

STATE OF IOWA DEPARTMENT OF  
**Health** AND **Human**  
SERVICES

EMERGENCY MEDICAL SERVICES  
ANNUAL REPORT

2022

## Acknowledgments

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## Executive Summary

In an effort to continuously improve and enhance our emergency medical services (EMS) systems across the State of Iowa, the Bureau of Emergency Medical and Trauma Services (BEMTS) has compiled the first annual report of data obtained by BEMTS to identify trends, strengths, and opportunities for improvement that our EMS services, providers and systems face.

This report utilizes data obtained through the ImageTrend EMS Data Registry, the AMANDA licensure registry, and from various programs offered through BEMTS (January 1, 2016 – January 1, 2023).

The following is a brief overview of the data included in the report:

- 10,743 total active EMS providers, a decrease of 1.5% from the previous year
  - 736 EMRs, a decrease of 7.9%
  - 6,191 EMTs, a decrease of 3.2%
  - 405 AEMTs, an increase of 11.3%
  - 3,361 paramedics, an increase of 1.9%
- 22,994 filled rostered positions
- 61% of rostered positions are identified as volunteer
- 62% first-attempt success rate for certification exams in Iowa, compared to 68% nationally
- 79% of candidates in Iowa ultimately pass certification exams
- 731 authorized services covering 897 service locations
- 453,564 total EMS incidents reported to the state registry for 2022, an average of 647 per service
- 364,833 of the 2022 incidents reported were 911 responses
- The statewide average 911 response time (dispatch to arrival on scene) was 7.72 minutes
- The average patient age in Iowa is 59 years

## List of Acronyms

AEMT.....	Advanced Emergency Medical Technician
ALS.....	Advanced Life Support
BEMTS.....	Bureau of Emergency Medical and Trauma Services
BLS.....	Basic Life Support
EMR.....	Emergency Medical Responder
EMS.....	Emergency Medical Services
EMSAC.....	Emergency Medical Services Advisory Council
EMSC.....	Emergency Medical Services for Children
EMT.....	Emergency Medical Technician
HHS.....	Iowa Department of Health and Human Services
IFT.....	Interfacility Transport
NEMESIS.....	National Emergency Medical Services Information System
NHTSA.....	National Highway Traffic Safety Administration
NREMT.....	National Association of Emergency Medical Technicians
PA.....	Physician Assistant
PSAP.....	Public Safety Answering Point
RN.....	Registered Nurse

## Overview

Emergency medical services (EMS) are provided in Iowa through a wide variety of models. The majority of EMS agencies identify themselves as volunteers, with the remainder staffed entirely by paid personnel or some combination of paid and volunteer providers. Volunteers may receive no compensation, or may be nominally compensated for responding to calls or being available to respond “on call.” Agencies may be privately owned for-profit businesses, or private non-profit organizations, or may be owned and operated by a city, county, township, hospital, or other public board. Some agencies can transport patients to a healthcare facility, while other agencies provide emergency care at the scene and have partnerships with neighboring ambulance services that provide transportation of patients.

All authorized EMS agencies in Iowa are capable of providing emergency care for life-threatening conditions, such as heart attacks, strokes, and serious injuries, however some services can provide more advanced interventions. Often, basic life support (BLS) agencies have agreements with neighboring advanced life support (ALS) agencies who can respond and assist when a patient requires or would benefit from a higher level of care.

The types of responses provided by EMS agencies are also very diverse throughout the state. While most services are best recognized for their responses to 911 or emergency calls that occur outside of the hospital, many also provide interfacility transfer services for area hospitals, routine medical transports such as moving patients from long-term care facilities to dialysis centers multiple times per week, or providing standby coverage for Friday night high school football games, weekly auto racing competitions, concerts, and other community events.

This variety in the types of agencies, levels of care, and transport capabilities creates an opportunity to build scalable, dynamic, efficient local EMS systems throughout the State of Iowa, to ensure that patients are able to receive the type of care they need when they need it.

## NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION TECHNICAL ASSISTANCE TEAM ASSESSMENT OF EMERGENCY MEDICAL SERVICES

In 1988, the National Highway Traffic Safety Administration (NHTSA) developed a Technical Assistance Team approach to support the technical evaluation of existing and proposed emergency medical services programs. In 2015, at the request of the Iowa Department of Public Health, the Technical Assistance Team conducted an evaluation of the EMS system in Iowa, focusing on ten EMS System Components defined by the NHTSA plus the area of preparedness:

- Regulation and Policy
- Resource Management
- Human Resources and Education
- Transportation
- Facilities
- Communications
- Trauma Systems
- Public Information and Education
- Medical Direction
- Evaluation
- Preparedness

One of the main recommendations of the Technical Assistance Team in the 2015 assessment was to develop regionalized systems of EMS care, which is an ongoing process throughout the state. The improvement of the state's oversight of EMS clinical care by hiring a State EMS Medical Director was a recommendation of the team. That goal was accomplished in 2017. Expanding our initiatives on the care and transport of pediatrics was another recommendation, and the department continues to develop our outreach in this area through our EMS for Children (EMSC) Coordinator. The development of Emergency Medical Dispatch (EMD) protocols, regulations, and training was also identified as a priority for the state.

## RULEMAKING AUTHORITY

Iowa Code Chapter 147A.1A designates the Iowa Department of Health and Human Services (Iowa HHS) as the lead agency for coordinating and implementing the provision of emergency medical services in this state and establishes the Emergency Medical Services Advisory Council (EMSAC) to provide recommendations and guidance to the department. Iowa HHS oversees EMS in Iowa through administrative rules defined in the Iowa Administrative Code [641] Chapters 130, 131, 132, 133, 139, 140, 142, and 144. These rules outline the requirements for maintaining records of personnel and agencies as well as EMS response incident data. The data collected by these registries were used to prepare this report.



## EMS Providers

A primary concern heard from EMS services across the state is a decreasing pool of EMS providers available to fill the open positions required to adequately serve our communities. A review of the number of EMS providers authorized by the Iowa Department of Health and Human Services (HHS) shows that while the number of certified providers is increasing at some certification levels and decreasing at others, the overall trend is showing a net loss in the number of providers holding active EMS certifications.

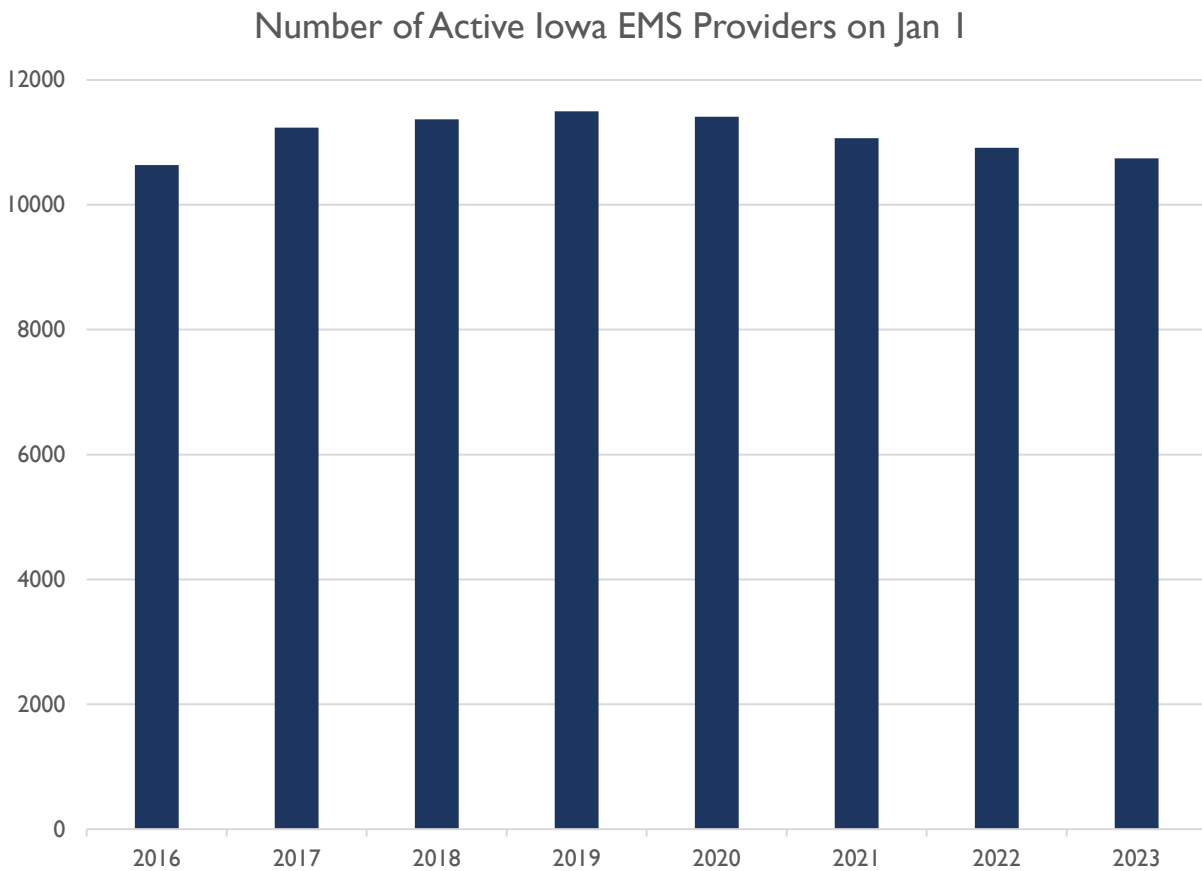


Figure 1: Number of certified EMS providers by year, 2016-2023

This downward trend has continued for each of the last four calendar years, showing decreases ranging from 0.8% to 3.0% of the total number of certified EMS providers.

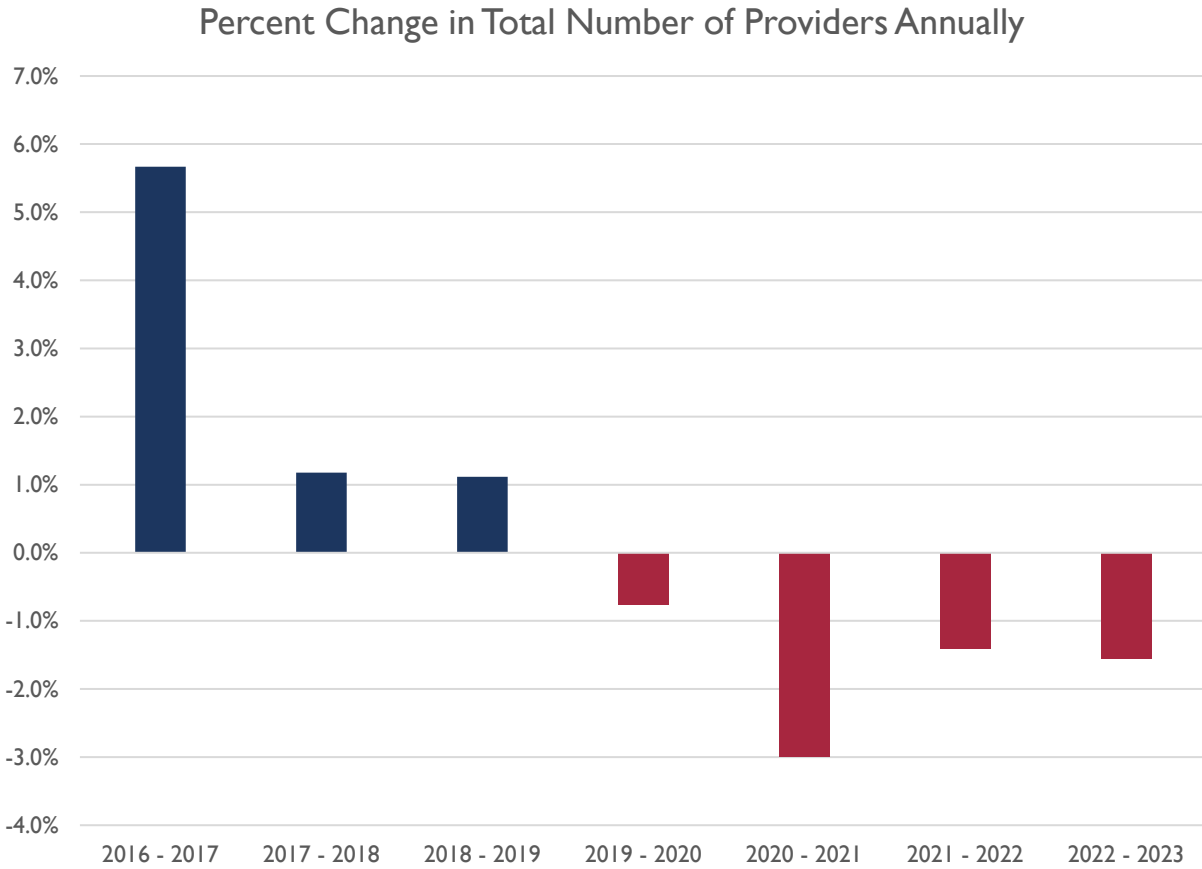


Figure 2: Percent change in the number of certified EMS providers by year, 2016-2023

Reviewing the EMS provider certification data by individual certification levels shows that the State of Iowa has seen a consistent decline in the number of providers at the two entry-level, basic life support (BLS) certification levels. These include the Emergency Medical Responder (EMR) and Emergency Medical Technician (EMT) certifications.

Active EMR certifications have declined each of the last seven years, with the highest percentage decline occurring in 2017 where the number decreased by 16.1% in that single year.

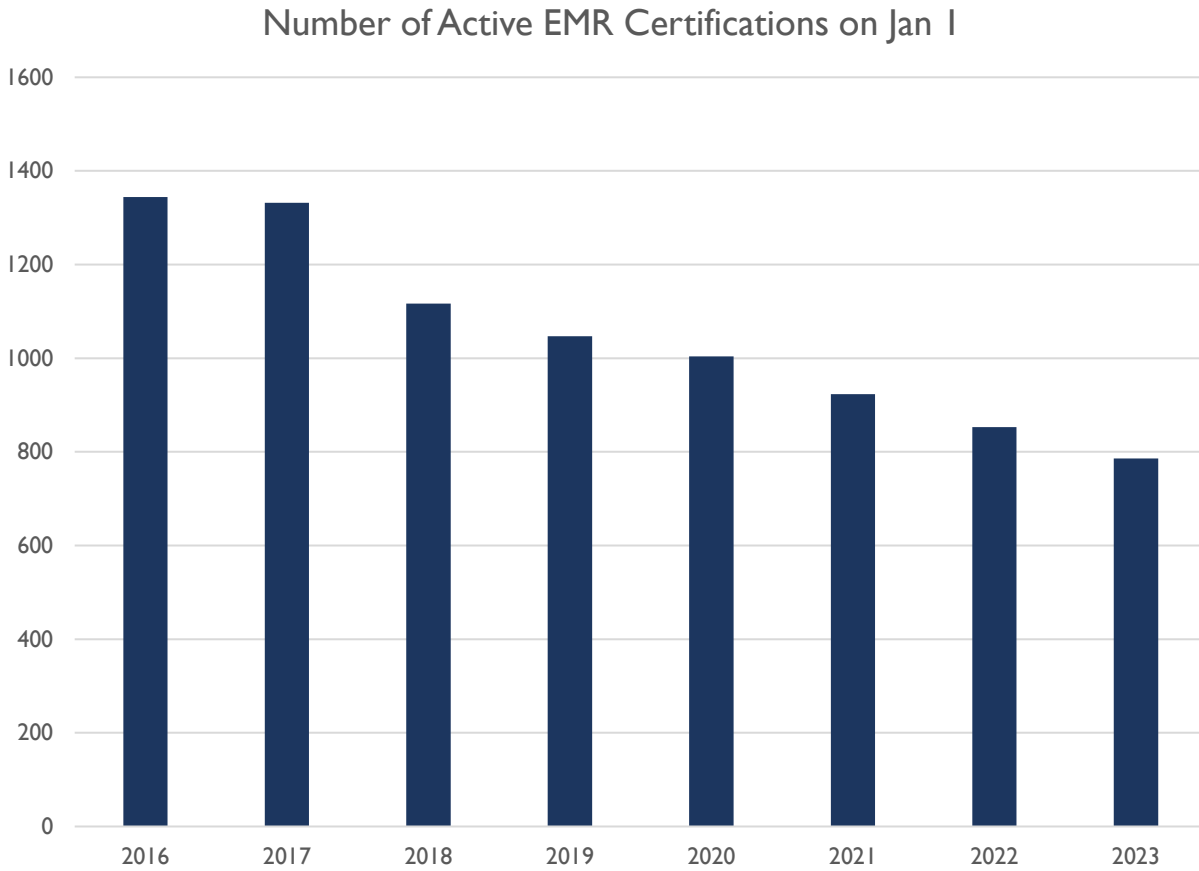


Figure 3: Number of certified emergency medical responders by year, 2016-2023

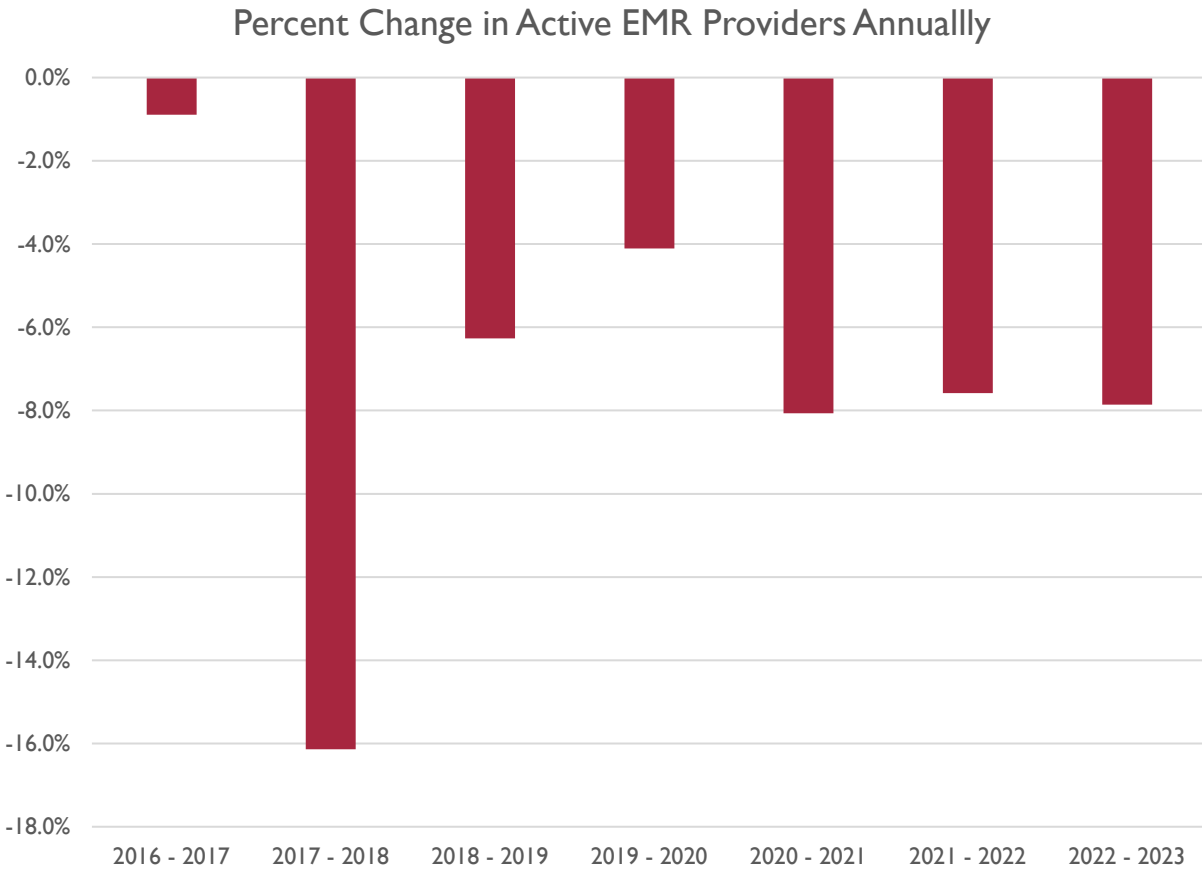


Figure 4: Percent change in the number of certified emergency medical responders by year, 2016-2023

While active EMT certifications had been increasing until 2018, since that year, Iowa has seen a decrease in the number of certified EMTs.

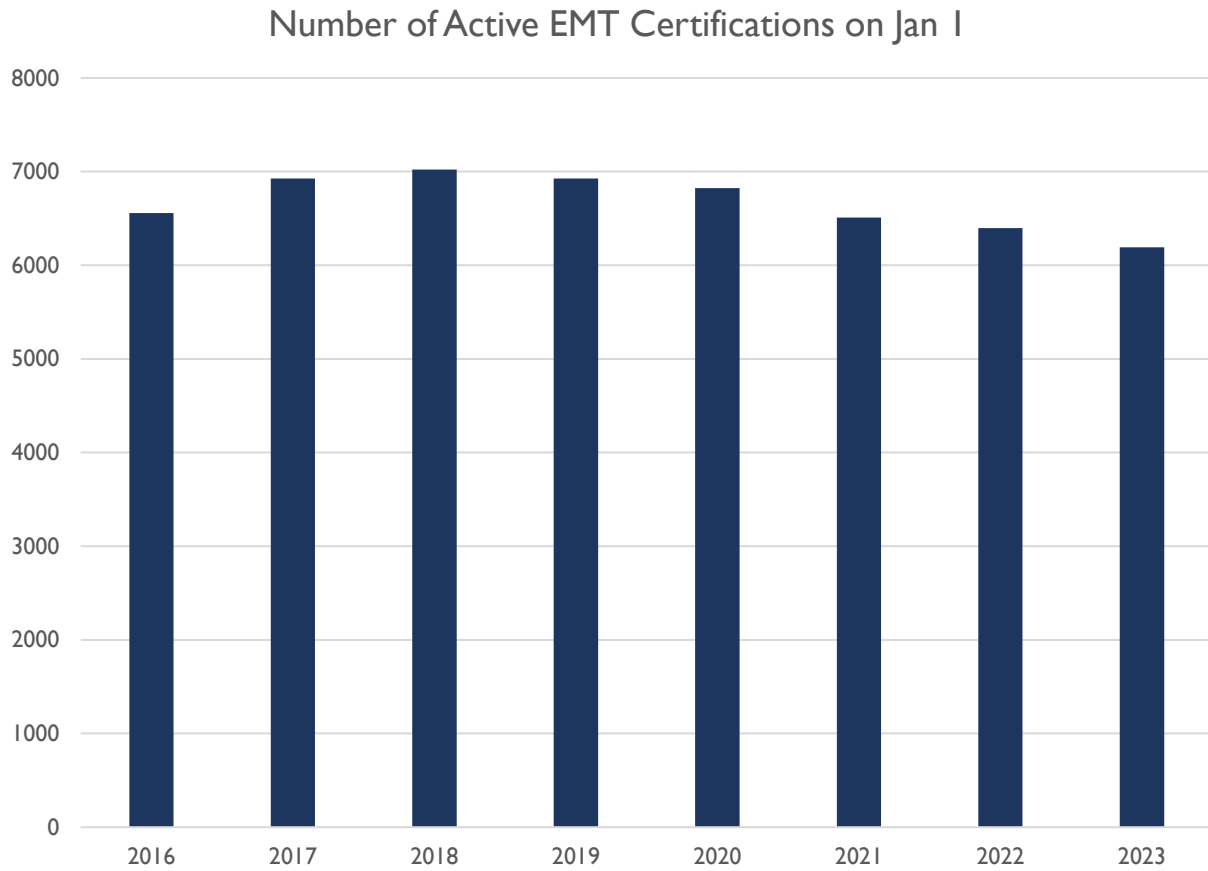


Figure 5: Number of certified emergency medical technicians by year, 2016-2023

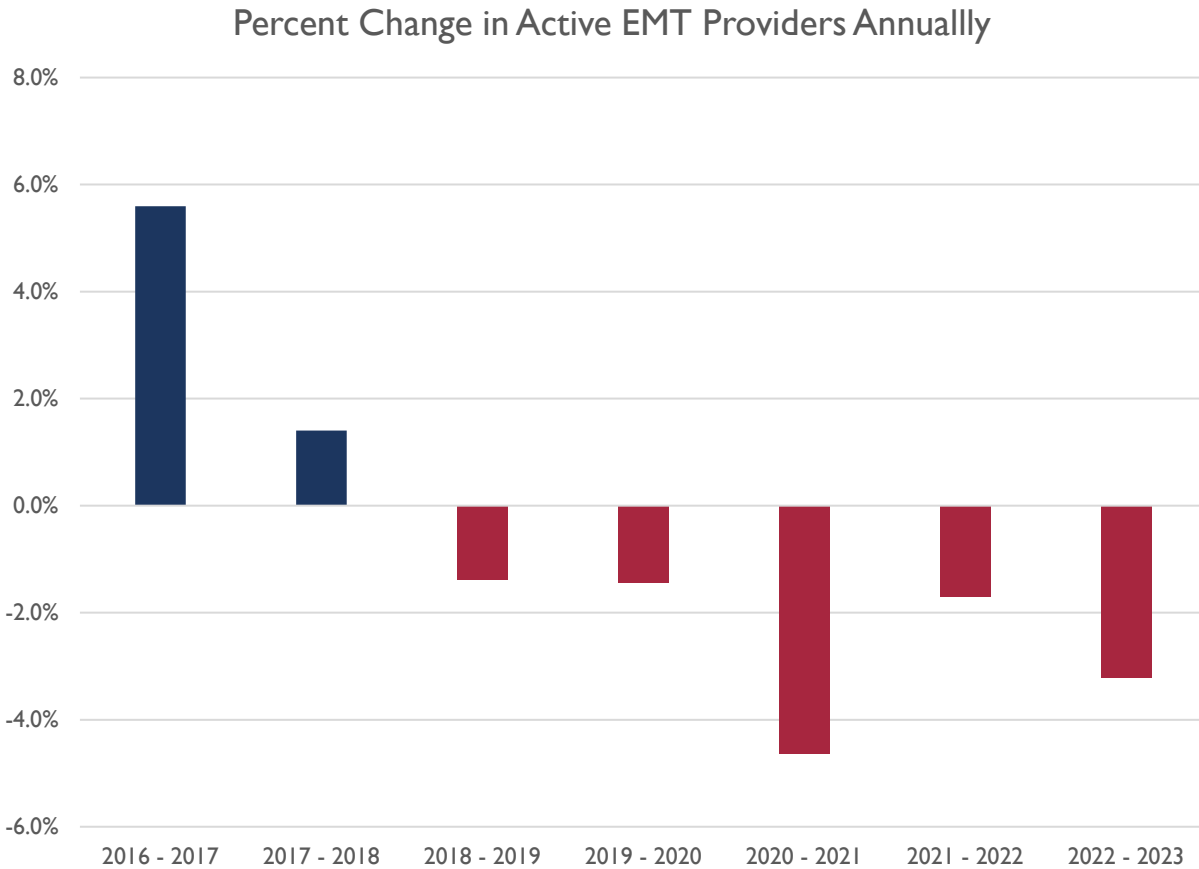


Figure 6: Percent change in the number of certified emergency medical technicians by the year 2016-2023

One possible contributing factor to this trend in entry-level EMS certifications could be the declining reliance on volunteers to staff local EMS agencies, resulting in a need for more paid providers. Typically, when an agency transitions from a volunteer staffing model to a career staffing model, the tendency is to hire more experienced providers with advanced life support (ALS) certification levels such as Advanced Emergency Medical Technician (AEMT) and paramedic. This shift likely encourages more providers to pursue a higher certification level, which could contribute to a decrease in the number of BLS providers and an increase in ALS providers. This possibility is supported by the increase in the number of AEMT and paramedic providers over the last several years in Iowa.

### Number of Active AEMT Certifications on Jan 1

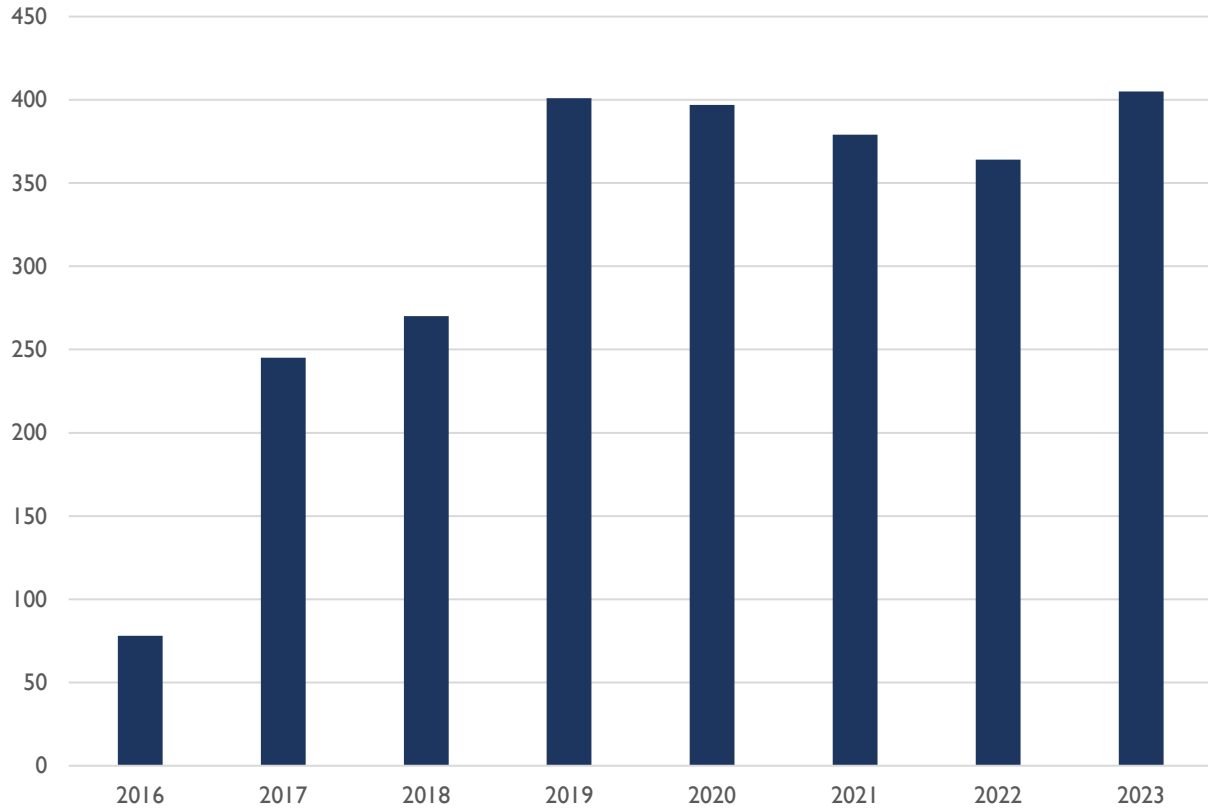


Figure 7: Number of certified advanced emergency medical technicians by year, 2016-2023

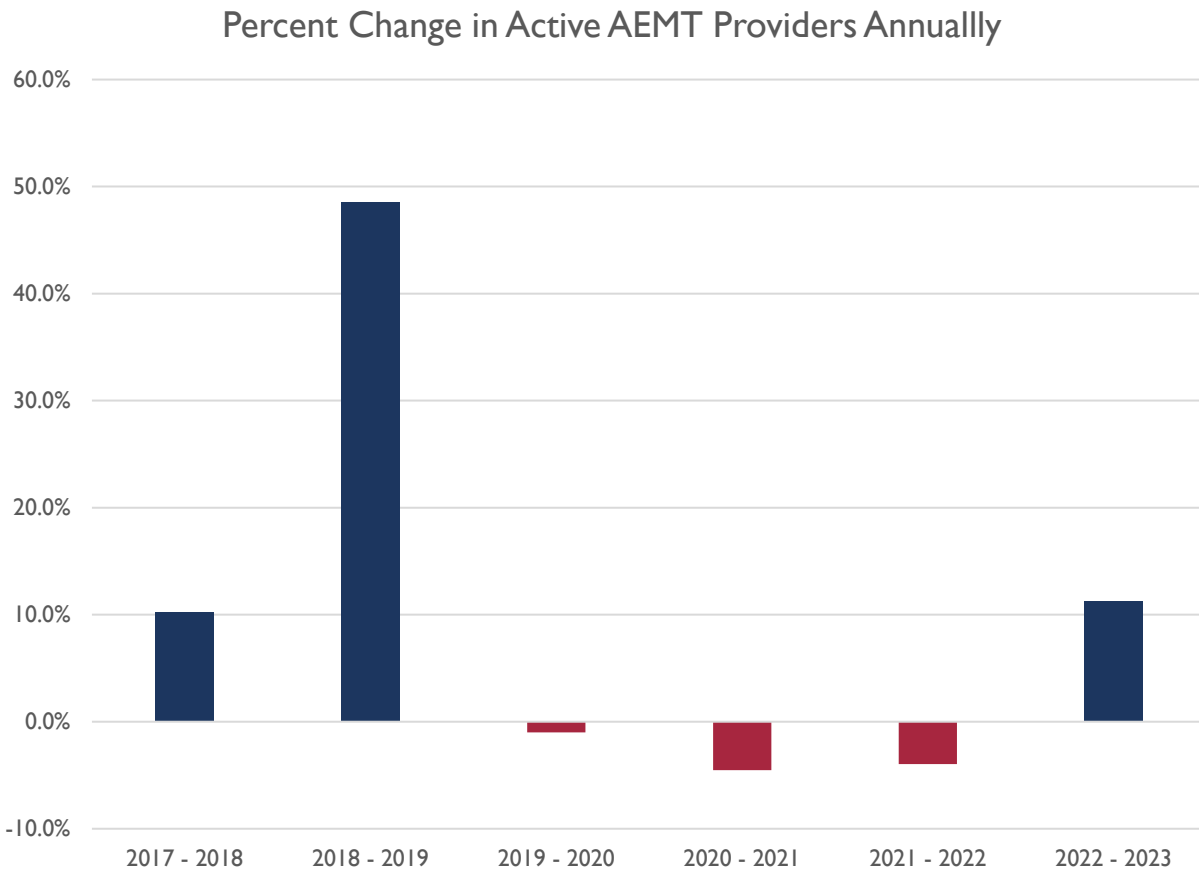


Figure 8: Percent change in the number of certified advanced emergency medical technicians by year, 2017-2023

It should be noted that the AEMT certification was a new option for providers in the mid-2010s when Iowa EMS training programs began offering the curriculum and the State of Iowa recognized the new certification level. This resulted in a dramatic increase in the number of AEMT certifications in the first years of offering, followed by a leveling off of the number of providers. Additionally, as a relatively new, mid-level EMS provider, the AEMT makes up the smallest group of EMS providers in Iowa.



Paramedic providers have consistently increased in Iowa over the last several years. This may be a result of an increasing demand for career providers to replace the decreasing base of volunteer providers or a result of local system development activities aimed at increasing the level of care available to citizens.

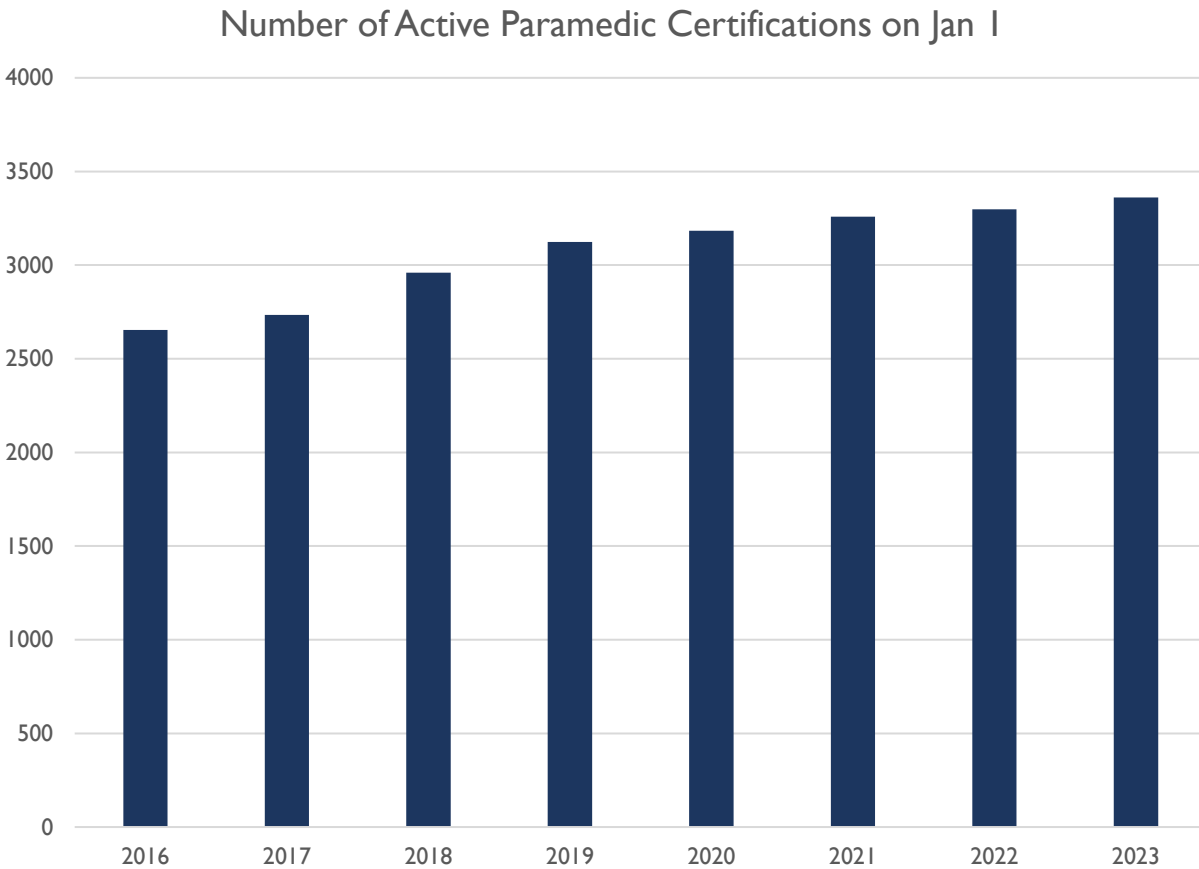


Figure 9: Number of certified paramedics by year, 2016-2023

### Percent Change in Active Paramedic Providers Annually

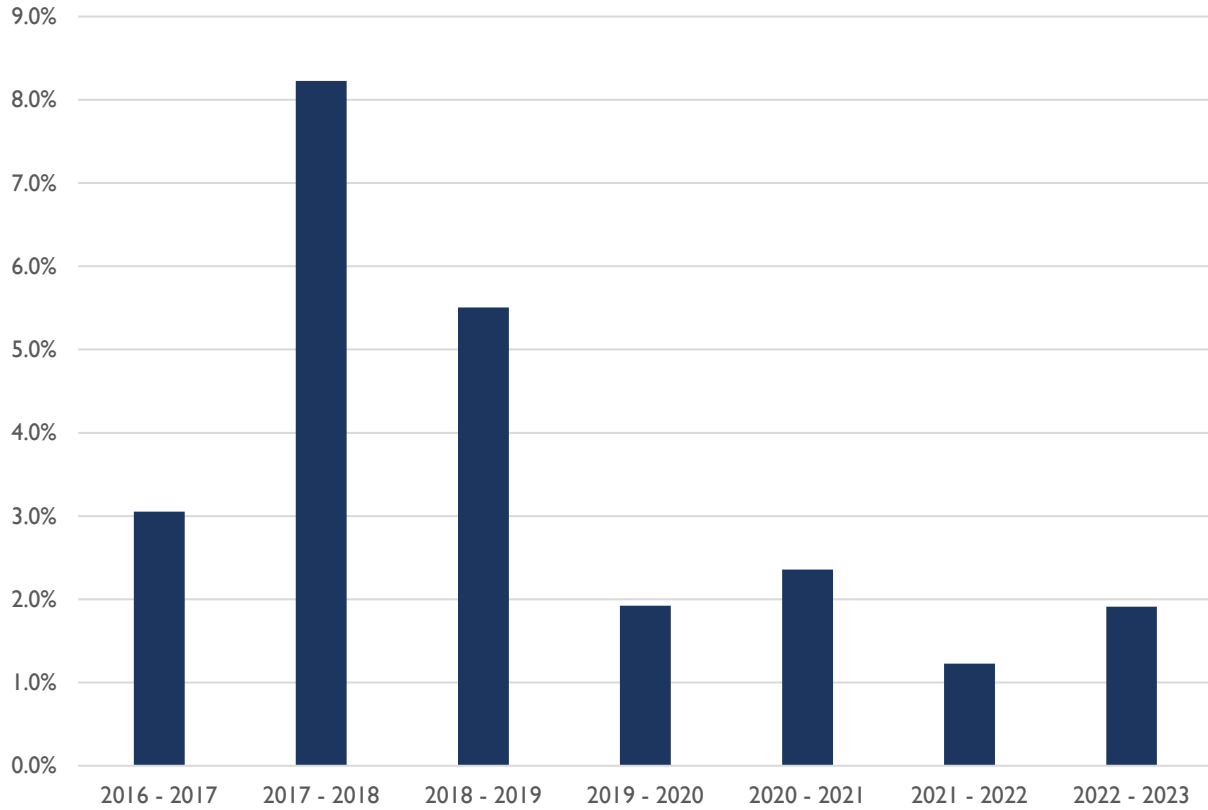


Figure 10: Percent change in the number of paramedics by year, 2016-2023

A concern often expressed in the EMS community is the aging of the providers and attrition due to retirement. As of January 1, 2023, the average age of actively certified EMS providers was 42.3 years with a median age of 41 years.

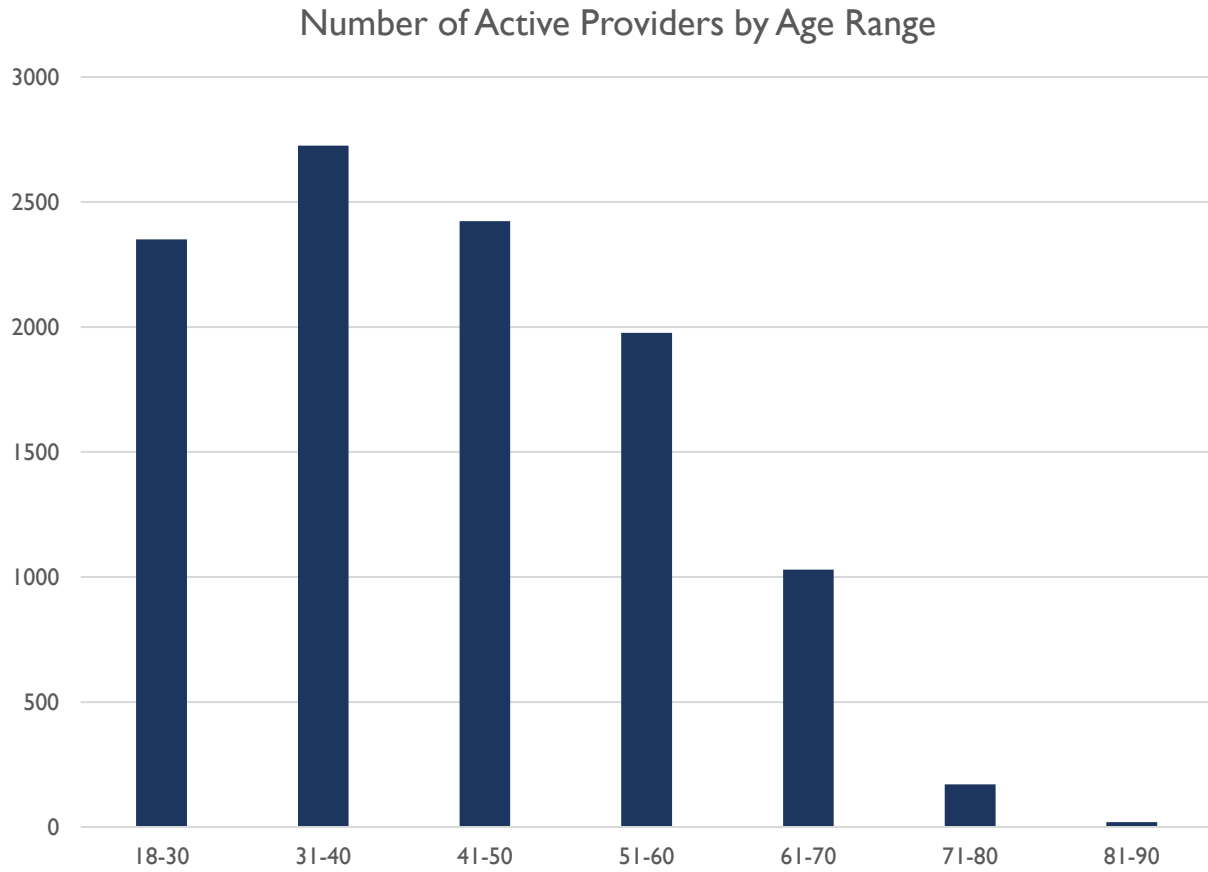


Figure 11: Number of certified providers by age range

This represents no change in the average age of providers as compared to January 1, 2022.

As of January 1, 2023, EMS services in Iowa collectively list a total of 22,994 filled positions on their service rosters. In addition to individuals holding active EMS certifications, EMS services can utilize a variety of other personnel in varying capacities to provide or supplement the EMS care provided in their communities. This includes registered nurse (RN) and physician assistant (PA) providers functioning under the RN or PA Exception rule. Under this rule, RNs and PAs can function as EMS providers up to the level of the service or the level authorized by the service’s physician medical director, whichever is lower. Many services also utilize non-certified support personnel. These personnel are not authorized to provide patient care but can support the EMS providers by operating the response vehicles, assisting with equipment, or lifting and moving patients under the direction of the EMS provider. Nearly 30% of all rostered positions on EMS services in Iowa are non-EMS certified providers and support personnel. This represents a remarkable utilization of non-EMS personnel resources in our communities to support the mission of their local EMS services.

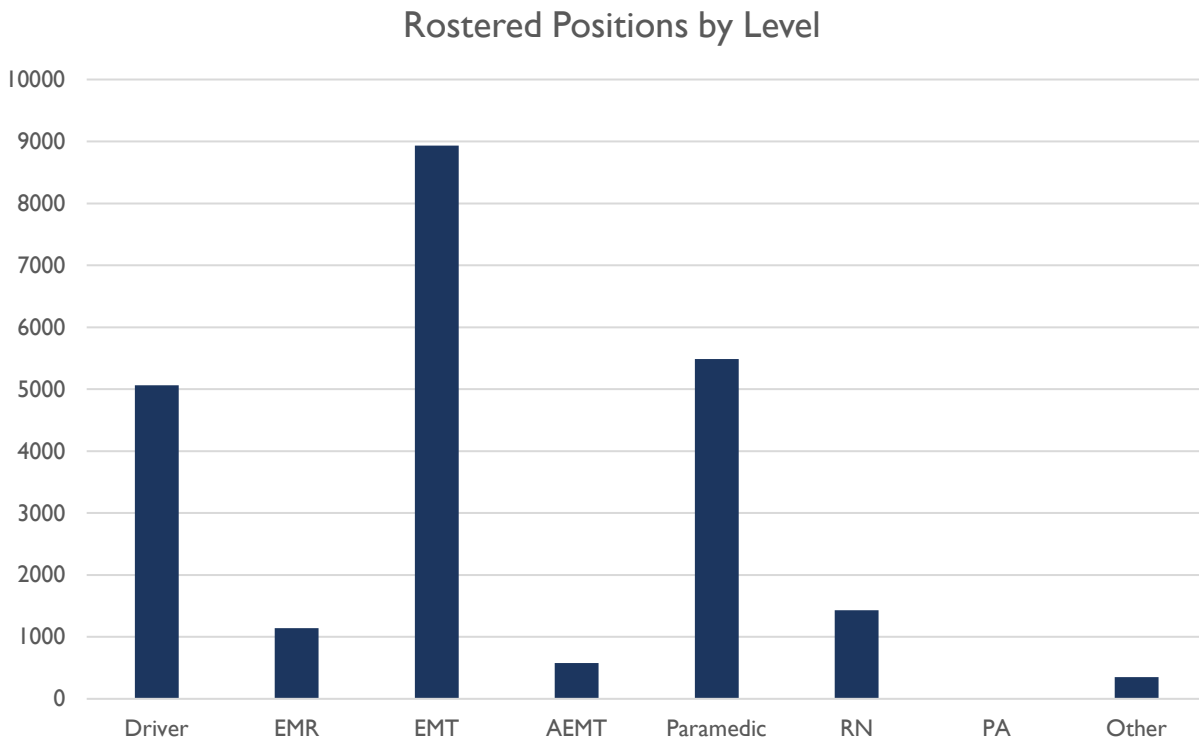


Figure 12: Rostered positions by level of certification

While the declining base of volunteer providers is a common concern voiced by EMS services across the state and nation, 61% of all rostered positions on Iowa EMS services are identified as volunteer positions. Although the total number of providers in Iowa has decreased since the previous year, this ratio is unchanged.

### Rostered Positions by Employment Type

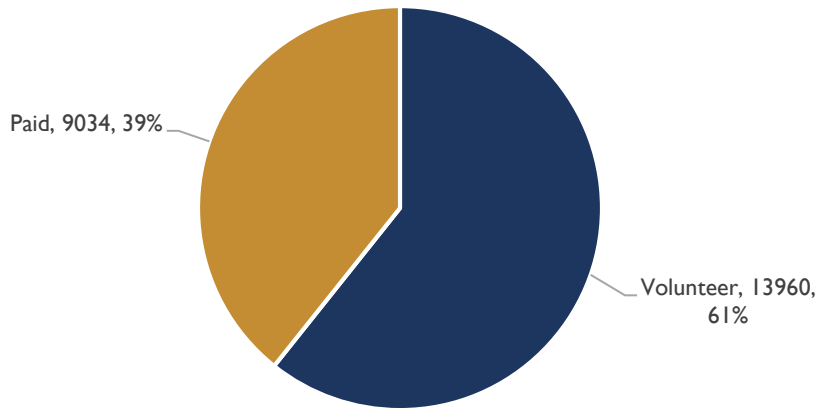


Figure 13: Rostered positions by employment type, paid vs volunteer

In Iowa, EMS providers may qualify to have endorsements attached to their certification. These endorsements include the EMS Evaluator, the EMS Instructor, and the Critical Care Paramedic. The EMS Evaluator allows the provider to serve as a certified candidate evaluator for the psychomotor exam. The EMS Instructor grants the provider the ability to function as the primary instructor of an initial education course up to their individual level of certification. The Critical Care Paramedic is available only to paramedics completing a recognized critical care program. This endorsement authorizes the paramedic to function under an expanded scope of practice.

The number of endorsements held by providers in Iowa has remained relatively level over the last three years. One interesting area of note, however, is that the number of providers holding the EMS Instructor endorsement has gradually increased over the last three years. In 2020, the revision to the Iowa Administrative Code removed the requirement that instructors attend a Bureau-sponsored instructor update workshop during their certification period. This may have prevented the attrition of instructors due to an inability to attend the annual update workshop.

For many years, there has been a concern that initial training courses were not available, especially in the rural areas of the state. This increase in the number of authorized EMS Instructors may create an opportunity to provide more initial training courses.

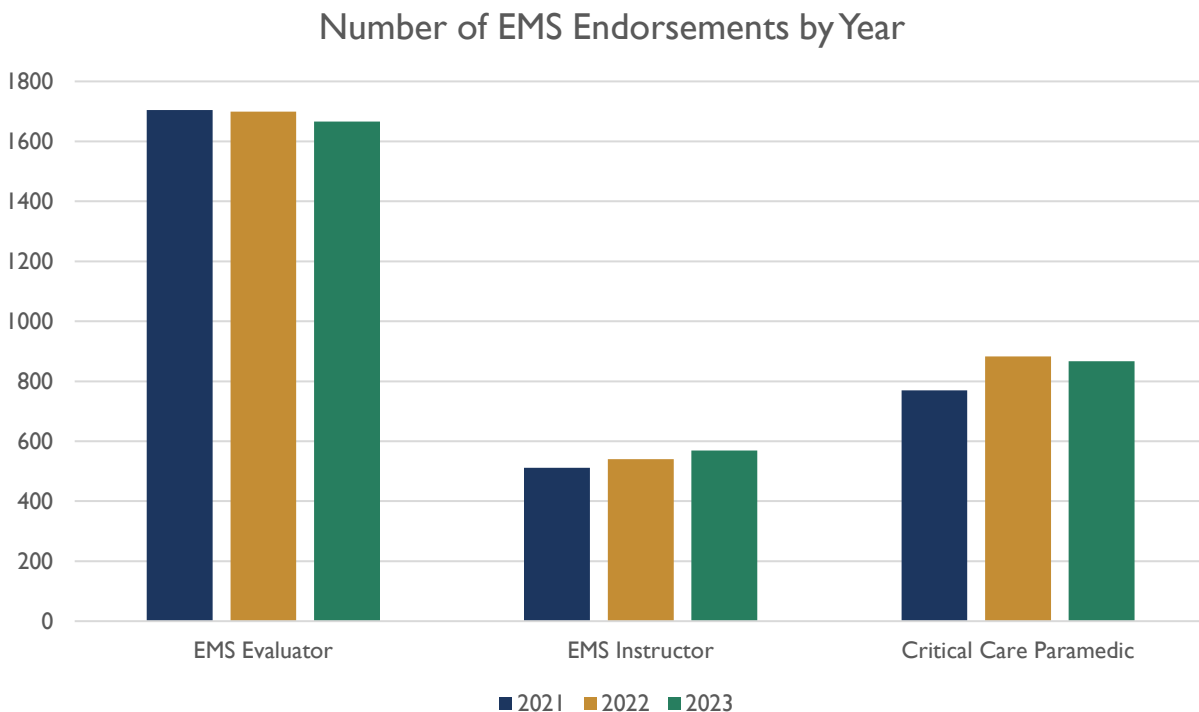


Figure 14: Number of active EMS endorsements by year, 2021-2023

## EMS Testing

Iowa, along with the vast majority of states, utilizes the National Registry of Emergency Medical Technicians (NREMT) testing process as the certification exam to obtain an Iowa EMS certification. This is a requirement of participation in the national EMS Personnel Licensure Interstate Compact. One part of this testing is a computer-based cognitive test. Candidates have two years from the completion of their course to pass their NREMT exam, during which time they are allowed six attempts at the exam. The first attempt passing rates for Iowa EMS candidates are shown below, separated by certification level attempted for each of the last three years.

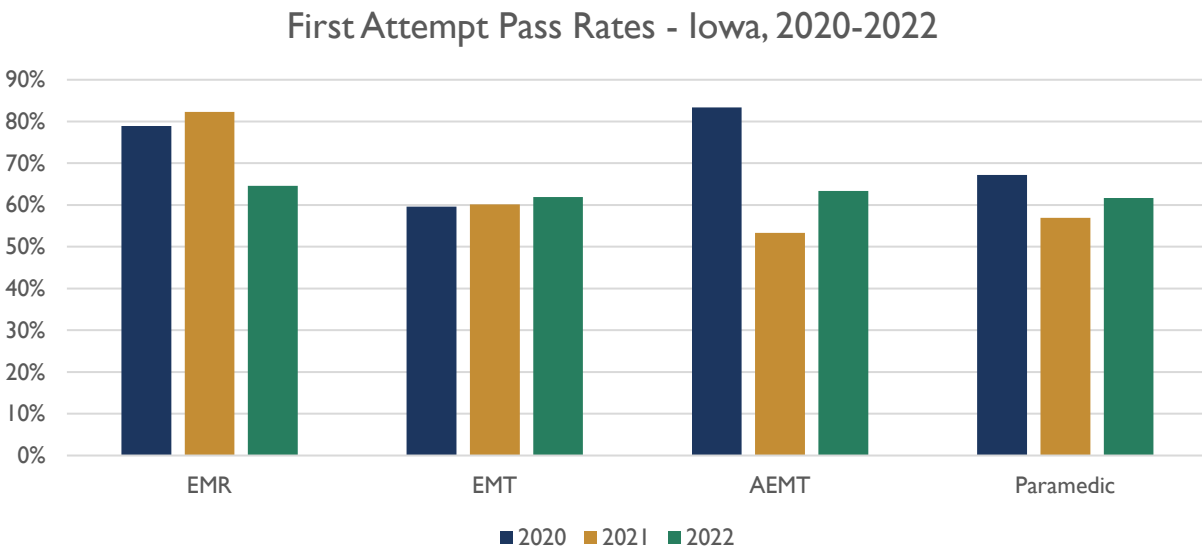


Figure 15: EMS candidate first attempt pass rates, NREMT cognitive exam, 2020-2022

The EMR and AEMT programs account for only a small number of students each year, so the passing rate can be dramatically shifted based on the results of a very small number of students. The EMT programs make up the greatest number of students and are therefore perhaps the best indication of any trends in the educational success of students. The chart above shows a gradual increase in the first-attempt passing rates for the EMT candidates in Iowa, which may be an indication that the students completing the coursework are entering the examination better prepared and more capable of succeeding. Overall, the first-attempt passing rate for candidates at all levels for the three years shown varied by only 1% from year to year, ranging from 61% to 62%.

Iowa's first-attempt pass rates were higher than the national average at the EMR and AEMT levels but lagged behind the national average at the EMT and paramedic levels. Iowa's overall first-attempt pass rate of 62% for all levels is somewhat lower than the national average of 68%.

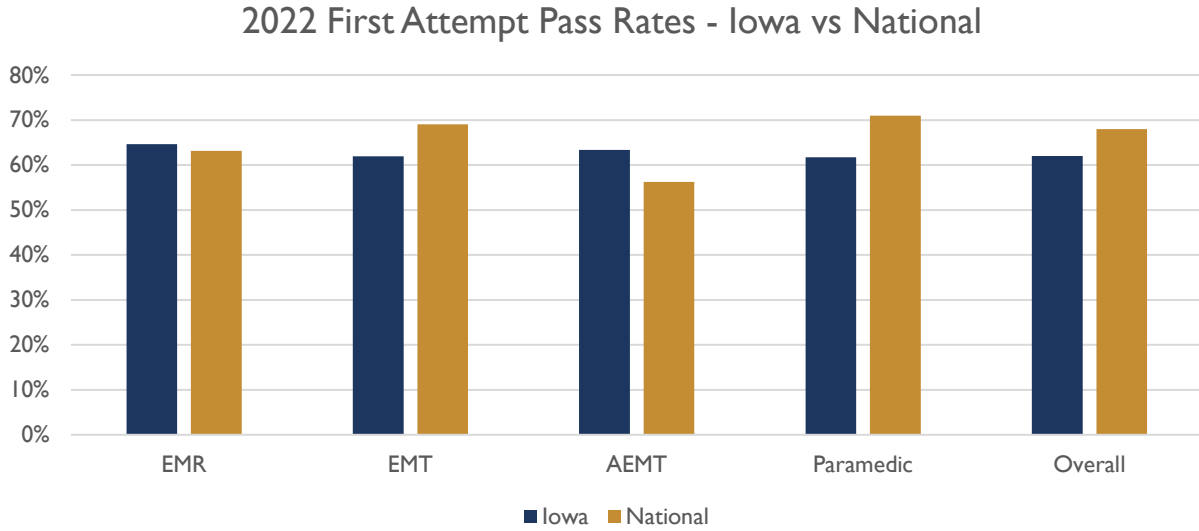


Figure 16: EMS candidate first attempt pass rates, Iowa vs national, 2022



A review of subsequent attempts shows that a significant number of candidates successfully pass the exam after an unsuccessful first attempt.

### 2022 Course Completion, EMR & EMT Testing

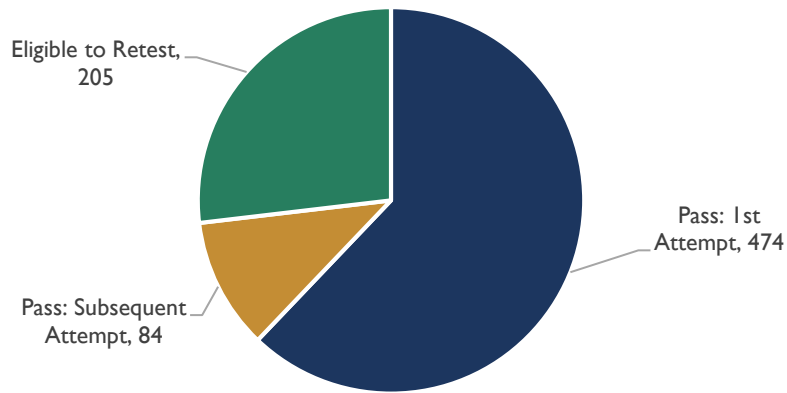


Figure 17: Testing results for EMR & EMT courses completed in 2022

### 2022 Course Completion, AEMT & Paramedic Testing

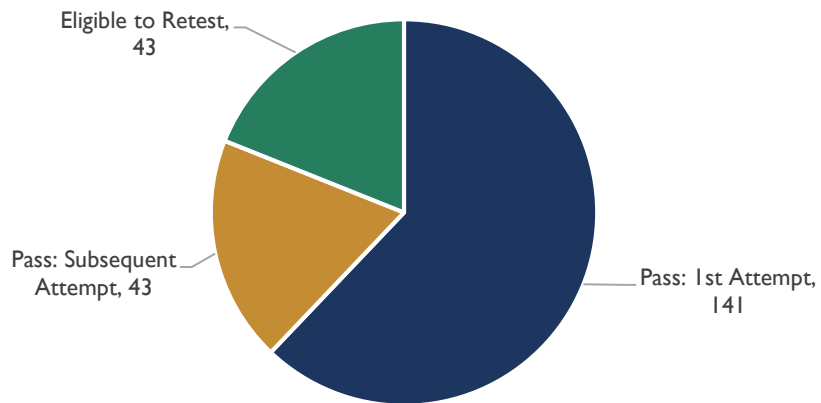


Figure 18: Testing results for AEMT & paramedic courses completed in 2022

For courses ending in 2020, the two-year time limit to complete testing expired in 2022. The chart below shows the final disposition of candidates across all levels who completed their initial courses in 2020.

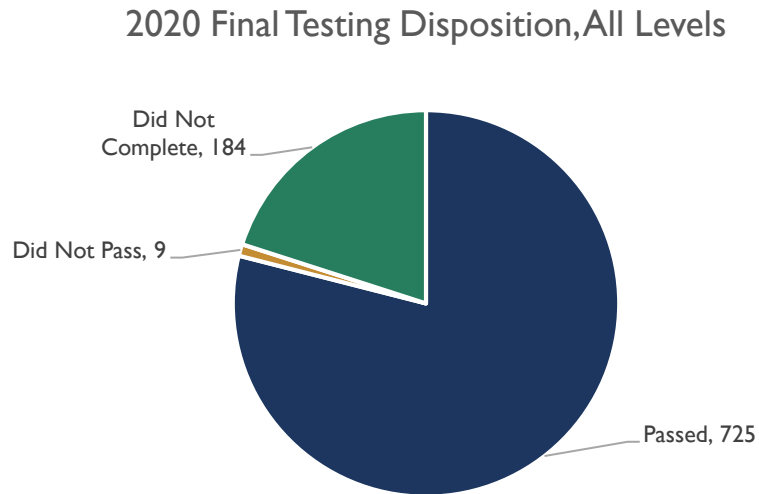


Figure 19: Final testing disposition for courses completed in 2020, all levels

## EMS Service Programs

The number of authorized EMS service programs in Iowa remained stable in the last year. At the start of 2023, there were a total of 731 authorized services in Iowa, reflecting a decrease of only three services from the previous year. These services provided EMS responses from a total of 897 service locations around the state, a decrease of only one location from the previous year. Some service locations that had been independent services in the past merged with other services to become part of one unified agency with the same number of service locations. The charts below show the breakdown of the levels of authorization for the services in Iowa and the type of transport service provided by the location.

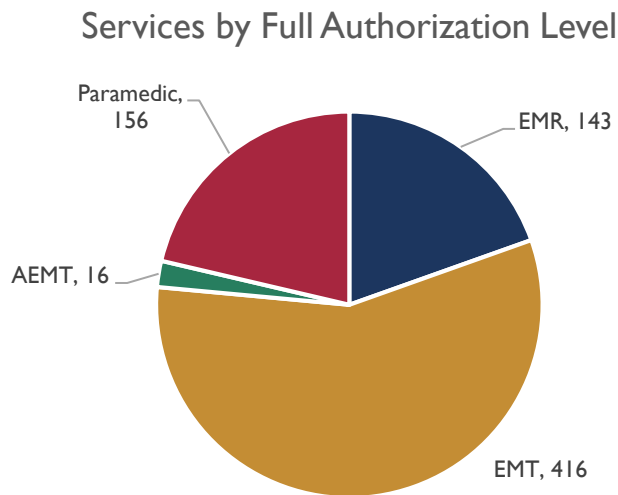


Figure 20: EMS services by authorization level

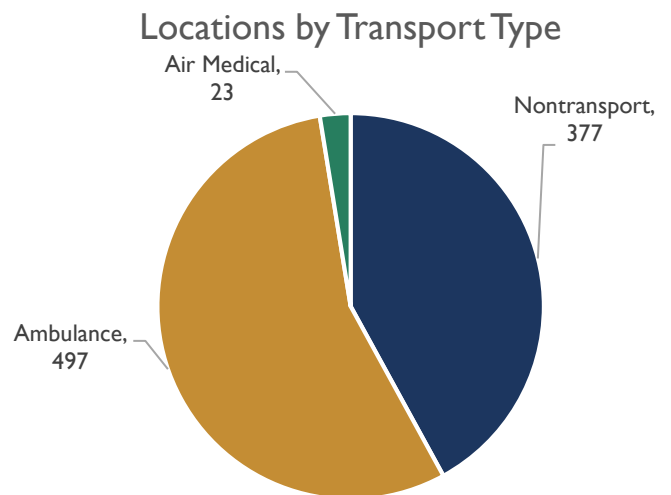


Figure 21: EMS services by transport type

## Incident Data Reporting

All authorized EMS service programs in Iowa are required to submit data elements to the state's EMS data registry. BEMTS is actively working to improve compliance with the data requirement, with a plan to achieve 100% compliance this year. Over the last five years, there has been a steady increase in the number of EMS service programs submitting data. The annual compliance rate for 2022 was 96%.

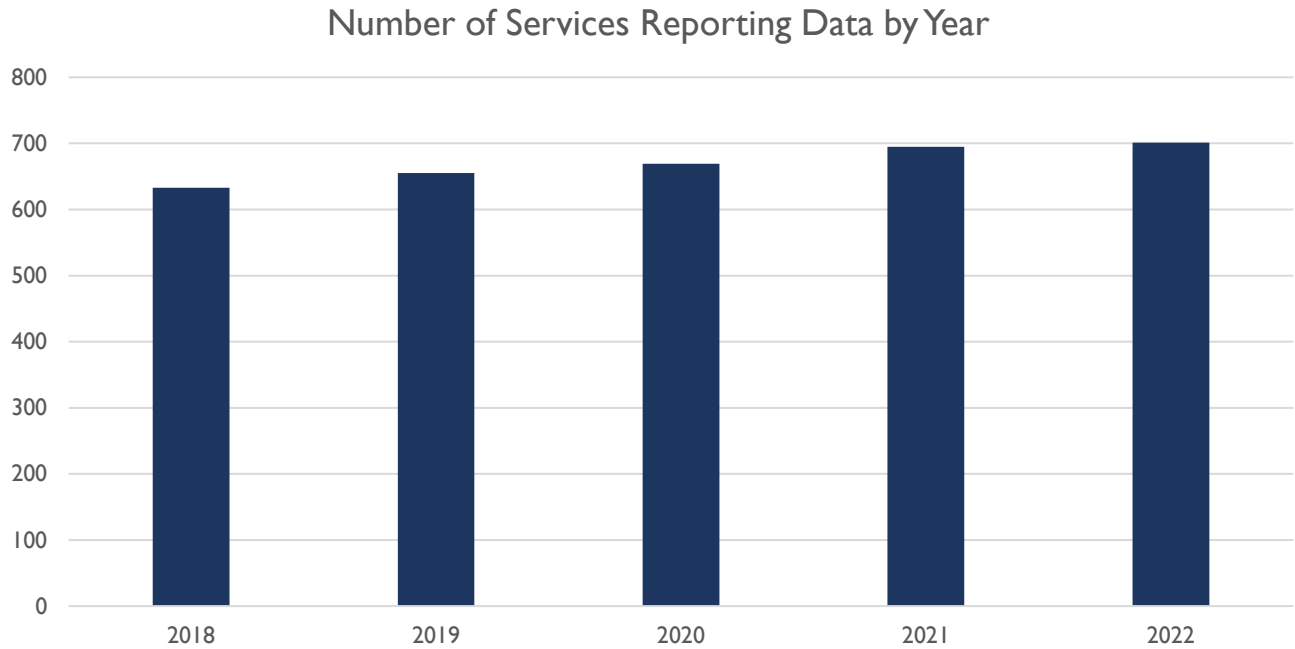


Figure 22: Number of services submitting data to state EMS incident registry, 2018-2022

The number of incidents for which a data report was submitted has also steadily increased, except for the calendar year 2020, which saw a slight decline. This decline mirrors anecdotal reports from EMS services indicating that in the early months of the COVID-19 pandemic, EMS call volumes decreased.

The increase in data submissions is not proportionate to the increase in the number of services submitting data, which suggests that services overall are experiencing an increase in call volume.

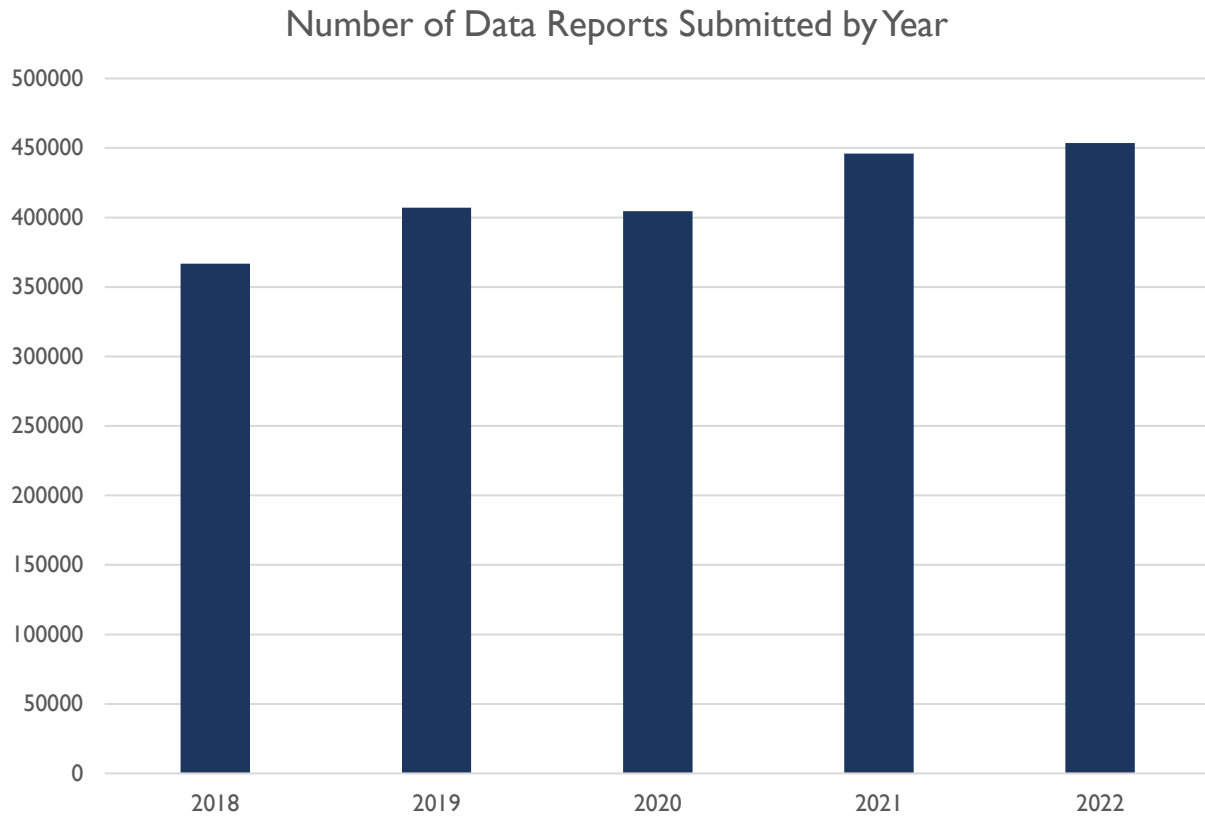


Figure 23: Incident data reports submitted to state EMS incident registry, 2018-2022

A review of the average number of data submissions per service supports this as well. The volume of data submissions has increased over the last five years, with the same exception for the calendar year 2020.

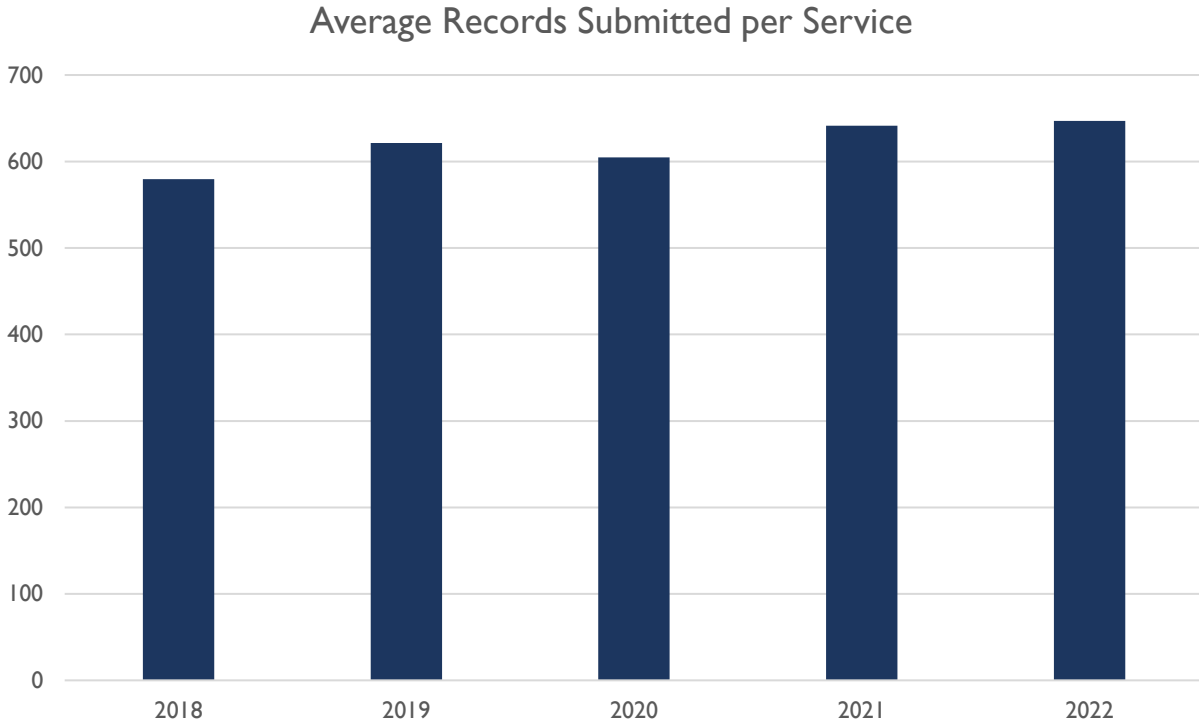


Figure 24: Average number of records submitted to EMS incident data registry, 2018-2022

A deeper analysis of the data shows that 54% of services reported responding to 100 or fewer calls for service, and 79% responding to 500 or fewer.

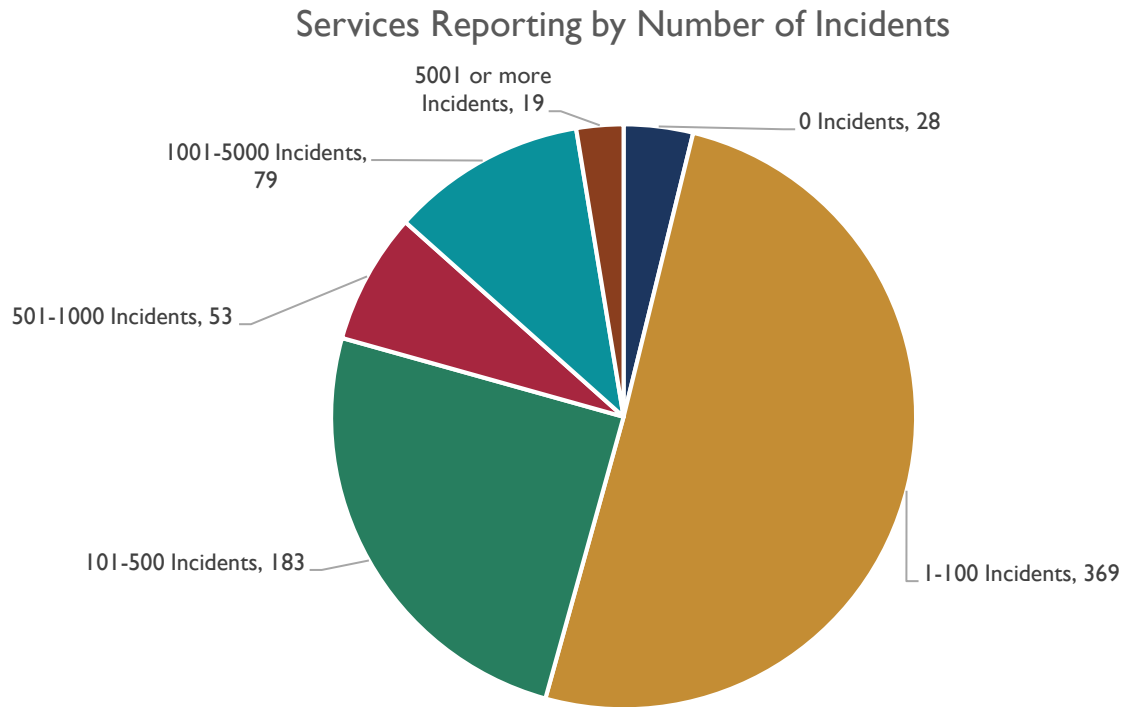


Figure 25: Services Reporting by Number of Incidents Reported

The table below shows the number of incidents submitted by the type of service requested.

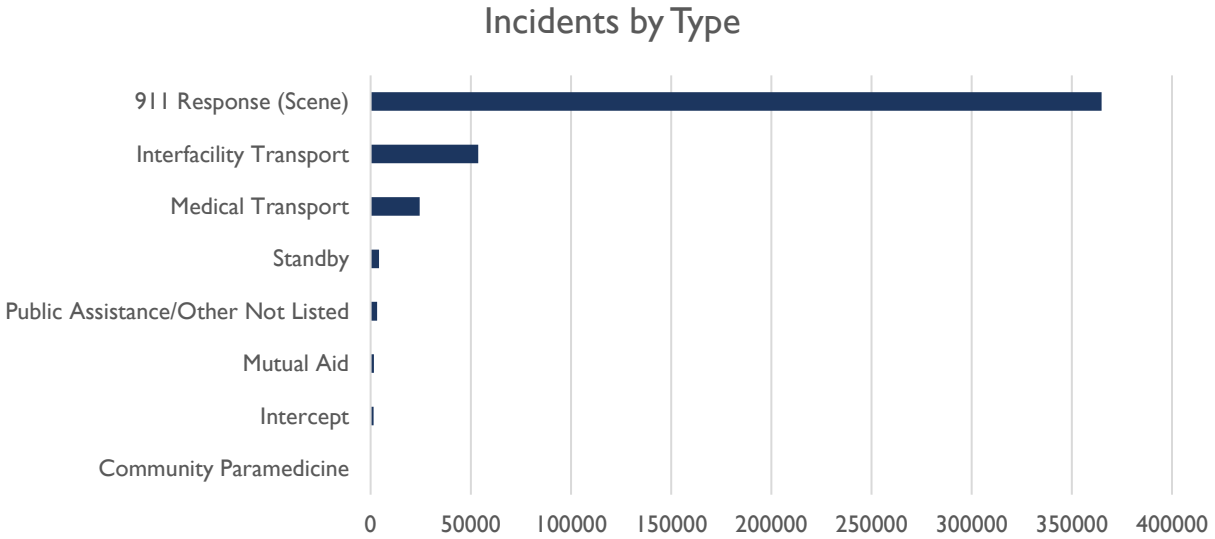


Figure 26: Incidents by type of service requested

In 2023, the State of Iowa will be switching to a new data dictionary for data collection to meet the National EMS Information Systems (NEMSIS) version 3.5 standards. The new standards will utilize a revised list of options for the type of service requested field, which will better define the type of incident being reported. The new standard will differentiate between types of 911 responses, to indicate whether the response was in the service’s primary response area, if it was a mutual aid call to another service’s primary response area, or an intercept to provide advanced care to a patient being transported by another service. The standard will also provide more options for interfacility transfers and will differentiate between hospital-to-hospital, non-hospital facility to the hospital, hospital to non-hospital facility, and non-hospital facility to non-hospital facility transfers. This expanded list of options will allow agencies to clearly define data sets for review and analysis in the future.



The [Iowa EMS System Standards](#) document establishes a minimum response time for the initial EMS crew to arrive on the scene. This response time is defined as the time elapsed between the moment the public safety answering point (PSAP) dispatches the EMS crew and the time the EMS crew arrives on the scene. The standard has defined response time as not exceeding 5 minutes in urban areas and not exceeding 15 minutes in rural areas.

In calendar year 2022, across all services both rural and urban, the average response time was 7.72 minutes. The chart below shows the distribution of response times.

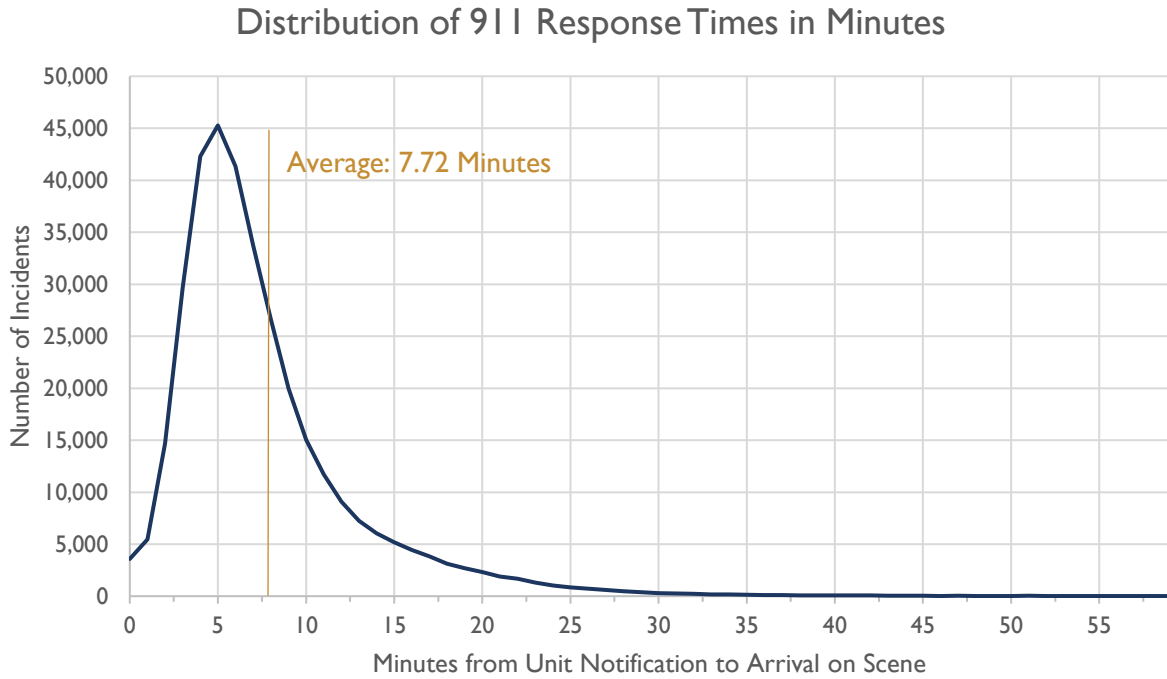


Figure 27: 911 response time distribution

EMS is requested for a wide variety of reasons. The twelve most common 911 dispatch reasons from 2022 are listed below. These are the complaints received by the PSAPs and relayed to the EMS services in the initial dispatching information.

### Top 12 Dispatch Complaints, 911 Calls

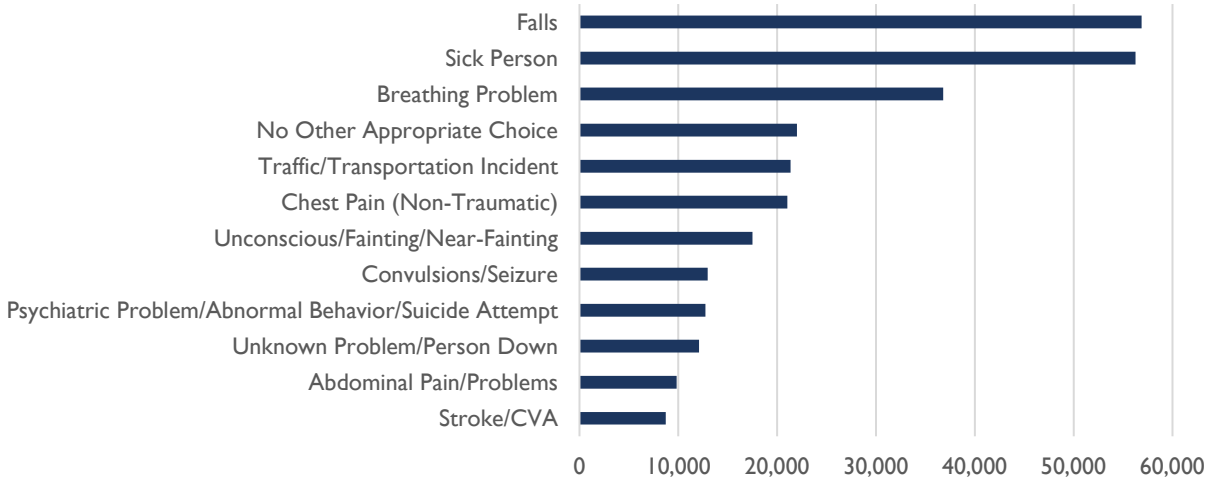


Figure 28: Top 12 dispatch complaints, 911 calls

With the adoption of the NEMSIS version 3.5 standards, the dispatch complaints reported will also have a new listing of options for the field that may better define the reason for the response and will lead to better data collection in the future.

The Provider's Primary Impression is the most significant condition identified by the EMS provider following the assessment of the patient, leading to the medical management given to the patient in the form of medications, treatments, or procedures. The tables below list the twelve most common primary impressions for 911 calls and interfacility transfers (IFTs).

### Top 12 Provider Primary Impressions, 911 Calls

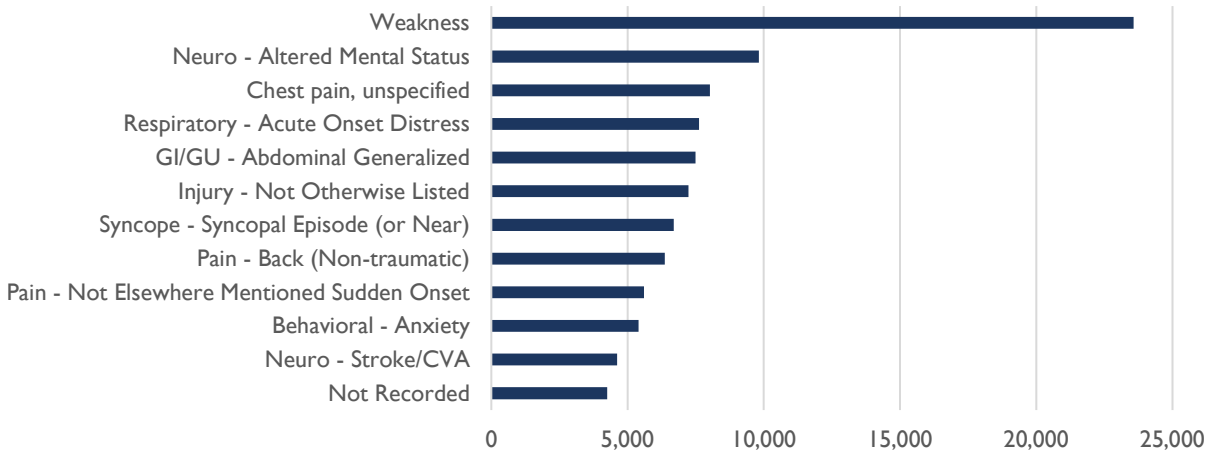


Figure 29: Top 12 provider primary impressions, 911 calls

### Top 12 Provider Primary Impressions, IFT Calls

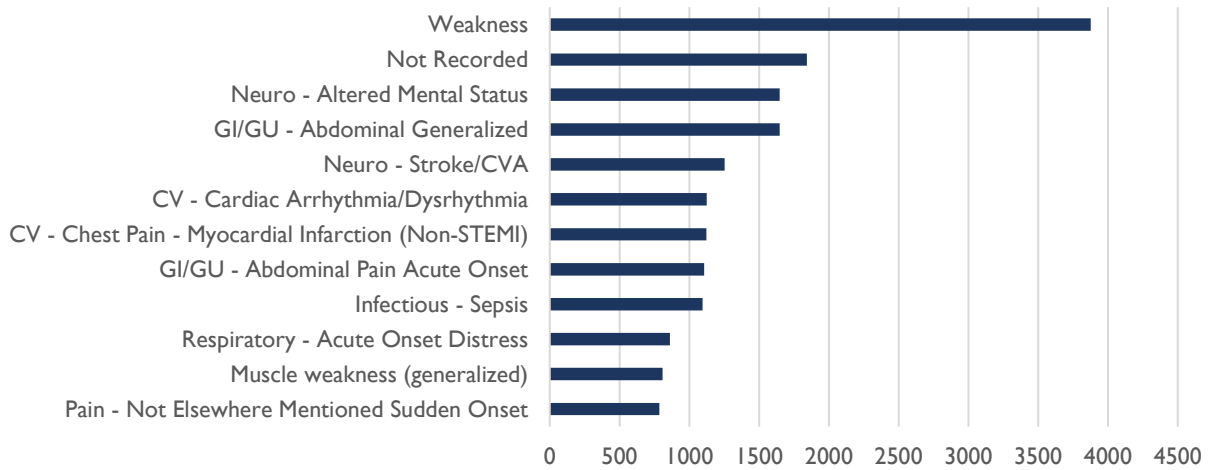


Figure 30: Top 12 provider primary impressions, IFT calls

The primary impression field will also be updated with a list of available values that are better suited to EMS with the migration to the NEMESIS version 3.5 standards.

The average age of an EMS patient in Iowa in 2022 was 59 years of age. EMS service programs are encouraged to undertake a review of local response patient demographics to understand the population served and to guide local training plans. Emphasis for training should focus on low volume, high-risk patient scenarios including specialty populations such as pediatrics, geriatrics and people with special healthcare needs.

The distribution below shows that as people reach their late teen and early adult years, the frequency with which EMS services are requested increases, leveling off at approximately age 20, then showing a sharp increase again at age 50. This trend reverses at around age 76.

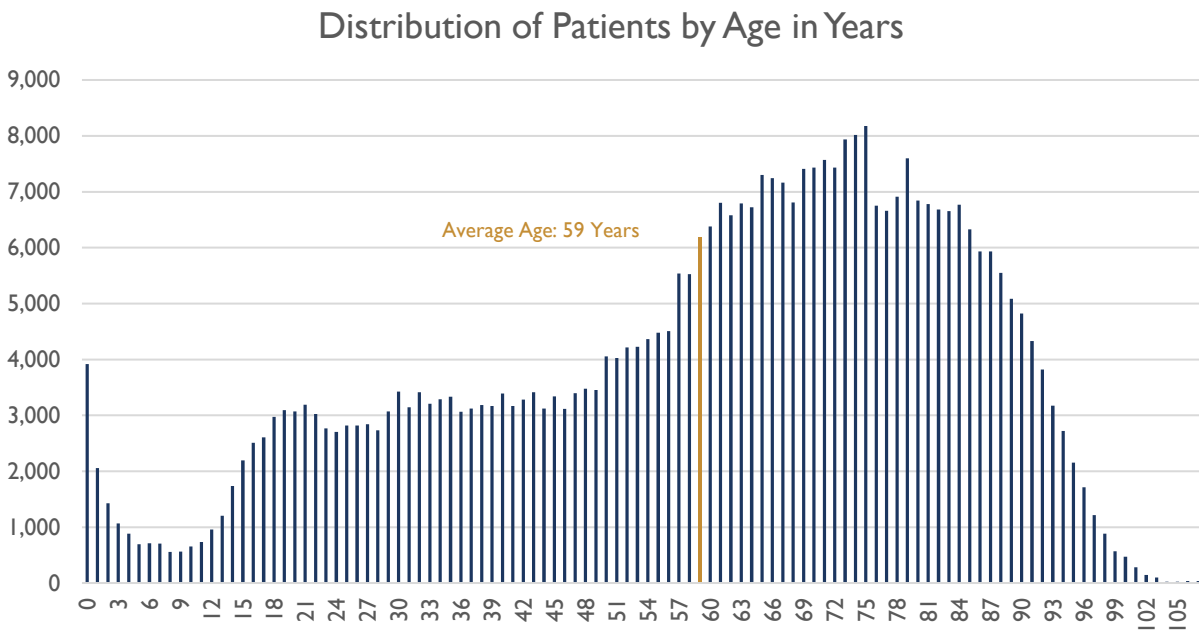


Figure 31: Distribution of patients by age

## Data Sources

Iowa EMS Registry: This registry contains data elements from EMS run reports for all Iowa-authorized EMS agencies. Data was obtained from this registry at <https://iowa.imagetrendelite.com/elite/organizationiowa/>.

AMANDA Registry: This registry contains all information regarding Iowa-certified individual EMS providers as well as Iowa-authorized EMS services. Data from this registry was used to compile information regarding EMS providers and services.

National Registry of Emergency Medical Technicians (NREMT): Data obtained from the NREMT was used to compile passing rates for Iowa EMS candidates and compare Iowa testing data to national testing data.