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Present status of medical transportation and communication in Nebraska

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PRESENT STATUS OF MEDICAL TRANSPORTATION AND COMMUNICATION IN NEBRASKA

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Ever since the inception of man he has been subjected to and suffered from physical trauma. Man has also suffered from sickness since his creation. He has been injured or become ill on the battlefields, hunting grounds, and places of pleasure. It would probably be safe to say that anywhere man has been he has been in danger of trauma or sickness. The latter aspect has brought to light the need for some mode of transportation when he became ill or injured away from home. He has needed a vehicle to move him to a place where care could be provided. "A vehicle to transport the sick and injured" is the definition Dorland's Medical Dictionary uses to define the word ambulance.[2] The vehicle has probably ranged from a man's back to our present day helicopter.

The development of this vehicle to transport the sick and injured is interesting. Sources are not complete and are rather sketchy. Ambulance development has seemed to parallel that of wars. This is probably because wars present all types of injuries. As war has become more devastating and more men have been in need of ambulance service, advances have been made in the organization of care and transportation of the sick and injured.

What is often called the oldest ambulance organization in the world is the British Ambulance Association of St. John

of Jerusalem. It was originated in 1048 A.D. during the crusades. It then fell dormant after the completion of these battles and was resurrected in 1870 under the above name with a mission of rendering first aid to persons in road, railway, and civil accidents.[6]

Ambulance organization as we know it today apparently began in the last decade of the 19th century. This was in connection with the Napoleonic wars. The leader was Dominique-Jean Larrey (1766 - 1842), a French military surgeon who served under Napoleon as Surgeon in Chief of the Grande Armee. He organized his Ambulance Volante or so-called "flying" field hospitals. These units removed the wounded from the battlefields in light carriages and provided preliminary surgical treatment. It is said his ambulances joined the battles directly and did not wait for their termination.[3]

George J. Curry, M.D., FACS, gave a good account of our own ambulance development in a keynote speech to the American Association of Ambulances convention in Miami Beach, Florida, on November 7, 1963. He states " Our own Civil War marked the beginnings of our ambulance system. Not only were horse or mule-drawn ambulances used, but hospital trains and boats, pack animals, hand carts, and oxen were equipped to carry wounded soldiers from the field of battle. Jonathan Letterman conceived his plan for an ambulance corps in 1862, and it was

eventually endorsed by Congress in an act dated March 11, 1865. Letterman was Medical Director for the Army of the Potomac. He planned an ambulance service for each army corps with adequate, well-disciplined personnel under sole control of the Medical Director. His scheme was first used in the Battle of Antietam in September, 1863. The effectiveness of Letterman's plan was in sharp contrast to the haphazard management of casualties characteristic of earlier battles such as Bull Run, where wounded lay on battlefields as long as thirty-six hours before evacuation. Letterman used three hundred ambulances to collect and shelter ten thousand wounded in twenty-four hours."

For thirty years immediately following the American Civil War, little is known about the type and quality of emergency care and transportation of the injured used in the United States. A pernicious practice in the latter 19th century was to send persons injured in street accidents jolting off in a passing hack or cab. This was considered luxury in some cities, and the attending policeman would hail an express wagon or truck team instead."

In the 1890's, large New York hospitals such as Bellevue, New York, Roosevelt, and Presbyterian had horse-drawn ambulances. These vehicles were staffed by internes. The driver had two duties - to drive the horse at a gallop with one hand and bang a gong with the other. There was space for two to four litters, and an interne stood or sat in the rear. The Presbyterian Hospital had

one of the first horseless ambulances, electrically driven. This vehicle did well on the downgrade, but on the upgrade a horse named "Chester" was kept nearby for aid."

"To Chicago belongs the distinction of having the first automobile ambulance in this country. The following date-line was carried in the New York Herald Tribune on February 24, 1899. The first automobile ambulance ever constructed was presented today to Michael Reese Hospital of Chicago. It was built in this city and was the gift of five prominent businessmen. Its weight is sixteen-hundred pounds, and its speed approximates sixteen miles per hour."[1]

Other records indicate that Cincinnati, Ohio General Hospital had a vehicle used to transport patients prior to 1865. New York's Bellevue Hospital began operating an ambulance service in 1870. 1875 brought the first ambulance service to Washington, D.C., and in 1876 Richmond, Virginia began service.

In World War I ambulance units first were issued mule-drawn vehicles, but motor-driven units soon appeared. Helicopter service appeared about 1950 in connection with the Korean conflict.[5]

From this short history it can be seen that ambulance origin and service has become more efficient and sophisticated to meet the needs man has developed to wage warfare in even greater magnitude. This development has had its impact on civilian medical transportation. Even today

it is easy to see that with the threat of atomic war man has and is developing ways to preserve as many lives as possible.

Little documented material could be found concerning ambulance history in Nebraska. By deduction and observation it can be safely said that the majority of small communities in Nebraska receive and have received their ambulance service from the local funeral directors. Various people give as the reason for this the availability to the funeral director of an enclosed vehicle capable of transporting a person in the prone position. So in smaller communities the history of development of transportation of the sick and injured would closely parallel that of the funeral vehicle or hearse which began as a horse-drawn carriage and has evolved to the present day vehicles. Also the funeral director was probably frequently called to the scene of trauma to remove bodies and was available to transport injured victims. These observations and generalizations apply to the great majority of communities in Nebraska, and as will be shown later, funeral directors still provide a good share of the ambulance service.

A new force has developed in the past twenty years. This is the emergency first aid vehicle of which Nebraska now has approximately 125. These are designed to meet emergency situations - accidents, fires, drownings, and such and are manned by volunteers for the most part who have taken upon themselves the task of performing emergency

first aid and short distance transportation. These vehicles usually are van or panel trucks and carry emergency first aid equipment.

The history of ambulance service in Nebraska's largest city, Omaha, again is sketchy, and no documented evidence could be found. However, George Nothhelfer, executive vice president of the Omaha Safety Council, took it upon himself in 1962 to discuss this history with various individuals who might recall it. The story he then recorded is quite interesting. The story begins with the Police Emergency Ambulance Service. This consisted of stretchers carried in patrol wagons. These vehicles were manned around the clock and were dispatched to accidents. In the event that it was necessary to transport an injured person he was carried on a stretcher on the floor of the patrol wagon. This practice was continued until 1934.

During 1934 a 1928 Lincoln touring car was rebuilt by the Weir Body Company. It was designed to serve as an ambulance and was placed in service at police headquarters. Shortly thereafter, another such car was rebuilt by the police department garage and was placed in service in the south side of town.

Until 1958 the police department supplied emergency ambulance service in full and then in part. It turned over its vehicles to the fire department in 1958. Two

of the vehicles are now used as "back-up" ambulance vehicles and a third vehicle was turned back to the police department to be used as a morgue vehicle.

From about 1936 to 1958 both the police and fire departments supplied emergency ambulance service. There seemed to be a tacit agreement that the police department would take all accidents in which one person was involved and which required no rescue work. Another provision was that the victim must be out-of-doors. This was a necessary provision because technically the fire department could make forcible entry into a building while the police department could not. The fire department also covered a large number of cases in which cessation of breathing was a factor.

The next development was that of the fire department rescue squad. Rescue units were not unique in metropolitan fire departments in 1934 when Omaha felt the need for one. The occasion that emphasized the need was a fire which occurred in a sugar warehouse in the neighborhood of Eleventh Street and the Viaduct. About fifteen to twenty firemen were overcome by smoke and fumes. It was necessary to carry the men to hospitals in fire department chiefs' cars. This motivated Chief Arthur Olson to investigate the possibility of supplying some form of emergency transportation and rescue service for

the protection of his men. Chief Olson had served as fire department master mechanic and was equipped to design the type of vehicle that he felt would be needed. Messrs. Meister and Marcheltt, the chiefs' chauffeurs, called upon businessmen to raise money to buy and equip such a unit. The first unit was a Diamond T truck. It was built in part in Kansas City and finished in Omaha.

Mr. Ben Meister was a patient of the late E. L. McQuiddy, M.D., and the two men visited frequently about equipment that would be needed for the unit and the type of training necessary for the men who would operate such a unit. Supplies were obtained from McKesson-Robbins for the unit, and it was placed in service June 9, 1936 at the No. 3 Firehouse at 19th and Harney Streets.

The late Dr. McQuiddy, a Professor of Medicine at the University of Nebraska College of Medicine, co-operated with Mr. Meister for the endorsement of the Omaha-Douglas County Medical Society. He was in fact censored by some of its members for "training laymen to perform surgery and other medical functions".

In 1946, Ak-sar-ben donated a unit to the city at a cost of $14,169.78. On February 1, 1949, December 20, 1951, and December 1, 1958, other units donated by Ak-sar-ben were put into use.

The rescue squad carried inhalators, and the fire department had been advised that the most effective way

of becoming proficient in their use was to employ them in actual emergency situations. This prompted the department to request the police department to refer emergencies for inhalator service to them.

In 1940 the American Red Cross supplied an iron lung to the City. So as not to favor a particular hospital they gave the lung to the fire department which agreed to move the lung on call.

Some statistics from Mr. Nothhelfer's report include these. From 1958 to 1962 total runs increased from 3058 to 5930. Miles travelled increased from 24,159 to 45,258. Emergency victims transported - 2272 to 4907. Auto accidents increased from 124 to 769. It should be noted that the fire department took over full responsibility for emergency transportation in 1958.[6]

The addition to the history of medical transportation of organized medicine in the United States parallels closely the development of the Committee on Trauma of the American College of Surgeons. The birth of this Committee really began in 1922 as the Committee on Fractures of the American College of Surgeons. Its primary aim was to improve the treatment of fractures. It grew out of the aftermath of World War I when many general surgeons were shocked to find how little was known by the medical profession about the care of fractures.

In 1939 the scope of the Committee was enlarged to try to cover the whole field of trauma, and in 1949 the name was changed to the Committee on Trauma.

The John A Hartford Foundation, Inc. made a three-year trant to the American College of Surgeons in 1960 to assist in promoting improvements in the care of the injured patients. The grant has been used to assist in supporting a field program. The purpose of this program is to improve medical management of the injured patient by assisting state, provincial, and local committees in every possible way. The first project of the field program was the study of the means of improving the quality of emergency facilities in hospitals. After this study was underway the program entered into the field of what happens to the person at the site of the accident and how he is transported.

This second program, like the first, is a broad problem. Where any regulation of ambulances exists, many types of control are found. There is much variance in the quality of drivers and attendants. Ambulance ordinances and legislative acts are rare and usually not enforced. Ambulances are expensive, but it is generally admitted that they are not built for functioning as they should for the good of the injured. Equipment is often supplied and no one is taught how to use it. More commonly, the ambulance is a practically empty vehicle even if the attendant is a trained person.[6]

The purpose of this thesis is a study and review of the present status of Nebraska's medical transportation and communications. The reasons for such a study are not readily apparent because few statistics are available of any kind concerning these subjects. Studies on the national level, other states, and isolated incidences in Nebraska adequately justify such a study.

In 1956 the American College of Surgeons, the American Association for the Surgery of Trauma, and the National Safety Council joined together in a Joint Action Program. One activity under the Joint Action Program was the designing of a questionaire to gather data on transportation of the injured in cities of various sizes. This was done after the executive committee of the Traffic Conference of the National Safety Council recommended that such a questionaire be circulated as part of the Annual Inventory of Traffic Safety Activities for 1958. The questionaire was mailed to 1569 cities. Completed questionaires were received from 865 cities, and these form the basis of the report.

The questionaire gathered data concerning: 1) the number and type of casualty-carrying vehicles and their equipment, 2) agencies, organizations, corporations, or individuals responsible for providing vehicles, 3) whether an attendant accompanied the driver of the

vehicle transporting the injured and what official position he held, 4) were the driver, attendant, and other personnel trained in first aid, 5) was training of personnel and the equipment on casualty-carrying vehicles regulated by city ordinance or state statute, 6) an opinion as to whether the reporting city provided safe and effective transportation of traffic casualties to a hospital, 7) in the opinion of persons concerned, would a traffic casualty in that city be transported to a hospital in a way conducive to his best interests and recovery, and 8) a description of laws, regulations, and policies in the reporting city governing safe driving and adherence to traffic regulation by vehicles transporting the injured.

They considered ambulances and dual-purpose patrol cars as the proper vehicles for transportation of the injured. Patrol cars should be used only in very slight injuries. They found that in the larger cities (500,000 to 6,000,000) only 39.1% of the vehicles used were either ambulances or dual purpose patrol cars. In the medium sized cities (50,000 to 500,000) 49.4% and in the smaller cities (10,000 to 50,000) 64.5% were considered adequate vehicles. In each group of cities a large number of patrol cars were used. They felt that the mere use of patrol cars implies inferior transportation of the injured.

Another field was the area of the number of people present at the scene of the accident for emergency care. It was found that a helper was available in the great majority of cities. Only 37 cities in all three groups reported no one other than the driver in attendance. From their returns it was impossible to evaluate training of the attendant and driver.

The results concerning the equipment carried left much to be desired. As a minimum the vehicles should have material for splinting fractures, controlling of hemorrhage, and dressing of wounds. Oxygen should also be available. The survey also showed that the number of ordinances regulating equipment were few. This is an area in which the American College of Surgeons favors further controls.

In the area of adequacy of training the survey showed a substantial percentage have had training in first aid. There was no indication of the level of training achieved. Of the 865 cities reporting, only 105 had city ordinances covering this area. 105 cities were covered by state statutes with much overlap. The states reporting did not include Nebraska.

The last two areas evaluated concerned effectiveness of emergency care and the safeness and sameness of the transportation. Since the results were so in favor

of these areas and since the questionaire required opinions of a city official, understandably prejudiced, little information was gained in these areas.[4]

This is one of the more elaborate indications of the need for study, review, and upgrading of our medical transportation system. There are many others. It was estimated from the above study by the Assistant Director of the American College of Surgeons, Dr. James B. Mason, that 25% of those persons totally disabled in traffic accidents would not be supplied with proper care and transportation after the accident.[4]

True, it can be said that the above statistics and findings cover cities 10,000 or over, and this applies to very few of Nebraska's communities. Since there are few available statistics in the state one might reason that this is indeed the case in Nebraska as well. However, it is interesting that studies have shown that injuries per population are more common in rural areas than urban areas. A study by the Department of Public Health of California showed that there were more traffic injuries/1,000 population in rural areas than urban areas - the figures being 13.72/1,000 in rural areas and 9.17/1,000 in urban areas. Fatalities were also greater per accident - being 0.153/1,000 population urban and 0.636/1,000 in rural areas. These figures pertain to traffic

accidents. It also appeared from their data that the proportion of the severe types of vehicular accidents is higher in urban areas, but the death rate as mentioned is higher in rural areas. Therefore the assumption that the higher death rate in rural areas is attributable to more severe accidents cannot be made. The investigators seemed to feel the answer to this paradox could be found in the factors occurring after the accident had happened.

They reason that by their very nature, rural accidents are less likely to be found immediately. Rural accidents more frequently involve only a single vehicle. Once a rural accident is discovered, transportation to a source of definitive medical care is harder to obtain, as was indicated in their study by the fact that, despite less severe injuries, 90% of the deaths in rural counties within one hour after injury occurred at the scene of the accident, while only 37% of urban deaths in the same interval were at the scene. The additional fact of greater distance to a medical facility further compounds the problem.[10]

When Nebraska is considered in the same type of study it isn't difficult to imagine what the results would be. Nebraska is grossly rural. In some areas of the state great distances are involved between communities, and hospitals are frequently far-removed from each other. Many highways in the north central and

western areas are lightly travelled. So if these are the findings in a state like California which still considers some of its parts rural, what is the case in Nebraska?

The only statistics or figures available in Nebraska are really estimates. They concern accidents involving ambulances. According to Thomas P. Ryan, State Safety Coordinator, there are ten to twelve accidents a year involving ambulances. The investigation of these usually points to inability and irresponsibility on the part of the driver. There is according to Mr. Ryan, evidence of unwarrented speed and unnecessary use of sirens. One example drives home the point. He related the story of a recent ambulance accident involving an ambulance traveling at excessive speed, sounding the siren, and using the flashing signal on an open highway. A car in front of the ambulance attempted to pull to the shoulder but was rear-ended by the ambulance before he could complete his move. The passenger in the ambulance, an elderly lady, was seriously injured and later died in the hospital to which she was being taken at the time of the accident. The investigator of the accident states that there was no emergency, and there was no need for excessive speed, siren, etc. A blood test of the ambulance driver indicated an alcohol content of 0.29%. A percentage in excess of 0.15% is considered

intoxicated by Nebraska motor vehicle law. This points up the lack of proper regulation on selection, training, and ability of some ambulance personnel. This is admittedly only one incident. It also points to the possible need for laws concerning speed and use of emergency vehicle warning systems in the state.[8]

Another isolated incident occurring in Nebraska was that related by a physician. A boy had been injured in a football game. His injury was a minor ankle sprain. It was convenient to transport him to the hospital in an ambulance. The problem that arose was that the boy was nearly asphyxiated in the ambulance due to a faulty muffler. This raises the question of maintenance and inspection of ambulances.

So by inference from national studies, the results presented above, and some estimates and isolated incidents in Nebraska, a study of Nebraska medical transportation and communications is indicated and verified.

The questionaires used for this study were developed by the principal investigator of medical transportation and communications in Nebraska, Dr. Lynn W. Thompson. In his first progress report to the Department of Health, Education, and Welfare, he explains how the questionaires were developed. He states, "The primary interest was to determine the desire of the ambulance operators in reference to an economical ambulance with good communications equipment. However, a more comprehensive survey resulted with the purpose of collecting data concerning existing civilian medical transportation and communications conditions in the state. Dr. Thompson spent much time evaluating surveys done in this subject by others. Some parts of other questionaires were used, but much was added dealing with the aspects peculiar to Nebraska."

"As a result of these studies three questionaires were developed. One was designed for physicians, one for mayors of each community, and one for those owning and providing ambulance service to the public. This gave a good range of response from three important groups - city government, the medical profession, and providers of ambulance service."[9]

Every practicing physician in Nebraska received a questionaire and was asked to fill out and return it. These questionaires sought the physicians' opinions on the adequacy of local ambulance services, adequacy of

vehicles, promptness of service, abuse of service by the public, charging for services, and need for improvements. There was a question to be answered concerning the type of service available in their community - private, funeral director, police or fire department rescue units, and others. They were asked if there were periods of time in which the community was without services, whether there was a medical advisory committee, and radio facilities available. Lastly they were asked if they would be interested in participating in a more detailed study of this situation.

The government questionaire was sent to all mayors in all communities in Nebraska. One question required their opinion. This dealt with whether they felt they had experienced any problems with ambulance service in their communities in the last three years. This was a yes or no question situation followed by eight problem situations. They were to check if their community had had problems. These included discontinued service, lack of liason between private companies and public rescue squads, costs, inability to staff volunteer squads, conflicts with the medical profession, political interference, independent attitude of private operators, and abuse by citizens of services offered. The latter part of the government questionaire also required opinions and was designed to determine if there is any need to

change or modify existing situations. These dealt with the mayors' opinions concerning the development at the University of Nebraska College of Medicine of a Department of Medical Transportation for research, education, and advisory services for Nebraska's medical transportation and communications system, development of an economical ambulance unit costing about $4,000, development of a state-wide communications network on one given frequency, development of a medical form to be completed on each patient by the ambulance personnel, development of an educational team to travel to Nebraska communities for the purpose of training personnel, and the development of a uniform code for all ambulance and rescue squads and enforced by proper authorities concerning the aspects of minimum safety standards, minimum sanitation standards, types of vehicles allowed, standard colors for vehicles, standard code for flashing lights, minimum educational requirements, standards for uniforms worn by personnel, standard radio frequency, and central dispatching center for each community for all types of medical transportation units. The remainder of the government questionaire dealt with the gathering of factual data. This included the organizations providing service in the community, the number of vehicles available, the staffing of community rescue units, the presence in the community of an advisory medical staff, subsidies to

private ambulance operators and how it was done, charges to patients by publicly-owned vehicles, the method used in obtaining public ambulances and equipment, the presence of minimum standards for inspection and sanitation, ordinances concerning speed, use of sirens and flashing lights, safety, and sanitation in the community and method of enforcement. Also included were an evaluation of the personnel indicating age, licensing, training, health examinations, level of formal education, the requirements concerning uniforms, taxes levied on private companies, the presence of an ambulance tax on the public, and a question concerning the availability, type, and placement of radio equipment.

The third questionaire was designed for groups and organizations providing ambulance services. This questionaire was sent to private ambulance operators and to fire and police department rescue units. This questionaire like the government questionaire is designed primarily to collect factual data of existing situations and other data that only providers of service could give. There was a section designed for research purposes as in the government questionaire and was identical with that described above. Areas covered which only the provider could answer included time devoted to ambulance duties, areas served by each organization or company, locations each company possesses, whether or not the group provides long distance service, promptness in answering calls,

mileage compiled for previous year by their ambulances, how simultaneous requests are handled, number of calls per day, week, month, year, the general trend in requests for services, equipment in ambulances - air conditioning, oxygen, splints, hemorrhage equipment - how often the ambulance is cleaned and when it is cleaned in situations such as transporting infectious diseases, types of insurance carried - liability and malpractice - radio equipment - location, frequency, and hook-ups - the use of any type of medical record for each patient, and whether uniforms are required. This questionaire also asked the same questions concerning local minimum standards and ordinances as were asked in the government questionaire. Also the same type question was asked this group in evaluating personnel as was asked the mayors.

From the above description of the questionaires used it can be seen that each questionaire was developed to fit the knowledge unique to each particular group. Opinions were primarily called for from the medical profession while both opinions and factual data were asked of mayors and providers. The government questionaire covered areas of administration, regulation, and finance of ambulance organizations. The provider questionaire sought specific information from the people serving the public concerning their businesses. The

questionaire sent the providers was sent to private providers such as funeral directors and private ambulance companies as well as to rescue units. The data was processed separately for each type provider.

The return realized from the questionaires was encouraging and is summarized in Table I.

TABLE 1 Return of Questionaires

Catagory	Sent	Response	%
Physicians	1248	739	58.8
Mayors	540	255	47.2
Providers	339	199	58.7
Private	214	129	60.3
Rescue units	125	70	56.0

The processing of the returned questionaires was automated with the use of a computer at the University of Nebraska College of Medicine. The machine used was an IBM 1620 with Card I/O System and 20K Memory. The first step was to give each question on each type questionaire a number and then punch the proper responses on IBM punch cards. Computer programming systems and special programs were used to edit and tabulate data cards. Counts were taken on each response to each question along with totals and percentages for each question. The programming packages used were the PDQ Fortran processor and sub-routines which include the Forcom sub-routine set for use with densely packed data on punch cards.

Examples of the three types of questionaires are included.

NEBRASKA MEDICAL TRANSPORTATION/COMMUNICATION STUDY

PROFESSIONAL QUESTIONNAIRE

REPORT FOR THE COMMUNITY OF_____NEBRASKA

DATE OF REPORT_____

NAME OF REPORTING PHYSICIAN_____

We are asking your assistance in an initial survey being conducted by the University of Nebraska College of Medicine and the Committee on Trauma of the American College of Surgeons. This study deals with the present everyday ambulance transportation of the citizens of the State of Nebraska. Please return this questionnaire in the enclosed envelope within 7 days.

Thank you very much for your cooperation. You will be informed at a later date as to the results and recommendations, either directly, or in the *Journal of the Nebraska State Medical Association.*

1. Check below the methods of medical transportation available your community
   ( ) Private ambulance company
   ( ) Funeral director providing ambulance service
   ( ) Police or fire department rescue unit
   ( ) Rescue unit other than police or fire department
   ( ) Ambulance owned and operated by a hospital

2. Are the ambulance services in your community adequate? ( ) Yes ( ) No

3. Are there enough vehicles in your community for the transportation of the sick and injured? ( ) Yes ( ) No

4. Are the ambulance services prompt in answering calls? ( ) Yes ( ) No

5. Are there periods when your community has no ambulance service? ( ) Yes ( ) No

6. Does your community have a medical advisory committee for the training of ambulance personnel? ( ) Yes ( ) No

7. Is there a two-way radio facility between the ambulances in your community and the nearest hospital or hospitals? ( ) Yes ( ) No

8. Do the citizens of your community abuse ambulance services?
   ( ) Never
   ( ) Infrequently
   ( ) Frequently
   ( ) Don't know

9. Do you feel that all private patients should be billed for ambulance service? Check below your reaction
   ( ) All patients able to pay should be charged
   ( ) Patients should be charged for private ambulance service only
   ( ) Patients should be charged for service by rescue units either volunteer or community supported as well as for private ambulance service

10. In your community ambulance service is there any need for improvement of any items listed below?
    a. Number of vehicles ( ) Yes ( ) No
    b. Type of vehicles ( ) Yes ( ) No
    c. Number of personnel ( ) Yes ( ) No
    d. Training of personnel ( ) Yes ( ) No

11. Would you like to participate in a more detailed study of this problem in your community? ( ) Yes ( ) No

LIST BELOW YOUR PERSONAL COMMENTS

_____

_____

_____

_____

_____

NEBRASKA MEDICAL TRANSPORTATION/COMMUNICATION STUDY

GOVERNMENTAL QUESTIONNAIRE

REPORT FOR THE COMMUNITY OF_____NEBRASKA

DATE OF REPORT_____

NAME OF REPORTING PERSON_____

We are asking your assistance in an initial survey being conducted by the University of Nebraska College of Medicine and the Committee on Trauma of the American College of Surgeons. This study deals with the present everyday ambulance transportation of the citizens of the State of Nebraska. Please return this questionnaire in the enclosed envelope within 7 days.

Thank you very much for your cooperation. You will be informed at a later date of the results of this survey and any recommendations that might come as a result of this investigation.

GOVERNMENTAL QUESTIONNAIRE

1. Check below the organizations providing ambulance service for your community
   - ( ) No one
   - ( ) Funeral Directors
   - ( ) Rescue units operated by local fire or police departments
   - ( ) Rescue units other than fire or police departments
   - ( ) Private ambulance company or companies
   - ( ) Ambulance operated by local hospital or hospitals

2. List below the number of medical transportation vehicles available to your community
   - ( ) Private ambulances.....
   - ( ) Rescue squad units.....

3. If your community owns rescue squad units, how are they staffed?
   - ( ) Paid employees of the community
   - ( ) Paid employees of the community plus volunteers
   - ( ) Volunteers

4. During the past three years has your community had any problems concerning ambulance service? ( ) Yes ( ) No
   If yes, which of the following items have been of concern
   - ( ) Providers of ambulance service have discontinued service
   - ( ) Lack of liason between private ambulance services and community operated rescue units
   - ( ) Cost of operation of community rescue units too high
   - ( ) Inability to staff volunteer rescue squad units
   - ( ) Conflict of opinion between medical profession and ambulance services referrable to operation and techniques
   - ( ) Political interference by elected or appointed officials
   - ( ) Independent attitude by private ambulance services in community
   - ( ) Abuse by citizens in making requests for ambulance service

5. Does your community have an advisory medical staff for rescue squad units and private ambulance services? ( ) Yes ( ) No

6. Does your community in any way subsidize the cost of operation of private ambulance services? ( ) Yes ( ) No
   If the answer is YES, how is it done?
   - ( ) Monthly retainer fee to private ambulance organization
   - ( ) Payment for each ambulance run
   - ( ) Payment only for transportation of indigent patients

7. If your community owns rescue squad equipment do you charge patient for usage ( ) Yes ( ) No If YES, what rates do you charge per call?.....

8. If your community owns rescue squad vehicles and equipment list below the method by which they were obtained
   - ( ) Purchased by the community from tax funds
   - ( ) Donated to the community by some philantrophy
   - ( ) Purchased by donations of the citizens
   - ( ) Acquired by community funds augmented by donations

9. Does your community have any minimum standards concerning the safety inspection of ambulances and rescue units? ( ) Yes ( ) No

10. Does your community have any minimum standards concerning the sanitation of ambulances and equipment? ( ) Yes ( ) No

11. If minimum standard regulations exist concerning safety and sanitation of ambulances in your community, are they enforced? ( ) Yes ( ) No

12. Does your community have any ordinances governing speed, use of siren and use of flashing lights on ambulances? ( ) Yes ( ) No

13. Concerning personnel associated with ambulance services and rescue squad units does your community require any of the following?
    - a. Possession of current driver license ( ) Yes ( ) No
    - b. Minimum age of 21 years ( ) Yes ( ) No
    - c. Possession of high school diploma ( ) Yes ( ) No
    - d. Health examination by a physician ( ) Yes ( ) No
    - e. Red Cross standard first aid training ( ) Yes ( ) No
    - f. Red Cross advanced first aid training ( ) Yes ( ) No
    - g. On the job first aid training ( ) Yes ( ) No
    - h. First aid training by local medical group or hospital ( ) Yes ( ) No
    - i. No training required for employment ( ) Yes ( ) No

14. Are drivers and attendants of ambulances required to wear any type of uniform? ( ) Yes ( ) No

15. Does your community levy a tax on private ambulances? ( ) Yes ( ) No

16. If there is an ambulance tax in your community, what is it?

$.....

17. Concerning radio communication for ambulances and rescue squad units in your community, which of the following applies

( ) No radio communication facility exists
( ) Rescue squad units have radio equipment in conjunction local fire or police departments
( ) Rescue squad units and private ambulance companies operate on one single frequency with a central dispatcher
( ) Private ambulance companies not permitted to operate on radio frequencies used by community rescue units
( ) Rescue squad units have radio contact with local hospitals
( ) Private ambulance companies have radio contact with hospitals
( ) No radio contact is maintained between ambulances and hospitals

THE FOLLOWING QUESTIONS ARE ASKED FOR RESEARCH REASONS TO DETERMINE IF IN THE FUTURE THERE IS ANY NEED TO CHANGE OR MODIFY THE EXISTING MEDICAL TRANSPORTATION AND COMMUNICATION MECHANISM WITHIN THE STATE OF NEBRASKA. AFTER ANSWERING THESE QUESTIONS PLEASE FEEL FREE TO ELABORATE AND CONTRIBUTE YOUR OWN OPINIONS AND SUGGESTIONS

18. Would you want developed at the University of Nebraska, College of Medicine a department of medical transportation for the purpose of:

a. Research in new methods of medical transportation
b. Research in new methods of medical communication
c. Educational program of a continuous nature for all persons associated with ambulance services and rescue squad units. This program would be in close cooperation with other educational organizations
d. Publication and distribution of educational material throughout the State of Nebraska.
e. Advisory service for all ambulance companies and rescue squad units ( ) Yes ( ) No

19. Would you like to see developed an ambulance unit costing in the vicinity of $4,000 that would be equally as serviceable for medical transportation as some of the existing units costing around $15,000? ( ) Yes ( ) No

20. Would you favor the development of a state-wide radio communication network on one given frequency with a range of 25 to 50 miles? This would be a medical transportation network with a base station operated by each hospital with the mobile units in each ambulance and rescue unit to enable each organization to be in constant contact with a medical facility. ( ) Yes ( ) No

21. Would you sanction a standard medical form for all ambulance and rescue squad units to be completed on each patient transported and to be presented with the patient at arrival to the hospital? ( ) Yes ( ) No

22. Would you like to see developed an educational team that would be available to travel to the different communities of the State of Nebraska for the purpose of training ambulance attendants and rescue squad personnel? ( ) Yes ( ) No

23. Would you like developed a uniform code for all ambulances and rescue squads and enforced by the proper authorities in the following aspects?

a. Minimum safety standards for all vehicles ( ) Yes ( ) No
b. Minimum sanitation standards for all equipment ( ) Yes ( ) No
c. Types of vehicles allowed for medical transportation ( ) Yes ( ) No
d. Standard color for all medical transportation vehicles ( ) Yes ( ) No
e. Standard code for flashing lights used on all ambulances and rescue squad units ( ) Yes ( ) No
f. Change from red to some other color for flashing lights on ambulances and rescue squad units ( ) Yes ( ) No
g. Minimum educational requirements in first aid for all ambulance and rescue squad personnel ( ) Yes ( ) No
h. Standardized uniforms for all personnel associated with ambulances and rescue squads ( ) Yes ( ) No
i. Standardized radio frequency for ambulances and rescue squad units ( ) Yes ( ) No
j. Central dispatching center for each community for all types of medical transportation units ( ) Yes ( ) No

NEBRASKA MEDICAL TRANSPORTATION/COMMUNICATION STUDY

PROVIDER OF TRANSPORTATION QUESTIONNAIRE

REPORT FOR THE COMMUNITY OF _____ NEBRASKA

DATE OF REPORT _____

NAME OF REPORTING PERSON _____

We are asking your assistance in an initial survey being conducted by the University of Nebraska College of Medicine and the Committee on Trauma of the American College of Surgeons. This study deals with the present everyday ambulance transportation of the citizens of the State of Nebraska. Please return this questionnaire in the enclosed envelope within 7 days.

Thank you very much for your cooperation. You will be informed at a later date of the results of this survey and any recommendations that might come as a result of this investigation.

1. Check below the item which applies to your organization
   ( ) Private ambulance company
   ( ) Funeral director providing ambulance service
   ( ) Police or fire department rescue unit
   ( ) Rescue unit other than police or fire department
   ( ) Ambulance owned and operated by a hospital

2. List the amount of time your organization devotes to ambulance duties
   ( ) 100% ( ) 75%-99% ( ) 50%-74% ( ) 25%-49%
   ( ) Less than 25%

3. How many stations or locations does your organization possess?
   ( ) One ( ) Two ( ) Three or more

4. Classify the area your organization services
   ( ) Community only
   ( ) Community and surrounding rural area
   ( ) Cross country such as between different communities

5. List the number of organizations providing ambulance service in your community
   ( ) One ( ) Two ( ) Three ( ) Four ( ) Five or more

6. Do you provide long distance ambulance service? ( ) Yes ( ) No

7. Upon receiving a call, how soon do you dispatch your ambulance?
   ( ) Less than 5 minutes
   ( ) 5 to 9 minutes
   ( ) 10 to 14 minutes
   ( ) 15 to 24 minutes
   ( ) 25 minutes or more

8. Check below the average yearly mileage compiled by each of your ambulances
   ( ) 5,000 miles or less
   ( ) 5,000 to 10,000 miles
   ( ) 10,000 to 20,000 miles
   ( ) over 20,000 miles

9. How do you routinely handle more than one request for an emergency at a time?
   ( ) Utilize standby equipment
   ( ) Delay second call until first one completed
   ( ) Transfer request to another ambulance service
   ( ) Deny service stating unavailability
   ( ) Advise caller to locate another ambulance service

10. During the past year have requests for ambulance service in your community
    ( ) Increased? ( ) Decreased?

11. Indicate below the average number of calls your organization makes
    .....Per day
    .....Per week
    .....Per month
    .....Per year

12. Indicate below the information requested concerning the vehicles used by your organization for the transportation of sick and injured

Make of Vehicle	Year of Manufacture	Cost of Vehicle	Number of Persons it will transport

13. Do you have air conditioning in each of your vehicles? ( ) Yes ( ) No

14. Do you have oxygen in each of your vehicles? ( ) Yes ( ) No

15. Do you have equipment for splinting fractures in each vehicle? ( ) Yes ( ) No

16. Do you have dressings and equipment for the control of hemorrhage in each vehicle? ( ) Yes ( ) No

17. Indicate how often you clean your ambulance equipment

	After each use	Daily	Weekly
a. Change linens	( )	( )	( )
b. Clean inside of vehicle	( )	( )	( )
c. Clean outside of vehicle	( )	( )	( )
d. Clean medical equipment	( )	( )	( )

18. Do you have special methods of cleaning your vehicle and the equipment after transporting a patient with a known infectious or contagious disease before answering another call? ( ) Yes ( ) No

19. Does your organization carry liability insurance on each vehicle? ( ) Yes ( ) No

20. Are each of your vehicles equipped with two way radios? ( ) Yes ( ) No If YES please answer the following questions

a. Are all ambulance services in your community on a single frequency with one base station? ( ) Yes ( ) No

b. In regard to your ambulance service, where is the base station?

( ) At your place of business
( ) Local hospital
( ) Local fire department
( ) Local police or sheriff office

c. What make radio equipment do you use.....

d. On what megacycle frequency do you operate.....

21. Does your community have any minimum standards concerning the safety inspection of your ambulances? ( ) Yes ( ) No

22. Does your community have any minimum standards concerning the sanitation of your ambulances and equipment? ( ) Yes ( ) No

23. If your community has any minimum standards of safety and sanitation inspections of vehicles and equipment are they enforced? ( ) Yes ( ) No

24. Does your organization instigate a medical record form on each patient transported? ( ) Yes ( ) No

25. If such a form is used, is it incorporated into the medical record of the patient after delivery to the hospital? ( ) Yes ( ) No

26. Please check below the listed items concerning drivers and attendants associated with your organization

a. Possession of current driver license ( ) Yes ( ) No
b. Minimum age of 21 years ( ) Yes ( ) No
c. Possession of high school diploma ( ) Yes ( ) No
d. Health examination by a physician ( ) Yes ( ) No
e. Red Cross standard first aid training ( ) Yes ( ) No
f. Red Cross advanced first aid training ( ) Yes ( ) No
g. On the job first aid training ( ) Yes ( ) No
h. First aid training by local medical group or hospital ( ) Yes ( ) No
i. No training required for employment ( ) Yes ( ) No

27. Does your organization carry malpractice insurance on employees? ( ) Yes ( ) No

28. Are the personnel in your organization properly trained in correct radio operation techniques? ( ) Yes ( ) No

29. Are the drivers and attendants of your organization required to wear any type uniform? ( ) Yes ( ) No

THE FOLLOWING QUESTIONS ARE ASKED FOR RESEARCH REASONS TO DETERMINE IF IN THE FUTURE THERE IS ANY NEED TO CHANGE OR MODIFY THE EXISTING MEDICAL TRANSPORTATION AND COMMUNICATION MECHANISM WITHIN THE STATE OF NEBRASKA. AFTER ANSWERING THESE QUESTIONS PLEASE FEEL FREE TO ELABORATE AND CONTRIBUTE YOUR OWN OPINIONS AND SUGGESTIONS

30. Would you want developed at the University of Nebraska College of Medicine a department of medical transportation for the purpose of:

a. Research in new methods of medical transportation
b. Research in new methods of medical communication
c. Educational program of a continuous nature for all persons associated with ambulance services and rescue squad units. This program would be in close cooperation with other educational units.

d. Publication and distribution of educational material throughout the State of Nebraska.

e. Advisory service for all ambulance companies and rescue squad units ( ) Yes ( ) No

31. Would you like to see developed an ambulance unit costing in the vicinity of $4,000 that would be equally as servicable for medical transportation as some of the existing units costing around $15,000? ( ) Yes ( ) No

32. Would you favor the development of a state-wide radio communication network on one given frequency with a range of 25 to 50 miles? This would be a medical transportation network with a base station operated by each hospital with the mobile units in each ambulance and rescue squad unit to enable each organization to be in constant contact with a medical facility. ( ) Yes ( ) No

33. Would you sanction a standard medical form for all ambulance and rescue squad units to be completed on each patient transported and to be presented with the patient at arrival to the hospital? ( ) Yes ( ) No

34. Would you like to see developed an educational team that would be available to travel to the different communities of the State of Nebraska for the purpose of training ambulance attendants and rescue squad personnel? ( ) Yes ( ) No

35. Would you like developed a uniform code for all ambulances and rescue squads and enforced by the proper authorities in the following aspects?

a. Minimum safety standards for all vehicles ( ) Yes ( ) No

b. Minimum sanitation standards for all equipment ( ) Yes ( ) No

c. Types of vehicles allowed for medical transportation ( ) Yes ( ) No

d. Standard color for all medical transportation vehicles ( ) Yes ( ) No

e. Standardization of flashing lights for vehicles ( ) Yes ( ) No

f. Change from red to some other color for flashing lights on ambulances and rescue squad units ( ) Yes ( ) No

g. Minimum educational requirements in first aid for all ambulance and rescue squad personnel ( ) Yes ( ) No

h. Standardized uniforms for all personnel associated with ambulances and rescue squads ( ) Yes ( ) No

i. Standardized radio frequency for ambulance and rescue squad units ( ) Yes ( ) No

j. Central dispatching center for each community for all types of medical transportation units ( ) Yes ( ) No

LIST BELOW YOUR PERSONAL COMMENTS

Firms and Organizations Providing Service

In evaluating the firms and organizations providing medical transportation in Nebraska, the results from the government questionaire were probably the most useful. Although only 47.2% of the city governments in Nebraska responded to the questionaire it is felt that this gives a pretty good idea of who is providing transportation. The percentage represents 255 towns regardless of size out of 540 asked to respond. The results are shown in Table 2.

TABLE 2 Government Returns

Funeral directors	72.1%
Rescue units (operated by police and fire departments)	40.3
Private ambulance companies	3.5
Ambulances operated by hospitals	0.3
No service	11.7

The physicians were asked to answer a similar question concerning who provides ambulance facilities in their communities. Their questionaire did not include a response if no service was provided. Also due to the large number of physicians reporting from the larger cities the answers do not offer as true a picture of the over-all situation as the response made by each city government. These results follow in Table 3.

TABLE 3 Professional Returns

Funeral Directors	69.9%
Rescue units (operated by police and fire departments)	67.9
Private ambulance companies	42.6
Ambulances operated by hospitals	1.2

The percentages are nearly the same for funeral directors, but the results from private companies are skewed by the large number of physicians from areas with private ambulance companies. The results for the police and fire department rescue units is also higher on the physicians' report most likely for the same reason.

So from the above the results presented from city government probably give the most reliable insight into the situation.

Vehicles, Equipment, and Upkeep

It was found that the 129 funeral directors reporting operated a total of 243 ambulances. This is about two ambulances per funeral director. It was found that the 70 rescue squads reporting operated 72 vehicles or about one unit per squad. Table 4 gives insight into the size of the organizations providing medical transportation in terms of the number of vehicles operated.

TABLE 4 Number of Vehicles

Number of vehicles per organization	Funeral directors	Rescue units
1	27.9%	82.8%
2	48.8	10.0
3	12.4	0
4.	3.1	0
5	1.5	0
6	0	0
7	0.7	0

So nearly 89.1% of the funeral directors operated from one to three vehicles with the largest percentage, 48.8%, operating two vehicles. The vast majority of rescue squads, 82.8%, operate one.

While the processing did not include the types of vehicles used by the two groups, there was a question requesting description of the vehicles used. From a rough counting of this question over two hundred of the vehicles described by the funeral directors were vehicles built on automobile chasses such as station wagons, combination hearse-ambulances, and ambulances. Only five vehicles were reported as being the type on pick-up or truck chasses such as van or delivery truck type vehicles. The rescue units reporting described 42 vehicles as being of the van type on truck chasses and 30 as being of the station wagon type on automobile chasses.

The results of questions concerning the equipment

used in the vehicles is presented in Table 5. These questions were asked only of the providers.

TABLE 5 Equipment

	Funeral directors	Rescue units
Air conditioning	71.3%	2.8%
Oxygen	70.5	92.8
Splints	68.2	88.5
Dressings for hemorrhage	67.4	87.1

It is evident from this that the great majority of funeral directors have air conditioned vehicles while the rescue units do not. It also appears that the rescue units are a little better equipped to handle various problems than are the funeral directors. Higher percentages of rescue units reported that they were equipped with oxygen, splints, and equipment for the control of hemorrhage.

In the area of sanitation of the vehicles and equipment the results are presented in TABLE 6. This too is taken from the returns from the providers.

The results of this sanitation survey show that nearly all in both groups change the linens after each use. The table indicates that a higher percentage of private providers change linens after each use. There is a larger percentage of rescue units which clean the inside of vehicles after each use and also clean the outside after each use. The area of cleaning medical

TABLE 6 Sanitation

	Change linens			Clean inside			Clean outside			Clean equipment			After infection	
	@	d	w	@	d	w	@	d	w	@	d	w	Yes	No
Funeral directors	93.0	0.7	0.7	55.8	8.5	26.3	28.6	13.1	46.5	75.9	0.7	3.1	82.9	10.0
Rescue units	82.8	4.2	2.8	68.5	4.2	17.1	37.1	5.7	38.5	75.7	2.8	7.1	52.8	37.1

Legend:

@ after each use

d daily

w weekly

equipment after each use is nearly equal in each group while a slightly higher percentage of rescue units clean it only weekly as compared to the private providers. There is a higher percentage of private providers which have special methods of sanitation following transporting infectious diseased patients when compared with the rescue units. 37.1% of the rescue units have no special means of sanitation following transport of infected and contagious patients.

Utilization of Facilities

There are no direct questions available concerning this area of the study. However, indirectly there are two questions present on the providers' questionaire that offer some insight into this field. These two are the number of calls per day and the time that each organization devotes to ambulance duties. The results of the question concerning calls per day are presented in Table 7.

TABLE 7 Number of Calls

Number of calls per day	Private providers	Rescue units
0	72.8%	50.7
1	12.4	2.8
2	0.7	0
3	1.5	1.4
4	1.5	0
5	0	0
6	0.7	0

It can be seen from this table that the great majority of private providers have less than one call per day. This also is true of rescue units. A large number of rescue units did not respond to this question. 16.8% of private providers had one or more calls per day while only 4.2% of rescue units had one or more per day.

The results of the question of time devoted to ambulance duties is presented in Table 8.

TABLE 8 Time Devoted

% of time	Private providers	Rescue units
100%	19.3%	4.2%
75-99%	0	5.7
50-74%	4.6	14.2
25-49%	11.6	11.4
less than 25%	58.9	55.7

The relatively high percentage of private providers stating they spent 100% of their time at ambulance duties is probably not true. They probably felt that since they are on call twenty-four hours a day this represents 100%. The near equal percentages stating less than 25% is the largest group and would probably have been larger if all had understood the question. Several indicated that being on call at all times was 100% of their time spent at ambulance duties.

It can be seen from these two tables that for many providers medical transportation in Nebraska is not a fulltime job. Very few have more than one call per day, and the large majority spend less than 50% of their time at ambulance duties.

Personnel Evaluation

The question used to evaluate personnel manning medical transportation vehicles was placed on the providers' questionaire. It has to do with requirements the provider might have for personnel. The results are presented in Table 9.

TABLE 9 Personnel Evaluation

Requirements	Private providers		Rescue units	
	Yes	No	Yes	No
Possession of current driver's license	95.3	0	90.0	1.4
Minimum age 21	83.7	9.3	84.2	7.1
Possession of high school diploma	79.0	13.1	37.1	48.5
Health examination by a physician	41.0	44.1	24.2	58.5
Standard Red Cross First Aid training	58.9	30.2	82.8	10.0
Advanced Red Cross First Aid training	26.3	55.0	55.7	31.4
On the job first aid training	52.7	28.6	47.1	35.7
First aid training by local medical group	13.9	62.7	40.0	41.4
No training required	27.1	36.4	18.5	32.8

It can be seen from Table 9 that the private providers and the rescue units provide their own standards for people they hire or accept as volunteers. In the field of possession of a driver's license, the great majority of private providers and rescue units require this. A large majority of both types of providers require their personnel to be twenty-one years of age. A large percentage of private providers require a high school diploma, but only 37.1% of rescue units require such an education. This difference perhaps is in the fact that the majority of rescue squad personnel are volunteers. Another area where there is a large discrepancy is the health examination of personnel. The percentage in neither group is high, but the private providers require this almost two times more frequently than rescue units. This, too, is probably due to the fact that personnel of private providers are employed while rescue unit personnel are largely volunteer. In the area of first aid training the rescue unit personnel lead the way as can be seen both in the Standard and Advanced Red Cross First Aid courses. Also the rescue units receive more training from medical groups. A fairly large percentage in each group require no training.

Concerning the way community-owned rescue squads are staffed the following results were obtained.

TABLE 10 Community Rescue Units

Personnel	Per cent	Communities
Paid employees of community	1.5	4
Paid employees of community plus volunteers	2.3	6
Volunteers	43.1	110

It can be seen that the majority of rescue squads are staffed by volunteers. This can be explained by the fact that the majority of rescue units are located in small communities that lack the volume that would necessitate hired employees. Of the ten communities with paid employees or paid employees plus volunteers, the population in each case is over 6,000. The majority are over 10,000.

It is also interesting to note some of the opinions and added comments several respondents made in the space provided for such on each questionaire. A physician from one large Nebraska community stated that too many college students were used to man private ambulances and that they were poorly trained. One funeral director stated that he used trained volunteers from local rescue units on his private calls. One mayor stated that no trained people were available either from the local private provider or fire department. Many mayors, physicians, and providers felt that more training was

needed. Little comment was given concerning other areas of the question concerning personnel.

Medical Transportation Finances

To evaluate this topic one must consider subsidies to private ambulance owners, taxes assessed private providers, how vehicles and equipment were obtained in the case of public rescue units, charges assesed patients for the services of public rescue vehicles, and cost of vehicles and equipment. The governmental questionaire had questions concerning these areas. The physicians' questionaire asked the physicians for their opinions on the billing of patients.

Subsidies to private ambulance companies is an interesting subject in itself. Many areas throughout the United States are doing this or considering it at the present time. Table 11 presents the findings concerning this practice in Nebraska at present. It also suggests how this is being done.

TABLE 11 Subsidies

	Yes	No
Does your community in any way subsidize the cost of operation of private ambulance services?	4.3%	87.8%
If so, how?		
Monthly retainer fee	0.0%	
Payment for each run	3.5	
Payment only for indigent patients	0.7	

It can be seen from these studies that very few communities subsidize the private providers. Where they do it is only for each run and very few provide for indigent patients. The county welfare offices no doubt provide some transportation for indigent patients, but there are no statistics on this. There is no community, based on these returns, which provides a retainer fee in turn for assurance of service.

In the area of taxes assessed ambulance operators there is a State Law, 60-337, which assesses a registration fee of $15 per ambulance and hearse.[8] This is the only fee assessed at the state level. On the community level this question of special ambulance tax assessed on private ambulances was asked of the mayors. 6.6% said they did assess a tax on ambulances and 70.1% said no. This 6.6% represents nine communities. Seven of the nine considered regular vehicle taxes as being taxes on ambulances. Two communities said yes but did not specify an amount.

The mayors were asked to describe how rescue units and equipment were obtained. These are the results of that question.

TABLE 12 Obtaining Equipment

Purchase by community from tax funds	14.9%
Donated to the community by philanthropy	5.4
Purchased by donations of the citizens	17.6
Acquired by community funds augmented by donations	9.8

These results appear to tell nothing since 51.3% of the reporting communities did not respond to the question. But not every community has a rescue vehicle. There are about 125 communities with rescue units, and for this group the data shows that a large percentage were obtained by donation. Tax funds were also used to a large extent. A combination tax and donation accounted for nearly 10%. Philanthropy was lowest on the list. Omaha was the best example in the philanthropy area - its vehicles being donated by Ak-sar-ben.

The mayors were also asked to state if patients were charged for the use of rescue squad equipment owned by the city government. 4.3% said yes they do charge while 5.3% said no. Again 41.9% did not respond probably because they had no such equipment. Thus it appears that few patients are charged for the use of public equipment.

On the providers' questionaire was a place to describe make, model, and cost of each vehicle. An approximate price was given for 210 ambulances operated by private providers and 56 ambulances operated by rescue units. These prices in most cases covered total cost of vehicle and equipment as shown in Table 13.

TABLE 13 Equipment Cost

Price range in $	Private operators	Rescue units
0-1,000	4	8
1-2,000	5	6
2-3,000	15	10
3-4,000	42	9
4-5,000	57	1
5-6,000	19	4
6-7,000	14	6
7-8,000	20	0
8-9,000	12	0
9-10,000	7	2
10,000 and greater	15	10

The percentages for each group are very comparable. 60.7% of rescue ambulances cost between $0-5,000, and 58.5% of private ambulances were in this range. 10.4% of private ambulances cost more than $9,000. It appears that the majority of each group tended to stay below $5,000. Percentage-wise there were a greater number of expensive rescue unit vehicles than private. The reason for this is not apparent. It is noted that there is a large disparity in the sizes of the groups, and thus comparisons are not valid. It may be due to the fact that private providers tend to be more economical since they are paying for their own vehicles while rescue vehicles are obtained in other ways.

The physicians' opinions concerning the billing of private patients is present in Table 14.

TABLE 14 Patient Charges

All patients able to pay should be charged.	68.0%
Patients should be charged for private service only.	17.4%
Patients should be charged for service whether by volunteer rescue unit or by private ambulance.	30.3%

From the above data it is felt that the only generalization that can be made is that the majority feel anyone able to pay for services should pay. No distinction was made between private and public service.

Additional comments were received on each type questionaire concerning the area of finances representing some isolated opinions and ideas. A few providers felt that physicians abuse rescue squad units by calling them because they know there is no charge. With reference to how rescue units are obtained, one small community reported they were trying to get a unit through surplus government supplies. In reference to subsidizing ambulance service one small community gives money to a nearby larger community rescue unit in turn for service. They felt, however, that distance was a problem, and a local unit was needed badly. Several smaller communities stated that they depend on facilities in other communities, but no mention was made of the financial arrangements. All these communities voiced a desire for their own service, and nearly all gave

financial reasons for not having such service in their communities. Several morticians added comments concerning the finances involved in offering ambulance services. They all felt that the return was inadequate to defray equipment costs. Several indicated that these costs are absorbed in funeral costs. One funeral director felt that the only reason some funeral directors provide ambulance service is to obtain the funeral should an ambulance patient die. One funeral director stated that he provided ambulance service for public relations reasons only, and the costs were added into funeral costs. Reports from private providers concerning collection of bills varies from 10 to 95% successful. These percentages were given in various conversations with private providers.

Present Communications Equipment

All three questionaires dealt with the present communications equipment available for medical fields.

The physicians were asked whether or not there was a two-way radio facility in the community between ambulances and hospitals. Again it is important to note that these results include a large number of responses from physicians clustered in the more populated areas of the state. 33.9% said yes there is such a facility; 49.7% said no. 16.2% failed to respond to this question. So almost half of the physicians stated there was no such facility even with the skewing of the results by large numbers of responses from the metropolitan areas.

Perhaps more representative of the state picture are the results received from the community governments. They were asked to indicate which of the following applies to their communities concerning radio communications for ambulances and rescue squads.

TABLE 15 Radio Communications

	Yes	No
No radio facilities existing	40.3%	35.2%
Rescue squad units have radio equipment in conjunction with fire or police departments	29.8	45.8
Rescue units and private providers' operate on one frequency with central dispatcher	3.5	72.1
Private providers not permitted to operate on frequency used by rescue units	4.7	70.9
Rescue squads have radio contact with local hospitals	4.3	71.3
Private providers have contact with hospitals	2.7	72.9
No radio contact between ambulances and hospitals	24.3	50.9

The number of mayors not responding to this question represented 24.3% of those reporting - a rather large percentage. Of those reporting 40.3% said they had no facilities, and 35.2% said they did. 29.8% were in conjunction with fire or police departments.

Little response was made to the questions concerning the frequencies used and who could use them. Only 2.7% of the mayors stated there was radio communication between private providers and hospitals, and only 4.3% of rescue

units had such an arrangement. 24.3% of those reporting stated there was no contact between ambulances and hospitals, and this would leave 50.9% with such contact. So the results are not consistent as to contact between hospitals and ambulances. Perhaps if a space had been provided for an "I don't know" response the majority would have responded to the questions especially in relation to radio frequencies and how they are used. As far as knowing if radio equipment is available or not the data is probably useful, but since understanding about frequency requires a bit more knowledge of radio operation this data is probably not too useful.

The private providers were also requested to give information concerning radio equipment. Since these are the people who also use the equipment it may be safe to assume their knowledge of radio equipment would lead to more consistent and valuable results. 10% of the private providers reporting stated their vehicles were equipped with two-way radios, and 83.7% said they were not. 6.2% failed to respond to this question. 5.4% said all ambulances were on the same frequency in the community, and 13.1% said no. 81.3% failed to respond to this question. When asked where their base station was, 71.3% failed to respond, 20.9% said it was at their place of business, 0.7% said local hospital or fire department, and 3.1% said it was at local police or sheriff's office.

The rescue units were asked the same question. 74.2% said they had two-way radios, 21.4% said they did not, and 4.2% failed to respond. 37.1% said all ambulance services were on the same frequency, 37.1% said they were not, and 25.7% failed to respond. Concerning base stations, 47.1% were at the local police or sheriff's office, 40% at the local fire department, 0% at the local hospital, and 1.4% at the place of business. 21.4% failed to respond to the base station question.

One additional comment made by a rescue unit reporting was that since the rescue unit works closely with the police, sheriff, and fire departments, they should all be on the same radio frequency.

Present Laws, Codes, and Ordinances

Concerning laws in existence at the state level having to do with ambulances, three are on the books. They are listed below.

60-337. "Registration fee; ambulance; hearse. For all ambulances and hearses the registration fee shall be fifteen dollars."

39-774. "Horn; requirements; regulations; police or fire vehicle; ambulance. a) Every motor vehicle when operated upon a highway shall be equipped with a horn in good working order capable of emitting sound audible under normal conditions from a distance not less than 200 feet; it shall be unlawful, except as otherwise provided in this section, for any vehicle to be equipped with or any person

to use upon a vehicle any siren, exhaust, compression or spark plug whistle or for any person at any time to use horn otherwise than as a reasonable warning, or to make any unnecessary or unreasonably loud or harsh sound by means of a horn or other warning device. b) Every police and fire department and fire patrol vehicle and every ambulance used for emergency calls shall be equipped with a bell, siren, or exhaust whistle of a type approved by the Department of Motor Vehicles."

39-745. "Speed limit; exemptions. The speed limitations set forth in Chapter 39, Article 7, shall not apply to vehicles when operated with due regard for the safety of others under directions of the Nebraska Safety Patrol, any conservation officer, sheriff, member of any police department, or any other police officer, in the chase or apprehension of violators of the law or of persons charged with or suspected of any such violation. It shall also not apply to fire department or fire patrol vehicles when traveling in response to a fire amarm or to public or private ambulances when traveling in emergencies - provided the exemption herein shall not apply to bondsmen. This exemption shall not protect the driver of any vehicle exempted herein from the consequences of a reckless disregard of the safety of others."

These are the only three state laws concerning ambulances and rescue equipment. Little is available concerning other community laws existing in Nebraska. The data from the

questionaires offers some insight.

The governmental and provider questionaires sought to determine if any laws existed in Nebraska concerning medical transportation. It was the purpose of these particular questions to ascertain if laws, standards, codes, or ordinances were present on the community level.

The mayors gave some interesting results concerning laws and standards regulating safety inspection of equipment, sanitation of equipment, and whether they are enforced. They were also asked for responses concerning ordinances regulating speed, use of sirens, and use of flashing lights on ambulances. There was also a question concerning any requirements the community has concerning personnel. The results follow in Table 16.

TABLE 16 Safety Standards I

	Yes	No
Minimum standard for safety inspection of ambulances and rescue units	17.6%	63.9%
Minimum standards of sanitation for equipment and vehicles	20.0	61.1
Are the above two codes enforced if they exist	18.8	12.5
Ordinances governing speed, use of siren, and flashing lights on ambulances	20.7	61.9
Are the following required of personnel?		
Possession of current driver's license	52.1	16.4
Minimum age of 21 years	40.0	24.3
Possession of high school diploma	5.8	45.8
Health examination by a physician	9.4	41.1

Red Cross Standard First Aid Training	33.3%	24.7%
Red Cross Advanced First Aid Training	20.9	30.9
On the job first aid training	17.2	32.1
First aid training by local doctors	7.8	40.3
No training required for employment	10.9	32.1

About one-fifth of the city governments stated they had minimum standards concerning safety inspection and sanitation of equipment and vehicles, and about the same number stated they were enforced. Also about one-fifth stated they had ordinances governing speed, use of sirens, and use of flashing lights on ambulances.

In the question concerning personnel, more than half stated they required a current driver's license, and two-fifths had a minimum age of 21 years. One-twentieth of the communities require a high shool education, and one-tenth require a health examination by a physician for their personnel. About one-third require the Standard Red Cross First Aid course, and one-fifth require Advanced Red Cross First Aid training. Less than one-tenth require any training by local medical groups or hospitals, and one-tenth require no training at all for employment. About one-fifth require on the job first aid training.

It is not known if the above data represents actual ordinances on the city statute books or whether it represents understandings or agreements taken for granted. A fair guess would be that it represents a mixture of the two.

If these questions would have been answered yes only by those actually having such ordinances written, the affirmative percentage would probably have been lower.

The private providers and rescue units were asked similar questions in the areas of sanitation, safety inspection, and enforcement. The results of that question appear in Table 17.

TABLE 17 Safety Standards II

	Private providers		Rescue units	
	Yes	No	Yes	No
Community standards concerning safety inspection of vehicles	5.4%	89.9%	15.7%	78.5%
Community standards concerning sanitation of ambulances and equipment	9.3	85.2	21.4	72.8
Are the statutes enforced	10.0	38.7	18.5	35.7

In comparing the above results concerning safety inspection and sanitation standards and their enforcement, it can be seen that the private providers answer less in the affirmative than the rescue units. It is also interesting to note that the percentages of rescue squads answering in the affirmative are very nearly equal to the way the mayors answered. The reason for this may be that the private providers are not as aware of existing community standards as are rescue units and mayors. It may be due to the fact that the city government and rescue units work more closely together and these laws or standards are not actually written

in the city statutes but are understandings, and the private providers are not aware of these. It may be due to the fact that the private providers are more aware of existing written standards they must meet and have given a truer picture of the facts in the data received from them. This also may be the case since it is doubtful that any of the mayors and rescue squad personnel searched the books for such written standards if they did not know for sure and just assumed such standards existed. Whatever the reason for the discrepancy the data is not sufficient enough to uncover the variation.

Distribution of Vehicles

In the provider questionaire there is data concerning the area served by each provider, distances traveled yearly, and whether long-distance service is provided. The results of these questions are presented in Table 18.

TABLE 18 Distances Traveled

	Private providers	Rescue units
Community only	3.1%	2.8%
Community and rural	75.9	88.5
Cross country between communities	41.0	7.1
Long-distance service	93.0	18.5
Average yearly mileage		
5,000 miles or less	55.0	87.1
5-10,000 miles	37.9	5.7

It can be seen from Table 18 that the majority of both types of providers service both community and rural areas. About an equal percentage restrict their services to communities only, and this a small percentage of the total. The great majority of private providers provide long-distance services while about one-fifth of the rescue units do. In total yearly mileage, a majority in both groups travel 5,000 miles or less, but the percentage is much greater in the rescue unit group. Few rescue units travel over 5,000 miles per year, but over one-third of the private providers do.

As far as distribution of rescue units is concerned, Map Number 3 illustrates this. Map Number 4 illustrates the distribution of private providers in the state. In comparing distribution the maps are quite similar in pattern with the eastern third, southern third, northern counties, and western counties pretty well represented as having service. This leaves a central area of about 1,400 square miles with very little service either public or private. This area includes Cherry, Grant, Hooker, Thomas, Blaine, Loup, Arthur, McPherson, and Logan counties. In this area there are two rescue units and three private providers. There are many communities including those in the area mentioned which are greater than forty miles from any type of service. So it can be seen from the maps that the eastern counties, followed by the southern counties,

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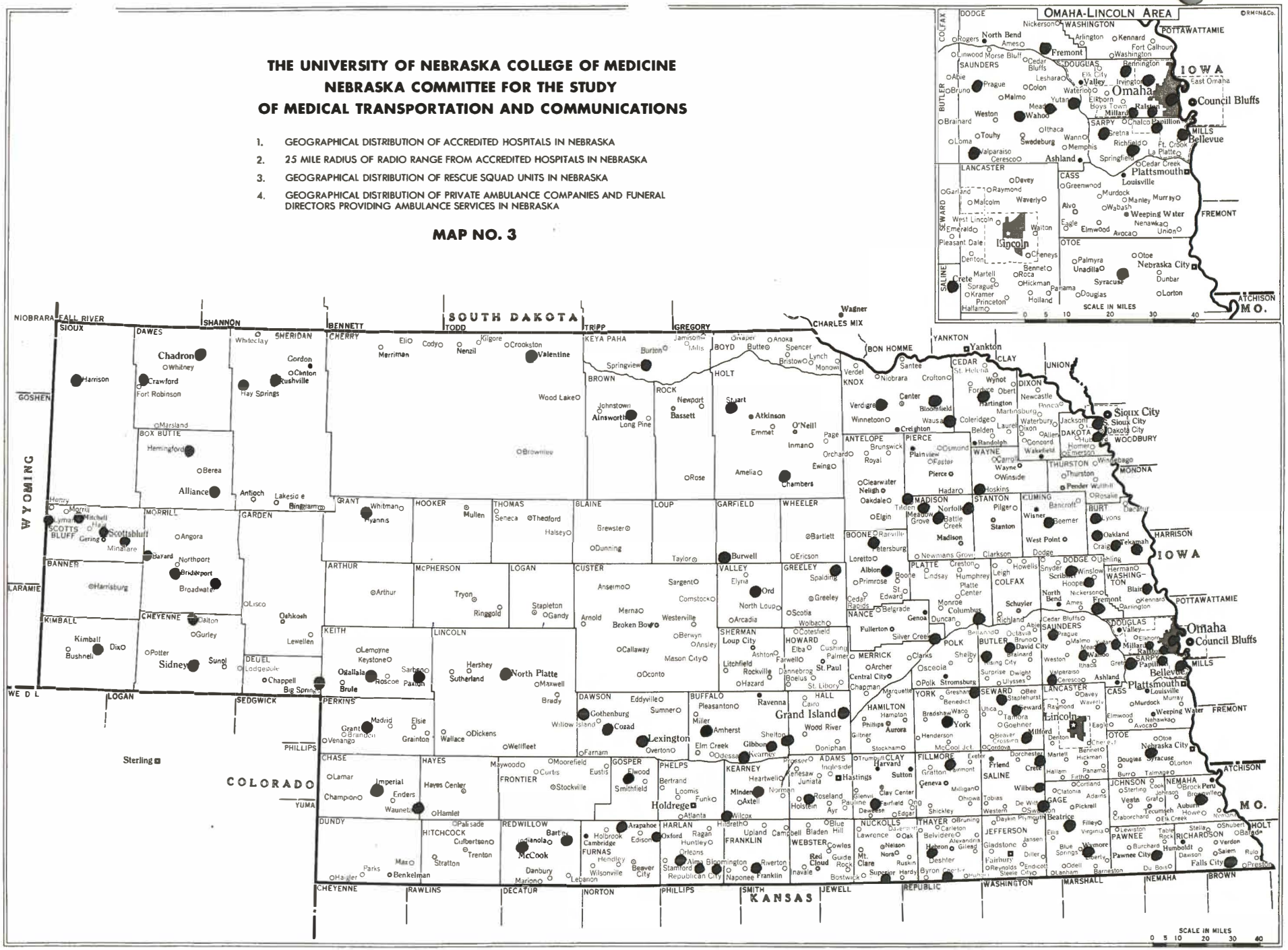
4. GEOGRAPHICAL DISTRIBUTION OF PRIVATE AMBULANCE COMPANIES AND FUNERAL DIRECTORS PROVIDING AMBULANCE SERVICES IN NEBRASKA

MAP NO. 3



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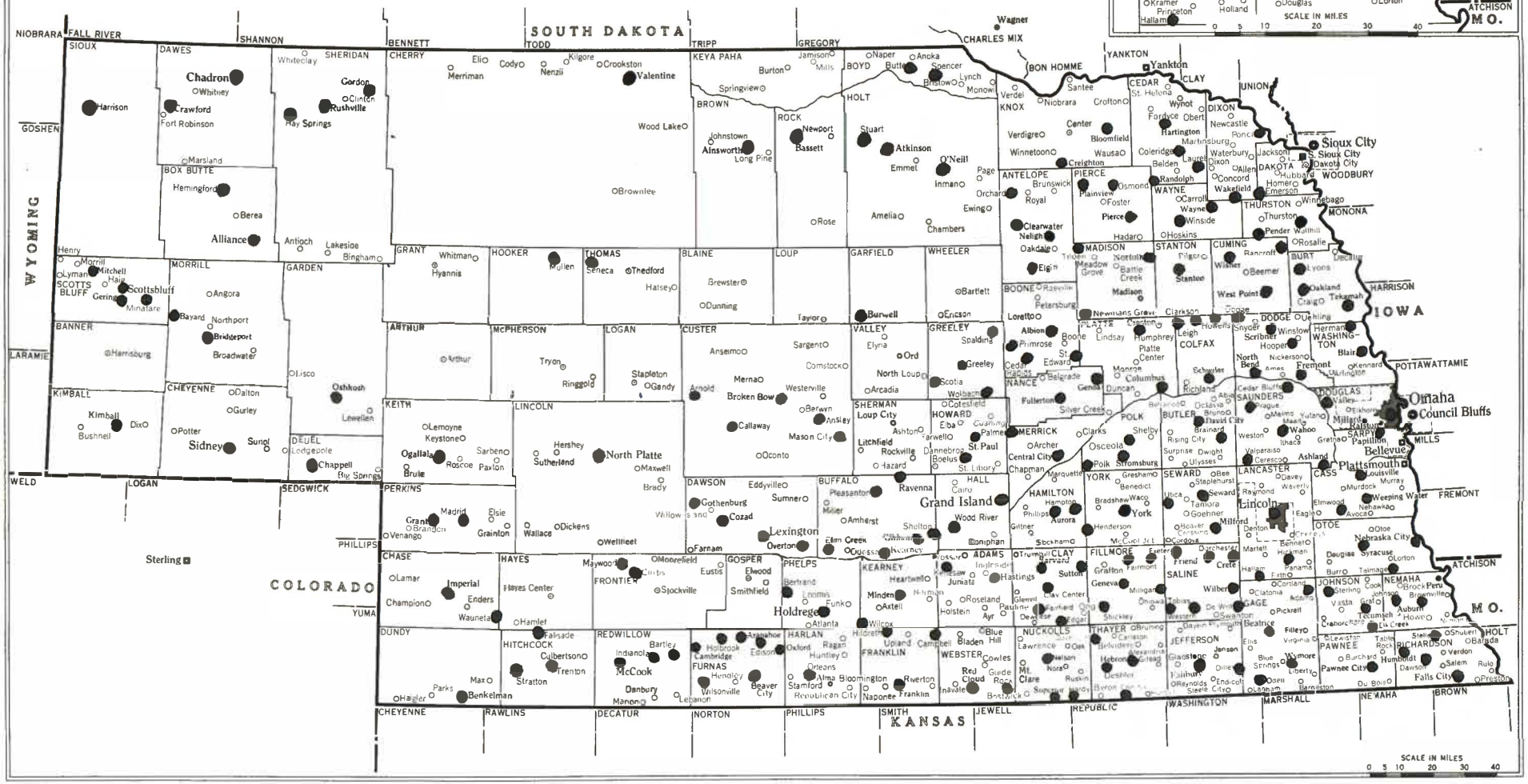
MAP NO. 4



MAP 4. GEOGRAPHICAL DISTRIBUTION OF PRIVATE PROVIDERS

followed by the western counties have the best and most comprehensive service according to the number of units servicing them. The central counties appear to be lacking service.

There were a large number of additional comments made by each group reporting concerning distances involved in Nebraska. One rescue unit stated they serviced a four-hundred square mile area and that they were hard put to do this at times. Arthur, Nebraska stated their nearest service was thirty-five miles away. Several communities stated they were greater than fifteen miles away from rescue equipment. Dunning receives service from Broken Bow - a distance of forty miles. Granitom from Grant - thirty-five miles. Tryon, Nebraska reported no equipment or service and no physician or hospital in the county. Their nearest service is thirty-five miles away. Tryon is in McPherson County with a population of 750 in the county and 860 square miles of area. Niobrara is thirty miles from service. Elmwood in the area with the most rescue units and ambulances reports they have to wait almost a half hour before service arrives after being called.

Distribution of Hospitals

Map Number 1 reveals the distribution of accredited hospitals. As can be seen this map is almost superimposable on Map Numbers 3 and4 showing distribution of transportation. There are a large number of hospitals in the eastern one-third of the state, and the southern, western, and northern

borders are pretty well covered. This map shows an area similar to the area described in Map Numbers 3 and4 which has only one accredited hospital. The area is the central portion of the state; the one hospital is at Valentine in Cherry County.

Additional comments concerning hospital distribution parallel those made in the section concerning distribution of transportation equipment. Tryon is thirty-five miles from an accredited hospital. Verdel is also thirty-five miles from a hospital. Bertrand is eighteen miles, Broadwater is fifteen miles, and Arthur is thirty-five miles. From the map it can be seen using the scale that Brownlee in Cherry County is greater than forty from an accredited hospital. Mullen is nearly 60 miles. Hyannis is the same. So it can be seen that great distances are involved in getting patients to accredited hospitals.

Department of Medical Transportation

Both the providers and mayors were requested to respond to a question concerning development at the University of Nebraska College of Medicine of a Department of Medical Transportation. It was suggested that the purpose of such a department would be research in new methods of medical transportation and communication, educational programs, publication and distribution of educational materials, and advisory services for all ambulance companies and rescue squads in the state. The results follow in Table 19.

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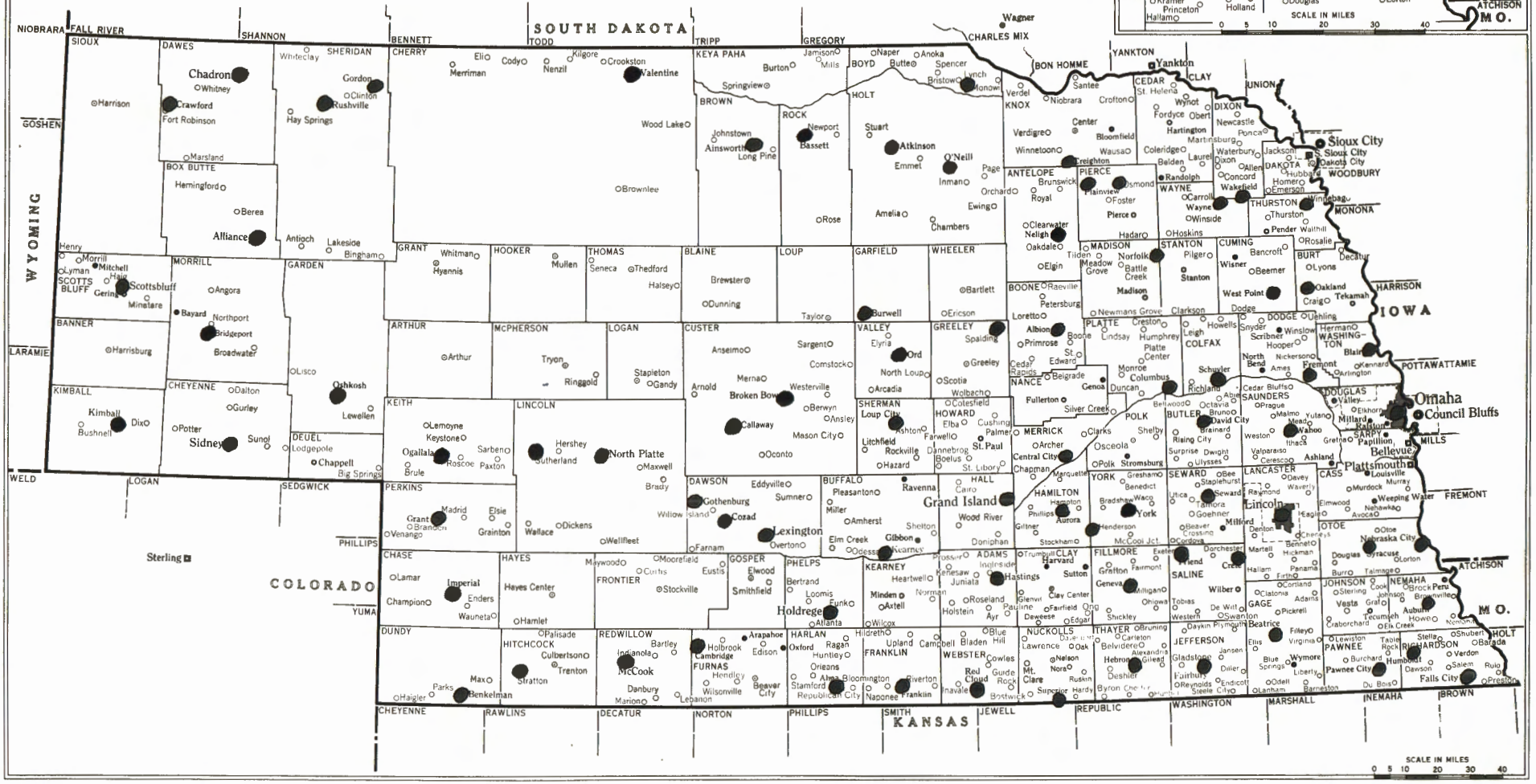
MAP NO. 1



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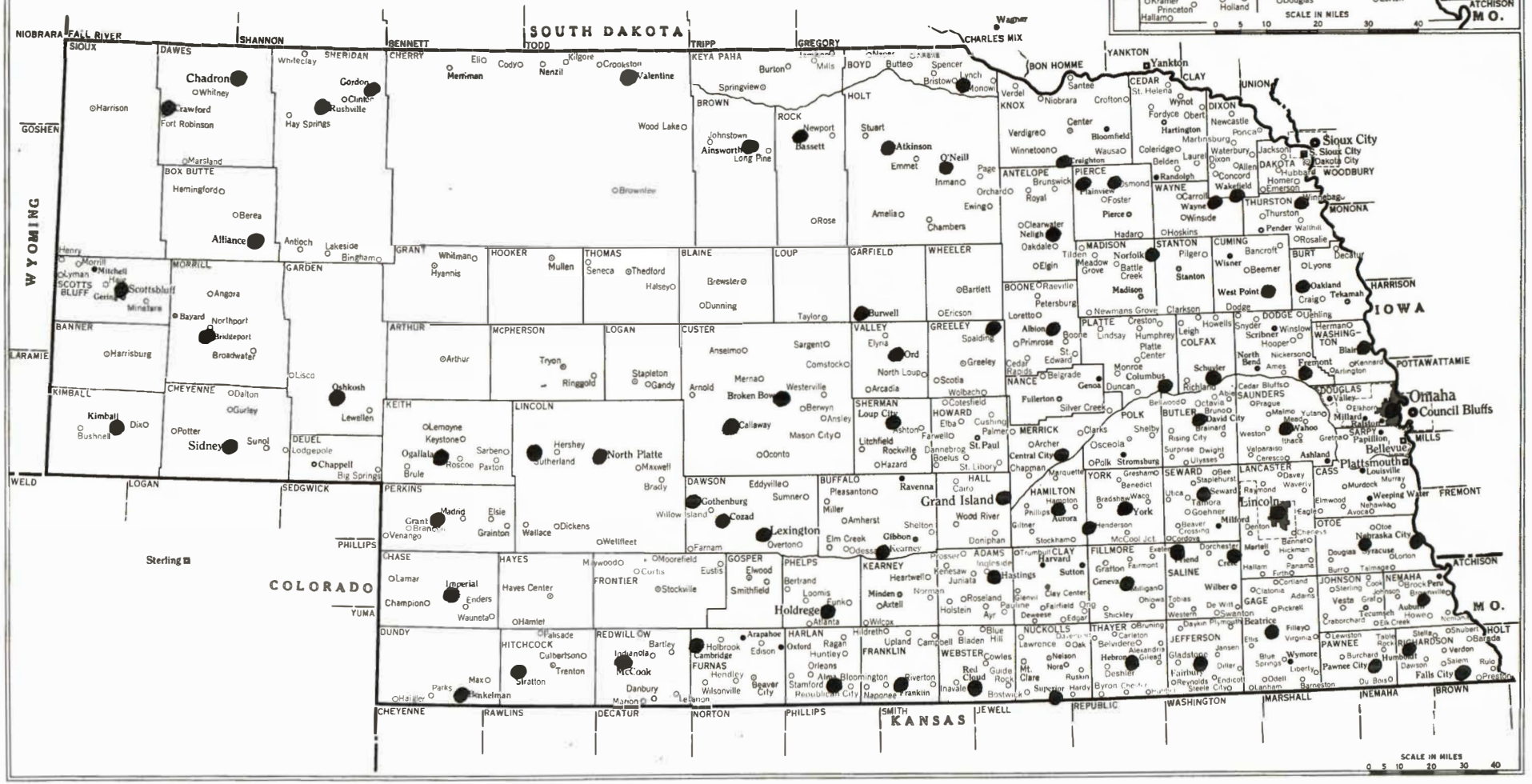
MAP NO. 1



MAP 1. GEOGRAPHICAL DISTRIBUTION OF ACCREDITED HOSPITALS

TABLE 19 Department of Medical Transportation

	In favor	Against
Private providers	64.3%	18.6%
Rescue Units	77.1	2.8
Mayors	56.8	14.5

As can be seen all groups had a majority in favor of such a development. The rescue units were most affirmative and the mayors least so.

In the area of opinions and suggestions one rescue unit suggested that the vocational education division of the state of Nebraska hire one additional man to handle nothing but rescue and emergency classes for all townspeople operating rescue units. This unit was also desirous of the Department of Medical Transportation. Several private providers suggested the use of local physicians and hospitals for more training. Several private providers also suggested that some department should be developed and publish an ambulance directory for Nebraska. No suggestions or opinions were written in direct opposition to such a department. There was some concern, however, over the cost of such an undertaking.

Development of Low-Cost Ambulance

In the area of the cost of ambulances, providers and mayors were asked if they would be in favor of the development of an ambulance costing in the vicinity of $4,000 which would be as serviceable and functional as one costing $15,000. The results are included in Table 20.

TABLE 20 Economical Vehicle

	In favor	Against
Mayors	65.0%	7.8%
Private providers	79.8	10.0
Rescue units	81.4	2.8

The majority in each group would favor such a development. The providers, both private and public, were equally in favor. The majority of mayors were in favor, but the affirmative percentage was less perhaps because they are not directly involved or aware of the cost of such vehicles.

The opinions of providers, private and public, generally was that it was a fine idea but a bit idealistic. (Dr. Lynn Thompson has developed such a vehicle in conjunction with one of the automotive manufacturers, and it is on display at the College of Medicine campus in Omaha.)

Development of Communications Network

The mayors and providers were asked whether they were in favor of the development of a statewide radio communications network on one given frequency with a range of 25 to 50 miles. The network was described to them as being solely a medical transportation network with a base station operated by each hospital with the mobile units in each ambulance and rescue unit to enable each organization to be in constant contact with a medical facility. The results of this opinion question are shown in Table 21.

TABLE 21 Radio Network

	In favor	Against
Mayors	54.1%	19.2%
Private providers	58.9	28.6
Rescue units	61.4	22.8

While the affirmative results were in the majority and nearly equal in each group, there was a fairly large percent of negative results in each group. The private providers were the most negative - greater than 25% answering no. The reason for this is not readily apparent. The financing of such a system no doubt was considered by many and perhaps more so by private groups since the funds for their part of such a system would come directly from their pockets. Other reasons might be difficulty in implementing such a system, failure to understand the question, or simply a negative feeling toward such a system with opinions concerning implementation of a more functional system.

Rescue squad opinions varied. Several felt that since rescue squads cooperate with fire departments and police and sheriffs' offices they should be on the same frequency. One small community stated they need communication with the nearest larger community because they have no service. Several communities without service stated they contacted the nearest service by telephone at present.

The accompanying Map Number 2 shows the coverage the state would have if such a communications network was

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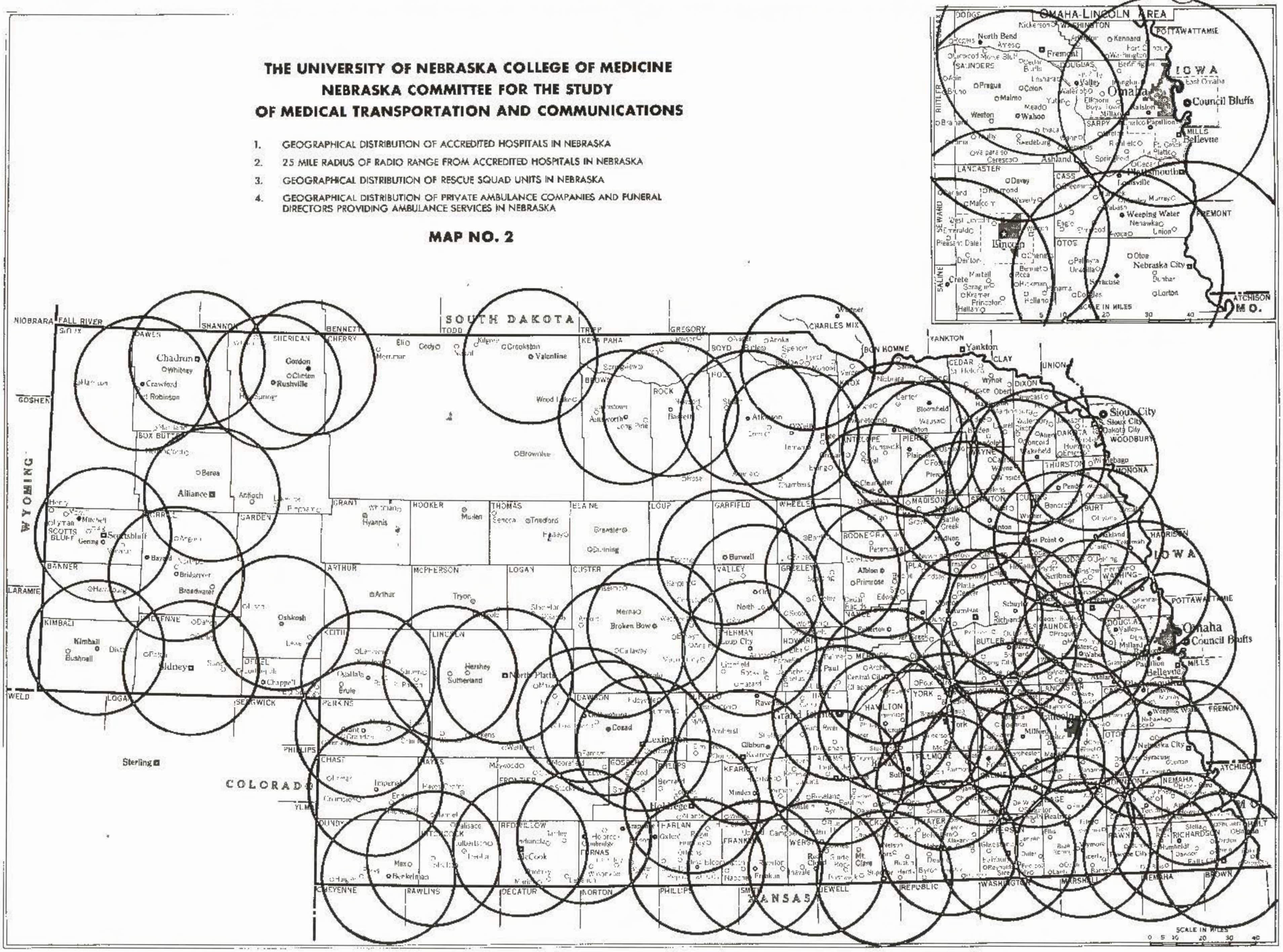
MAP NO. 2



MAP. 2. 25 MILE RADIUS OF RADIO RANGE FR M ACCREDITED HOSPITALS

developed. It indicates the area covered if all accredited hospitals had radio equipment with a 25 mile radius of service. This leaves a large area in central Nebraska without any service. It will be remembered that the maps depicting distribution of ambulances and accredited hospitals also showed this similar area. If the range was increased to 50 miles from each center this area without service would be decreased considerably, and the other small areas without service would also be covered.

Development of Medical Form

The mayors and providers were asked if they would sanction a standard medical form for all ambulance and rescue squad units to be completed on each patient transported and to be presented with the patient upon arrival at the hospital. Table 22 gives the opinions.

TABLE 22 Medical Form

	In favor	Against
Mayors	53.3%	18.8%
Private providers	34.8	49.6
Rescue units	62.8	20.8

The results of the question show that the majority of mayors and rescue units were in the affirmative while a larger group of private providers were more negative than affirmative to this proposal. The reasons given were varied. The private providers generally felt this was unnecessary and would probably mean little to the attending

physician. Also they felt this would just be another requirement for them which would take even more time. Some of the mayors and rescue units answering no gave such reasons also. It would be interesting to see how physicians would respond, but they were not asked this question. This would give an indication of the value of such a form from the physicians' standpoint.

Development of an Educational Team

The mayors and providers were asked if they would like the development of an educational team to travel to the different communities of the state for the purpose of training ambulance attendants and rescue squad personnel. Table 23 lists their responses.

TABLE 23 Educational Team

	In favor	Against
Mayors	64.7%	11.3%
Private providers	72.8	17.0
Rescue units	81.4	7.1

In this question the majority in each group answered yes. The rescue units seemed to be most receptive to such an idea while the mayors were the least although the majority said yes. The private providers had the highest percentage answering no and the rescue units the least. As has been stated one group felt local medical personnel could handle this. It probably can be safely said from this that such a team would be welcomed in most Nebraska communities.

Safety and Sanitation Code

Mayors and providers were asked their opinions on the development of a uniform code for all ambulances and rescue units and the enforcement of such a code by the proper authorities. The following aspects were included with the results of their opinions in Table 24.

TABLE 24 Codes for Safety and Sanitation

	Mayors		Private providers		Rescue units	
	Yes	No	Yes	No	Yes	No
Minimum safety standards for all vehicles	67.4%	7.0%	78.2%	11.6%	85.7%	2.8
Minimum sanitation standards for all equipment	67.0	7.0	75.9	13.1	78.5	10.0
Types of vehicles allowed for medical transportation	42.3	25.8	39.5	47.2	31.4	45.7
Standard color for all vehicles	46.2	24.3	20.1	67.4	45.7	40.0
Standard code for flashing lights	62.7	10.1	55.0	31.0	71.4	17.1
Change from red to some other color for flashing lights	26.6	43.1	14.7	73.6	20.0	65.7
Minimum first aid requirements for personnel	60.0	11.7	55.0	29.4	72.8	15.7
Standard uniforms for personnel	19.6	47.8	5.4	82.9	25.7	55.7
Standard radio frequency for medical transportation	49.0	21.1	46.5	31.7	45.7	37.1

Central radio dispatch for each community	37.6	26.6	32.5	48.0	37.1	40.0

Those areas in which all three groups were most affirmative include minimum safety standards, minimum sanitation standards, standard codes for flashing lights, and minimum educational requirements in first aid. They were least affirmative concerning changing the color of flashing lights from red to some other color, standard uniforms for personnel, and central dispatching center for each community for radio communications. Concerning standard colors for all vehicles about half of the mayors and rescue units were in favor, but only one-fifth of the private providers were. In the area of standardization of vehicles the rescue units answered in the least affirmative way with about one-third in favor and about one-half opposed. The mayors were in favor of this, and the private providers were opposed. The private providers were the most negative about changing the color of the flashing red lights. They, too, were very negative about standard uniforms for personnel. The reasons for the negative responses to several of these were probably the cost and the bother involved. This was especially the response from the private group. Several private providers stated that too many standards would force them to quit the service because of being unable to meet the added expense they thought would result. Others felt that changing colors and standardizing some things was just plain unnecessary.

Summary

In summary, the purpose of this thesis was a study and review of medical transportation and communications in Nebraska. This study is based on the results of three questionaires developed by Dr. Lynn W. Thompson. The questionaires were designed for three groups of people closely related to medical transportation and communication. These three groups are physicians, mayors of Nebraska communities, and providers of medical transportation. The questionaires were designed to gather data concerning various areas of medical transportation and communication in Nebraska. The data was received and processed using the IBM data processing equipment at the University of Nebraska College of Medicine.

It was found that the great majority of medical transportation in Nebraska is provided by funeral directors. Second in line was community owned rescue units. A small percentage was provided by private ambulance companies. A considerable number of the communities stated that no one provided service. These responses were received from the mayors and are considered most reliable since they represent all types and sizes of communities.

It was found that the majority of private providers operated from one to three ambulances and the majority of rescue units operated one vehicle. A review of the type of vehicle each type of provider operates revealed that most use vehicles built on automobile chasses while

a large percentage of rescue units use van type vehicles on truck or pick-up chasses.

Both groups indicated a majority of the vehicles were equipped with oxygen, splints, and equipment for hemorrhage control. However, a larger percentage of rescue units were so equipped. A larger percentage of private providers have air conditioned vehicles, however.

In the area of sanitation the majority of each group change linen on stretchers following each use. The private providers recorded a slightly higher percentage, however. The majority in both groups clean the inside of their vehicles after each use, but the percentage was higher in the rescue unit group. A minority in each group clean the outside of the vehicle after each use, the highest percentage indicating they clean it weekly. A large and nearly equal percentage of each group clean equipment after each use. A large percentage of private providers have special sanitation methods following transport of infectious disease patients. The percentage of rescue units with such methods was greater than fifty percent but not nearly so high as the private providers.

In the area of utilization of equipment and time devoted to ambulance practice the great majority of private providers indicated they had less than one call per day. A small percentage indicated they had one or more calls per day. There was a large percentage of rescue units not responding to this question, but those

responding as having less than one call per day were in the majority with less than one-twentieth indicating they had more than one call per day. Concerning time devoted to ambulance duties a majority in each group indicated they devoted less than 25% of their time. About one-fifth of private providers stated they devoted 100% of their time to such duties because they were on twenty-four hour call.

A large percent of private providers and rescue units require their personnel to possess current drivers' licenses and be at least twenty-one years of age. A large percent of private providers require a high school diploma while a minority of rescue units do. A large percentage of rescue units require Standard Red Cross First Aid training while a smaller percentage but still a majority of private providers do. About half of the rescue units require Advanced Red Cross First Aid training while about one-fourth of private providers do. A minority in each group require no training, the percentage being higher with the providers. A small percentage of private providers require first aid training by local medical groups. A larger percentage of rescue units require it. A small percentage of rescue units require health examinations on personnel, while a larger percentage of private providers require such.

Concerning personnel operating community-owned vehicles, the largest percentage indicated they are staffed by

volunteers. A small percentage use paid employees.

About one-twentieth of the communities reporting subsidize private providers, and when they are subsidized it is usually done by payment for each run. About one-twentieth stated they assessed a special tax on ambulances but were not specific as to how much. It appeared that community-owned vehicles were obtained by varied means with the largest number being obtained through donations by local citizens. A small percentage of communities charge patients for public rescue unit service. The majority of private operators use vehicles which cost between 3,000 and 6,000 dollars. The cost of rescue units varied greatly from a few hundred dollars to over 10,000 dollars. A larger percentage of rescue units cost more than 10,000 dollars when compared with the percentage of private vehicles in this price range. A large percentage of physicians felt that patients able to pay should pay without distinction to type of service.

A large percentage of rescue squads indicated they had two-way radio equipment while a small percentage of private providers indicated they were so equipped. The remainder of the questions concerning communications were poorly answered with many failing to respond.

There are three laws on the statute books of Nebraska governing registration fees for ambulances, use of a siren, and speed limit exemptions. A majority of mayors reported that no ordinances or standards exist concerning sanitation

or safety inspection of vehicles and equipment. A majority of mayors reported no ordinances governing speed, use of siren, and flashing lights on ambulances. Results of data concerning community ordinances for personnel reveal that greater than half require current drivers' licenses. A fairly large percentage require a minimum age of twenty-one but not a majority. In the areas of possession of a high school diploma, health examinations, and first aid training all affirmative results were in the minority. Also about half of the mayors failed to respond to these latter areas. In all of the cases where affirmative answers were recorded it is not known if actual written laws exist. The private providers were also asked if community laws exist concerning safety inspections and sanitation, and the negative percentage was by far the largest with a good response from the group on this item. Rescue unit response was also negative concerning these areas.

Concerning areas served by providers each group has a high percentage in the community and rural category. A small number of rescue units provide cross country service between communities and about half of the private providers do. A large percentage of rescue units travel 5,000 miles or less, and a majority of private providers travel in this mileage bracket. A much larger percentage of private providers are in this mileage bracket-that of 5-10,000 miles per year.

Maps Numbers 3 and 4 portray private provider and rescue unit distribution throughout the state. They are nearly superimposable with the eastern, southern and western counties well represented. There is a central area, however, that is nearly bare and with poor coverage.

Map Number 1 portrays the distribution of accredited hospitals, and it shows that their distribution is very similar to the rescue unit and private provider distribution. There is the central sparse area in this map also.

The majority of all groups were affirmative concerning the development of a Department of Medical Transportation at theUniversity of Nebraska College of Medicine. The rescue units were most in favor.

Concerning the development of an ambulance costing about $4,000, the mayors and both types of providers responded with large affirmative percentages. Both types of providers were more in favor than the mayors.

The majority of mayors and both types of providers were in favor of the development of a state-wide communications network solely for medical transportation use. The highest percentage of nayes was recorded from the private providers, but the differences in negative percentages was not great. Map Number 2 shows the coverage the state would have if such a communications network was developed. It depicts coverage if all accredited hospitals were centers with a transmitting radius of twenty-five miles. This radius leaves again a large area in central Nebraska

without coverage. If the radius was increased to fifty miles little area would be left uncovered.

Concerning development of a standard medical form to be completed on each patient by rescue units and private providers, the majority of mayors and rescue units were in favor. About one third of the private providers were in favor while nearly one half were opposed.

The mayors and both types of providers were in favor or the development of an educational team to travel throughout the state for the purpose of training personnel. The mayors were least affirmative, the rescue units most affirmative , and the majority in all groups were in favor.

Concerning development of a uniform code for all ambulances and rescue units, the majority of mayors and providers were in favor of a standard code for safety, sanitation, color of flashing lights, and minimum educational requirements. Both types of providers recorded high percentages against changing the color of flashing lights from red to some other color and standard uniforms for personnel. About two-fifths of the mayors were against these two. A large percentage of private providers were against standard vehicle color while the percentage recorded for mayors and rescue units was in favor of this. Both types of providers recorded a higher negative percentage concerning standards for types of vehicles used. The mayors were more affirmative than negative concerning this. About half of all groups were in favor of a standard radio frequency

for ambulances and rescue units, and about one-third of each group was in favor of a central dispatching center for each community. Both types of providers were more negative than affirmative concerning a central dispatcher.

Conclusions

It is not the purpose of this thesis to make judgement on the adequacy of the various aspects of Nebraska's medical transportation network. To make such judgement would require comparison with national trends, recommendations of various organizations and government agencies, and determination of the peculiarities of the state. This would be a study in itself. The purpose of this thesis is to report the results of a study of medical transportation and communications in Nebraska with the hope of finding areas of weakness and need in this vital area of medical care.

It is the opinion of the author that several weaknesses and needs have been brought to light by this study. The following are the areas involved:

1) There are several communities and areas in the state with little or no facilities for medical transportation.

2) While a majority of providers, both private and public, have the Standard Red Cross First Aid course the percentage is not nearly 100%. The percentage carrying Advanced cards is much less. There are several groups who have no training at all.

3) Few laws and standards exist governing sanitation of equipment, safety inspection of vehicles, qualifications of personnel, and training of personnel. Few laws exist governing or setting standards for the use of sirens, flashing lights, and speed of medical transportation vehicles.

Where laws do exist the question of enforcement has not been answered. Laws at the state level govern only use of sirens, speed limit exemptions, and licensing of ambulances.

4) Communications systems and networks are non-existent. Few private providers have radios. Networks in use by rescue units usually involve the local fire department. Communications with hospitals are non-existent from ambulances. Frequencies used are crowded.

5) Few groups and organizations consider medical transportation a fulltime job.

These are the areas which possibly need more investigation and study. No doubt there are others.

In the area of questions concerning opinions as to whether the various organizations and people questioned would be in favor of improving and developing better ways for Nebraska's medical transportation, the results are encouraging. It can be concluded that the majority are in favor of more and better training, research into better ways of training, educational materials, better communications, and more economical and serviceable equipment.

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