NEMSIS
BETTER DATA. BETTER CARE.

2020 DATA REPORT

NEMSIS DATA REPORT 2020

WHAT IS NEMSIS?

NEMSIS is the National Emergency Medical Services Information System supported by the National Highway Traffic Safety Administration (NHTSA), Office of Emergency Medical Services (OEMS).

States and territories across the nation submit EMS data to the NEMSIS Technical Assistance Center (TAC). The TAC receives the data and stores it in the National EMS Database.

NATIONAL EMS DATABASE

It is the largest publicly available database of prehospital medical care in the United States.

It is **not** a patient registry as one patient may require multiple EMS encounters/ transports during a single event and not every EMS response has a patient encounter. While very robust and extensive, the database is not a full census of EMS activations because there are a few states/territories that do not contribute data. It is a database of EMS activations.

PUBLIC DATA

The public dataset is comprised of data elements and values that are made available to the public. States and territories submit some data that are not open to public use without explicit authorization from that state/territory. The restricted data include geographical identifiers such as incident ZIP Code, EMS agency name, and receiving facility ZIP Code.

No personal health information (PHI) is reflected in the data provided by States.

NATIONAL DATA STANDARD

NEMSIS is responsible for establishing and maintaining a National EMS Data Standard through extensive collaboration with industry stakeholders. State/territory EMS data managers, EMS software vendors, clinicians, billers, researchers and national partners all contribute to the development of and updates to the data standard.

Data elements represented in the standard are identified as National, State, Optional, and Custom. Only National data elements are submitted to the NEMSIS TAC for inclusion in the National EMS Database.

NEMSIS v3.4 DATA STANDARD

The 2020 EMS data reflected in this report are primarily submitted in the NEMSIS v3.4 standard. Some states/ territories submitted their data in the previous version of the standard, NEMSIS v3.3.4, until August 2021 when that version was closed permanently.

Of the 585 data elements present in the v3.4 standard, 165 are national and collected by the NEMSIS TAC. Each state/territory determines which additional elements they will require, and EMS agencies may also implement the collection of elements specific to their service.

DATA QUALITY

Much care is taken to ensure that the data are as clean as possible. All data submitted by states must comply with the XML standard and are exposed to several hundred error rules. For the most part, the NEMSIS TAC does not correct identified errors.

The NEMSIS TAC does not have the resources to require states or agencies to correct errors retrospectively, but errors are reported to states, with hopes of future data refinement. Thus, the information contained in this dataset is provided as reported by states.

COVID-19

The COVID-19 global pandemic had a significant impact on EMS response. The widespread public concern affected patient's willingness to call for ambulance service. It also increased response and turn-around times, impacted agency staffing, and exacerbated clinician burn-out.

In this report, COVID-19 infection is not identified directly due to the lack of early diagnosis capabilities in the prehospital setting. It is captured under the case definition of Influenza-like Illness (ILI) which presents clinically in a similar way to COVID in prehospital settings. Please refer to the case definition here for more details:

https://nemsis.org/case-definitions/

Additional information on the impact of COVID to EMS is found in the section, EMS by the Numbers: Impact of COVID-19 on page 12.

OVERVIEW

Total Number of Activations

43,488,767

Participating States/Territories

50

Number of Agencies

12,319

911 Initiated Responses

19,533,036

An EMS activation is an occurrence which initiates an EMS response with the potential of patient medical care. This is also referred to as an EMS "call" or "run". An activation can include: 911 calls, critical care transports, interfacility transports, standby events, or scheduled medical transports. The data are reflected as the number of activations instead of the number of patients because there can be more than one activation per patient per call.

TYPICAL PATIENT (OVERALL)

Age 61-70 - 4,532,938 (15.6%)
Race White - 12,249,440 (62.4%)
Sex Female - 1,4615,040 (50.36%)
EMS Transport Method Ground-Ambulance - 22,558,196 (98.76%)

Inclusion criteria: 911 initiated and patient contact was made. Values that were marked Not Applicable or Not Recorded are removed.

TYPICAL PATIENT (PEDIATRIC)

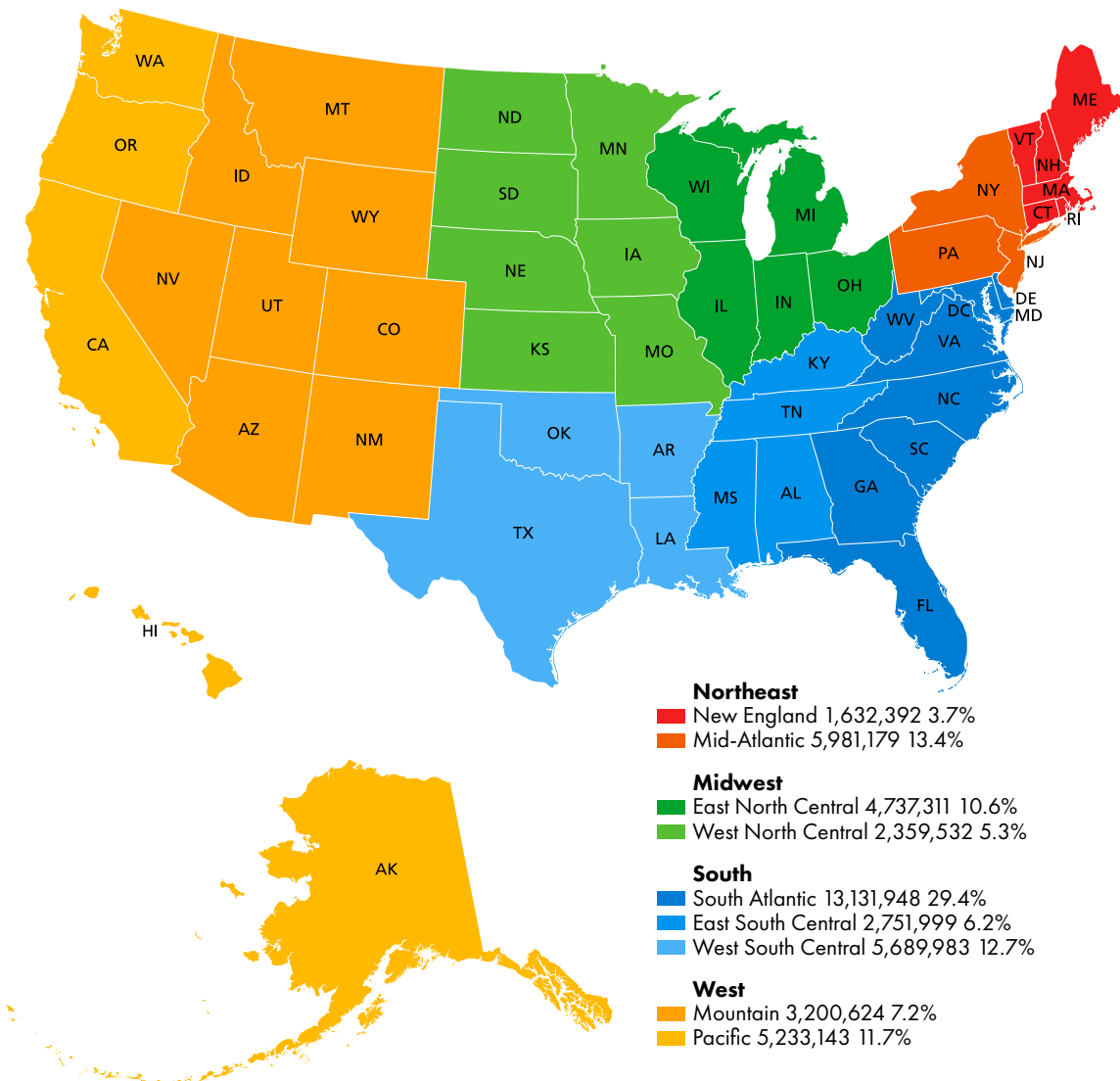**Age** 17 - 180,663 (11.8%)
Race White - 2,743,940 (62.4%)
Sex Male - 924,445 (51.6%)
EMS Transport Method Ground-Ambulance - 2,071,860 (97.5%)

Inclusion criteria: 911 initiated and patient contact was made. Values that were marked Not Applicable or Not Recorded are removed.

US CENSUS DIVISION REGION OF EMS ACTIVATION

eScene.23 - The census tract in which the incident occurred.

Northeast
- New England 1,632,392 3.7%
- Mid-Atlantic 5,981,179 13.4%

Midwest
- East North Central 4,737,311 10.6%
- West North Central 2,359,532 5.3%

South
- South Atlantic 13,131,948 29.4%
- East South Central 2,751,999 6.2%
- West South Central 5,689,983 12.7%

West
- Mountain 3,200,624 7.2%
- Pacific 5,233,143 11.7%

PATIENT AGE

ePatient.15 - The patient's age (either calculated from date of birth or best approximation).

Age	%	
0-10	2.6%	
11-17	2.6%	
18-20	2.6%	
21-30	10.4%	
31-40	10.8%	
41-50	10.3%	
51-60	14.2%	
61-70	15.6%	
71-80	15.0%	
81-90	11.8%	
91-120	4.1%	

Scale: 0, 1,000,000, 2,000,000, 3,000,000, 4,000,000, 5,000,000

Inclusion criteria: 911 initiated and patient contact was made. Values that were marked Not Applicable or Not Recorded are removed.

RACE/ETHNICITY
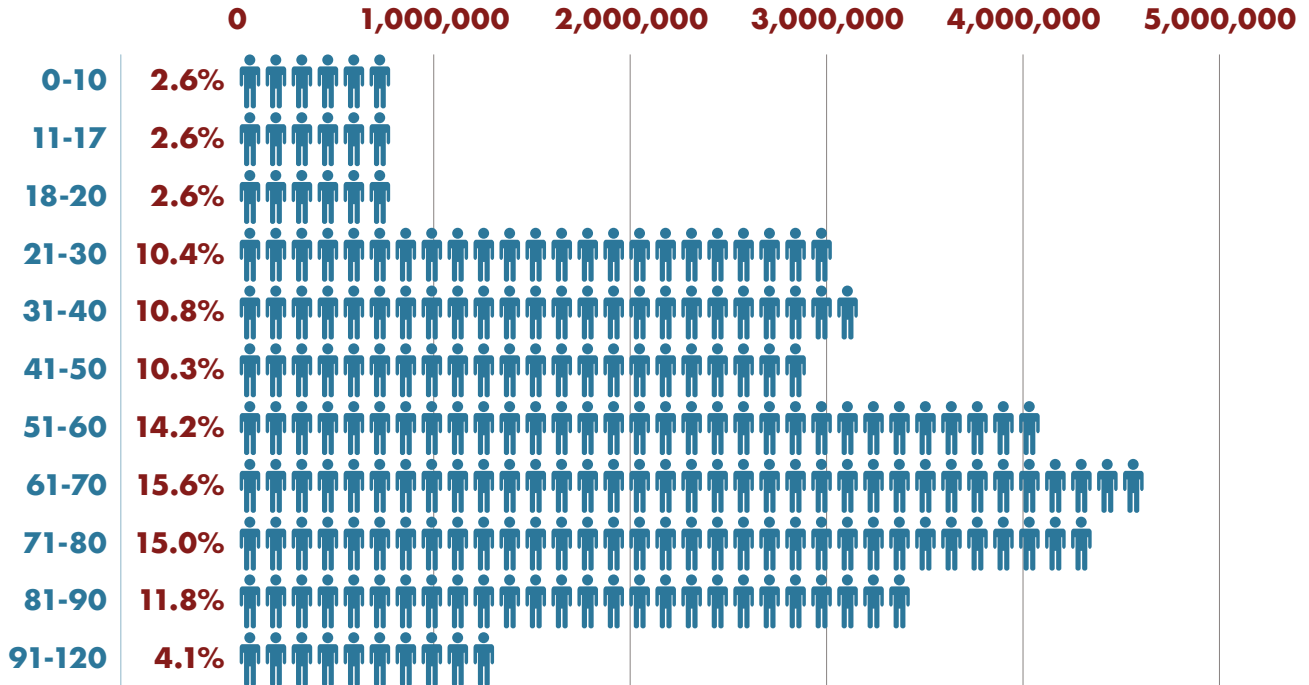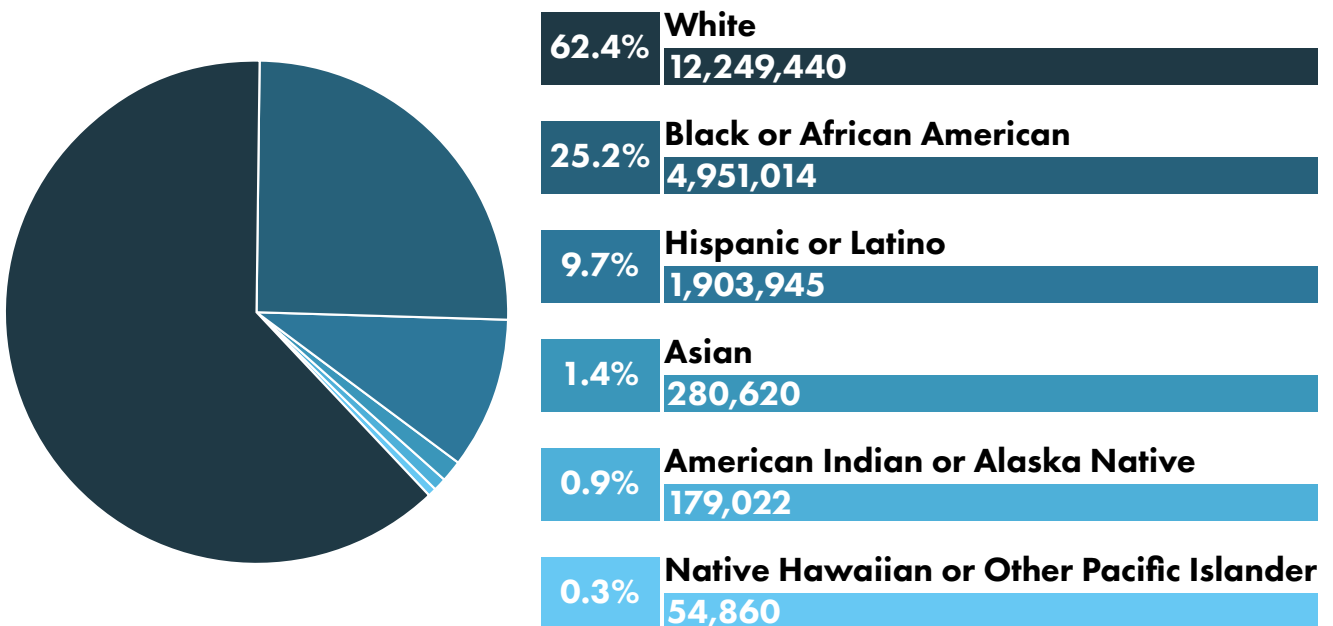
ePatient.14 - Patients can indicate more than one race.
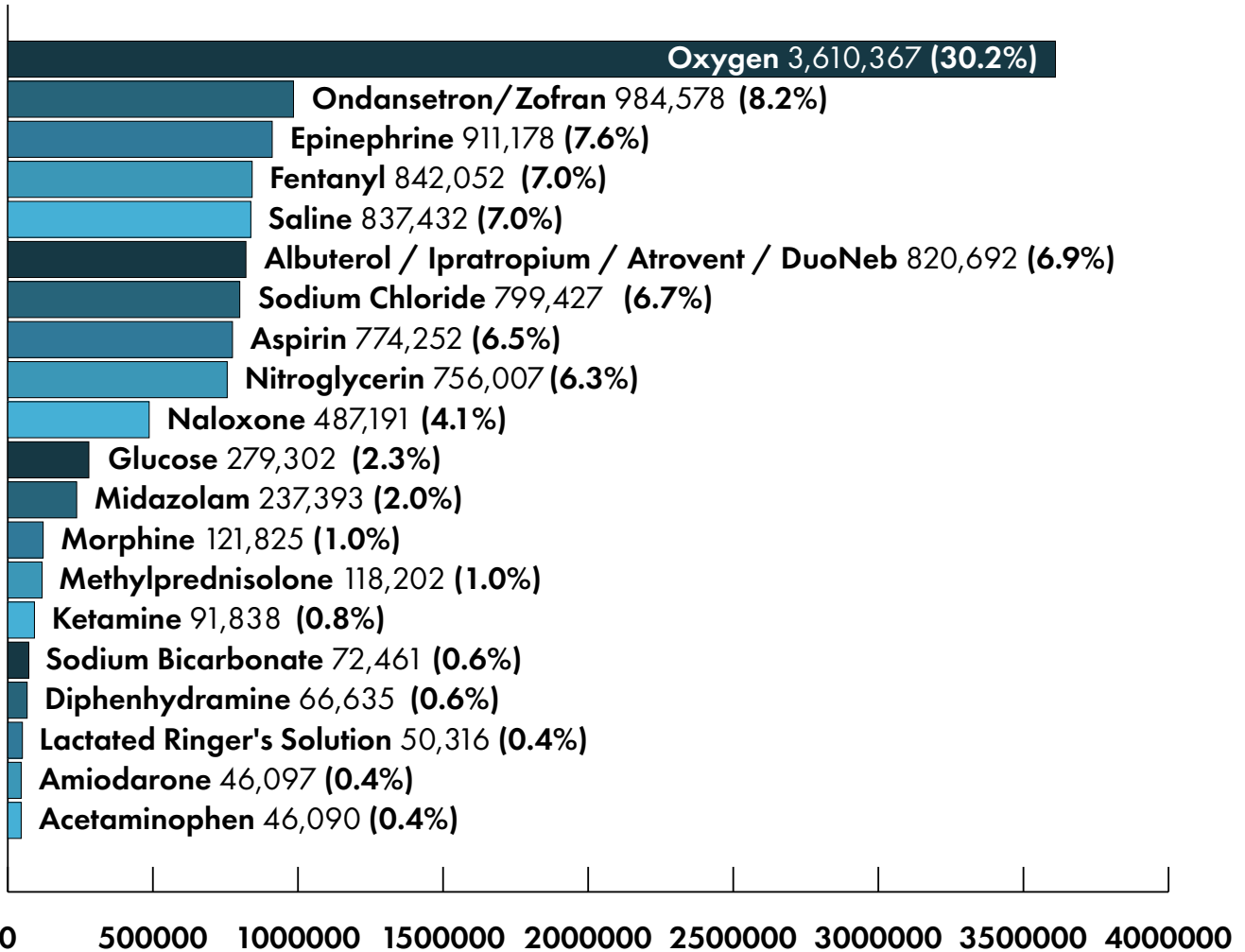The patient's race as defined by the OMB (US Office of Management and Budget).
OMB requirements are provided at: https://grants.nih.gov/grants/guide/notice-files/NOT-OD-15-089.html

%	Race	Count
62.4%	White	12,249,440
25.2%	Black or African American	4,951,014
9.7%	Hispanic or Latino	1,903,945
1.4%	Asian	280,620
0.9%	American Indian or Alaska Native	179,022
0.3%	Native Hawaiian or Other Pacific Islander	54,860

Inclusion criteria: 911 initiated and patient contact was made. Values that were marked Not Applicable or Not Recorded are removed.

TOP 18 MEDICATIONS GIVEN

eMedication.03 - Medication given. List of medications based on RxNorm (RXCUI) codes.

Medication	Count	Percent
Oxygen	3,610,367	(30.2%)
Ondansetron/Zofran	984,578	(8.2%)
Epinephrine	911,178	(7.6%)
Fentanyl	842,052	(7.0%)
Saline	837,432	(7.0%)
Albuterol / Ipratropium / Atrovent / DuoNeb	820,692	(6.9%)
Sodium Chloride	799,427	(6.7%)
Aspirin	774,252	(6.5%)
Nitroglycerin	756,007	(6.3%)
Naloxone	487,191	(4.1%)
Glucose	279,302	(2.3%)
Midazolam	237,393	(2.0%)
Morphine	121,825	(1.0%)
Methylprednisolone	118,202	(1.0%)
Ketamine	91,838	(0.8%)
Sodium Bicarbonate	72,461	(0.6%)
Diphenhydramine	66,635	(0.6%)
Lactated Ringer's Solution	50,316	(0.4%)
Amiodarone	46,097	(0.4%)
Acetaminophen	46,090	(0.4%)

Inclusion criteria: 911 initiated and patient contact was made. Values that were marked Not Applicable or Not Recorded are removed.

EMS AGENCY ORGANIZATIONAL STATUS

dAgency.12 - The primary organizational status of the agency. The definition of Volunteer or Non-Volunteer is based on state or local definitions.

Organizational Status	Count of Events	Percent of Total
Non-Volunteer	35,422,815	79.1%
Mixed	8,519,838	19.0%
Volunteer	857,880	1.9%
TOTAL	44,800,533	100%

URBANICITY OF EMS INCIDENT LOCATION

Urbanicity is calculated using the 2013 USDA Urban Influence Codes to best classify geographic areas. Read more here: https://www.ers.usda.gov/data-products/urban-influence-codes/documentation.aspx

Urbanicity	Count of Events	Percent of Total
Urban	37,315,544	86%
Rural	2,903,317	7%
Suburban	2,620,635	6%
Wilderness	674,997	2%
TOTAL	43,514,493	100%

TOP 20 CAUSES OF INJURY

eSituation.11 - The reported/suspected external cause of the injury. Based on ICD-10-CM codes)

Incident Patient Disposition	Count of Events	Percent of Total
Falls (including tripping, slipping, fall from furniture/stairs, ice/snow)	2,310,751	52.9%
Motor Vehicle Crash (including car accident, collision, motorcycle, occupant injured)	1,251,763	28.6%
Assault (including by bodily force, by blunt object, by stabbing, by other means)	394,267	9.0%
Homicide (attempted) NOS	65,745	1.5%
Intentional self-harm by unspecified sharp object or other specified means	35,462	0.9%
Accidental hit, strike, kick, twist, bite, bump, or scratch by another person	34,141	0.9%
Other specified events, undetermined intent	28,489	0.7%
Striking against or struck by other objects	25,306	0.7%
Contact with blunt object, undetermined intent	25,161	0.7%
Contact with or bitten by dog	21,390	0.6%
Contact with knife, sword or dagger	20,453	0.5%
Contact with unspecified sharp object, undetermined intent	19,985	0.5%
Other specified effects of external causes	19,592	0.5%
Caught, crushed, jammed or pinched in or between objects	14,491	0.4%
Contact with sharp glass	13,714	0.4%
Suicide attempt	13,435	0.4%
Struck by thrown, projected or falling object	13,180	0.3%
Foreign body or object entering through skin	12,907	0.3%
Injury, unspecified	12,394	0.3%
Contact with machinery NOS	8,175	0.3%
TOTAL	**3,840,821**	**100%**

Inclusion criteria: 911 initiated and patient contact was made. Values that were marked Not Applicable or Not Recorded are removed.

■ PROVIDER'S PRIMARY IMPRESSION

eSituation.11 - The EMS personnel's impression of the patient's primary problem or most significant condition which led to the management given to the patient (treatments, medications, or procedures). Based on ICD-10-CM codes.

Primary Impression ICD 10 Name	Count of Events	Percent of Total
Asthenia NOS	1,674,290	13.3%
Injury, unspecified	1,365,821	10.8%
Change in mental status NOS	978,343	7.8%
Acute pain, not elsewhere classified	822,230	6.5%
Generalized abdominal pain	781,947	6.2%
Acute respiratory distress syndrome	694,188	5.5%
Syncope and collapse	612,440	4.9%
Mental illness NOS	577,423	4.6%
Chest pain, unspecified	565,791	4.5%
Encounter for general examination without complaint, suspected or reported diagnosis	555,559	4.4%
Other Malaise	487,610	3.9%
Encounter for adult health check-up NOS	481,003	3.8%
Back pain NOS	461,692	3.7%
Generalized pain NOS	401,491	3.2%
Severe abdominal pain (generalized) (with abdominal rigidity)	397,353	3.1%
Other chest pain	365,716	2.9%
Encounter for observation NOS	360,149	2.9%
Unspecified injury of head	359,723	2.9%
Cardiac arrest, cause unspecified	339,816	2.7%
Anxiety NOS	334,308	2.6%
TOTAL	**12,616,893**	**100%**

Inclusion criteria: 911 initiated and patient contact was made. Values that were marked Not Applicable or Not Recorded are removed.

■ TRANSPORT MODE FROM SCENE

eResponse.23 - The indication whether the response was emergent or non-emergent. An emergent response is an immediate response as determined by local or state protocols.

Transport Mode from Scene	Count of Events	Percent of Total
Emergent (Immediate Response)	15,099,744	72.3%
Non-Emergent	5,399,074	25.9%
Emergent Downgraded to Non-Emergent	297,186	1.4%
Non-Emergent Upgraded to Emergent	90,818	0.4%
TOTAL	**20,886,822**	**100%**

PATIENT/CREW DISPOSITION

eDisposition.12 - Type of disposition and/or transport of the patient by this EMS Unit.

Primary Impression ICD 10 Name	Count of Events	Percent of Total
Patient Treated, Transported by EMS	20,151,063	58.0%
Canceled (Prior to Arrival At Scene)	2,175,118	6.3%
Patient Refused Evaluation/Care (Without Transport)	2,055,534	5.9%
Patient Treated, Transferred Care to Another EMS Professional	1,886,854	5.4%
Canceled on Scene (No Patient Contact)	1,630,743	4.7%
Patient Treated, Released (AMA)	1,569,915	4.5%
Patient Evaluated, No Treatment/Transport Required	1,129,534	3.2%
Canceled on Scene (No Patient Found)	1,106,563	3.2%
Patient Treated, Released (per protocol)	825,550	2.4%
Assist, Unit	617,423	1.8%
Assist, Public	397,999	1.1%
Patient Dead at Scene-No Resuscitation Attempted (Without Transport)	283,706	0.8%
Assist, Agency	283,187	0.8%
Standby-Public Safety, Fire, or EMS Operational Support Provided	259,019	0.7%
Patient Dead at Scene-Resuscitation Attempted (Without Transport)	127,294	0.4%
Standby-No Services or Support Provided	122,853	0.4%
Patient Treated, Transported by Law Enforcement	52,189	0.2%
Patient Treated, Transported by Private Vehicle	50,653	0.15%
Patient Refused Evaluation/Care (With Transport)	24,553	0.07%
Patient Dead at Scene-No Resuscitation Attempted (With Transport)	9,453	0.03%
Patient Dead at Scene-Resuscitation Attempted (With Transport)	5,508	0.02%
Transport Non-Patient, Organs, etc.	1,376	<0.01%
TOTAL	**34,766,087**	**100%**

Inclusion criteria: 911 initiated and patient contact was made. Values that were marked Not Applicable or Not Recorded are removed.

■ PATIENT'S PRIMARY SYMPTOM

eSituation.09 - The primary sign and symptom present in the patient or observed by EMS personnel. Based on ICD-10-CM codes.

Primary Symptom ICD 10 Name	Count of Events	Percent of Total
Asthenia NOS	1,871,160	13.9%
Generalized pain NOS	1,547,287	11.5%
Change in mental status NOS	1,125,461	8.4%
Other general symptoms and signs	929,155	6.9%
Shortness of breath	921,965	6.9%
Chest pain, unspecified	861,002	6.4%
Dyspnea, unspecified	670,627	5.0%
Back pain NOS	591,796	4.4%
Encounter for general examination without complaint, suspected or reported diagnosis	581,260	4.3%
Hemorrhage NOS	493,579	3.7%
Headache	440,771	3.3%
Encounter for adult health check-up NOS	426,969	3.2%
Syncope and collapse	419,664	3.1%
Generalized abdominal pain	415,197	3.1%
Light-headedness	406,338	3.0%
Other malaise	373,490	2.8%
Encounter for observation NOS	351,070	2.6%
Nausea	342,031	2.5%
Fever with chills	334,842	2.5%
Worries	324,397	2.4%
TOTAL	**13,428,061**	**100%**

Inclusion criteria: 911 initiated and patient contact was made. Values that were marked Not Applicable or Not Recorded are removed.

■ TYPE OF SERVICE REQUESTED

eResponse.05 - The type of service or category of service initiated of the EMS Agency responding for this specific EMS event.

Type of Service	Count of Events	Percent of Total
911 Response (Scene)	34,718,261	77.5%
Medical Transport	5,430,872	12.1%
Interfacility Transport	4,070,413	9.1%
Public Assistance/Other Not Listed	238,734	0.5%
Standby	139,488	0.3%
Intercept	112,426	0.3%
Mutual Aid	88,249	0.2%
TOTAL	**44,798,443**	**100%**

Inclusion criteria: 911 initiated and patient contact was made. Values that were marked Not Applicable or Not Recorded are removed.

■ TYPE OF DESTINATION

eDisposition.21 - The type of destination to which the patient was transported or transferred.

Type of Destination	Count of Events	Percent of Total
Hospital-Emergency Department	19,719,180	89.7%
Hospital-Non-Emergency Department Bed	1,666,293	7.6%
Other EMS Responder (ground)	150,330	0.7%
Other	134,198	0.6%
Home	73,593	0.3%
Freestanding Emergency Department	70,736	0.3%
Nursing Home/Assisted Living Facility	65,250	0.3%
Medical Office/Clinic	37,921	0.2%
Other EMS Responder (air)	37,097	0.2%
Morgue/Mortuary	19,160	0.1%
Police/Jail	4,264	0.02%
Urgent Care	2,964	0.01%
TOTAL	**21,980,986**	**100%**

Inclusion criteria: 911 initiated and patient contact was made. Values that were marked Not Applicable or Not Recorded are removed.

■ EMS PROVIDER LEVEL OF CARE

eResponse.15 - The level of care (BLS or ALS) the unit is able to provide based on the units' treatment capabilities for this EMS response.

Level of Care	Count of Events	Percent of Total
ALS-Paramedic	31,377,211	70.0%
BLS-Basic /EMT	9,795,572	21.9%
Specialty Critical Care	1,033,233	2.3%
ALS-AEMT	867,818	1.9%
ALS-Intermediate	556,522	1.2%
BLS-AEMT	434,027	1.0%
BLS-First Responder/EMR	405,926	0.9%
BLS-Intermediate	164,862	0.4%
ALS-Nurse	89,050	0.2%
ALS-Community Paramedicine	47,711	0.1%
BLS-Community Paramedicine	18,339	0.1%
ALS-Physician	8,172	<0.1%
TOTAL	**44,798,443**	**100%**

■ EMS BY THE NUMBERS: IMPACT OF COVID-19 ON EMS RESPONSE

The following graphs demonstrate both the count and rate of Influenza-like Illnesses (ILI) as a measure to capture suspected COVID infections. Diagnosing COVID-19 in the prehospital setting is often out of scope for EMS agencies. ILI symptoms present in a similar way to COVID symptoms and have proven to be an acceptable way to assess EMS activations that may include COVID-suspected patients.

Both count and rate of ILI activations charts include, within the defined period, all EMS activations in which the Type of Service Requested [eResponse.05] is a 911 response AND Arrived at Patient Date/Time [eTimes.07] is not blank OR Incident/Patient Disposition [eDisposition.12] indicates that patient contact occurred.

The Case Definition of ILI in the prehospital setting is based on the record inclusion criteria provided in the Companion Guide for the National NEMSIS ILI Surveillance Dashboard. The ILI Surveillance Dashboard Companion Guide can be found at: ILI Dashboard Companion Guide. Provided below are examples of data elements which include ICD-10-CM codes for ILI criteria.

EMS Primary and Secondary Impression
- B79 codes: SARS and other Coronavirus
- J09 codes: Influenza
- J15 codes: Pneumonia

Patient Primary and Associated Symptoms
- R05 codes: Cough
- R06 codes: Shortness of Breath
- R50 codes: Fever
- J02 codes: Pharyngitis

The global inclusion criteria define the minimum characteristics each event record must meet for inclusion in any of the calculations for v3 Surveillance Dashboards. For details on each element, it's code, and range of values see the NEMSIS Version 3.4 Data Dictionary.

The criteria for including ICD-10-CM codes to represent influenza-like illness were drawn from guidance provided by the CDC (Centers for Disease Control), ILI dashboards provided by EMS software vendors, and codes utilized by EMS clinicians and archived in the National EMS Database (i.e., internal validity monitoring).

The breadth of codes considers the unique presentation of patients, coding variation found in available EMS software, and lack of definitive diagnosis capabilities in the prehospital environment. The inclusion criteria are intended to capture EMS interactions that could be consistent with an influenza diagnosis. This is not a COVID-19 specific report.

There are also vertical-colored lines which represent key dates:
- The red line marks when the CDC announced COVID-19 community spread in 2020.
- The orange line shows Memorial Day.
- The yellow line marks Labor Day.
- The green line marks Thanksgiving.
- The blue shaded area represents when "Stay-At-Home" orders were generally established by states in 2020.

COUNT OF ILI ACTIVATIONS
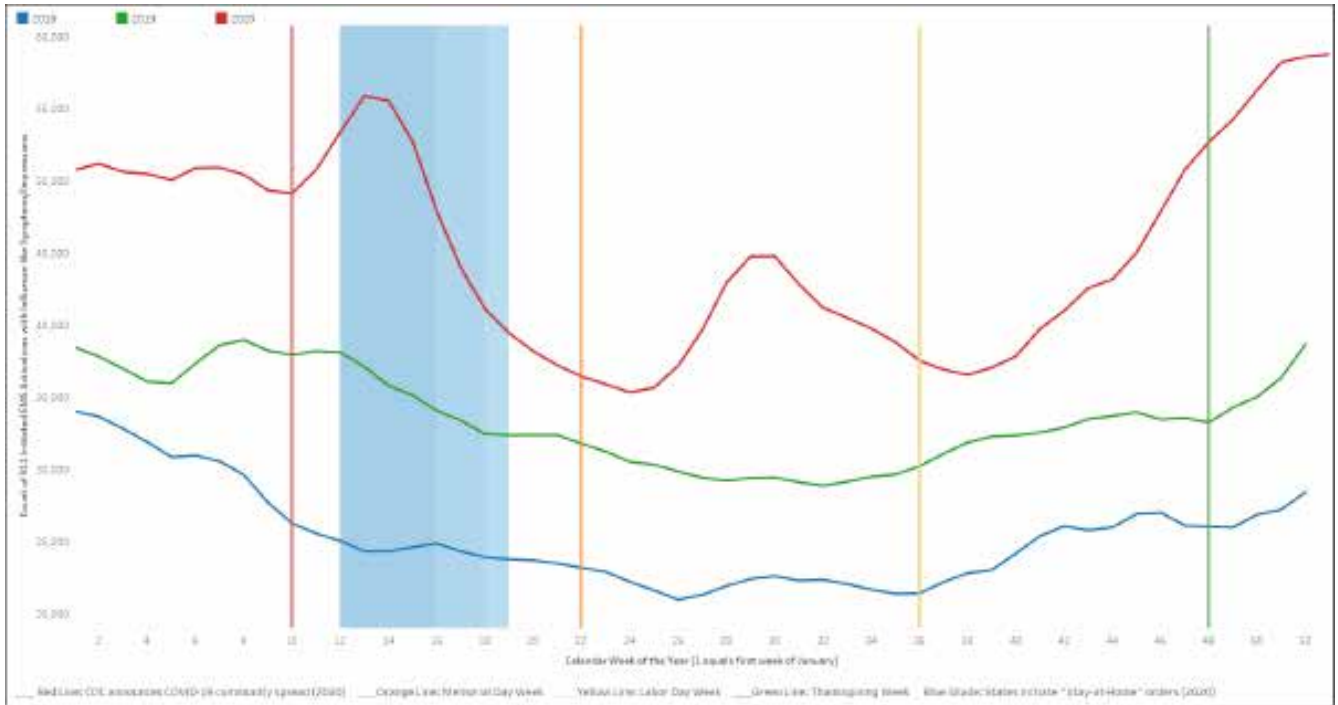
RATE OF ILI ACTIVATIONS
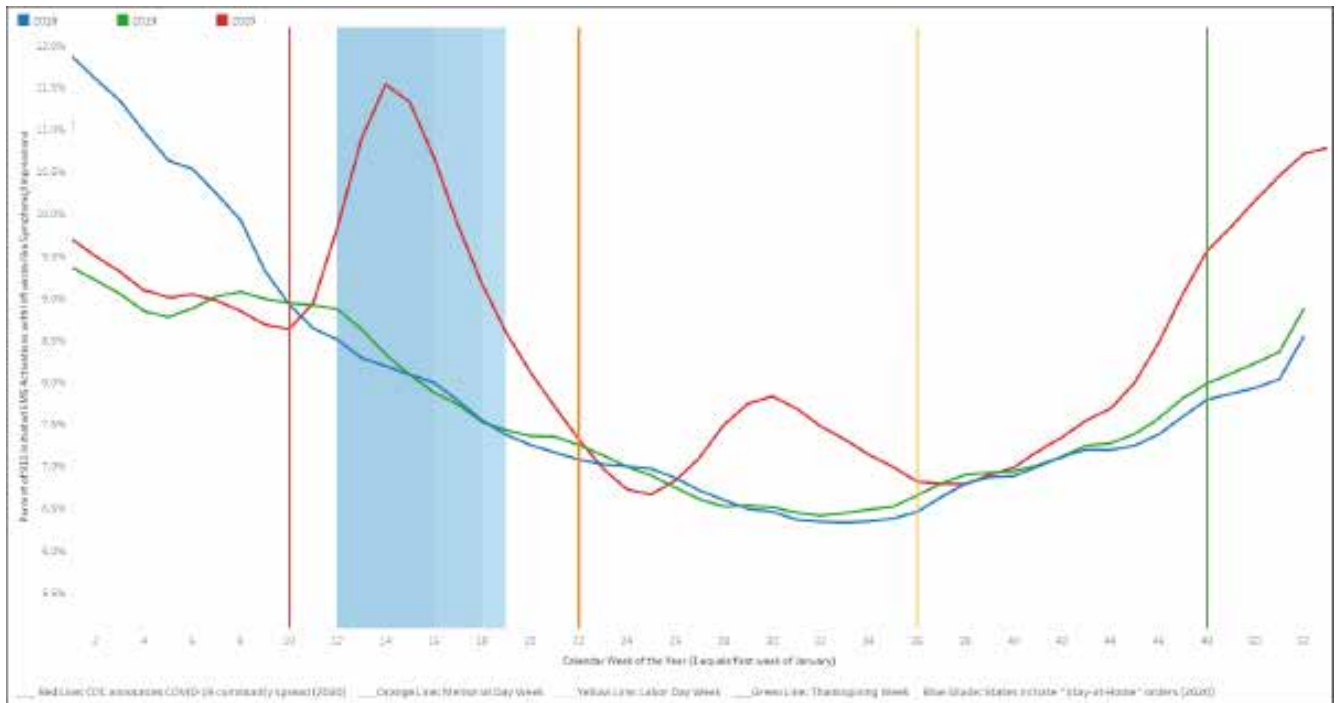
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ACKNOWLEDGMENTS

No publication using NEMSIS data would be possible without the dedication and professionalism of EMS clinicians across the country. Likewise, the support and technical guidance provided by state/territory offices of EMS, EMS software vendors, and national partners create the foundation through which EMS data can inform policies, procedures, and protocols to improve EMS evidence-based medical care.

ASSUMPTIONS OF EMS DATA

Hundreds of thousands of EMS clinicians from every walk of life and demographic, document their patient encounters. There is no single right way to complete a patient care report (PCR) and documentation training is varied.

As such, EMS data are rarely collected in calm, sterile, predictable environments. States, territories, and agencies all impact the methods, requirements and codes used to document EMS response activities. This is why there are many descriptions (or codes) used to describe similar injury or illness characteristics. (See Cause of Injury graphic on page seven for an example of the many methods and requirements used to document a "fall".)

RESEARCHERS

A Public-Release Research Dataset is available to researchers. These very large files (SAS, STATA, ASCII) contain all the public data for one year. Researchers can create and run their own queries and as a static dataset, their results may be validated by other researchers. The Public-Release Research Datasets are used frequently in peer-reviewed scholarly publications. The Public-Release Research Dataset does not contain information that identifies patients, EMS agencies, receiving hospitals, or reporting states. EMS events submitted by states/territories to NEMSIS do not necessarily represent all EMS activations occurring within a state. In addition, states may vary in criteria used to determine the types of EMS activations submitted to the NEMSIS dataset.

Request a copy of the NEMSIS Public-Release Dataset here:
https://nemsis.org/using-ems-data/request-research-data/

CITATION

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