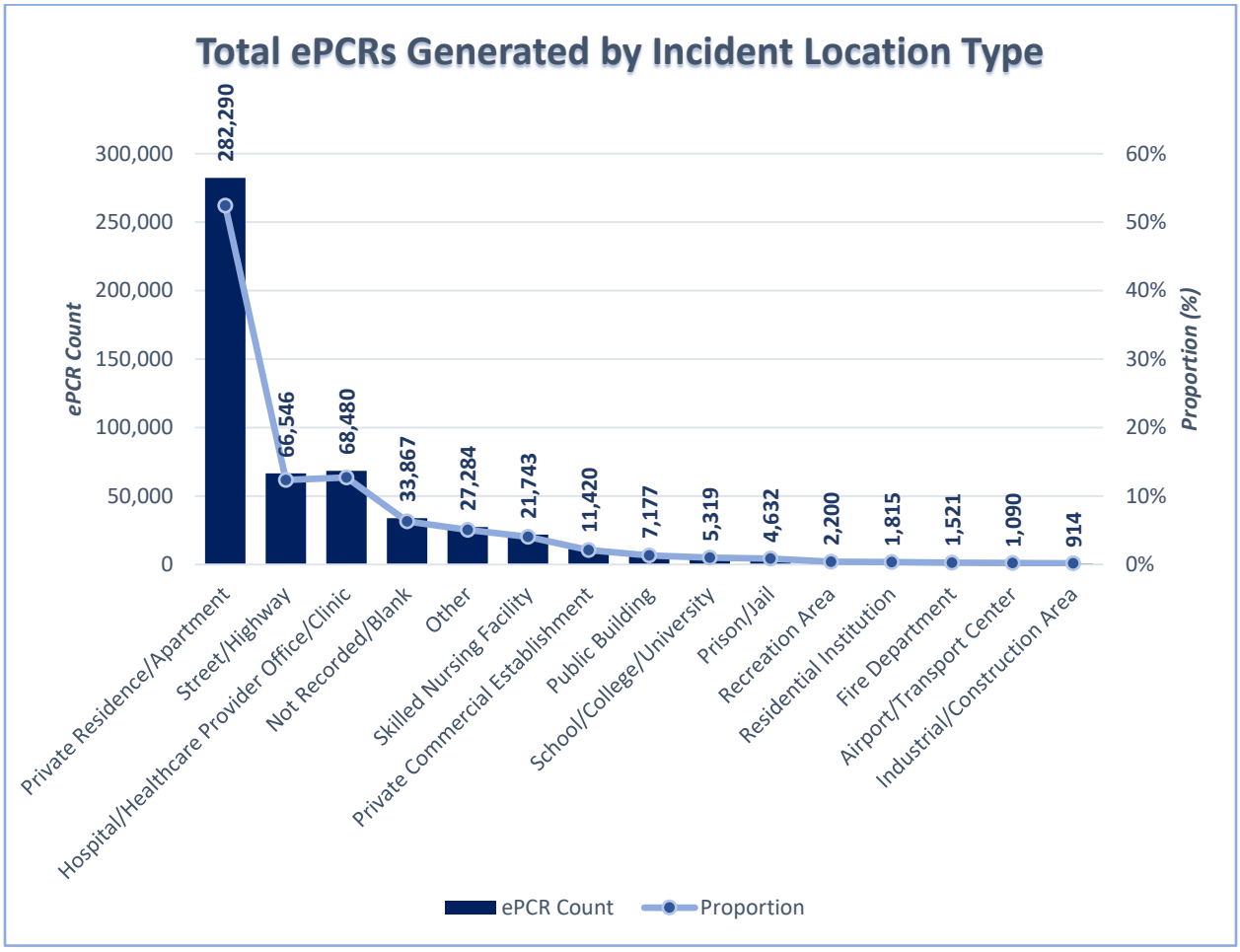
The figure above represents the total number and proportion of ePCRs in the 2021-2022 fiscal year by Incident Patient Disposition. Patient incident disposition is taken from ImageTrend NEMSIS value eDisposition.12. From the data, it can be seen that the majority of patients encountered were treated and transported by the same EMS unit (231,958 records; 43%). 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 noted as blank (1,145 records).

Figure 10: Total Number of ePCRs Generated in FY 2021-2022 by Agency



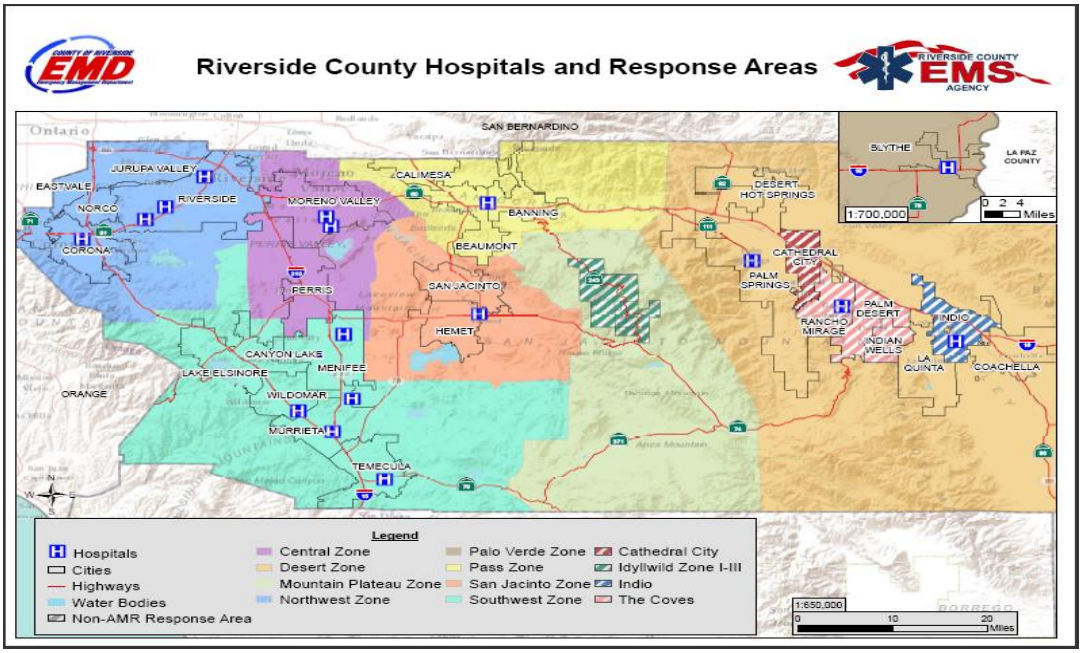
The figure above shows the distribution of EMS patient care reports submitted by each provider agency from July 2021-June 2022. Riverside County Fire Department represents the agency that makes up the largest proportion of ePCRs received during this time with 178,560 reports (33.2%). AMR Riverside was the second agency with the most ePCRs generated during that time with 147,807 reports (27.4%).

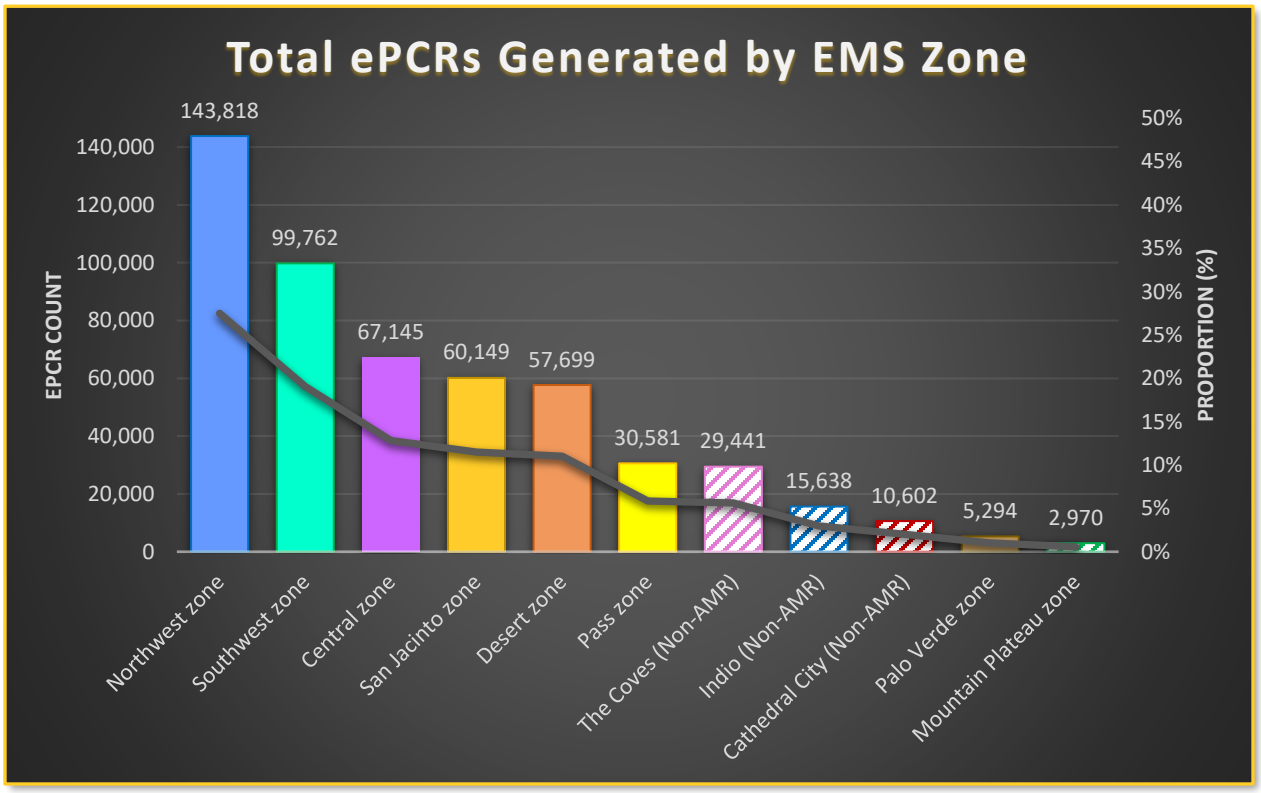
Figure 11: Total ePCR Count by Scene Incident Location Type
(see Appendix for Breakdown)



The figure above displays the total number and proportion of ePCRs by Scene Incident Location Type in the 2021-2022 fiscal year. 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 (282,313 records, 52.3%). 6.5% (34,825 records) of the total ePCRs submitted did not include a scene incident location type, shown as "Not Recorded/Blank".

Figure 12: 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 July 1st,2021-June 30th, 2022. The majority of records originated within the Northwest EMS Zone with 143,818 records (27.5%). The EMS zone with the lowest frequency of generated records was the Mountain Plateau Zone with 2,970 records (0.6%). This analysis was done using data extracted from ImageTrend Elite using the scene incident city name (escene.17) and matched to corresponding zones. Approximately 2.9% (15,603) of the records were removed from this analysis due to incident city documented as missing/blank.

Appendix A- *Scene Location Breakdown for All Incidents*

Original Scene Location Type	Count	Scene Location Type	Count	Proportion
Private Residence/Apartment	282,290	Private Residence/Apartment	282,290	52.40%
Street and Highway	66,546	Street/Highway	66,546	12.35%
Hospital	53,868	Hospital/Healthcare Provider Office/Clinic	68,480	12.71%
Healthcare provider office/clinic	12,748			
Urgent Care	1,864			
(blank)	33,567	Not Recorded/Blank	33,867	6.29%
Not Recorded	300			
Other	27,284	Other	27,284	5.06%
Skilled Nursing Facility	21,743	Skilled Nursing Facility	21,743	4.04%
Private Commercial Establishment	11,420	Private Commercial Establishment	11,420	2.12%
Public Building	7,177	Public Building	7,177	1.33%
Prison/Jail	4,632	Prison/Jail	4,632	0.99%
School/College/University	5,319	School/College/University	5,319	0.86%
Recreation area	2,200	Recreation Area	2,200	0.41%
Residential institution	1,815	Residential Institution	1,815	0.34%
Fire Department	1,521	Fire Department	1,521	0.28%
Airport/Transport Center	1,090	Airport/Transport Center	1,090	0.20%
Industrial or construction area	914	Industrial/ Construction Area	914	0.17%
Wilderness area	824	Wilderness Area	824	0.15%
Health Club/Gym	588	Health Club/Gym	588	0.11%
Farm/Ranch	282	Farm/Ranch	282	0.05%
Swimming Pool	259	Swimming Pool	259	0.05%
Beach/Ocean/Lake/River	225	Beach/Ocean/Lake/River	225	0.04%
Railroad Track	128	Railroad Track	128	0.02%
Military base	75	Military Base	75	0.01%

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

Original Scene Location Type	Count	Scene Location Type	Count	Proportion
Hospital	50,677			
Healthcare provider office/clinic	2,042	Hospital/Healthcare Provider Office/Clinic	52,924	81.44%
Urgent Care	205			
Skilled Nursing Facility	4,741	Skilled Nursing Facility	4,741	7.30%
Private Residence/Apartment	2,703	Private Residence/Apartment	2,703	4.16%
Other	1,340	Other	1,340	2.06%
Prison/Jail	1,156	Prison/Jail	1,156	1.78%
(blank)	714	Not Recorded/Blank	714	1.10%
Airport/Transport Center	568	Airport/Transport Center	568	0.87%
Street and Highway	307	Street/Highway	307	0.47%
School/College/University	206	School/College/University	206	0.32%
Public Building	133	Public Building	133	0.20%
Residential institution	81	Residential Institution	81	0.12%
Private Commercial Establishment	50	Private Commercial Establishment	50	0.08%
Fire Department	21	Fire Department	21	0.03%
Industrial or construction area	10	Industrial/Construction Area	10	0.02%
Recreation area	12	Recreation Area	12	0.02%
Health Club/Gym	6	Health Club/Gym	6	0.01%
Farm/Ranch	5	Farm/Ranch	5	0.01%
Swimming Pool	3	Swimming Pool	3	0.00%
Wilderness area	2	Wilderness Area	2	0.00%
Military base	1	Military Base	1	0.00%
Railroad Track	1	Railroad Track	1	0.00%

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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