Emergency Ambulance Service

1978 Annual Report

Emergency Medical Services Section
Minnesota Department of Health
717 Delaware St. S.E.
Minneapolis, Minnesota 55440

EMERGENCY AMBULANCE SERVICE

1978

ANNUAL REPORT

Prepared for the Emergency Medical Services Section
by the Minnesota Center for Health Statistics
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TABLES, GRAPHS AND ILLUSTRATIONS

INTRODUCTION

The purpose of this report is to provide information on the status of the provision of emergency medical services (EMS) by emergency ambulance services throughout Minnesota. The tables, graphs, and figures included in this report represent calendar year 1978 data. The report includes some comparison with similar data reported for 1977. The data included in this report were reported by licensed ambulance services in Minnesota and processed by the Minnesota Department of Health.

Some of the findings of this report as compared to 1977 data are as follows:

-- There was virtually no change in the average response time of 18 minutes from call to scene.

-- In 1978 approximately 47.6 percent of all reported trauma injuries were sustained to the head, face and neck. This is down slightly from the 49.2 percent reported in 1977.

-- Both critical and moderate injury rates decreased by approximately 15 percent from 1977.

-- Minor emergencies increased from 69.7 percent in 1977 to 74.6 percent in 1978 (see Graph IV-C). These minor emergencies accounted for nearly three out of four emergency ambulance runs during 1978.

-- The Metropolitan Region at 26.4 cases per 1,000 population continues to have the highest utilization rate per capita. The state utilization rate of 17.9 per 1,000 population is up five percent from 1977.

-- Reported responses to occupational accidents increased 13.7 percent over reported responses in 1977.

-- There was a 15.3 percent increase in ambulance service utilization by persons over 65 years of age over 1977.

Recognition is made of the fact that reporting difficulties have again caused lack of completeness in data collected. Thorough analysis of the data is therefore very difficult, since "unknown" categories comprise large percentages of the totals used in calculations. Thus, data should be interpreted with caution.

It is intended that the facts included in this report will be educational and informative to persons interested in EMS. Comments and suggested formats for information presentation would be appreciated.

SECTION I RESPONSE TIMES/MILEAGES

Section I (graphs A-E) comprises individual components of cumulative response times/mileages for emergent cases in Minnesota by health planning region and statewide during 1978.

Specific categories included are:

Graph A. Response Time from Call to En Route
Graph B. Response Time/Mileage from Base to Scene
Graph C. Time Spent at Scene
Graph D. Response Time/Mileage from Scene to Arrival at a Health Care Facility
Graph E. Cumulative Response Time/Mileage from Call to Arrival at a Health Care Facility

Graph I-A indicates the average response time from call to actual routing of the ambulance. The 1978 data indicate no change statewide from the 1977 response time of 6 minutes.

Of the eight health planning regions represented, three reported an increase in time was necessary to respond to a call, three responded more quickly than in 1977, and two indicated the time spent to be the same as 1977. The Arrowhead region showed the most significant decrease -- from 6 minutes in 1977 to 4 minutes in 1978, a 33.3% decline. Conversely, the Min-Dak region data represented an increase in response time of 33.3% (from 6 to 8 minutes).

Graph I-B illustrates average response time/mileage from base to arrival at the scene of the incident. Comparison of the 1978 data to 1977 indicates no change statewide in time, but a decrease of 11.1% in distance traveled.

The Southwestern region data indicated a 38.5% increase in time (from 13 to 18 minutes) compared to the 18.2% increase in miles traveled. Agassiz data showed the greatest decrease in travel time where a 19.2% difference was realized (from 26 minutes in 1977 to 21 minutes in 1978). However, mileage to the scene in the

Agassiz region also decreased markedly from 26 to 11 miles -- a 57.7% decrease. It is interesting to note that average travel time was less than average miles traveled in two of the regions in 1977, whereas in 1978 all regions reported travel time to be more than mileage. This factor is very likely due to improved reporting.

Figure I-C represents the average time spent at the scene of trauma by accident crews. No change is indicated between 1977 and 1978 data in five of the EMS regions or statewide. Increases in time spent at the scene were apparent in the Min-Dak and Southcentral regions, and the Southwestern region reported the only decrease.

Average minutes at scene

Region	1978	1977	Percent Change
Agassiz	17	17	0.0
Arrowhead	20	20	0.0
Central	14	14	0.0
Metropolitan	19	19	0.0
Min-Dak	17	15	+13.3
Southcentral	17	14	+21.4
Southeastern	15	15	0.0
Southwestern	14	19	-26.3
State	18	18	0.0

Graph I-D depicts response time/mileage from the scene of incident to arrival at a health care facility. The 1978 Statewide time remained unchanged from 1977 data, while mileage dropped 7.1%. Regionally, the most sizeable decrease in both response time and mileage was shown in the Central region where time was reduced from 24 to 21 minutes (a 12.5% decrease) and mileage decreased from 21 to 17 miles (a 19.0% reduction). The greatest increase in response

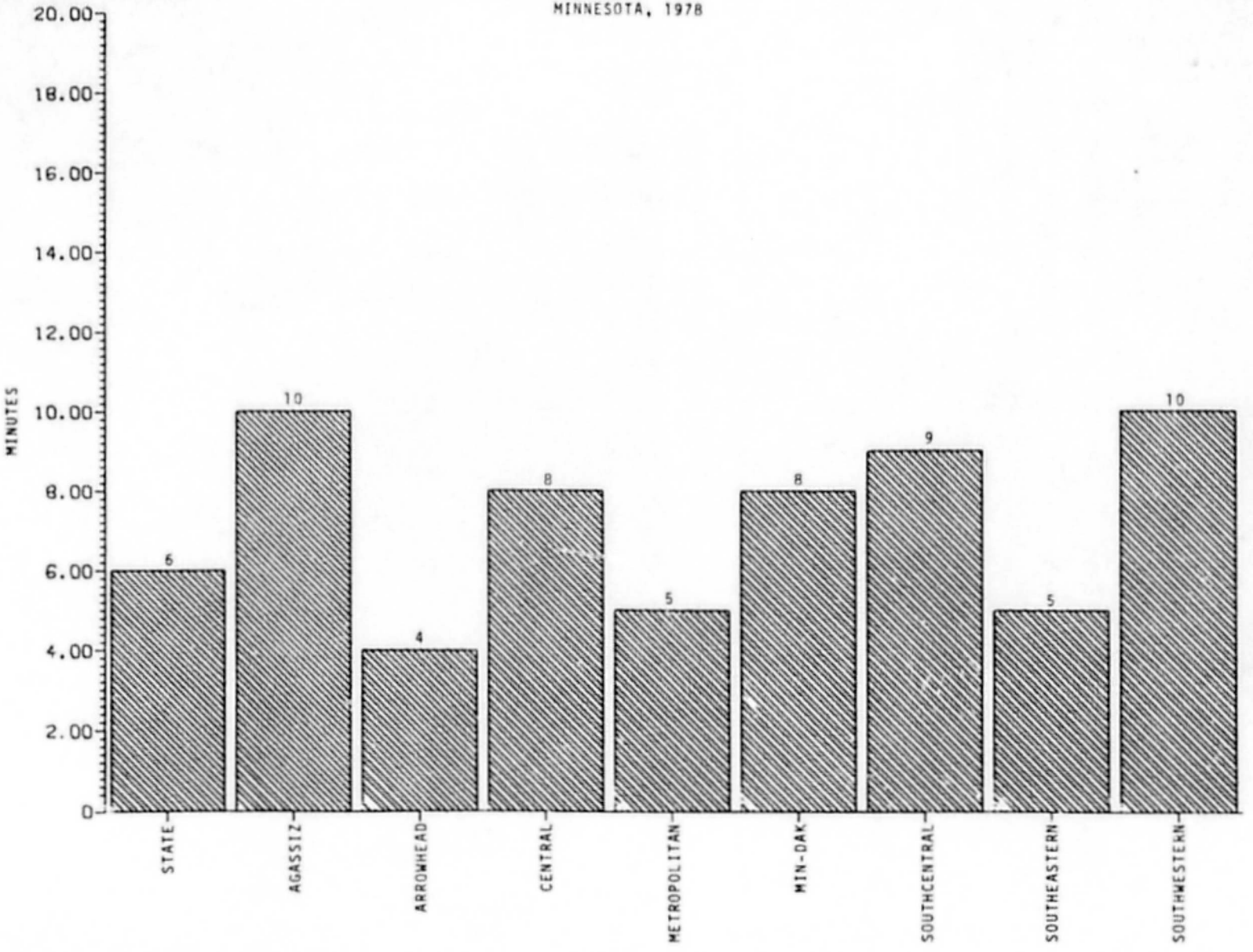
time (35.3%) was indicated in data reported by the Min-Dak region -- from 17 to 23 minutes. Min-Dak data also represented the largest increase in distance traveled with a 21.4% increase observed.

Graph I-E illustrates the cumulative response time/mileage from call to arrival at a health care facility by ambulance services. An overall decrease of 8.7% was noticed in miles traveled statewide, but total average time decreased only 1.8% from 1977 to 1978.

The greatest increase in time (26.5%) was visible in the Min-Dak region (from 49 to 62 minutes), while the Southwestern region reported the largest increase in mileage of 10.0% (from 30 to 33 miles). The most noticeable decreases in both time and mileage were apparent in the Agassiz region where time was reduced from 89 minutes in 1977 to 75 minutes in 1978 (a 15.7% decrease) and miles diminished 37.0% -- from 54 to 34.

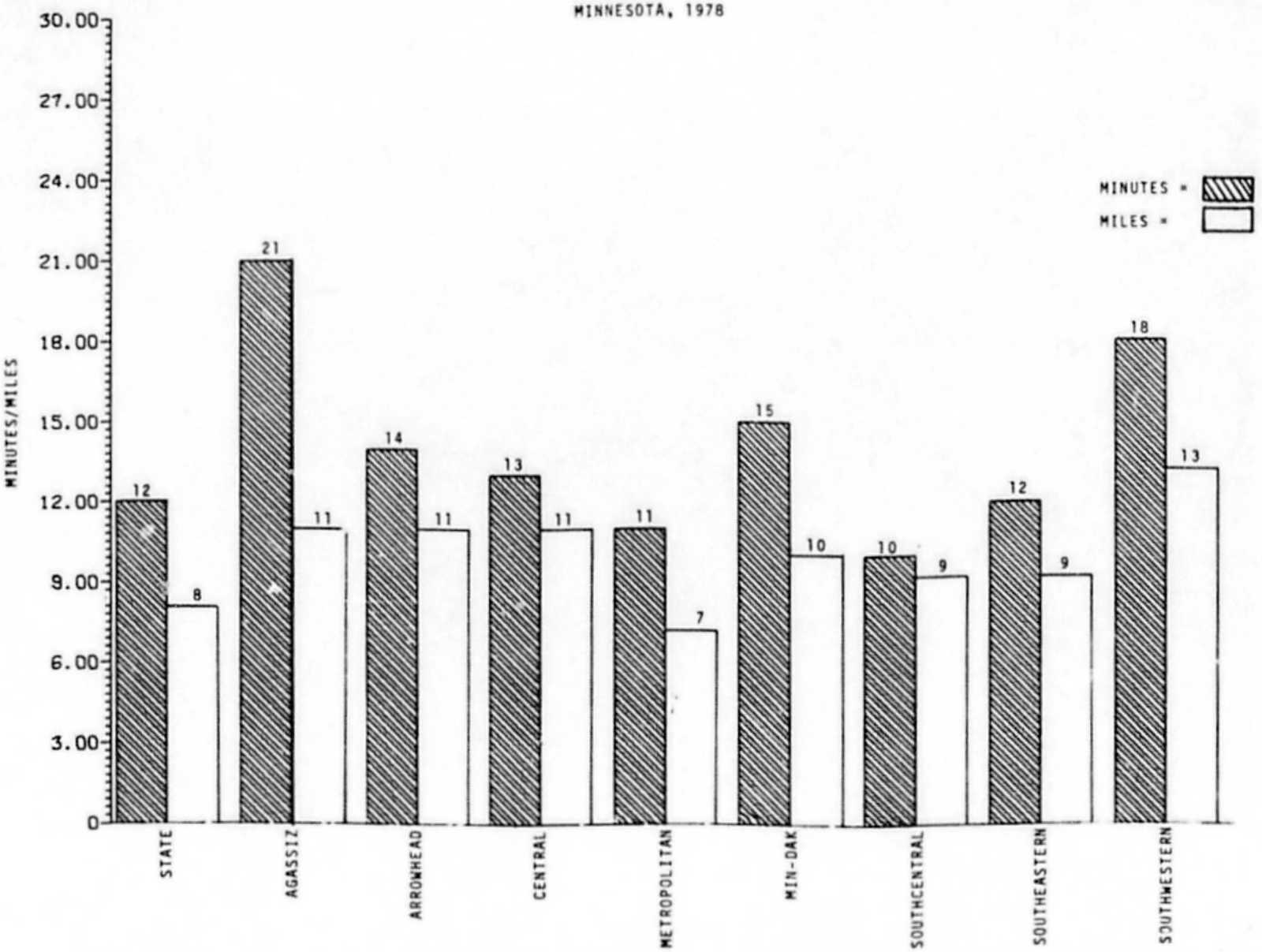
GRAPH I-A

AVERAGE RESPONSE TIME FROM CALL TO EN ROUTE BY EMS REGION
MINNESOTA, 1978



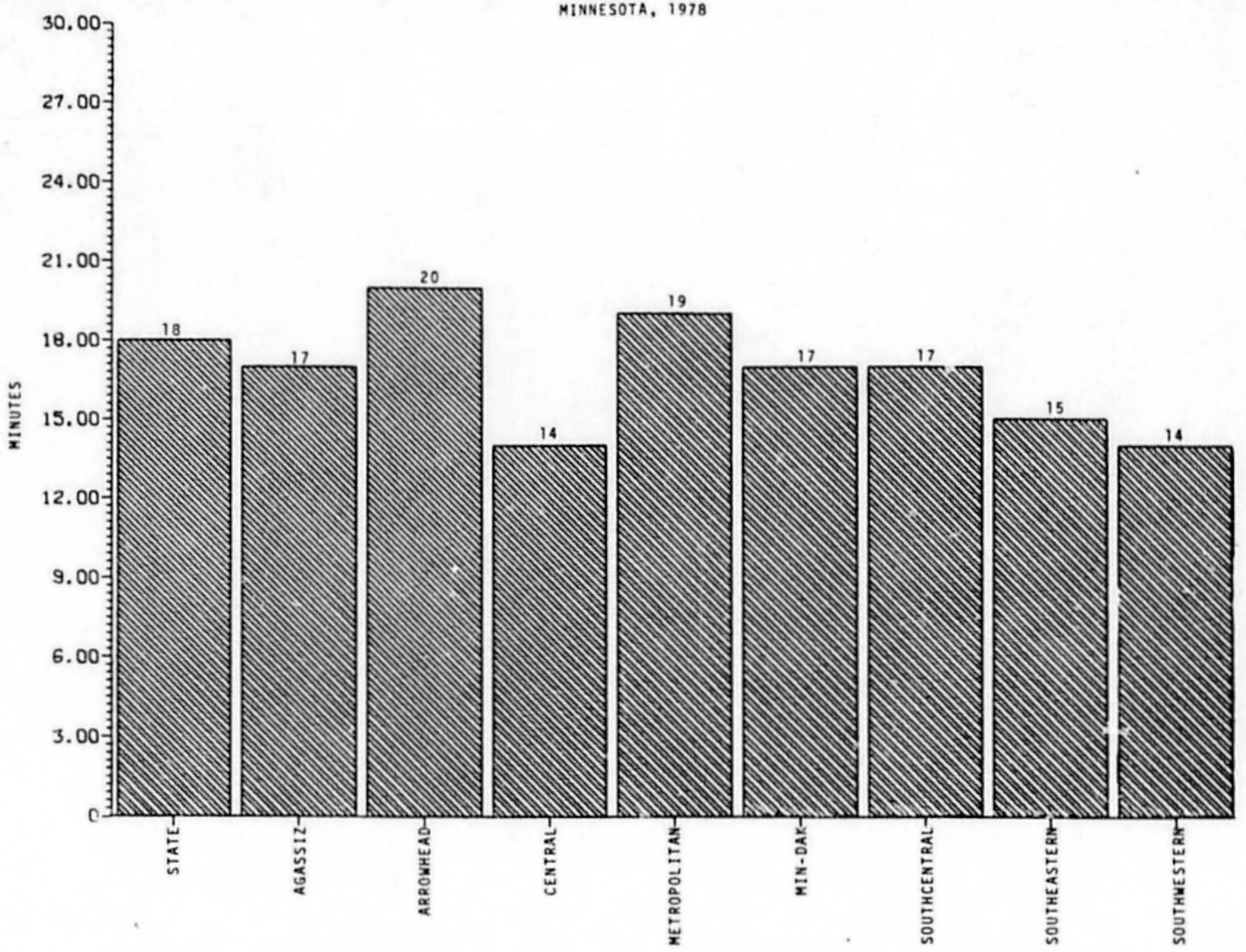
GRAPH I-B

AVERAGE RESPONSE TIME/MILEAGE FROM BASE TO SCENE BY EMS REGION
MINNESOTA, 1978



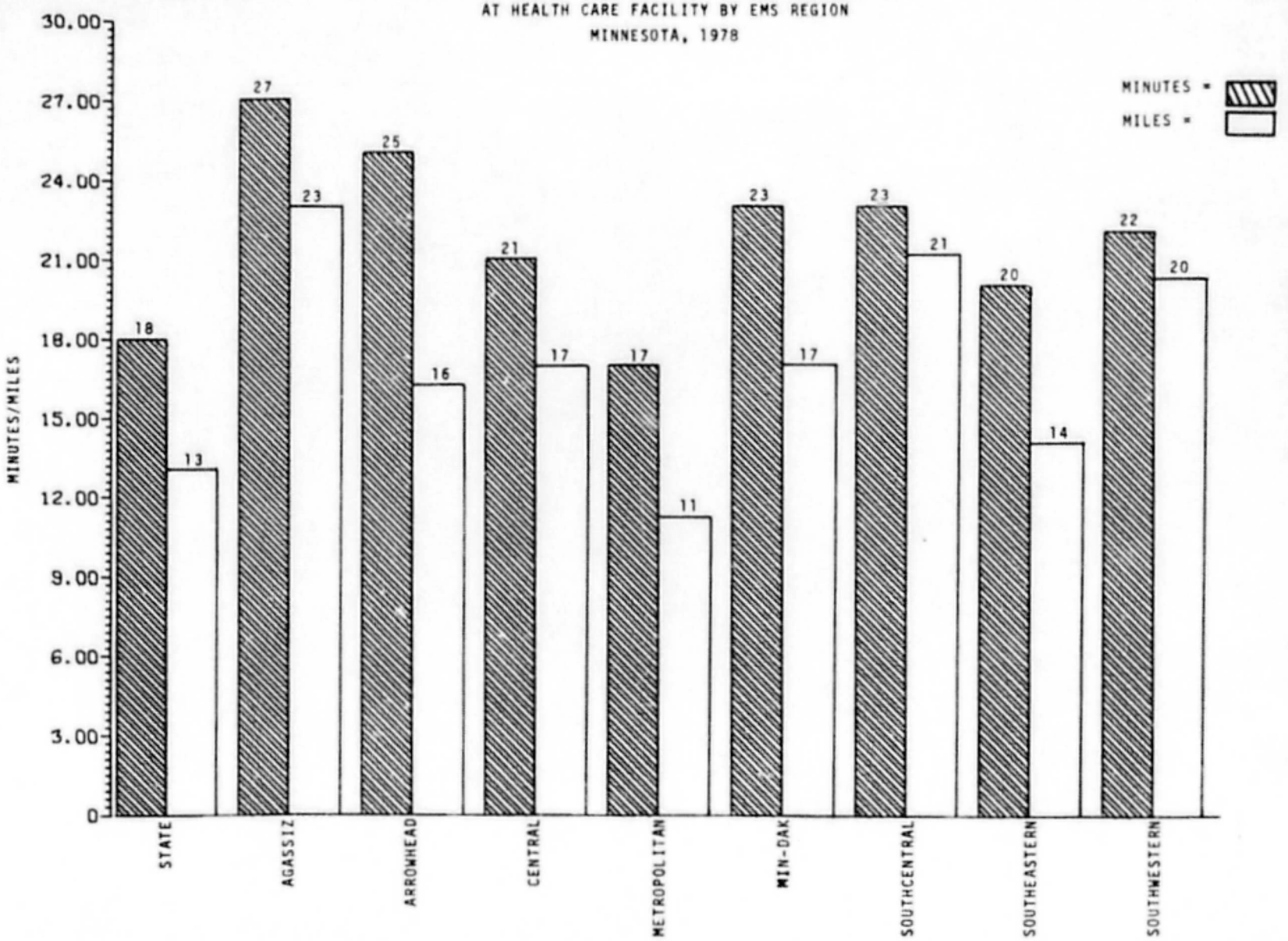
GRAPH I-C

AVERAGE TIME SPENT AT THE SCENE BY EMS REGION
MINNESOTA, 1978



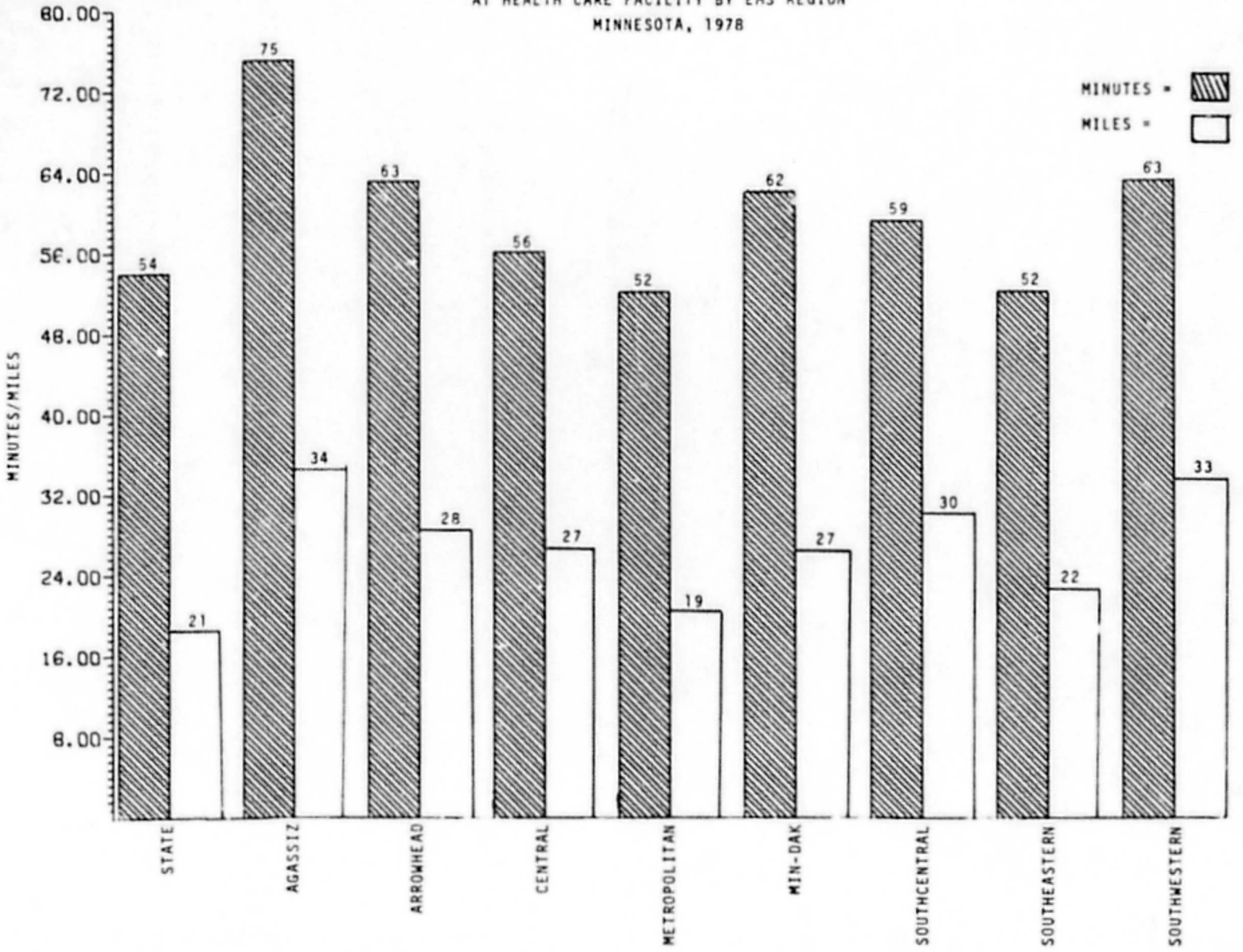
GRAPH I-D

AVERAGE RESPONSE TIME/MILEAGE FROM SCENE TO ARRIVAL
AT HEALTH CARE FACILITY BY EMS REGION
MINNESOTA, 1978



GRAPH I-E

CUMULATIVE RESPONSE TIME/MILEAGE FROM CALL TO ARRIVAL
AT HEALTH CARE FACILITY BY EMS REGION
MINNESOTA, 1978



SECTION II TRAUMA BY AREA OF INVOLVEMENT, REPORTED CASES

The 1978 reported trauma by area of body involvement is explained in the narrative below. The category "pain" is not included in the percent calculations largely because of its indeterminate nature.

The leading types of injury to the Head were:

1. lacerations (32.7%)
2. abrasions/contusions (23.5%)
3. blunt injuries (18.4%)
4. hemorrhages (17.8%)

The leading types of injury to the Face were:

1. lacerations (48.2%)
2. abrasions/contusions (31.7%)
3. blunt injuries (15.8%)

The leading types of injury to the Neck were:

1. fractures (27.7%)
2. blunt injuries (23.2%)
3. abrasions/contusions (19.4%)
4. lacerations (15.4%)

The leading types of injury to the Chest were:

1. blunt injuries (34.8%)
2. rib fractures (28.8%)
3. abrasions/contusions (20.9%)

The leading types of injury to the Abdomen were:

1. blunt injuries (45.7%)
2. abrasions/contusions (28.3%)

The leading types of injury to the Back were:

1. blunt injuries (32.6%)
2. abrasions/contusions (29.8%)
3. fractures (17.8%)
4. lacerations (9.2%)

The leading types of injury to the Leg were:

1. fractures (42.6%)
2. abrasions/contusions (22.9%)
3. blunt injuries (15.9%)
4. lacerations (13.9%)

The leading types of injury to the Arm were:

1. fractures (29.5%)
2. abrasions/contusions (29.2%)
3. lacerations (22.6%)
4. blunt injuries (12.4%)

The leading types of injury to the Hand were:

1. lacerations (45.8%)
2. abrasions/contusions (31.3%)

The leading types of injury to the Foot were:

1. abrasions/contusions (34.2%)
2. lacerations (27.8%)
3. blunt injuries (23.5%)

Pictorial II-A represents percent calculations of trauma or illness by area of body involvement. Unknown bodily location, unknown type of trauma (consisting of 42.5% of all cases), and the "pain" category are not included in the total trauma figure of 43,374.

Reported head, face and neck trauma involved 47.6% of the total, while injuries to appendages comprised 39.0%. These percentages compare with 49.2% and 37.7% respectively in 1977.

CHEST PAIN

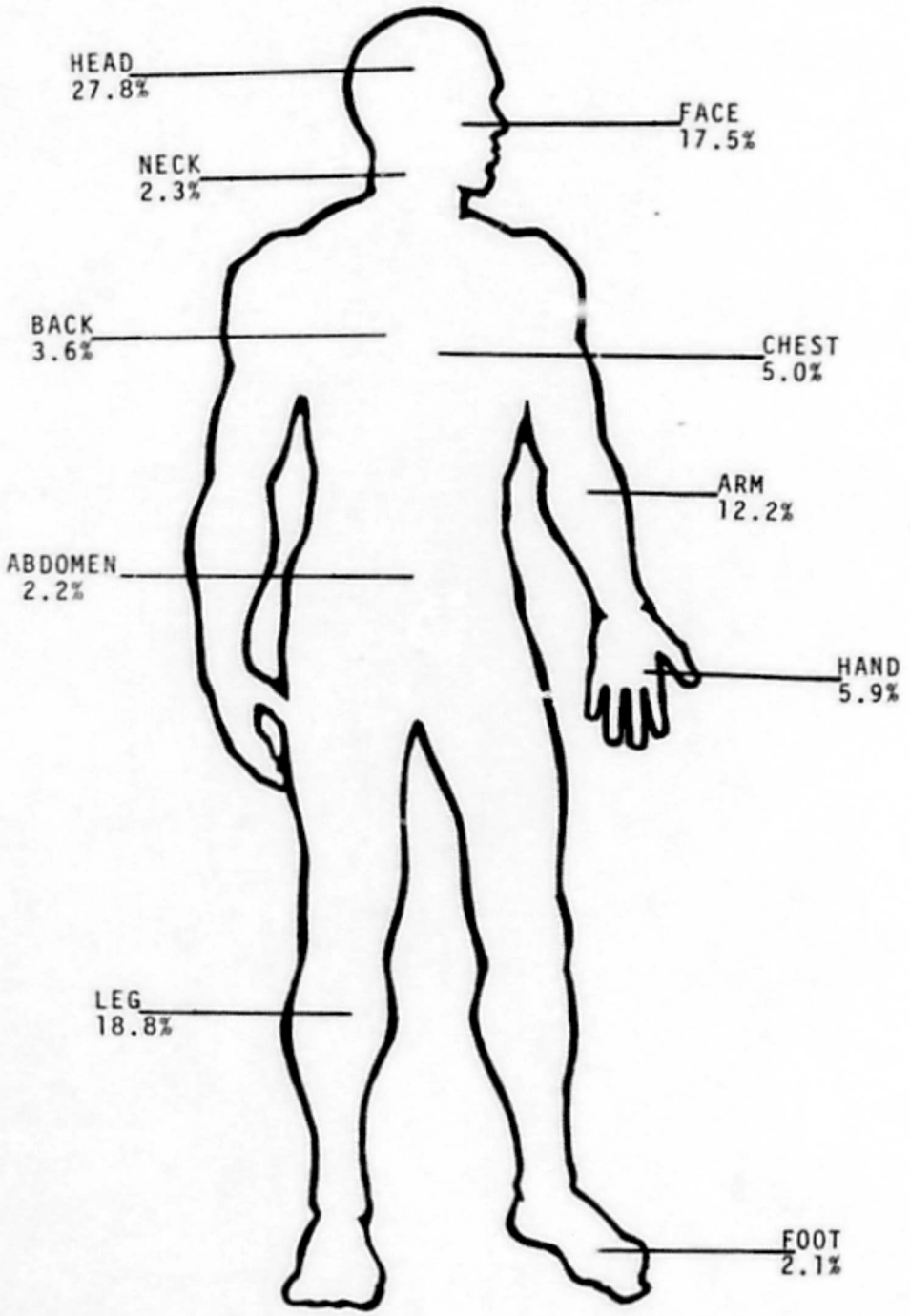
Pain, which is not included in the above categories, occurs in almost 80% of cases involving the chest. Most of these cases involving chest pain conceivably represent internal problems such as heart attack. Following is a breakdown of chest involvement with "pain" included:

1. pain (79.3%)
2. blunt injuries (7.2%)
3. rib fractures (6.0%)
4. abrasions/contusions (4.3%)

Pictorial II-A also excludes pain from the percent calculations. If pain were included, chest involvement would rise to 11.3% of all reported cases rather than the 5.0% indicated in the Pictorial.

Pic. II-A

TRAUMA BY AREA OF INVOLVEMENT
REPORTED CASES
MINNESOTA, 1978



ALL OTHERS 2.5

SECTION III TREATMENTS RENDERED

Table III-A denotes the frequency distribution of treatments rendered to the 71,074 properly recorded emergent cases in Minnesota in 1978. A total of 110,136 treatments (or approximately 1.5 per case) were administered. This compares with the 103,181 reported treatments in 1977 - also 1.5 per case.

The large percentage of "unknown" treatments evolve from reports which do not specify nature of treatment and those cases for which no treatment was necessary.

TABLE III-A

PERCENT DISTRIBUTION OF
TREATMENTS PERFORMED
MINNESOTA, 1978

TREATMENT	FREQUENCY (%)	
OXYGEN	15.2	
ESTABLISHMENT OF AIRWAY	8.4	
TELEMETRY/ECG MONITORING	8.1	
ADMINISTRATION OF IV FLUIDS	7.8	
SPINE BOARD	7.3	
CONTROL OF BLEEDING	6.8	
MEDICATIONS	4.6	
LIMB SPLINTS	3.8	
CPR	1.5	
COLD APPLICATIONS	1.2	
SUCTION	1.1	
PULMONARY RESUSCITATION	0.8	
DEFIBRILLATION	0.6	
ALL OTHER	3.8	
UNKNOWN	28.9	
TOTAL	100.0	110,136 TREATMENTS

SECTION IV URGENCY OF CALL

Table IV-A contains rates per 1,000 population of ambulance cases by urgency of the call.

Arrowhead regional data indicated the highest critical injury rate in 1978 whereas the Metropolitan region denoted the highest rate of minor injury. These findings coincide with the ranking in 1977.

The total Statewide rate increased by 4.7% due to the 10.8% rise in rate of minor injuries. Both critical and moderate injury rates decreased by approximately 15% from 1977 reported data.

TABLE IV-A

REGIONAL AND STATE RATES PER 1,000 POPULATION*
OF AMBULANCE CASES BY URGENCY,
MINNESOTA, 1978

REGION	CRITICAL	MODERATE	MINOR	UNKNOWN	TOTAL
STATE	1.1	2.8	13.3	0.6	17.9
AGASSIZ	1.0	1.6	5.5	0.7	8.8
ARROWHEAD	1.5	3.0	11.2	0.9	16.7
CENTRAL	1.3	2.4	5.3	0.5	9.5
METROPOLITAN	1.2	3.8	20.7	0.7	26.4
MIN-DAK	0.5	1.2	5.4	0.4	7.5
SOUTHCENTRAL	0.8	1.6	5.3	0.7	8.4
SOUTHEASTERN	1.0	1.9	7.5	0.5	10.8
SOUTHWESTERN	0.6	1.0	2.9	0.3	4.8

* Rates per 1,000 population calculated from 1977 Provisional Population Estimates prepared by the Office of the State Demographer.

As shown in Table IV-B below, 1978 data denote a slight increase of 4.7% in the utilization rate of ambulance service in Minnesota since 1977. The only major regional changes were observed in the Southcentral region, where utilization rates increased by 10.5%, and in the Southwestern region as the rate dropped 11.1%. Metropolitan region data continued to display the highest utilization rates of all EMS regions.

TABLE IV-B

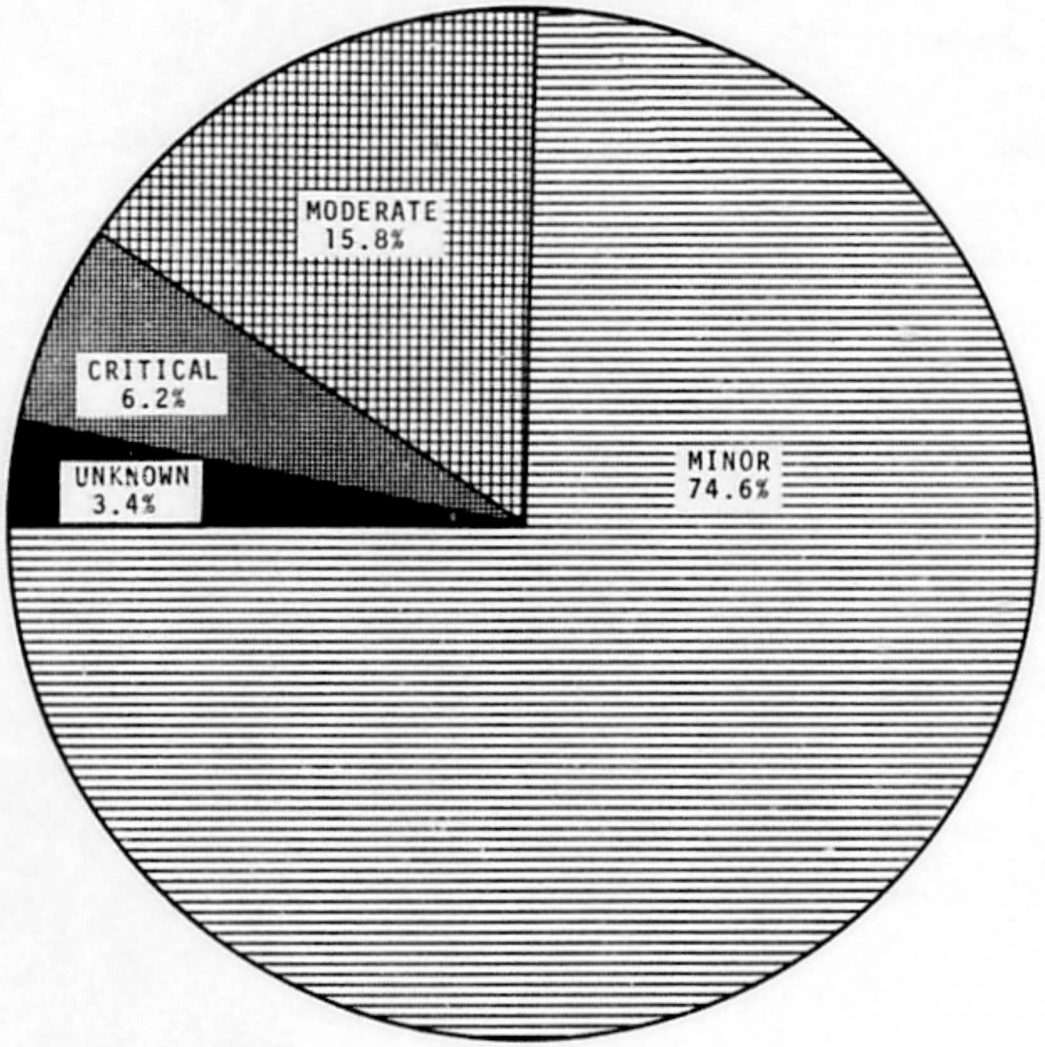
TOTAL UTILIZATION RATES* BY EMS REGION AND STATEWIDE 1977 AND 1978

	RATES	
REGION	1978	1977
State	17.9	17.1
Agassiz	8.8	8.4
Arrowhead	16.7	17.9
Central	9.5	9.5
Metropolitan	26.4	24.6
Min-Dak	7.5	7.6
Southcentral	8.4	7.6
Southeastern	10.8	10.9
Southwestern	4.8	5.4

* Rates per 1,000 population calculated from 1977 Provisional Population Estimates prepared by the Office of the State Demographer.

GRAPH IV-C

PERCENTAGES OF TOTAL AMBULANCE
RUNS BY URGENCY
MINNESOTA, 1978

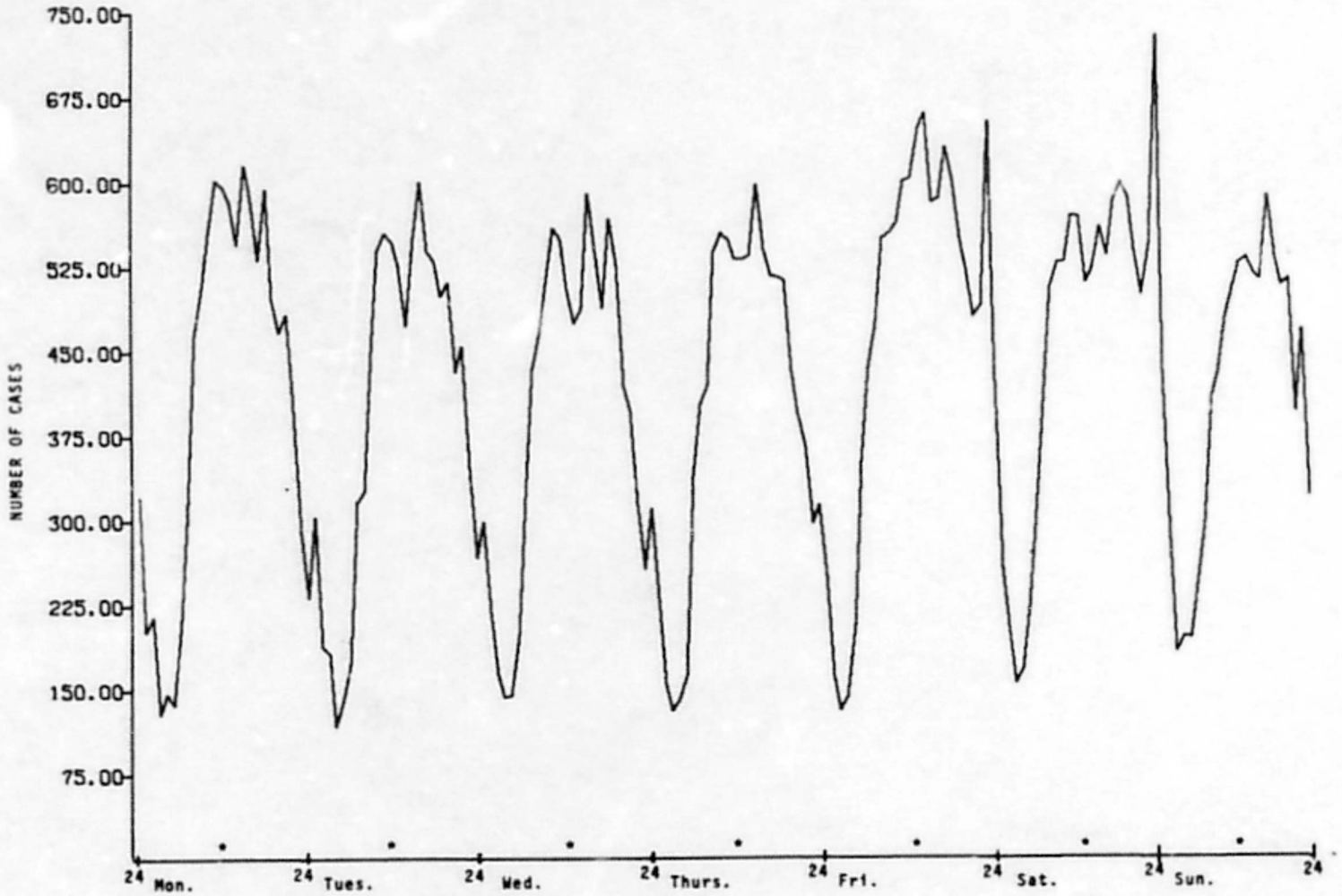


SECTION V DISTRIBUTION OF CASES BY TIME AND DAY OF WEEK

Graph V-A illustrates the statewide distribution of ambulance cases for each 24 hour period during the week. The highest demand for ambulance service emerged during the 1600 hour (4:00 to 5:00 P.M.), when 5.7% of all runs occurred. The lowest percentage of incidents transpired between the hours of 0400 and 0600 -- approximately 1.5% of total ambulance runs occurred in each hour. As indicated in Graph V-A, frequency of incidents did not vary appreciably throughout the weekdays. As one would expect, Friday and Saturday lead in greatest number of incidents occurring per day with each day holding 15.4% of total ambulance cases.

GRAPH V-A

EMERGENT CASES BY TIME/DAY OF WEEK
MINNESOTA, 1978



SECTION VI INCIDENT TYPES

Table VI-A represents the 1978 total number and frequency distribution of incident types for each health planning region and statewide.

The most notable changes between 1977 and 1978 data appear in occupational incidents, which rose 13.7%, and in school incidents which declined 11.3%.

Again, as in 1977, it is difficult to analyze regional data due to the fact that the unknown category comprises at least 19% and as much as 43% of the total reported incidents regionally and 23.1% statewide.

As indicated in Graph VI-B the percent distribution of incident types has fluctuated only slightly in most categories. All defined categories with the exception of occupational and unknown declined in 1978. This factor may indeed be due to the increase in the unknown incident type.

TABLE VI-A

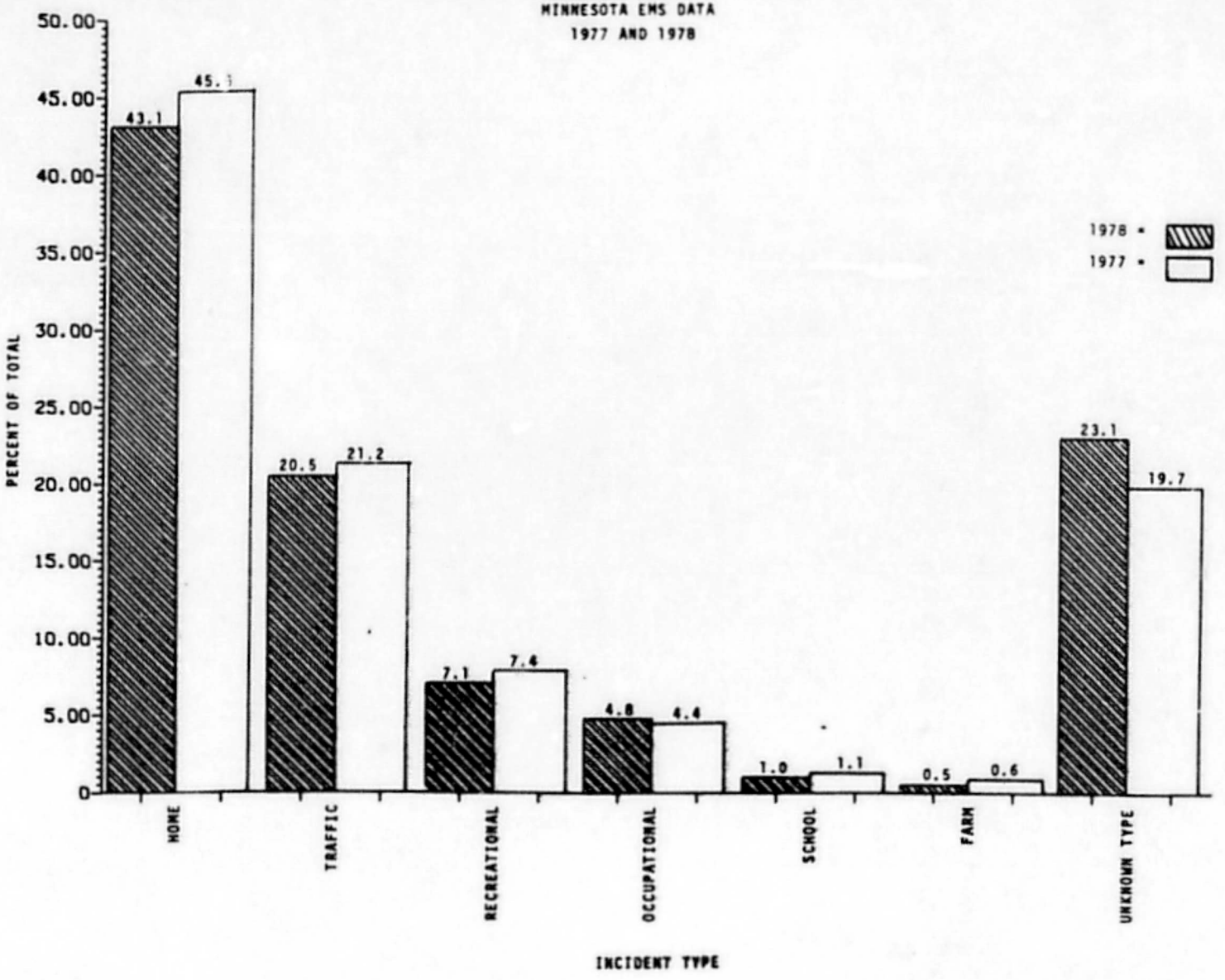
FREQUENCY OF INCIDENT TYPES BY HEALTH PLANNING REGION AND STATEWIDE
MINNESOTA, 1978

	INCIDENT TYPE							
REGION	HOME	TRAFFIC	RECREATIONAL	OCCUPATIONAL	SCHOOL	FARM	UNKNOWN	TOTAL
AGASSIZ	348	295	78	35	22	30	614	1,422
ARROWHEAD	2,079	1,247	409	270	56	31	1,607	5,699
CENTRAL	992	1,209	263	91	26	57	1,406	4,044
METROPOLITAN	24,405	9,453	3,841	2,618	486	104	9,885	50,792
MIN-DAK	458	369	79	48	11	19	494	1,478
SOUTHCENTRAL	438	476	57	68	28	31	740	1,838
SOUTHEASTERN	1,477	1,146	277	205	50	55	1,128	4,338
SOUTHWESTERN	423	341	69	61	11	40	518	1,463
STATE TOTAL	30,620	14,536	5,073	3,396	690	367	16,392	71,074

• Indicates 1200 Hour (Noon)

GRAPH VI-B

PERCENT OF TOTAL AMBULANCE RUNS BY INCIDENT TYPE
MINNESOTA EMS DATA
1977 AND 1978



SECTION VII AMBULANCE SERVICE UTILIZATION BY AGE GROUP

The 1977 population by age group* was used to obtain rates** of ambulance service utilization by age group for 1977 and 1978 reported Minnesota data.

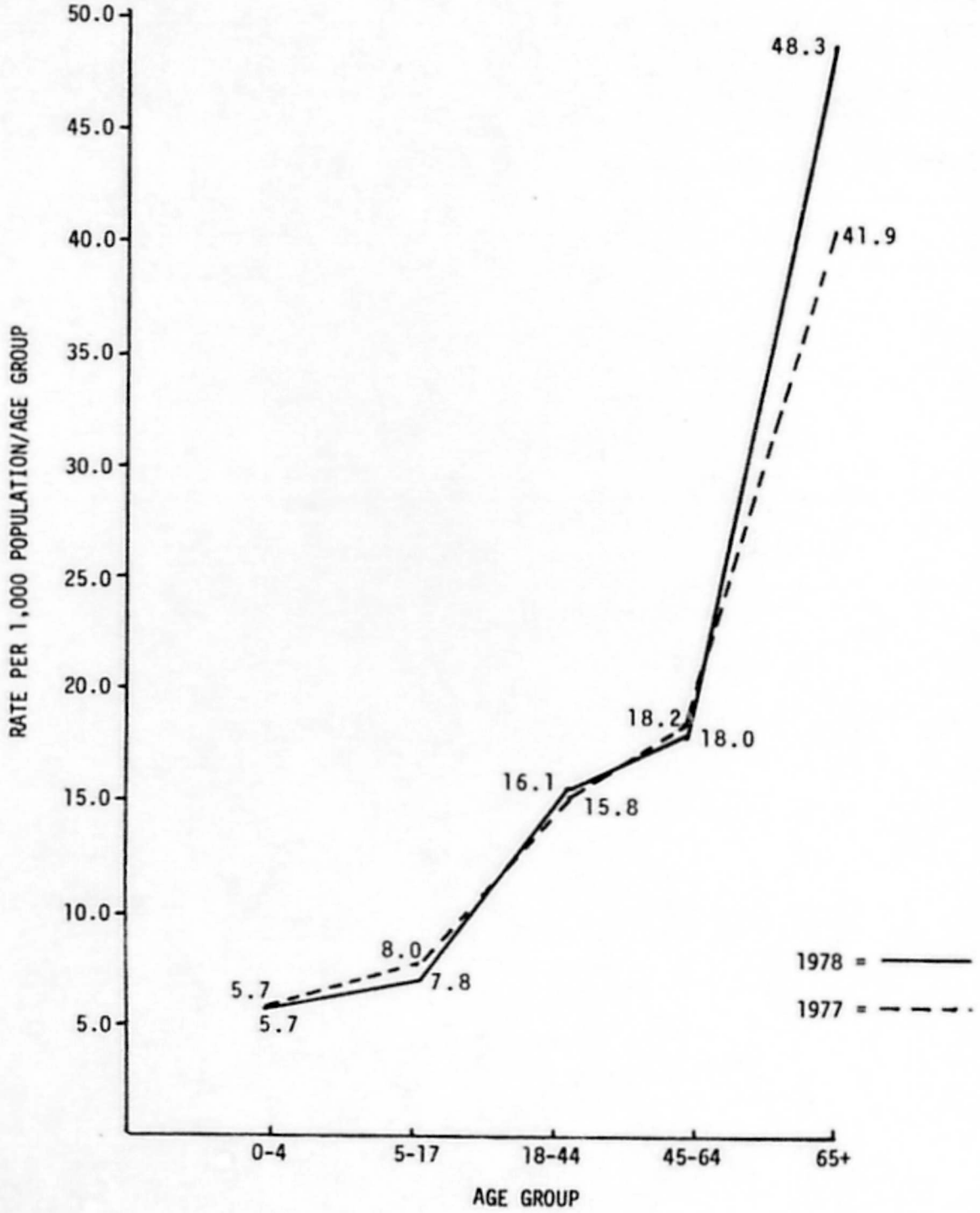
There was a 15.3% increase in ambulance service utilization by the 65 and over population - rates rose from 41.9 to 48.3. As Graph VII-A illustrates, little change was apparent in utilization rates for other age groups.

* Population estimates by age group derived from Minnesota Center for Health Statistics age-sex population estimates

** Rates calculated by ambulance services rendered per 1,000 population

GRAPH VII-A

AMBULANCE SERVICE UTILIZATION BY AGE GROUP
MINNESOTA, 1977 AND 1978



Appendix I

Company:

Crew:

Location:

Name:

Address:

Pt. M.D.

Receiving M.D./R.N.

☐ I Refuse Treatment/Transportation

LEVEL OF CONSCIOUSNESS

☐ ALERT ☐ REACTS TO PAIN
☐ DROWSY ☐ UNRESPONSIVE
☐ REACTS TO VOICE ☐ DETERIORATED EN ROUTE

PUPILS (R / L)

☐ ☐ CONSTRICTED
☐ ☐ DILATED
☐ ☐ REACTS
☐ ☐ UNREACTIVE

BREATHING

☐ S.O.B.
☐ LABORED
☐ NORMAL

☐ VITAL SIGNS ABSENT
☐ DOA (SCENE)
☐ DOA (HOSP.)

SKIN

☐ NORMAL ☐ COLD
☐ PERSPIRING ☐ HOT
☐ CYANOTIC

MENTAL STATUS

☐ ORIENTED
☐ DISORIENTED

Problem:

TIME	B/P	PULSE	RESP	
		P_1		POSITION AT SCENE: ☐ FACE DOWN ☐ SITTING ☐ ON BACK ☐ STANDING ☐ ON SIDE
		P_2		☐ CITIZEN CPR ☐ ANTI-SHOCK TROUSERS ☐ STRETCHER ☐ AMBULATORY
		P_3		

96151

EMS #

DATE

CALL #

OPTIONAL

ODOMETER START

TIME—MILITARY
CALLED
ENROUTE
AR SCENE
LV SCENE
AR HOSP

AT SCENE

AT HOSP

HOSP

OTHER THAN HOSP

AGE

SEX

RED LIGHTS & SIREN
OUT
IN
RUN CANCELLED

CITY LIMITS
INSIDE
OUTSIDE

ACCIDENT TYPE
TRAFFIC
FARM
HOME
OCCUPATIONAL
RECREATIONAL
SCHOOL
OTHER

COMPLETE SHADED DATA ITEMS FOR EACH EMERGENCY RUN.

COMPLETE OTHER ITEMS AS REQUIRED.

(D-810 (10-76)

ESTAB. AIRWAY
ORAL AIRWAY
ESOPHAGEAL TUBE
CPR
PULMONARY RESUSCITATION
CONTROL BLEEDING
OXYGEN
SUCTION
LIMB SPLINTS
TRACTION SPLINT
SPINE BOARD
OBSTETRICAL
IRRIGATION
COLD APPLICATION
INCUBATOR (NEO-NATAL)

PATIENT RESTRAINTS
OTHER

	HEAD	FACE	NECK	CHEST	ABDM	BACK	LEG	ARM	HAND	FOOT
ABRASION-CONTUSION										
LACERATION										
BURN										
BLUNT INJURY										
PENETRATING INJURY										
PAIN										

	SKULL	NECK	RIBS	BACK	PELVIS	UPPER ARM	LOWER ARM	UPPER LEG	LOWER LEG
FRACTURE									

	MOUTH	NOSE	EARS	VAGINA	RECTUM	LACERATION
HEMORRHAGE						

	NOSE	EAR	LEG	FOOT	TOE	ARM	HAND	FINGER
AMPUTATION								

CONDITION
☐ CRITICAL
☐ POOR
☐ FAIR
☐ SUSPECTED OVERDOSE

☐ EXTRICATION

COPIES GO TO:
(1) AMBULANCE SERVICE
(2) BOARD OF HEALTH
(3) HOSPITAL
(4) FILE

MINNESOTA BOARD OF HEALTH 717 DELAWARE MPLS., 55440

EMERGENCY MEDICAL SERVICE RECORD

AMBULANCE SERVICE COPY

Emergency Medical Services Regions