SOUTH DAKOTA'S REGIONAL SERVICES DESIGNATION AMBULANCE SYSTEM STUDY

The following Regional Service Designation assessment is aimed to identify current challenges facing Emergency Medical Services (EMS) in South Dakota while ensuring all South Dakotans - regardless of where they live - receive high-quality healthcare in a timely and efficient manner.

Developed in Partnership by Healthcare Strategists, Inc.
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EXECUTIVE SUMMARY

The landscape of emergency medical services (EMS) has changed dramatically over the past several decades, requiring higher levels of training and the use of sophisticated equipment to aid in patient care and treatment. Despite these advancements, rural and frontier EMS agencies in South Dakota remain largely volunteer based, with a forecasted decline in volunteer levels over the next 5-10 years. EMS in South Dakota faces the same or similar daunting challenges of other rural providers across the country, exacerbated by changing workforce demographics, a struggling economy, and diminishing reimbursement. Regional Service Designation (RSD) provides a qualitative and quantitative analysis of the state of EMS across the state with the goal of ensuring long-term sustainability for the industry.

The South Dakota Department of Health partnered with Healthcare Strategists to complete a comprehensive analysis of the current state of EMS. The report was generated through a compilation of over 400 stakeholder interviews in 8 months and a comprehensive review of historical performance data and surveys. EMS stakeholders participated at meetings within each ambulance district, during the annual conferences for the South Dakota Ambulance Association, the statewide trauma conference, and EMS Association, remote interviews, and 7 virtual listening sessions.

The State of South Dakota's desire to improve and sustain services across the state is a worthy goal, but it will most likely mean providing costly, long-term solutions to problems that have worsened over decades due to the large volunteer workforce and system funding. The state's willingness to provide $7.5 million dollars for future grant funding provides a starting point for improvement, but there must be a focus for programs that plant the seed of long-term sustainability.

The goal of understanding the current ambulance system and identifying the strengths and improvement opportunities was essential in this report and through the gathering of recommendations. The state's objective is an ambulance response time of 30 minutes or less to any resident or visitor who calls 9-1-1. It is clear that the ambulance providers are passionate about serving their communities. The commitment is strong and evident in the personal sacrifices being made to ensure their friends, families, and neighbors have an ambulance available should they call 9-1-1.

The South Dakota Department of Health shows a similar determination to support the needs of ambulance services across the state. Many improvements and best practices have been implemented, increasing the availability and quality of the patient care provided in the pre-hospital environment. The recent purchase of LIFEPAK 15 monitor/defibrillators and Telemedicine in Motion hardware installations available to all ambulance services runs complimentary to this report. Never before has the team of Healthcare Strategists seen another state like South Dakota financially "step up" to this level – the Governor, the department's executive leadership, and the State Legislature need to be commended for their actions.

Key Findings

The interviews and data analysis provided a wealth of information on the status of ambulance providers in South Dakota. The findings and recommendations are summarized in the table below. Additional information is provided in the Best Practices section.

NOTE: *Each recommendation has a designated time period starting with short-term (less than 24 months), medium-term (24-48 months), and long-term (greater than 48 months). The terms are based on the complexity and number of stakeholders necessary for implementation. They are estimates that will need further review before establishing related action items.*

Recruitment and retention are the greatest challenges facing ambulance availability in South Dakota. Most ambulance services described their staff as paid, but are essentially volunteer with a very modest reimbursement rate for each call completed or for the time on a call. These volunteers have full-time jobs outside of their EMS role (unless they are retired). The lack of staff funding is driven by the low number of transports, and related revenue, per year to support career personnel. Increasing volunteerism and retaining the current staff are crucial.

Once recruited, there is significant trepidation about training and testing, specifically, the National Registry EMT (NREMT) testing for EMR, EMT, and paramedic. This causes fewer recruits to enroll in the necessary training or take the NREMT test; the result is a loss of volunteers to staff ambulances. Assisting instructors with NREMT test preparation is vital to address this roadblock to more EMS providers.

The use of a single patient care reporting software, i.e., ImageTrend, statewide is a monumental improvement. Now, there is an opportunity to use that data to understand the EMS system and patient care provided. The ImageTrend data can support training initiatives, new programs, clinical benchmarks, rate of bystander CPR, and other steps to provide highest quality care to the residents and visitors of South Dakota.

Best Practices

- Flexible state staffing requirements (i.e., not requiring the driver to be an EMT) to ensure an ambulance will respond
- Telemedicine in Motion bringing hospital practitioners to the ambulance patient through video chat
- Upgrade of all ambulance heart monitors/defibrillators (approximately 308)
- Statewide electronic pre-hospital patient care reporting system (i.e., ImageTrend) at no cost to providers to capture EMS data that will drive system design, improvements, and clinical education
- Remote emergency medical technician (EMT) training increases the number of EMTs available to volunteer
- Low and no-cost EMT training through grants and other programs increases the volunteer workforce
- State allows ambulance services to teach emergency medical responder (EMR) and EMT internally, increasing the number of trained staff

Findings	Recommendations	Term
Response Times		
Southwestern region not meeting 30-minute response time standard	Meet with neighboring agencies to analyze possible solutions; potential options include a satellite station of an existing provider, recruiting a new community ambulance service, or determining a 30-minute standard as unrealistic for this area	Short
Workforce Staffing, Recruitment, and Retention		
Communities unaware of the need	Attend all types of community organization meetings to educate and recruit	Short
Major employers unaware of the need	Encourage ambulance services to approach local businesses to recruit new members	Short
Fire departments are primarily uninvolved in EMS	Request fire departments respond to only life-threatening calls (e.g., cardiac arrests)	Short
Air resources underused	Consider auto-launch protocols for EMS helicopters, balance acuity with loss of ground ambulance to a region in policy development	Short
Minimal state on-site interaction	Conduct on-site visits with each ambulance service a minimum of once every two years.	Short
Inter-Facility Transports are delayed	When local ambulance service is unavailable, allow neighboring ambulance services to complete transfers of patients between hospitals	Med.
Lack of formal recruitment drives	Develop formal processes; consider full-time coordinators to service a county, region, or district; fund through local government and grants	Med.
The community is untrained	Consider legislation to incorporate CPR and Stop-the-Bleed campaigns for all middle and high schools	Med.
No credit incentives for students to learn EMS	Offer college-level science credits for high school students who complete EMR and EMT training. Encourage students to get experience with local ambulance services.	Med.
Lack of awareness for EMS volunteer and career needs	Create an awareness campaign to promote the EMS opportunities, both volunteer and career, to increase EMS personnel	Med.

Findings	Recommendations	Term
Overall lack of volunteering	Establish volunteer service project requirements in schools to instill community engagement	Long
Equipment and Supply Acquisition		
Older volunteers cannot lift gurneys	Promote and raise awareness of grant opportunities for auto-loading gurneys to extend the "working" tenure of ambulance volunteers	Short
Patients are transported unnecessarily	Enhance the current telemedicine project to treat and refer patients; increase ambulance availability; reduce hospital overload; reduce healthcare costs; improve patient satisfaction	Long
Quality Control Metrics		
Lack of statewide metrics	Establish 5 top-quality metrics to monitor patient care	Short
Lack of continuous quality improvement	Implement continuous quality improvement processes for patient care reports to track statewide care weaknesses and opportunities for future trainings	Short
Lack of statewide metrics	Establish 5 new (10 total) top-quality metrics to monitor patient	Med.
Not all dispatch centers use EMD	Train all dispatchers to provide EMD assessment and instructions	Med.
Lack of statewide metrics	Establish 10 new (20 total) top-quality metrics to monitor patient	Long
Training and Education		
Undertrained staff	Review policies at EMR, EMT, and AEMT levels with medical direction to determine alternative solutions to treat more life-threatening situations	Med.
Students are not passing NREMT	Recommend instructors participate with local education organizations and outside subject matter experts to support instruction on techniques helpful to improve pass rates for the NREMT tests	Med.
Taking too long to get a license	Continue existing steps and efforts that are improving wait times for providers to get licensed	Short
Minimal community preparedness	Develop community training for hands-only CPR, stop-the-bleed, Meet Your Neighbor, Community Emergency Response Team (CERT), etc.	Med.
Effective Billing Practices and Accountabilities		
Lack of report writing skills	Develop a quality education process to improve data reporting and use of ImageTrend software to increase the quality of the data input	Short

Findings	Recommendations	Term
Local EMS Medical Director's Education, Ongoing Networking Opportunities, and Medical Direction		
Lack of EMS medical director coordination	Establish a statewide working group or committee of EMS medical directors	Short
Lack of standardized scope of practice	Create a statewide scope of practice subcommittee to make recommendations on pre-hospital capabilities	Short
Regionalization Strategies		
Lack of volunteers	Consider a county, region, or district coordinator for the recruitment and retention of volunteers	Med.

INTRODUCTION

THE STATE OF SOUTH DAKOTA IDENTIFIED THE NEED TO ENSURE EFFECTIVE AMBULANCE SERVICE AND ESTABLISHED A GOAL OF A RESPONSE TIME OF 30 MINUTES STATEWIDE. THE LEGISLATURE PASSED FUNDING TO SUPPORT AN EMS CONSULTING FIRM TO REVIEW AVAILABLE DATA AND MEET WITH THE EMS STAKEHOLDERS, AS WELL AS GRANT FUNDING TO SUPPORT IMPROVEMENTS. HEALTHCARE STRATEGISTS WAS ENGAGED IN 2023 TO MEET THESE NEEDS. THE CONSULTING TEAM FROM HEALTHCARE STRATEGISTS COMPRISES EMS EXPERTS WITH NO LESS THAN 35 YEARS OF EXPERIENCE EACH. THEY MET WITH OVER 400 EMS STAKEHOLDERS FROM RAPID CITY TO SIOUX FALLS AND MOBRIDGE TO YANKTON (SEE ADDENDA 1 AND 2). ALL PROVIDERS WERE VERY OPEN AND ENGAGING IN SHARING THEIR AGENCIES' DEMOGRAPHICS, STRENGTHS, AND OPPORTUNITIES FOR IMPROVEMENT.

CURRENT STATE OF THE AMBULANCE SYSTEM

Population Density Analysis

South Dakota receives ground ambulance services from 122 public, private, and community-based providers. There are mutual aid agencies along the state borders that support ambulance needs as requested. Figure 1 demonstrates the current coverage map for the state using a 30-minute station radius. The darker sections of the state map indicate the denser population areas. As expected, the greatest concentration of ambulances is near the population centers. The northwest and central regions (i.e., Districts 5, 6,
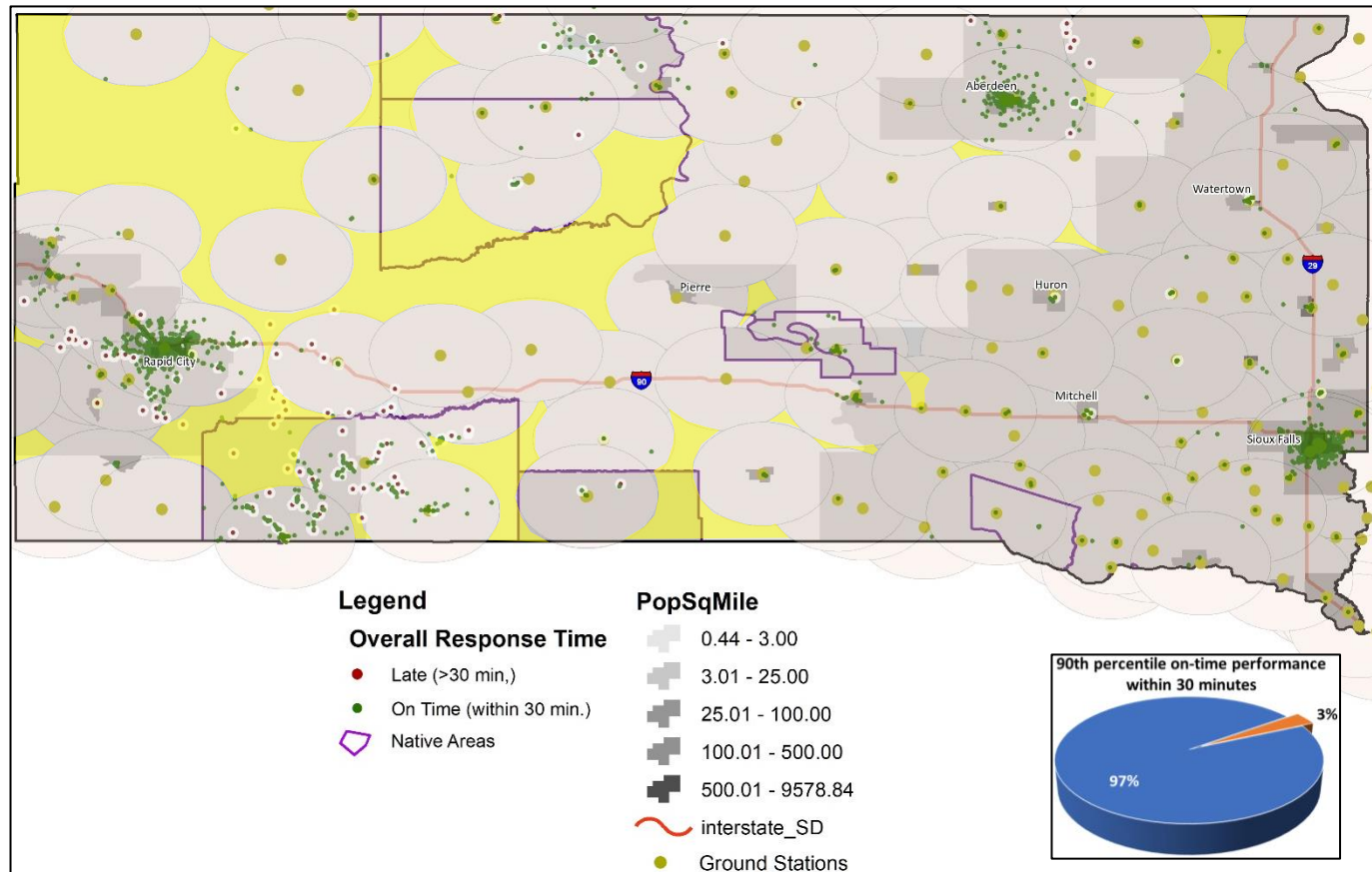
Figure 1: Population Density with Response Radius

& 7) have the largest uncovered service area (highlighted in yellow). It should be noted that the majority of "late" responses (i.e., red dots) greater than 30 minutes from a station occurred southeast of Rapid City. Additional planning with surrounding agencies may be warranted. Looking at on-time performance, 118 (97%) agencies are achieving 30 minutes or faster 90% of the time (Figure 1).

Response vs. Enroute Times

Response times are useful when looking at service performance at many levels, typically suburban and urban population densities. The lower call volume in rural and remote regions (i.e., those with lower people per square mile) does not financially support paid staff and shorter ambulance response times. Due to the expansive geography and low population density
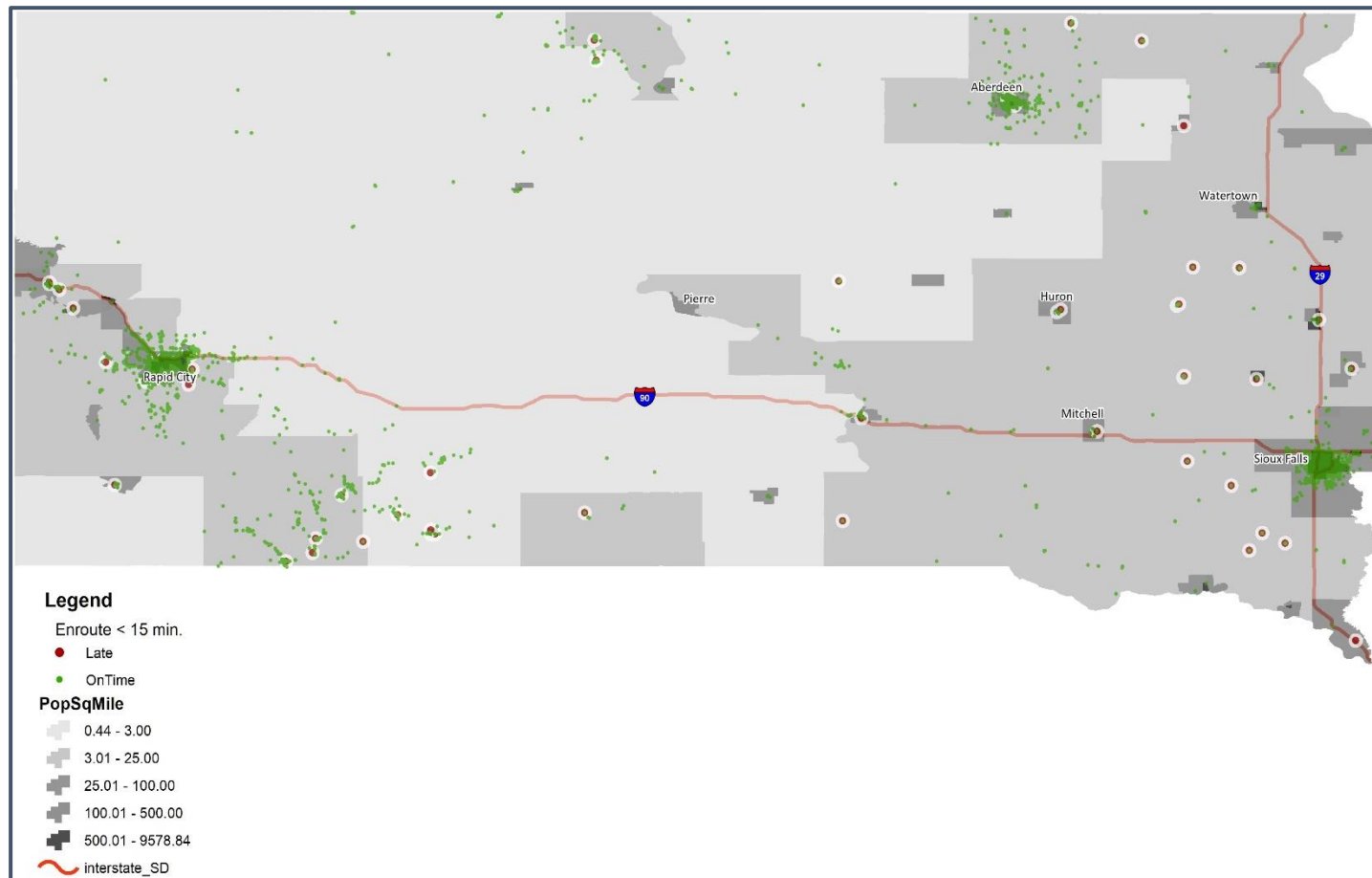
Figure 2: Population Density with Enroute Performance

in many communities, it may be more appropriate to utilize enroute times to measure the operational effectiveness. Figure 2 provides call volume utilizing on-time versus late, using a standard of no more than 15 minutes to begin responding. It is worth noting that call volume density does not correspond perfectly to population density. Nor are any of those extended enroute times in the regions without an ambulance within 30 minutes as shown in Figure 1. Some ambulance systems no longer utilize population density when calculating performance.

Historical Call Volumes by Type

9-1-1 responses have increased consistently each year; since 2018, call volume is up by 52%. With half of 2023 data available for 9-1-1 responses, it appears to be close to or slightly under 2022 call volume. See Figure 3.

Inter-facility transport (IFT) volume saw a similar increase from 2018 through 2021 at 40%; however, the volume dropped by 28% from 2021 to 2022. It is unclear what precipitated the decline in the last year.

Flight team transport data did not appear until late 2021, which may indicate this call type was not an option in the patient care reporting (PCR) software until this time.

Paramedic units "intercepting" EMT units to increase the level of care have been steady at roughly 300-350 incidents per year. Mutual aid responses range between 144 and 223 annually; this volume seems low for a state with 77,000 to 111,000 ambulance responses yearly. "Other" call type includes standbys, public relations events, public assistance, and welfare checks.

Historical Call Volumes by Type

Call Type	2018	2019	2020	2021	2022	2023	Total	
911 Response (Scene)	55,536	71,265	74,961	78,931	84,532	39,962	**405,187**	**73.4%**
Inter-Facility Transport	19,473	24,237	25,741	27,224	19,624	9,840	**126,139**	**22.9%**
Flight Team Transport				449	4,179	2,111	**6,739**	**1.2%**
Intercept	284	301	317	310	350	158	**1,720**	**0.3%**
Mutual Aid	157	187	184	144	223	94	**989**	**0.2%**
Other	2,011	1,980	1,721	2,046	2,412	1,041	**11,211**	**2.0%**
Total	**77,461**	**97,970**	**102,924**	**109,104**	**111,320**	**53,206**	**551,985**	**100.0%**

Source: ImageTrend, 2023 includes Jan-Jun

Figure 3: Historical Call Volumes by Type

Cancelled Calls

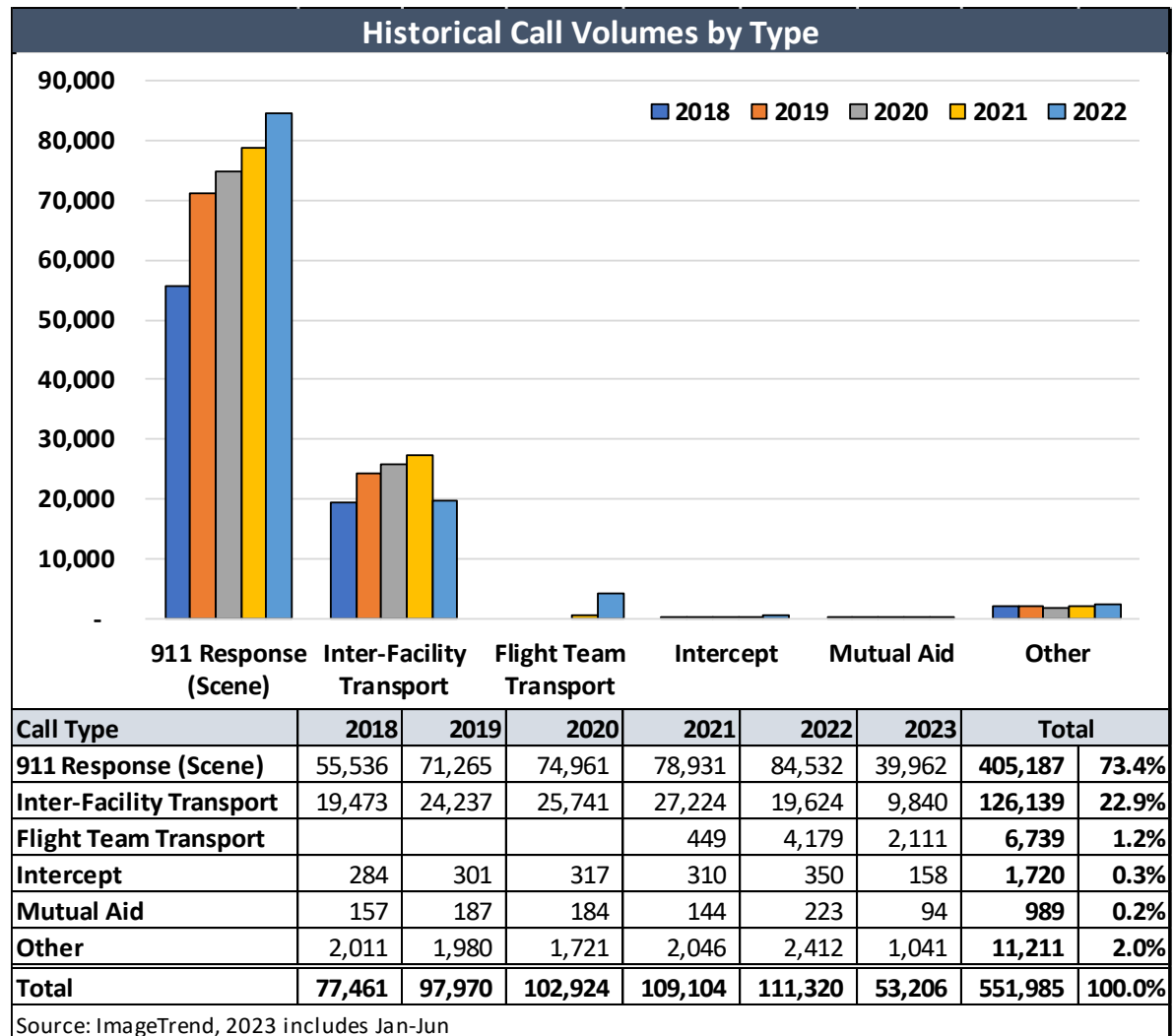The Unit Disposition field has only been tracked by PCR since 2022. Figure 4 identifies the canceled/dry-run rate is currently 30.1%. This percentage is within the typical range for ambulance systems.

Mutual Aid

Since 2018, roughly 1.7% of the 9-1-1 responses have been mutual aid responses to another community. The agencies receiving and giving the most and least mutual aid based on percentage of calls are profiled in Figure 5. Those receiving help more often may be in jeopardy of closing. Agencies needing the least mutual aid may offer best practices for others to consider adopting.

Call Disposition				
	2022	2023	Total	
Cancelled/No Patient Contact	850	2,762	3,612	2.9%
Patient Contact/No Transport	5,846	27,993	33,839	27.2%
Patient Transported	77,836	9,207	87,043	69.9%
Total	84,532	39,962	124,494	100.0%
Source: ImageTrend, 2023 includes Jan-Jun				

Figure 4: Call Disposition

Mutual Aid Received- Top 20		Mutual Aid Received- Bottom 20		Mutual Aid Given - Top 20		Mutual Aid Given - Bottom 20	
#	Ambulance Agency	#	Ambulance Agency	#	Ambulance Agency	#	Ambulance Agency
1	Frederick Fire and Rescue	104	North Sioux City Fire Rescue EMS	1	Sioux Falls Fire Rescue	104	Rosebud Sioux Tribal Ambulance
2	Jefferson Ambulance Service	105	Marshall County Ambulance Service	2	Lake Preston Volunteer Ambulance	105	Campbell County Ambulance Service
3	White Ambulance Service	106	Perkins County, dba Bison Ambulance	3	Hurley Ambulance Service	106	Jones County Ambulance Service
4	Elkton Community Ambulance	107	Kul Wicasa Oyate (Lower Brule)	4	Stickney EMS	107	Mitchell Fire & EMS
5	Faulk County Ambulance Service	108	Crow Creek Sioux Ambulance Service	5	Centerville Community Ambulance	108	Tripp County Ambulance Service
6	Viborg Ambulance Service	109	Hand County Ambulance Service	6	Midland Area EMS	109	Madison Regional Health System
7	Deuel County Ambulance Inc.	110	Paramedics Plus	7	Deuel County Ambulance Inc.	110	Bonesteel - Fairfax Ambulance
8	Tabor Community Ambulance	111	Med-Star Paramedic Ambulance, Inc.	8	White Lake Ambulance Service	111	American Medical Response
9	De Smet Emergency Rescue Unit	112	Lemmon EMT Association	9	Tyndall Ambulance Service	112	Miner County Ambulance Service
10	Stickney EMS	113	Pine Ridge Service IHS Ambulance	10	Med-Star Paramedic Ambulance, Inc.	113	Timber Lake Ambulance Service
11	Day County Ambulance Service	114	Mellette County Ambulance Service	11	Parker Volunteer Ambulance Service	114	Faith Ambulance Service
12	Wessington Ambulance Service	115	Rosebud Sioux Tribal Ambulance	12	Philip Ambulance Service	115	Huron Ambulance Service, Inc.
13	Marion Community Ambulance	116	Mobridge Regional Hosp. Ambulance	13	Plankinton Ambulance Association, Inc.	116	Marshall County Ambulance Service
14	Alcester Emergency Medical Service	117	Cheyenne River Unit IHS Ambulance	14	North Sioux City Fire Rescue EMS	117	Piedmont Fire & Ambulance Service
15	Gettysburg Ambulance Service	118	Grant-Roberts Ambulance Service	15	Avon Save-A-Life Ambulance Service	118	Kul Wicasa Oyate (Lower Brule)
16	Castlewood Ambulance District	119	D-n-D Inc., dba Aberdeen Ambulance	16	Keystone Ambulance Service, Inc.	119	Paramedics Plus
17	Hudson Ambulance Association	120	Douglas County Ambulance-Armour	17	Hoven Ambulance Service	120	Carthage Ambulance Service
18	Conde Ambulance Service	121	Harding County Ambulance Service	18	Sturgis Fire & Emergency Services	121	Frederick Fire and Rescue
19	McIntosh VFD-Ambulance Service	122	Sioux Falls Fire Rescue	19	Harding County Ambulance Service	122	Marion Community Ambulance
20	Bowdle Ambulance Service	123	Standing Rock Ambulance-McLaughlin	20	Viborg Ambulance Service	123	McIntosh VFD-Ambulance Service

Source: ImageTrend data, 2018-Jun 2023
Notes: Ranking based on percentage of mutual aid calls

Figure 5: Mutual Aid Received and Given

2016: South Dakota EMS Survey and Listening Sessions Report

The survey was distributed to all providers, ground and air, who are based in the state and a few others who operate in the state but are based in neighboring states. The survey was appropriately distributed to these 122 providers, but there was no definitive statement regarding how many responded. The reader has to assume that all responded, based on the statement, "All transporting EMS agencies in South Dakota were surveyed" (pg. 2). Appropriate disclaimers existed in the report, including one that states, "EMS Program staff provided assistance to some of the agencies in completing the survey" (pg.2). The reader has to assume that meant technical assistance.

An opportunity to participate in the listening sessions was appropriately provided to all 122 agencies serving the residents and visitors of South Dakota and it was reported that approximately 30% of those agencies sent representatives to the sessions. The methodology and process used to gather this data for this report appears satisfactory to consider the results statistically valid.

Data Overview and Comments

The subsequent data reporting is clear, well written, and validates the perception of South Dakota as a mostly rural EMS community, with not unexpected challenges. Sixty-five percent of South Dakota EMS agencies serve a population 3,000 or fewer with 36% serving a population of less than 1,000. Only 27% of the agencies providing services respond to more than 500 calls a year. These statistics match our observations throughout the state as well. The report considers the elements of hospital availability, travel time, level of care provided, staffing, personnel availability, sustainability and other components to identify the major issues and challenges facing EMS in South Dakota.

Major Issues and Challenges

The report identifies seven major issues and challenges (pg. 14) identified from the survey and the listening sessions; they are:
- Workforce shortages
- Reliability
- Sustainability/Preservation of the volunteer staffing model
- Financial resources
- The successful testing of new providers
- Outdated laws and rules
- Regional collaboration

The report crosswalks each issue/challenge through the results of the survey and listening sessions and a case is made for the relevancy of each item. Many of these concerns are the exact items being discussed and approached today in 2023. A reference is made to a "sustainability index" developed by SafeTech to measure more objectively the sustainability of EMS providers. They post some results suggesting that many providers either are "not likely" to be sustainable of are "facing challenges to sustainability." Anecdotally, the results do not appear out of line but the report does not include the sustainability survey tool nor any indication of past validations, so it is difficult to analyze the findings.

2018: South Dakota Community Leader EMS Survey

This report provided information about the state and future of South Dakota's EMS from a community leaders' perspective. An online survey was developed with input from the South Dakota Department of Health, Office of Rural Health.

The Survey

The survey gathered responses from a variety of community members, business leaders and local governmental officials in communities across the state. A total of 245 respondents chose to participate in the survey. This appears to be a statistically significant number although the number of potential respondents is unknown. A majority (65%) of respondents were from communities of 3,000 people or less – possibly skewing the results towards the rural communities. There were respondents from all geographic areas of the state. The respondents were also more heavily involved in "local government" or "elected official/township," than the other categories combined (i.e., hospital, elected county, business owner, citizen, other).

This survey tool provided two open ended questions:
1. What are the top three challenges facing your ambulance service today?
2. What would you like the EMS Program and Office of Rural Health to know about ambulance services and EMS in your community?

The responses were paraphrased and summarized. SafeTech Solutions' main takeaway showed, "A limited understanding of EMS amongst community leaders, and that what is understood about the challenges, costs, and needs of community ambulance services is mixed and paradoxical. Survey results suggest community leaders would benefit from more information about EMS, particularly rural EMS, and the elements supporting its long-term reliability and sustainability" (pg. 1).

Not surprisingly there are some common findings displayed in this report compared to the results published in the 2016 South Dakota EMS Survey and Listening Sessions Report. For example, staffing, funding, and sustainability issues are among the top concerns for the community leaders who responded to the survey as they were for the provider organization. The "limited understanding" appropriately identified in this survey is an added concern that needs addressing in South Dakota.

Analysis of 9-1-1 Responses by Acuity

The emergency medical dispatch (EMD) process utilizes a preset number of call types from Alpha (low) to Echo (high) acuity; they are often referred to by the brand name – Medical Priority Dispatch System (MPDS). Within South Dakota, 72.0% of 9-1-1 responses are Alpha or Bravo, typically less serious in nature (see Figure 6). Compared with the International Academies of Emergency Dispatch (IAED) data, only 43.1% have lower

Emergency Medical Dispatch (EMD) Codes									IAED
Code	2018	2019	2020	2021	2022	2023	Total		
Alpha	314	576	615	684	777	465	3,431	23.9%	17.6%
Bravo	730	1,200	1,432	1,381	1,345	818	6,906	48.1%	25.5%
Charlie	190	400	395	447	501	283	2,216	15.4%	21.9%
Delta	169	351	344	354	356	210	1,784	12.4%	29.4%
Echo	7	3	-	2	2	1	15	0.1%	1.8%
Total	1,410	2,530	2,786	2,868	2,981	1,777	14,352	100.0%	96.2%

Sources: ImageTrend; 3.1M IAED records, 2009
Notes: 2023 data contains January-June; IAED data does not include 3.8% Omega call type

Figure 6: EMD Codes

acuity. The implication is more transports within the state are for less acute injuries and illnesses. In contrast, IAED identifies 1.8% are Echo calls to only 0.1% in South Dakota.

Top-10 Dispatch Reasons	
Reason	Frequency
Sick Person	12.6%
Fall	10.7%
Breathing Problem	7.8%
Transfer/Transport	6.9%
Other	6.4%
Motor Vehicle Crash	6.3%
Chest Pain / Cardiac Problem	6.0%
Unknown Problem	5.3%
Seizure/Convulsions	4.4%
Unconscious/Near-Fainting	3.5%
Total	70.0%

Source: ImageTrend, 2018-Jun 2023

Figure 7: Top10 Dispatch Reasons

The most frequent 9-1-1 reason was for a sick person (12.6%); this is a generic "catch-all" for most types of weakness, flu symptoms, fever, etc. (see Figure 1). The second reason for a 9-1-1 response was due to a fall (10.7%). A fall does not have to be from an elevated position; a simple trip-and-fall would be included. With the percentage of older adults on blood thinner medication, a simple blow to the head can be very serious. Breathing problems are the third most common need for 9-1-1 at 7.8%; this would include asthma, anxiety, heart failure, pneumonia, etc. It is notable that 11.7% of the time, the call is categorized as "other" or "unknown problem." The ambulance crew has little information to prepare for the patient. Addendum 3 provides a more exhaustive breakdown of the reasons why people call 9-1-1.

The data indicates that a high proportion of 9-1-1 transports in South Dakota are for less acute needs as compared to other communities in the United States. The inference is these patients are likely treated and discharged from the emergency departments (Eds) and not admitted to the hospital. More importantly, minor injuries and illnesses are ideal candidates for telemedicine opportunities instead of the historical treat-and-transport to the ED.

Use of Lights & Siren

Many EMS systems are focused on the use of lights and siren in an attempt to reduce the risk to the ambulance crews, patients, and the driving public. Studies show the chance of a direct or indirect traffic collision is four times higher when using emergency lights and siren.[1] Furthermore, in most cases, the use of lights and sirens typically do not appreciably reduce response times nor have they been shown to improve patient outcomes.[2] South Dakota responds and transports in emergency mode at 78.5% and 49.4% on average, respectively (see Figure 8). The emergency response mode is fairly high, and it is highly unusual to see roughly half of all transports using lights and siren. The risk to the crew and the public is significant with little potential benefit. Despite being a useful tool for determining appropriate non-emergent responses, dispatch centers using Emergency Medical Dispatch (EMD) dispatch almost all responses as emergent, yet only 6% of patients are subsequently transported with lights and siren (see Figure 9).

Use of Lights & Siren							
Year	2018	2019	2020	2021	2022	2023	Total
Response	69.1%	76.9%	79.2%	81.2%	80.8%	82.8%	**78.5%**
Transport	41.2%	48.2%	50.2%	51.7%	50.3%	56.0%	**49.4%**

Source: ImageTrend, 2023 includes Jan-Jun

Figure 8: Use of Lights & Siren

Use of Lights & Siren (L&S)						
	Response Mode			**Transport Mode**		
EMD	L&S	No L&S	%	L&S	No L&S	%
Alpha	2,184	7	99.7%	66	2,118	3.0%
Bravo	2,897	1	100.0%	142	2,755	4.9%
Charlie	1,649	2	99.9%	107	1,542	6.5%
Delta	1,216	-	100.0%	161	1,055	13.2%
Echo	11	-	100.0%	1	10	9.1%
Total	7,957	10	99.9%	477	7,480	6.0%

Source: ImageTrend, Jan 2018-Jun 2023

Figure 9: MPDS and Use of Lights & Siren

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[1] https://cdn.emergencydispatch.org/iaed/pdf/TheWakeEffect_EmergencyVehicle-Related_Collisions.pdf
[2] https://pubmed.ncbi.nlm.nih.gov/28134063/

Ambulance Billing Economic Analysis

Figure 10 provides a charge rate comparison for South Dakota ambulance providers produced by PCC, Inc., the leading billing service in the state. The current Medicare Super Rural and Wellmark BCBS rates are also shared in the chart. It should be noted that neither has a published treat and release rate, which is permitted under certain conditions. A breakdown of the charges is provided based on the company's historical experience in South Dakota. Addendum 4 offers a fee schedule comparison prepared for the South Dakota Ambulance Association.

South Dakota Charge Rate Comparison Average Rates vs. Published Fee Schedules							
CPT Procedure	Breakdown	Average Charge	High	Low		Medicare Super Rural	Wellmark BCBS
A0426 – ALS Non-Emergency	1.0%	$ 750	$1,000	$ 500		$ 346.09	$ 465.00
A0427 – ALS Emergency	35.0%	$ 1,050	$1,300	$ 735		$ 547.96	$ 735.00
A0428 – BLS Non-Emergency	4.5%	$ 600	$ 700	$ 387		$ 288.40	$ 387.00
A0429 – BLS Emergency	46.4%	$ 900	$ 950	$ 620		$ 461.44	$ 620.00
A0433 – ALS-2 Emergency	2.0%	$ 1,250	$1,500	$1,065		$ 793.11	$1,065.00
A0998 – Treatment on Scene	11.0%	$ 150	$ 500	$ 100		-	-
A0425 – Mileage (per mile)*		$ 18	$ 32	$ 14		$ 12.15	$ 13.00
36680 – IV Access via I/O		$ 185	$ 220	$ 120		-	-
A0394 – IV Fluids & Supplies		$ 150	$ 185	$ 75		-	-
A0382 – BLS Supplies		$ 75	$ 50	$ 100		-	-
A0396 – Intubation		$ 100	$ 200	$ 50		-	-
A0398 – ALS Supplies		$ 150	$ 200	$ 150		-	-
A0422 – Oxygen		$ 75	$ 100	$ 50		-	-
93005 – ECG 12 Lead		$ 100	$ 125	$ 75		-	-
93041 – ECG 3 Lead		$ 75	$ 100	$ 75		-	-
Source: PCC Inc., An Ambulance Billing Service							
Notes: * Medicare Rural Mileage based on $12.15 for the first 17 miles, then $8.10 afterwards							

Figure 10: South Dakota Charge Rate Comparison

Payor Mix and Collections per Transport							
	2021			2022			
Payor	Transports	Payments	Per Transport	Transports		Payments	Per Transport
BCBS	945 8.0%	$ 844,844	$ 894.01	1,159	7.0%	$ 916,096	$ 790.42
Medicaid	1,849 15.7%	$ 485,505	$ 262.58	2,038	12.4%	$ 607,793	$ 298.23
Medicare	5,285 45.0%	$3,208,535	$ 607.10	7,160	43.5%	$4,300,324	$ 600.60
Medicare HMO	878 7.5%	$ 535,727	$ 610.17	1,869	11.4%	$ 970,519	$ 519.27
Other Payers	2,046 17.4%	$1,257,881	$ 614.80	2,900	17.6%	$1,480,549	$ 510.53
VA	754 6.4%	$ 878,204	$ 1,164.73	1,328	8.1%	$1,353,125	$ 1,018.92
Total	11,757 100.0%	$7,210,696	$ 613.31	16,454	100.0%	$9,628,406	$ 585.17
Source: PCC, Inc.							
Note: 2022 slightly lower due to more urban transports and late payers (e.g., VA, Indian Health)							

Figure 11: Payor Mix and Collections per Transport

Figure 11 demonstrates the payor mix for ambulance services billed by PCC, Inc. In 2022, they were responsible for invoicing roughly 19% of the ambulance transports statewide. The data has a high percentage of Medicare and Medicare HMO transports, indicating over 50% of the patients are over age 65.

Medicaid Supplemental Funding

A federal law mandates public hospitals cannot be forced to subsidize patients who are the federal government's responsibility, i.e., Medicaid patients. The federal government offers additional payments for these patients. This law has been interpreted to apply to pre-hospital services as well. For the states that have implemented these programs, the public ambulance providers have increased their Medicaid payments substantially, by 50% of the costs not paid by Medicaid initially (i.e., roughly $140/transport).

Addendum 5 describes the supplemental funding estimate presented by Sarah DiCicco with Pacific Consulting Group at the February 2023 South Dakota Ambulance Association Conference. The analysis identified there is up to $3.6M additional revenue available to public providers across the state. This estimate is based on publicly available data and a sampling of public agencies' cost data; actual results would vary based on better data.

Current Volunteer Subsidy

Over the last ten years, there has been a migration from complete volunteerism to some compensation within most ambulance services. The subsidy is typically referred to as paid-on-call (i.e., a below-minimum wage rate per hour to be available) or paid-per-call (e.g., a flat rate per call, hourly rate during the call). During the interview phase of this project, all of the pre-hospital providers clearly view themselves as volunteers. They appreciate the subsidy, but no one considers it sufficient without full-time employment. Most volunteers have other non-EMS careers as their primary source of income.

As can be expected, trained EMTs and paramedics gain experience through volunteering before applying to the few ambulance services with full-time positions. There is even attrition within paid agencies, losing staff to employers with better salaries and benefits. This is the natural progression in most communities. Hopefully, they will continue to volunteer with their home agencies.

Incorporating Pre-Hospital Staff into Local Healthcare Systems

There is insufficient transport volume to support career staff in most ambulance services. Based on interviews, the average ambulance service needs $400,000 in annual revenue to breakeven. With an average collection of $585-613 per transport, this equates to at least 650 transports annually. There are only 20 services out of 122 that meet those criteria (see Figure 12). Therefore, they rely on volunteer (or minimally paid on-call) staff. Any opportunities for pre-hospital providers to work in the healthcare industry, concurrent with being available for ambulance needs, should be encouraged. This has the added benefit of maintaining life-saving skills and broadening experience. Listed below are examples that have proven effective in other communities.

1) **Hospital-Based Service**: The hospital employs the ambulance staff in the ED or other department. They own the vehicle and equipment. When a call for service is received, they remain paid through the hospital for the duration of the call. This simplest model can lead to adding more services, such as community care.

2) **Hospital Partnership**: The hospital employees are encouraged to become volunteers/paid-on-call staff with the local ambulance provider. These employees must be in positions with job flexibility in order for them to respond to 9-1-1 calls without disturbing hospital operations. Examples would include administration, ancillary services, possibly ED, etc. When the 9-1-1 request is received, the employees "punch out" as hospital staff and are part of the ambulance service until they return to work. This opportunity requires greater coordination and balancing of the hospital and ambulance responsibilities.

3) **Healthcare Facilities Partnership**: Beyond hospitals, health clinics and urgent care centers could also serve as potential partners. There may be opportunities for EMTs and paramedics to augment existing staff and improve the level of healthcare resources available in rural areas. Similar to hospital partnerships, the facility responsibilities would need to have the flexibility to allow leaving for ambulance responses.
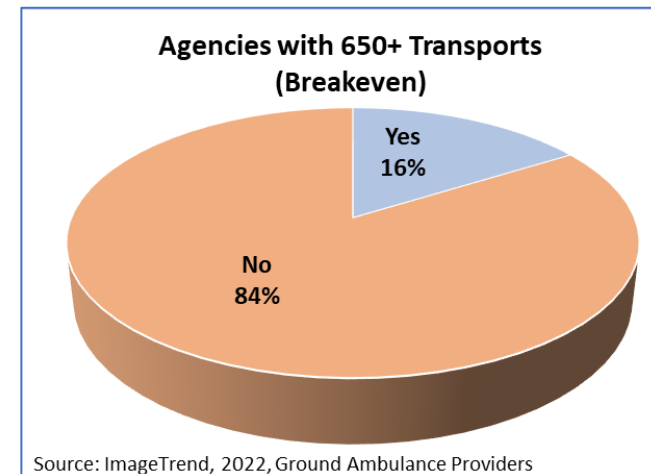

Agencies with 650+ Transports (Breakeven)

Yes 16%

No 84%

Source: ImageTrend, 2022, Ground Ambulance Providers

Figure 12: Breakeven Agencies

4) **Community Healthcare Workers/Community Paramedicine**: Most ambulance services have significant downtime between calls. Finding paying opportunities can help bridge the gap between paid-on-call and career staff for ambulance services that are close to breakeven through transports, or at least higher hourly rates to retain and attract new volunteers. All communities have EMS "friendly faces" that use ambulance services disproportionately. Through proactively "rounding" on these residents, future transports and ED visits can be avoided. This service, often called community paramedicine, has value to the patient, his/her insurance carrier, and the Eds by mitigating unnecessary healthcare expenses. If these patients have been discharged from the hospital within the last 30 days, the hospitals will be penalized financially by Medicare for readmissions. The financial incentives to avoid necessary healthcare costs create opportunities with payors and hospitals to fund home visits. Similar programs are being funded by grants and other charities to improve the level of care for the most vulnerable populations.

5) **Home Healthcare**: Due to vast geography, there may be regions of South Dakota underserved for in-home patient care. Research possibilities with visiting nursing associations and other home healthcare organizations. During COVID-19, there was a surge of "hospital at home" programs where hospitals moved inpatients home to complete their "inpatient" care. This is only possible in communities where there are caregivers to provide routine follow-up care and the availability of on-demand caregivers for urgent or unforeseen issues. Underutilized pre-hospital providers are excellent solutions to the latter.

FINDINGS AND BEST PRACTICES

Workforce Staffing, Recruitment, and Retention

Ensuring a sufficient and competent workforce is the most challenging component of any EMS system, regardless of whether the staff is paid or volunteer, or located in an urban or rural community. Short, medium, and long-term plans for recruitment are necessary to improve the number of volunteers available to the ambulance agencies.

Best practice: To meet the need of transporting patients, the state has been flexible in staffing requirements for ambulances. While not ideal, it is better to have one EMT and a driver/operator than requiring two EMTs per ambulance that could create a significant delay in getting the patient to the hospital or trauma center.

Short-term recommendation: Have EMS staff visit each ambulance provider at least every two years. Regular meetings between state staff and the ambulance provider can facilitate many improvements through better communication and coordination of services. Examples would include Telemedicine-in-Motion adoption, maximizing ImageTrend reporting, sharing grant opportunities, identifying local needs, etc.

Short-term recommendation: Local ambulance service members should attend local community meetings and present the staffing needs of the ambulance service. Groups could include Rotary, Kiwanis, Lions, Veteran's Hall, Chambers of Commerce, Visitor's Bureau, etc. When recruiting new volunteers through these organizations, it is helpful to remind attendees that they can volunteer as well as encourage their family, friends, and employees about the values of volunteering.

Short-term recommendation: Promote volunteering to local employers. Encourage ambulance services to approach local businesses that may be willing to let staff leave for ambulance calls. One example is John Deere, who has made this commitment as a company throughout the country.

Short-term recommendation: Establish a mutual response from the fire department for truly life-threatening calls. Like the ambulance service, most fire departments are also volunteer. Responding to all medical calls would place an unrealistic burden on volunteer firefighters. However, requesting assistance for the highest acuity calls that require additional personnel to be successful (i.e., cardiac arrests), would limit the burden significantly. The state data indicates only 0.1% (845) of calls are high acuity (i.e., Echo). That number seems low based on IAED data, that shows it at 1.8%. Based on 2022 9-1-1 responses, the estimated impact would be 845 to 1,521 Echo calls annually distributed across all fire stations statewide. It is presumed that most firefighters are trained in CPR; however, only ambulances and police cars have automated external defibrillators (AEDs). Identifying grant funding to equip all fire departments with at least one AED should be considered. Similar to police officers, firefighting is a physically demanding role. There is the significant potential that the AED will be needed for a firefighter in cardiac arrest due to the strenuous demands on the fire scene.

Short-term recommendation: Consider increasing the use of air resources for 9-1-1 calls, such as through auto-launch (i.e., requested at time of dispatch) protocols for patients with significant injuries or illnesses. During 2022, there were only 305 EMS helicopter responses out of 84,532 (0.4%) calls. When asked during interviews why the low number, providers stated police often cancel air resources for lower acuity cases to "save them" for the big emergency. This belief is appreciated, but it could cause there to be no ground ambulance for multiple hours in the communities furthest from the hospitals. While there would be a helicopter available, there would be no ground ambulance to get the patient from the scene to the landing zone. There should be a balance between acuity and loss of local resources when considering the use of EMS helicopters. Furthermore, in addition to trauma patients which are often flown to trauma centers, the increased use of helicopters for transport to other specialty stroke and STEMI (i.e., ST Elevation Myocardial Infarction) hospitals presents an opportunity to improve care for these time-sensitive conditions.

Medium-term recommendation: Develop a statewide education campaign to spread awareness and the need for EMTs, both volunteer and career. It is likely that many people are unaware of the need and their community or the career opportunity. The education can be accomplished through public service announcements, local campaigns, social media, and other approaches.

Medium-term recommendation: Allow out-of-area ambulance services to retrieve IFT patients needing a higher level of care. This challenge was identified by roughly ten services, primarily those sending patients into Sioux Falls. A number of providers mentioned that they will decline an IFT if there is no crew available to cover 911 while committed to the IFT. Currently, patients needing transport to another hospital for an in-patient service unavailable locally, are required by state law to be moved by the local ground

ambulance provider. The next allowable option is air transport, even if not high acuity. Often, the destination is a large tertiary hospital located in a major city. It is likely these cities have a career ambulance service with dedicated IFT ambulances that could bring the patient to the tertiary hospital. Local ambulance providers should continue to have the "right of first refusal" for IFT needs to maintain call volume.

Medium-term recommendation: Establish formal recruitment drives. This may be supported by identifying a coordinator at the county, region, or district level. Local or grant money could fund this position full-time for a period of time to maximize its effectiveness for each community.

Medium-term recommendation: Consider legislation to teach CPR and Stop-the-Bleed courses in all schools, as early as seventh grade. Programs in other states have seen lives saved while fostering a responsibility to serve family members, friends, and the community. It also starts instilling the value of giving back to the community at a young age. Further promote community resiliency through Meet Your Neighbor, CERT, and other programs.

Medium-term recommendation: Offer college-level science credits for high school students who complete EMR and EMT training. Encourage students to get experience with local ambulance services.

Long-term recommendation: Lack of volunteers is impacting all types of volunteer organizations, not just ambulance services. In the words of John F. Kennedy, "Ask not what your country can do for you – ask what you can do for your country." It is critical to instill the importance and value of volunteering at a young age. Working with the state education department, health services could develop service project requirements at the middle and high school grades. This may start with a requirement to volunteer a minimum number of hours at a community organization each year or every two years. The number of hours would be less for younger students and increase in future grades. In the senior year, each student could select a non-profit organization of their choosing and complete a service project to benefit it. One example is the service project required to attain the rank of Eagle Scout within the Boy Scouts of America.

Equipment and Supply Acquisition

Best practice: The Telemedicine In Motion program is a bleeding-edge example of the state's support for the EMS system. Through the program, any pre-hospital provider can turn on the system in the back of the ambulance and be connected to an Avel physician or mid-level provider. That caretaker will ask questions, provide advice, recommend destinations, and suggest treatments within the scope of the pre-hospital provider. South Dakota is a shining example of the possibilities for telemedicine in the pre-hospital arena.

Best practice: The state's commitment to improving equipment is a best practice and one not seen elsewhere in the nation. The purchase and distribution of over 308 LIFEPAK heart monitors for all ambulance services is an admirable pledge of support.

Short-term recommendation: Promote and raise awareness of grant opportunities for auto-loading gurneys. The recent provider surveys indicate an aging workforce. Interviews revealed a willingness to continue volunteering; however, there are concerns about physical stamina as volunteers age. According to Stryker, roughly half of the South Dakota ambulance services have already purchased auto-loading gurneys for this exact reason. It is estimated that this gurney upgrade could increase a volunteer's service period by 5-10 years.

Long-term recommendation: Expand the Telemedicine In Motion program to provide treat-and-refer options. With over 70% of the 9-1-1 responses being low acuity (i.e., Alpha and Bravo) calls, there is significant potential for not transporting every patient to an ED. This will require coordination with the existing healthcare providers and insurance carriers to connect the right patient to the right disposition. Ideally, the insurance carriers will appreciate the ED expense savings and pay for the ambulance response and evaluation in lieu of transport. It is estimated that ED expenses are seven times greater than an ambulance transport. From a technological perspective, the current telemedicine is permanently mounted in the ambulance, requiring any telemedicine consult to happen in the ambulance; that is not ideal during inclement weather. Opportunities to install a portable system should be encouraged while relationships with insurance carriers are developed.

Quality Control Metrics

Local and statewide quality metrics are essential to ensure that current services meet nationally recognized standards of care. Without established quality expectations and a consistent local and statewide system of measurement, there is little chance to identify opportunities for improvement.

Best practice: Establishing a state-provided electronic PCR (ePCR) system (i.e., ImageTrend) at no cost to providers will serve the state's interests with significant benefits. Almost all EMS transport data is in one database allowing the state to have immediate access to patient care data. EMS studies, such as this project, have access to excellent and comprehensive data. Trends in EMS usage, patient care, and clinical standards can be tracked easily. While counties have adopted a single ePCR platform, South Dakota may be the only state to do so – and at its expense.

Short, medium, and long-term recommendation: Establish five top quality metrics initially, such as cardiac arrest survival through the CARES registry, appropriate trauma, STEMI and stroke destination, treatment of hypoglycemia, and many others. Expand metrics up to 20 over time as they are identified. Local EMS leadership should be free to establish additional measures as deemed appropriate for local needs. The statewide adoption of ImageTrend provides a tremendous advantage in measuring statewide performance in a centralized and consistent manner as well as a mechanism for local quality improvement activities.

Short-term recommendation: Implement continuous quality improvement processes for patient care reports to track statewide care weaknesses and opportunities for future trainings. The ImageTrend platform provides the ideal data source for finding and tracking the care provided to patients. Part of this process will be the metrics selected above. As trends are identified, training priorities and initiatives can be established to improve the overall care provided in South Dakota.

Medium-term recommendation: Ensure 100% EMD implementation for 9-1-1 call centers. It is crucial in rural environments for the 9-1-1 caller to be given life-saving instructions, such as hands-only CPR, tourniquet application, emergency childbirth, etc., as it will take time for responders to reach the patient. The current ImageTrend 2023 data set shows that just over half of all 9-1-1 calls are being processed through EMD protocols (20,438/39,962 = 51.1%). However, only 4.4% (1,777 calls) received a designation of Alpha-Echo MPDS determinant. This may be an issue of the dispatch computer data not feeding properly into the ImageTrend database. The collection and recording of accurate and consistent MPDS determinants are essential for determining next level system improvements such as efficient resource utilization and appropriate use of lights and siren.

Training and Education

South Dakota has implemented many excellent strategies for getting the necessary education to serve on an ambulance. The training association provides ongoing education to the different ambulance providers.

National Registry Testing

During interviews, a number of providers commented that the National Registry of Emergency Medical Technician (NREMT) tests are challenging and a barrier to new volunteers. A review of the state and national data identified that South Dakota EMTs (Figure 13) are slightly behind the national average for the last 11 years at 6.4%.

NREMT - License Pass Rates

EMT

EMT	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1st Attempt	71%	63%	60%	60%	61%	60%	67%	59%	52%	59%	65%
3rd Attempt	77%	72%	66%	67%	75%	72%	76%	68%	67%	70%	73%

Source: National Registry Emergency Medical Technicians (NREMT), www.nremt.org/maps

Figure 13: EMT Pass Rates

NREMT - License Pass Rates

Paramedic

Medic	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1st Attempt	74%	75%	75%	75%	60%	69%	63%	58%	55%	45%	36%
3rd Attempt	81%	84%	83%	92%	83%	81%	77%	77%	75%	69%	64%

Source: National Registry Emergency Medical Technicians (NREMT), www.nremt.org/maps

Figure 14: Paramedic Pass Rates

What is more concerning is the negative trend of paramedics passing the test on the first attempt. From 2012-2015, South Dakota was consistent with the national average (Figure 14). However, it has dropped to only 36% in 2022 (compared to 70% nationally). That is the lowest passing rate of any state (See Addendum 6).

Best practice: The three mobile high-fidelity simulation trucks and training contracts are an industry best practice. The state embraced the training challenge of distance learning with a primarily volunteer workforce. The concept of bringing the education to providers on a rotating basis is cutting edge and one that other states should consider. This resource should be funded consistently.

Best practice: The state training curriculum allows for remote EMT training. This is an excellent way to bring education to regions of the state without the traditional brick-and-motor schools. This innovative program provides more opportunities to train new EMTs.

Best practice: Through different grants and state funding, there is low and no cost EMT education options offered throughout the state. The best practice should be continued through applying for continued grant funding to keep the EMT classes free or low cost.

Best practice: Many agencies offer their own Emergency Medical Responder (EMR) and EMT education programs. This local training removes yet another burden to getting volunteers trained for ambulance service.

Medium-term recommendation: Develop a robust capability for EMR and EMT to handle life-threatening situations. This may include draw or auto-inject epinephrine, naloxone, glucometers, baby aspirin, etc. The EMT and AEMT scope could include albuterol inhaler treatments and supraglottic airways (e.g., iGel tubes) for airway management.

Medium-term recommendation: Instructors teaching EMR, EMT, and paramedic programs should receive specific training on how to study and successfully pass the NREMT test. This may include practice tests and additional instruction on the NREMT test challenges.

Medium-term recommendation: Shorten the certification processing times. Multiple providers described 3-4 month waiting times, most often when applying for initial certification. This experience was related to all levels of licensing from EMR to paramedic. Recommend a meeting of state officials and local ambulance services to discuss challenges and solutions to improve the process.

Public Education

Since the 9-1-1 telephone system was established over 50 years ago, there have been public messaging campaigns that encourage people to dial 9-1-1 and someone will respond to fix their problems. We start this public education as young as kindergarten age. Now, people are calling for help and not when it is a true emergency. The MPDS data suggests that over 70% of 9-1-1 calls are for non-life-threatening reasons. Of those patients assessed, 27% choose not to go to the hospital after being evaluated by the ambulance crew. In rural South Dakota, lengthy response times are likely to determine the patient's outcome. During a major disaster, such as a tornado or snowstorm, the 9-1-1 system will be overwhelmed quickly or unable to reach all calls for service. It is appropriate to start instilling some personal responsibility and resilience for the general public to be prepared for emergencies.

Medium-term recommendation: Develop a robust community preparedness program. At a minimum, this should include learning hands only CPR and stop-the bleed techniques. The public are the true "first" first responders and have a definite positive impact on the survivability of the patient. In rural communities, the person saved is more likely to be a family member or friend than a complete stranger.

Medium-term recommendation: Improve community resiliency during emergencies through neighborhood preparedness. Consider adopting the "Meet Your Neighbor" federal program to develop emergency preparedness within neighborhoods. The goal is to have neighbors rely on each other before reaching out to 9-1-1 and other solutions. This becomes very relevant during natural disasters and weather events that overwhelm first responders and hamper accessibility.

Effective Billing Practices and Accountabilities

With 120 ambulance services, there is significant variability in the charting and coding completed by the thousands of different pre-hospital providers. Some services have full-time paid staff to support documentation training and review; however, most services do not have this resource.

Short-term recommendation: Ensure every service provides initial and ongoing training for all staff on how to write an effective PCR for both patient documentation and billing. Within most ambulance services, report writing is not well defined and new staff do not always receive proper training or understanding of the importance of accurate documentation. One example is the "level of care provided" field within NEMSIS 3.5. ALS providers have a tendency to select ALS, even though no ALS care was provided. This complicates the billing process and can lead to charging for ALS inappropriately. The state can support this improvement through regular updates and training for ambulance directors to share with their staff. This recommendation is supported by how infrequently this field is entered into ImageTrend. Figure 15 demonstrates that 95% of PCRs do not have an entry in this field. When comparing PCR to billing data, the PCR documentation shows ALS care provided during 57% of transports, yet the leading billing provider only billed ALS for 38% of the time.

Ambulance Level vs. Care Provided						
Ambulance Level	Care Provided ALS	Advanced EMT	BLS	Critical Care	Blank	Total
ALS (EMTP, RN, MD)	8,712	975	3,016	100	270,383	283,186
Limited ALS (AEMT)	1		2		131	134
BLS (EMT)	190	58	4,535	54	66,390	71,227
EMR					199	199
Critical Care	17		10	42	16,374	16,443
Blank	22	1	5	32	58	118
Total	8,942	1,034	7,568	228	353,535	371,307

Source: ImageTrend, Jan 2018-Jun 2023

Figure 15: Ambulance Level vs. Care Provided

Local EMS Medical Director's Education, Ongoing Networking Opportunities, Medical Direction

EMS medical directors serve an essential leadership role in ambulance delivery. As the highest medical authority in an EMS organization, these physicians play the essential roles of provider education, policy development, and quality assurance that establish the tone, culture, and professionalism of patient care for EMS responders. Furthermore, actively engaged medical directors can inspire an EMS workforce and improve job satisfaction and retention.

The current group of EMS medical directors in South Dakota essentially operate independently of any statewide scope of practice, quality standards, treatment guidelines, and destination criteria. There are no central committees or organizations of South Dakota EMS Medical Directors in which they could network, discuss challenges and opportunities, and share best practices.

Short-term recommendation: Organize the EMS medical directors through a committee or working group with regular quarterly or semiannual meetings. Ideally, there would be some financial reimbursement and/or continuing medical education credits to encourage attendance. The structure of this group is best served by an executive board which consists of a president, president elect, past president, secretary, and treasurer. At least one physician should join the National Association of EMS Physicians, an excellent national organization, and consider attending the Gathering of Eagles conference, considered to offer the most valuable workshops for EMS improvement. The designated physician would serve as the liaison for bringing best practices back to South Dakota, disseminating through this statewide organization, and improving the care in the pre-hospital environment.

Medium-term recommendation: Recommend a statewide scope of practice subcommittee composed of boarded emergency medicine, critical care, and trauma-trained physicians who can identify evidence-based EMS interventions, procedures, and medications to establish a scope of practice that is industry leading and most appropriate for the South Dakota EMS providers. This group would report recommendations to the state EMS Medical Director for consideration and possible implementation.

Regionalization Strategies

Whenever considering opportunities for greater efficiencies, the concept of regionalization is often mentioned. In many situations, it is definitely worth considering. However, the vast distances between ambulance services in many parts of the state do not lend themselves to operational consolidation. That said, there may be potential ways to partner administrative duties, such as recruitment and retention, between the ambulance services.

Medium-term recommendation: Most ambulance services are reliant on volunteers to manage the service in addition to running calls. Encourage partnerships between agencies to hire a full-time coordinator to support all of the ambulance services in each county or region. The advantage is a dedicated person with the time and commitment to support each agency's needs with recruitment and retention of volunteers. The coordinators could attend community meetings, visit high schools, share the needs with major employers in the area, etc. The regional support coordinator position could be funded through individual agencies, county support, and possible grant opportunities.

Addendum 1: Interview List

South Dakota Interview List			
Organization/Group	**Date**	**Location**	**Attendees**
SD Ambulance Association	2/11/2023	Pierre	150
Black Hills Life Flight	2/11/2023	Pierre	1
District 6	2/17/2023	Rapid City	50
District 4	2/18/2023	Aberdeen	25
SD 911 Dispatch Director	3/13/2023	Virtual	1
Pennington County Fire	5/2/2023	Rapid City	1
District 6	5/3/2023	Rapid City	20
City of Sioux Falls	5/5/2023	Sioux Falls	10
SD Association of Healthcare Organizations	5/5/2023	Sioux Falls	4
CareFlight	5/5/2023	Sioux Falls	1
SD Trauma Medical Director	5/5/2023	Sioux Falls	1
District 2	5/6/2023	Brandon	8
SD EMS Medical Director	5/6/2023	Sioux Falls	1
District 1	5/24/2023	Brookings	20
District 3	5/24/2023	Yankton	20
Avera Health	5/24/2023	Sioux Falls	4
SD Healthcare Coalition	6/7/2023	Sioux Falls	45
District 7	7/18/2023	Mobridge	12
SD Area Health Education Council	7/18/2023	Pierre	2
Hughes County Sheriff	7/19/2023	Pierre	1
District 5	7/19/2023	Pierre	12
State Fire Marshal Office	7/19/2023	Pierre	1
Secretary of Health	7/19/2023	Pierre	2
Lyman County Ambulance	7/19/2023	Oacoma	1
SD Trauma Conference	9/12/2023	Mitchell	20
SD EMS Association Conference	10/28/2023	Rapid City	60
Total			**473**

Addendum 2: Ambulance District Maps

South Dakota In-State Ground Ambulance Service Map

122 In-State Ground Ambulance Services
1 Out-of-State Ground Ambulance Service with Base in SD

District 1 | District 2 | District 3 | District 4 | District 5 | District 6 | District 7

- Ground Ambulance Service
- Secondary Ambulance Location From Primary Licensed Ground Service
- Out of State (ND) Licensed Ambulance Service with base in SD (collecting EMS ePCR Data)

As of 11/10/2023

SOUTH DAKOTA DEPARTMENT OF HEALTH
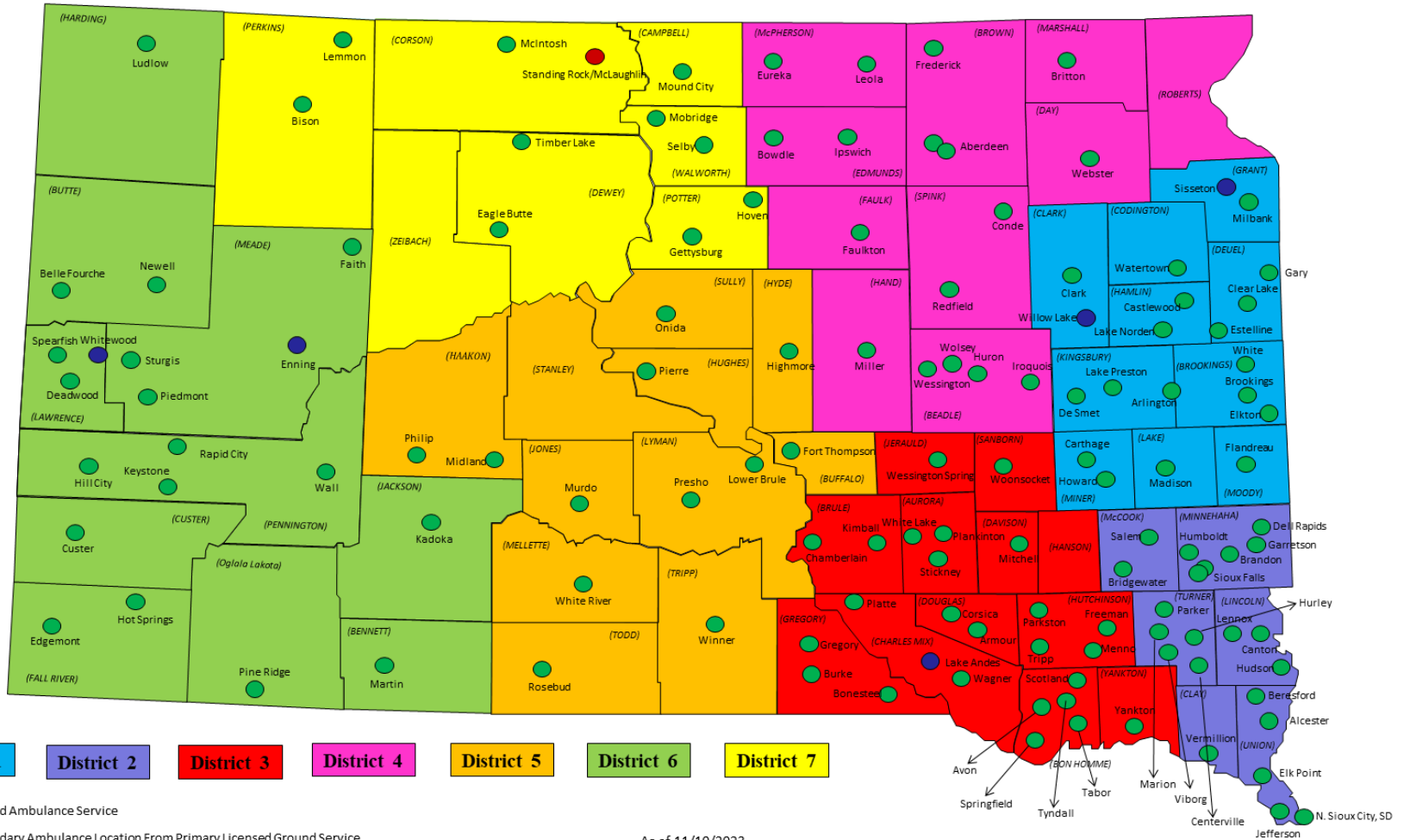
South Dakota In-State Air Ambulance Service Map

6 In-State Air Ambulance Services (Active)
1 Inactive In-State Air Ambulance Service

SOUTH DAKOTA DEPARTMENT OF HEALTH

District 1 | **District 2** | **District 3** | **District 4** | **District 5** | **District 6** | **District 7**

● Rotor-Wing Ambulance Service Locations
● Fixed-Wing Ambulance Service Locations
● Secondary Rotor-Wing Base Location from Primary Licensed Air Ambulance Service
● Secondary Fixed-Wing Base Location from Primary Licensed Air Ambulance Service

As of 11/10/2023
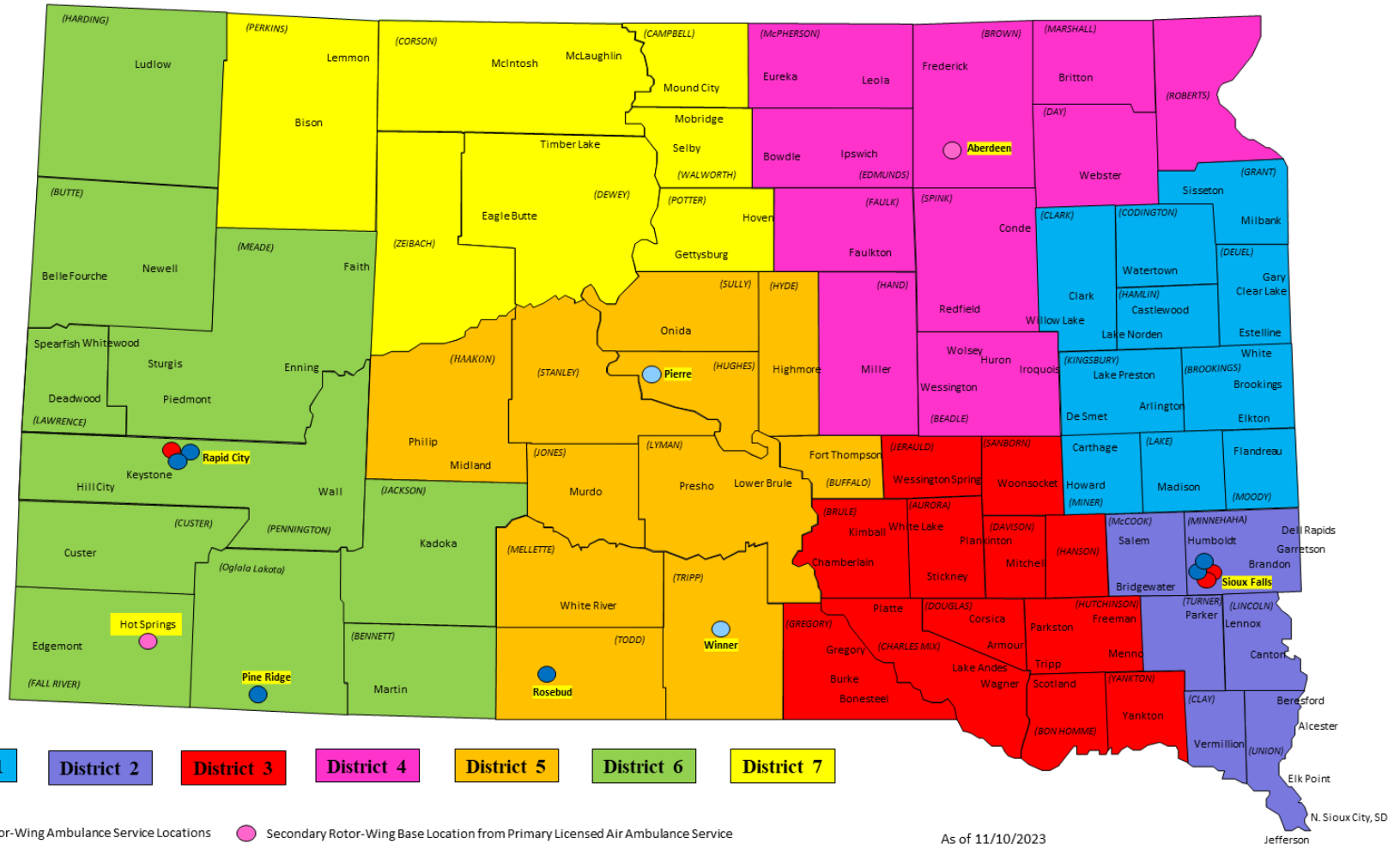
Addendum 3: Dispatch Reason

Note: Over 800 "Provider Primary Impressions" are within the data provided. The "Dispatch Reason" field provides a better overview of call types with fewer than 80 choices.

Dispatch Reason								
Type	2018	2019	2020	2021	2022	2023	Total	
Sick Person	5,904	8,378	8,915	9,439	12,336	6,272	51,244	12.6%
Fall	5,576	7,600	7,764	8,281	9,546	4,783	43,550	10.7%
Breathing Problem	4,180	5,272	6,495	6,220	6,427	3,088	31,682	7.8%
Transfer/Transport	4,127	5,031	5,271	5,556	5,886	2,100	27,791	6.9%
Other	4,520	4,883	5,537	4,908	4,368	1,609	25,825	6.4%
Motor Vehicle Crash	3,729	4,647	4,561	5,093	5,258	2,391	25,679	6.3%
Chest Pain / Cardiac Problem	3,571	4,559	4,223	4,679	4,906	2,448	24,386	6.0%
Unknown Problem	3,035	4,011	4,373	4,598	3,712	1,721	21,450	5.3%
Seizure/Convulsions	2,414	3,009	3,072	3,550	3,787	1,942	17,774	4.4%
Unconscious/Near-Fainting	1,774	2,570	2,747	2,826	2,964	1,414	14,295	3.5%
Traumatic Injury	1,875	2,651	2,651	2,742	2,915	1,396	14,230	3.5%
Abdominal Pain/Problems	2,144	2,327	2,431	2,843	2,432	1,149	13,326	3.3%
Assault	1,698	1,802	2,033	1,854	2,162	1,020	10,569	2.6%
Hemorrhage/Laceration	1,078	1,384	1,546	1,530	1,580	707	7,825	1.9%
Stroke/CVA	919	1,158	1,255	1,292	1,390	715	6,729	1.7%
Overdose/Poisoning	933	1,296	1,223	1,294	1,269	568	6,583	1.6%
Diabetic Problem	985	1,292	1,250	1,186	1,181	596	6,490	1.6%
Psychiatric Problem	857	1,104	1,169	1,179	1,272	742	6,323	1.6%
Back Pain (Non-Traumatic)	784	994	915	991	981	423	5,088	1.3%
Cardiac Arrest	538	775	890	927	866	432	4,428	1.1%
Weakness/Lethargic	380	759	908	997	715	355	4,114	1.0%
Altered Mental Status	586	537	515	566	466	241	2,911	0.7%
Pregnancy/Miscarriage	427	566	504	422	460	207	2,586	0.6%
Alcohol intoxication	326	454	509	527	396	190	2,402	0.6%
Medical Alarm	276	343	404	445	481	219	2,168	0.5%
Lifting Assist	152	330	349	449	520	316	2,116	0.5%
Pain			1	224	1,197	584	2,006	0.5%
Well Person Check	275	298	333	398	467	189	1,960	0.5%
Allergic Reaction/Stings	324	398	343	354	338	166	1,923	0.5%
Standby	268	366	352	367	421	131	1,905	0.5%
Headache	238	337	318	328	333	177	1,731	0.4%
Dizziness	231	358	302	402	294	114	1,701	0.4%
Penetrating Trauma	252	272	346	350	192	80	1,492	0.4%
Fire	162	211	222	285	345	121	1,346	0.3%
Choking	171	266	245	292	257	97	1,328	0.3%
Heat/Cold Exposure	132	267	205	284	319	120	1,327	0.3%
Animal Bite	187	191	181	173	230	144	1,106	0.3%
Burn(s) / Explosion	99	115	104	107	106	62	593	0.1%
Nausea/Vomiting			1	100	341	106	578	0.1%
Syncope/Near-Fainting				123	266	184	573	0.1%
Eye Problem/Injury	65	78	105	99	84	46	477	0.1%
Possible DOA	98	83	78	103	13	50	425	0.1%
CO/Hazmat/Inhalation/CBRN	56	66	60	91	74	38	385	0.1%
Airmedical Transport	41	45	58	55	60	26	285	0.1%
Dehydration	51	51	42	67	34	12	257	0.1%
Fever			1	71	101	44	217	0.1%
Epistaxis (Nosebleed)				23	119	71	213	0.1%
Alcohol Detox/Withdrawal				30	111	52	193	0.0%
Industrial Accident	28	34	36	23	28	20	169	0.0%
Stabbing				10	113	41	164	0.0%
Drowning/Diving/SCUBA	23	37	27	37	26	13	163	0.0%
Structure Fire				11	71	40	122	0.0%
GI Bleed				17	69	35	121	0.0%
Gunshot				8	69	43	120	0.0%
Automated Crash Notification	21	31	17	26	14	2	111	0.0%
Pandemic/Epidemic	1	2	46	23	10	1	83	0.0%
Electrocution/Lightning	11	17	15	8	17	7	75	0.0%
Hanging				6	32	12	50	0.0%
Intercept		1		3	22	22	48	0.0%
Assist Other Agency				5	24	18	47	0.0%
Healthcare Admission	14	9	3	11	8		45	0.0%
Respiratory Arrest				3	24	10	37	0.0%
Mutual Aid-Medical				1	10	4	15	0.0%
Auto vs. Pedestrian				9	5		14	0.0%
Morgue Transport					3	6	9	0.0%
Extrication / Entrapped				1	4		5	0.0%
MCI				1	4		5	0.0%
Explosion				3			3	0.0%
Sting/Envenomation				3			3	0.0%
Search and Rescue				2			2	0.0%
Aircraft Down					1		1	0.0%
Total	55,536	71,265	74,961	78,931	84,532	39,962	405,187	100.0%

Source: ImageTrend, 2023 includes Jan-Jun

Addendum 4: SDAA Fee Schedule Comparison

Charge Description	Commercial Payer 2021 Allowable Fee	SD Medicaid Effective for Dates of Service After 7/1/2021	Medicare Urban Allowable 2023	Medicare Rural Allowable 2023	Medicare Super Rural Allowable 2023
A0425 – ALS/BLS MILEAGE	$18.00	$4.34	$8.71	$8.80	$13.20
A0426 - ALS NON EMERGENCY	$900.00	$189.94	$325.02	$328.21	$402.39
A0427 - ALS EMERGENCY	$1,250.00	$282.02	$517.62	$519.66	$637.10
A0428 - BLS NON EMERGENCY	$600.00	$154.01	$270.85	$273.51	$335.32
A0429 – BLS EMERGENCY	$950.00	$237.85	$433.36	$437.61	$536.51
A0433 – ALS2	$1,450.00	*	$744.84	$752.14	$922.12
A0434 – SCT	?	*	$880.27	$888.90	$1,089.79
A0998 – AMBULANCE RESPONSE/TREATMENT	$250.00	*	*	*	*

Other Supply Charges

ALS ROUTINE DISPOSABLE SUPPLIES	$150.00	*
BLS ROUTINE DISPOSABLE SUPPLIES	$75.00	*
DEFIBRILATION, ALS	$150.00	$29.14
DEFIBRILATION, BLS	?	$29.14
ECG 12 LEAD	$125.00	*
ECG 3 LEAD	$85.00	*
ESOPHAGEAL INTUBATION, INCL SUPPLIES	$50.00	$51.35
EXTRA ATTENDANT ALS/BLS	?	$41.39
IV ACCESS VIA I/O	$120.00	*
IV FLUIDS AND SUPPLIES	$150.00	$41.12
OXYGEN SUPPLIES	$100.00	$22.26

Medicare allowable rates published do vary slightly from actual payment due to a calculated rate as determined by the origin Point Of Pickup (POP) zip code.
1 – Based on known payer allowable amounts 2021.
2 – Based on fee schedule for Rural Base Rate & 1-17 Ground Miles.
3 – Based on CMS definition of Super Rural Bonus (SRB). See IOM 100-04, Ch 15, Sec 20.1.

January 1st, 2022

Addendum 5: PCG Analysis of Supplemental Medicaid Funding

Public Consulting Group Analysis of Supplemental Medicaid Funding, presented at February 2023 SDAA Conference

Assumptions from FOIA Data Provided by State

1. Total number of ground ambulance service providers in the state = 139
2. Total number of eligible government owned ambulance providers = 56 (40%)
   a. Total number of public providers that are fire based = 13 (9.4%)
   b. Total number of public providers that are 100% EMS = 30 (21.6%)
   c. Total number of public hospital providers = 25 (21.6%)
5. Total number of tribal agencies = 6 (5%)
6. Total number of private, private hospital, and non-profit providers = 77 (55%)

Based on SDAA Ratio Extrapolation*

|	SDAA	All Eligible Providers
# of Providers	23	49
12-month Budget	$ 27,284,300	$ 41,744,979
Total # of transports	19,696	30,135
Total # of Medicaid transports	3,744	5,728
Total Amt of Medicaid Payments	$ 862,915	$ 1,320,259
SDAA/State Ratio	**47%**	

Statewide Revenue Estimate

| Line	Data Source	Estimate	Calculation
1	Budget/Expenditures	$ 41,744,979	
2	EMS/Medical Percentage	70%	*Moderate Est.*
3	Total EMS Costs	$ 29,221,485	*Line 1*Line 2*
4	Total EMS Transports	30,135	
5	Cost Per Transport	$ 1,385	*Line 3/Line 4*
6	Total Medicaid Transports	5,728	
7	Total Medicaid Costs	$ 7,933,723	*Line 5*Line 6*
8	Total Medicaid Payments	$ 1,320,259	
9	Payment Per Medicaid Transport	$ 230.48	*Line 8/Line 6*
10	Loss Per Medicaid Transport	$ (1,154.52)	*Line 9-Line 5*
11	Total Computable (State & Federal Share)	$ 6,613,464	*Line 7-Line 8*
12	FMAP Application	54.98%	*FY24*
13	**Projected Federal Settlement**	**$ 3,636,082**	*Line 11*Line 12*
14	**Projected State Share**	**$ 2,977,381**	*Line 11*35.11%*

Notes: *PCG received raw data from 23 South Dakota public providers to get an understanding of their costs and to ultimately arrive at a cost per transport. This data was used to showcase a potential ASPP settlemental. We used the statistics in the "Assumption" box to extrapolate the raw data received from 23 public providers to develop a high-level estimate for all eligible providers in the state of the South Dakota.

Addendum 6: NREMT – License Pass Rates, 2022

EMT
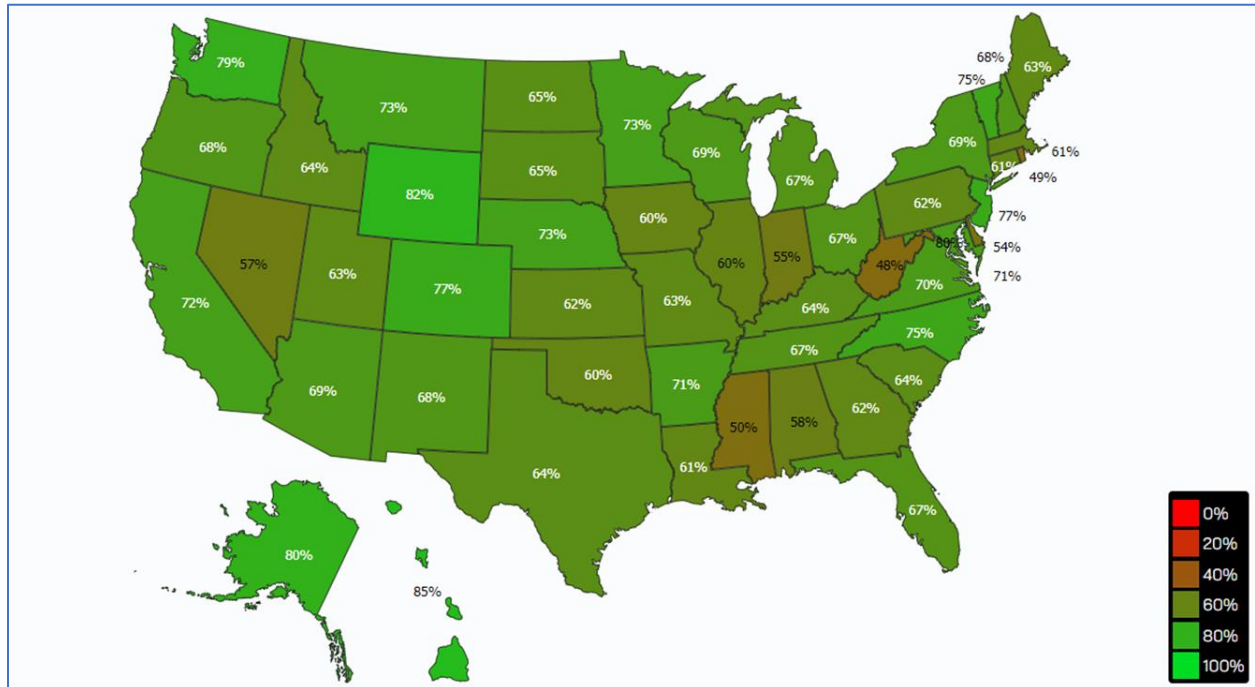
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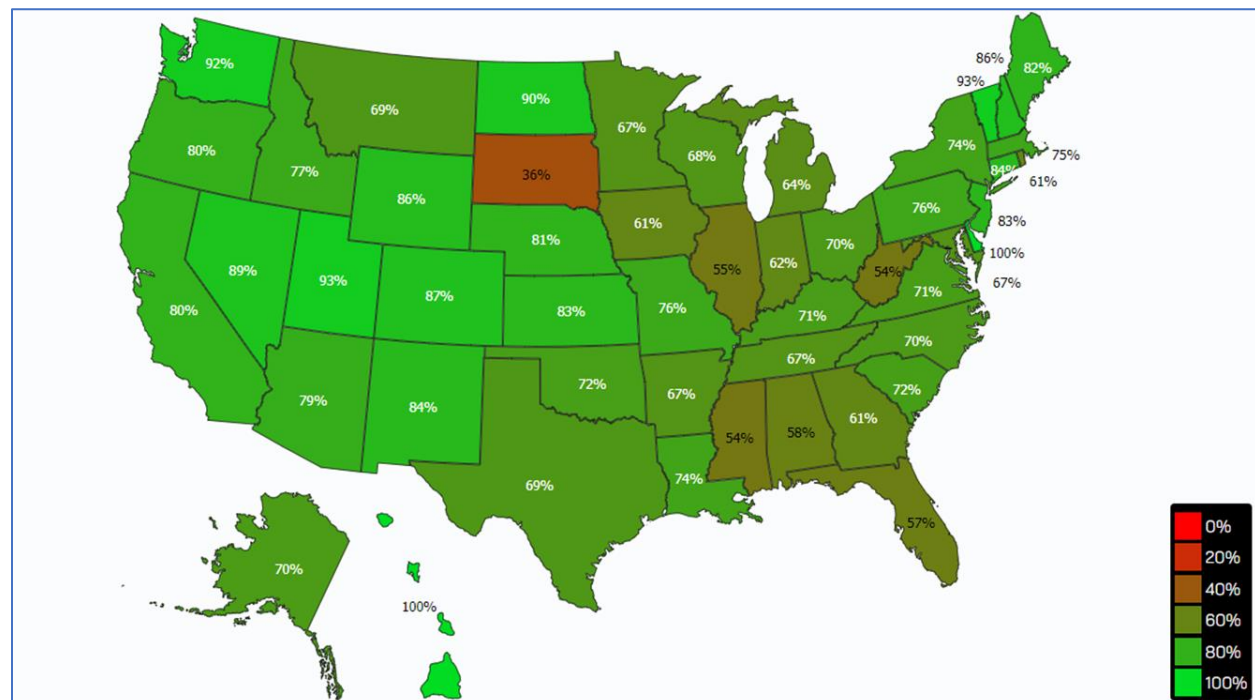
Addendum 7: Acronyms

Acronym	Meaning
AED	automated external defibrillator
AEMT	Advanced Emergency Medical Technician
ALS	Advanced Life Support (EMT-P)
BLS	Basic Life Support (EMT)
CERT	Community Emergency Response Team
ED	emergency department
EMD	Emergency Medical Dispatch
EMR	Emergency Medical Responder
EMT	Emergency Medical Technician
EMT-P	Emergency Medical Technician-Paramedic
ePCR	Electronic PCR
IAED	International Academies of Emergency Dispatch
IFT	Inter-Facility Transport
MPDS	Medical Priority Dispatch System
NHTSA	National Highway Traffic Safety Administration
NREMT	National Registry of Emergency Medical Technicians
PCR	Patient Care Report
STEMI	ST Elevation Myocardial Infarction