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BUREAU OF EMERGENCY MEDICAL SERVICES AND TRAUMA SYSTEM

EMERGENCY MEDICAL SERVICES FOR CHILDREN 2019 EMS INCIDENTS

Prepared By

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INTRODUCTION

PURPOSE, METHODS

Purpose:

The purpose of this report is to systematically describe Pediatric (patients aged between 0-17 years) EMS incidents occurring in Arizona in the year 2019. This report will provide the descriptive statistics of Pediatric EMS run volume by various factors like age, gender, county, etc.

Methods:

The data for this report has been synthesized from the Arizona Prehospital Information & EMS Registry System (AZ-PIERS) (AZ-PIERS is a free, electronic Patient Care Records (ePCRs) registry that allows EMS agencies to collect and transmit records to the State). We used the 2019 population denominators from the Arizona Health Status and Vital Statistics database ¹ to calculate EMS run rates per 100,000 Arizona residents. The data preparation was done in SAS 9.4 and the graphs were developed in Tableau 4.2. The primary and secondary impressions from the EMS diagnosis field were categorized using IC-10 and Clinical Classifications Software (CCS) categories². Refer to appendix B for more details.

Limitations:

The report is incident based and not patient based hence the prevalence of primary and secondary impressions may not be the true representation of cases in the State of Arizona. A single patient may be counted multiple times in the report based on how many agencies were involved in transporting or treating the patient. We will be providing an estimate of the duplicate percentages in the future Bureau reports.

- 1. Arizona Department of Health Services, Population Health and Vital Statistics. Population Denominators: 2019. http://pub.azdhs.gov/health-stats/menu/info/pop/index.php
- 2. https://www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp

SUMMARY

- In 2019, there were a total of 61,987 Pediatric EMS incidents (Cancelled, False and Stand by incidents were removed from the analysis) that were submitted to AZ-PIERS from January 1, 2019 to December 31, 2019. These incidents made up 7% of the total EMS incidents.
- Population aged 15-17 had the largest overall number of EMS incidents, followed by children ages 0-4.
- Males were more represented for ages 0-9, whereas females were more represented for ages 15-17.
- Most 911 pediatric ambulance incidents occurred between 12 p.m. and 8 p.m., weekdays more than weekends.
- Navajo county had the highest EMS incident rate per 100,000 and Greenlee had the lowest EMS incident rate per 100,000.
- 911 response calls represented 70% of all pediatric EMS incidents.
- 48% of the 911 pediatric incidents occurred at a private residence.
- Injury was the most common impression in the EMS diagnosis field followed by Seizures.
- Falls were the most common mechanism of injury followed by Motor vehicle non traffic incidents. More than half (73%) of these injuries were unintentional.
- Among the procedures analyzed, Cardiac monitor was the most common procedure performed and Heart rate(91%) was the most common vitals measured.
- Albuterol was the most common medication administered (excluding Oxygen, Normal Saline).

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EMS RESPONSE TYPES (N = 61,987)



DISTRIBUTION OF 911 EMS INCIDENTS BY DAY AND TIME OF THE WEEK (N= 42,728)

Figure 2 : 911 EMS incidents volume by time of day and day of the week

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday		
12a.m - 2a.m	326	304	298	252	254	417	443	102	931
2a.m - 4a.m	135	102	126	124	112	153	147		
4a.m - 6a.m	181	153	158	158	169	145	120		
6a.m - 8a.m	424	498	443	493	423	268	236		
8a.m - 10a.m	556	589	589	560	625	502	349		
10a.m - 12p.m	720	747	700	696	760	671	545		
12p.m - 2p.m	767	735	761	706	788	734	617		
2p.m - 4p.m	866	890	843	893	826	743	617		
4p.m - 6p.m	867	918	931	863	807	801	702		
6p.m - 8p.m	771	776	751	740	828	823	719		
8p.m - 10p.m	518	512	482	541	640	577	530		
10p.m - 12a.m	144	136	148	163	202	207	174		

Data source : AZPIERS 2019

PEDIATRIC EMS 2019 DATA - SUMMARY





Scene arrival to Destination arrival and Scene arrival to Scene depart times include only transported incidents.

Figure 4 : 911 EMS incidents - Response times

Data source : AZPIERS 2019

911 EMS INCIDENTS - AGE

DISTRIBUTION OF 911 EMS INCIDENTS BY AGE



911 EMS INCIDENTS BY AGE AND MONTH





DISTRIBUTION OF 911 EMS INCIDENTS BY GENDER



Figure 7: 911 EMS incidents by gender

Data source : AZPIERS 2019



DISTRIBUTION OF 911 EMS INCIDENTS BY GENDER AND AGE

911 EMS INCIDENTS - COUNTY

911 EMS INCIDENTS DISTRIBUTION BY COUNTY



Figure 9: 911 EMS incident rate per 100,000

EMS Incident Rate 135 1,596

* Maricopa county does not include data from Phoenix Fire Data source : AZPIERS 2019



The primary and secondary impressions from the EMS diagnosis field were categorized using IC-10 and Clinical Classifications Software (CCS) categories.

Data source : AZ-PIERS 2019

DEATHS IN EACH IMPRESSION CATEGORY

Figure 11: 911 EMS incidents - Death percentage in primary and secondary impression categories of interest



Data source : AZ-PIERS 2019

PROVIDER PRIMARY AND SECONDARY IMPRESSION CATEGORIES OF INTEREST

IMPRESSION CATEGORY BY AGE

Figure 12: 911 EMS incidents - Distribution of primary and secondary impression categories of interest by age group



INJURY MECHANISM





Data source : AZ-PIERS 2019

Mechanism of Injury	N	%
FALL	2,704	25.90%
MOTOR VEHICLE-NONTRAFFIC	1,341	12.84%
STRUCK BY/AGAINST	1,433	13.73%
MVT-OCCUPANT	1,289	12.35%
CUT/PIERCE	383	3.67%
OTHER TRANSPORT	329	3.15%
MVT-UNSPECIFIED	170	1.63%
MVT-PEDESTRIAN	142	1.36%
PEDAL CYCLIST, OTHER	128	1.23%
BITES AND STINGS, NONVENOMOUS	112	1.07%

Injury mechanisms are categorized based on External cause of Injury (E-codes). E–codes are the ICD codes used to classify injury incidents by mechanism (e.g., motor vehicle, fall, struck by/against, firearm, or poisoning) and intent (e.g., unintentional, homicide/assault, suicide/self–harm, or undetermined). (NCHS. ICD–10: External cause of injury mortality matrix [online]. Available from: <u>/nchs/injury/injury matrices.htm</u>)

The E-code matrices can be found at https://www.cdc.gov/nchs/injury/injury_tools.htm

Definitions for transport related accidents (Motor vehicle accidents) can be found at <u>https://apps.who.int/classifications/apps/icd/</u> icd10online2004/defs.htm

INJURY MECHANISM

INJURY MECHANISM BY AGE



Data source: AZ-PIERS 2019

MEDICATIONS





Note: The count in each Medication category refers to number of patients who received the drug once, it does not refer to number of doses given to each patient. A patient is counted for only once.

Figure 16a: Percentage of 911 Pediatric incidents with procedures of interest



Figure 16b: 911 Pediatric incidents - Procedures of interest



Data source : AZPIERS 2019

Note: The count in each procedure category refers to number of patients who had the procedure performed once, it does not refer to number of times a procedure has been performed for each patient. A patient is counted for only once.

• EMS Response Types:

Note: These definitions are from the NEMSIS v3 Extended Data Definitions Dictionary https://nemsis.org/wp-content/uploads/2018/09/Extended-Data-Definitions_v3_Final.pdf

- ⇒ Medical (Convalescent) transport: Transports that are not between hospitals or that do not require an immediate response; these are generally for the purpose of transportation to or from an appointment, performance of a procedure, or long-term care (e.g., hospital to home/ hospice/rehabilitation/long-term care facility).
- Convalescent transport is defined as "a scheduled transport other than an interfacility transport" in R9-25-901
- ⇒ Interfacility transport: Any transfer, after initial assessment and stabilization, from and to a healthcare facility, to include specialty hospitals, for the purpose of continuation of acute care, this would also include emergent transfer requests (e.g., hospital to hospital, clinic to hospital).
- ⇒ 911 Response on Scene: Emergent or immediate response to an incident location, regardless of method of notification (e.g., 9-1-1, direct dial, walk-in, flagging down, air ambulance scene flight).

APPENDIX B. PROVIDER PRIMARY AND SECONDARY IMPRESSION CATEGORIES CRITERIA

Impression Category	Criteria
Obstetrics	CCS Category description of primary or secondary impressions = Spontaneous abortion or Induced abortion or Postabortion complications or Ectopic pregnancy or Other complications of pregnancy; abruptio placenta; placenta previa or Hemorrhage during pregnancy; abruptio placenta; placenta previa or Hypertension complicating pregnancy; childbirth and the puerperium or Early or threatened labor or Prolonged pregnancy or Malposition; malpresentation or Fetopelvic disproportion; obstruction or Fetal distress and abnormal forces of labor or Polyhydramnios and other problems of amniotic cavity or Umbilical cord complication or GB-related trauma to perineum and vulva or Forceps delivery or Other complications of birth; puerperium affecting management of mother or Other pregnancy and delivery including normal
Psychiatric Disorders	CCS Category description of primary or secondary impressions = Adjustment disorders or Anxiety disorders or Attention-deficit conduct and disruptive behavior disorders or Developmental disorders or Disorders usually diagnosed in infancy childhood or adolescence or Impulse control disorders NEC or Mood disorders or Personality disorders or Schizophrenia and other psychotic disorders
Diabetes	CCS Category description of primary or secondary impressions = Diabetes mellitus without complication or Diabetes mellitus with complications
Substance Abuse	CCS Category description of primary or secondary impressions = Alcohol-related disorders or Substance-related disorders
Seizures	Epilepsy; convulsions
Suicide	Suicide and intentional self-inflicted injury
Respiratory Disorders	CCS Category description of primary or secondary impressions = Aspiration pneumonitis; food/vomitus Asthma Chronic obstructive pulmonary disease and bronchiectasis Lung disease due to external agents Other lower respiratory disease Other upper respiratory disease Respiratory failure; insufficiency, arrest Pleurisy: pneumothorax; pulmonary collapse Other upper respiratory infections
Drowning	CCS Category description of primary or secondary impressions = Drowning

APPENDIX B. PROVIDER PRIMARY AND SECONDARY IMPRESSION CATEGORIES CRITERIA

Impression Category	Criteria
Cardiac Arrest	Primary Impression or one of the Secondary Impressions = Cardiac arrest or Ventricular fibrillation or Ventricular Flutter OR Cardiac Arrest During EMS Event = ("Yes, After EMS Arrival" or "Yes, Prior to EMS Arrival") Incident Disposition = Cardiac Arrest, Resuscitation Attempted (With Transport) or Cardiac Arrest, Resuscitation Attempted (Without Transport) Or (Patient Dead at Scene - No Resuscitation Attempted 901H)
Injury	Situation Possible injury = 'Yes'
Opioid	Medication given description = "Naloxone or 'Narcan' or 'Naloxone Hydrochloride And primary impression = Opioid abuse or Opioid abuse with intoxication or Opioid abuse with unspecified opioid induced disorder or Opioid related disorder or Opioid use, unspecified or Poisoning by other opioids, accidental (unintentional). OR Was naloxone/Narcan administered prior to you/your entity's arrival? Is not missing OR Was naloxone/Narcan administered by you/your entity? Is not missing