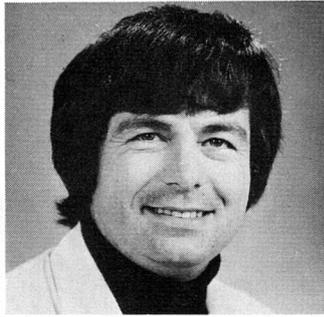


KANSAS CITY, KANSAS



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COLLEGIATE
EMERGENCY MOBILE INTENSIVE CARE TRAINING PROGRAM

FIRST SEMESTER - DIDACTIC		CREDITS
Introduction to Etymology	1	1
Anatomy	2	2
Physiology	3	3
Cardiology	4	4
Medical Emergencies	4	4
Trauma	1	1
Total		15

SECOND SEMESTER - CLINICAL		CREDITS	CLOCK HOURS
Surgery	3	80	
Obstetrics	1	40	
Burn Unit	1	40	
Cardio-Thoracic ICU	1	40	
Pediatrics ICU	1	40	
Coronary ICU	1	40	
Surgical ICU	1	40	
Emergency Room	1	40	
Respiratory Therapy	1	40	
Total	10	320	

SUMMER SESSION - FIELD INTERNSHIP		Credits
Week 1: Extrication and Equipment Review	0	0
Week 2-12: Field Internship	10	10
Total		10

Note: Depending upon the work schedule of the service utilized for internship, 11 calendar weeks should allow each student to ride the units for 25 working shifts of 24-hour duration each. (FIGURE 1)

BACCALAUREATE PROGRAM IN EMS

Kansas University Medical Center developed an Emergency Mobile Intensive Care Training Program (paramedic) in January of 1974 closely following the lines of the already proven programs in Seattle and Los Angeles. These programs provided training to employees of governmental entities in Kansas City, Topeka and Johnson County. Numerous requests were received from individuals desiring this training, but not desiring to be an employee of one of these three entities prior to obtaining the training. Rather, they wished to be preparing for a career in Emergency Medicine. Investigation into various colleges and medical schools throughout the U.S. revealed that as far as could be determined there was no similar program being run in a medical school and none in four year colleges directed to a baccalaureate degree. The active response to this was to develop a 45 semester hour curriculum lasting 12 months which essentially was 1 semester of didactic lecture, 1 semester in-hospital clinical experience, and 1 three month summer period of field internship. Figure 1 depicts the basic curriculum.

Agreements were entered into with the state community college system so that any student completing a standard curricula (Figure 2) in a community college and attending a Medical Center for 1 year, could then obtain an Associate of Arts degree in Emergency Medical Services from any participating community college within the state.

FRESHMAN YEAR			
First Semester	Cr.	Hrs.	Second Semester
Composition 151	3	9	Composition 152
Accounting 161	2	6	Accounting 171
Biology 155 or 145	5	15	Small Business Management 257
Psychology 151	3	9	Principles and Practices EMS 110
Speech 151	3	9	Chemistry 151 (or equivalent)
Education 111	1	3	Physical Education
Physical Education	1	3	
	18	54	

(FIGURE 2)

Similar agreements were worked out with four year colleges so that in January of 1976, the first graduate with a Bachelors degree in General Studies with a major in EMS was graduated from the University of Kansas. This is possibly the first Bachelors degree in EMS in the United States. As Emergency Medical Services continues to blossom, the need for EMS administrators is becoming more apparent. Kansas University Medical Center has now developed a curriculum and will offer a Bachelors degree in Emergency Medical Services Administration. The program will consist of 1½ years spent at the Medical Center in Kansas City and 2½ years obtained either on the Lawrence campus or other accredited four year institutions. The curriculum for each phase of the program is noted in Figure 3 and 4.

General	Credit Hours
English	6
Psychology	3
Sociology	3
Speech	3
Statistics	3
Total	18

Business	Credit Hours
Intro to Management	3
Personnel Management	3
Business Law	3
Accounting	3
Economics	3
Computer Science	3
Human Relations	3
Total	32

Sciences	Credit Hours
Biology (including human anatomy and physiology)	10
Chemistry	5
Physics	5
Total	20

Electives	Credit Hours
Areas of the humanities	8
Total	8

Prerequisite program total hours: 76 hours (FIGURE 3)

COURSES	Credit	Hours
First Semester		
INTRO TO Etymology	1	1
Anatom	2	2
Physiology	3	3
Emergency Medical Technician	4	4
Radio Communications	4	4
EMS Administration	1	1
Summer Session		
EMT/Paramedical	5	5
Advanced Care of Sick and Injured I	5	5
Introduction to Clinical Units	1	1
Second Semester		
Advanced Care of Sick and Injured II	5	5
Clinical Experience	6	6
Intensive Care Units	4	4
Labor and Delivery	1	1
Surgery	1	1
Emergency Room	1	1
Respiratory Therapy	1	1
Third Semester		
DEFENSIVE Driving & Extrication	2	2
Administration - Practical Experience	10	10
Field Internship	10	10
Total		155

B.S. in EMS Total (FIGURE 4)

BACCALAUREATE PROGRAM IN EMS

- First Semester Credits:**
1. Introduction & Etymology Credits: Medical Terminology is introduced by the use of prefixes, suffixes, and root words to build a vocabulary of medical personnel in all fields.
 2. Anatomy Credits: Human anatomy beginning with cellular structure to system applications provides the student with knowledge of normal body structure. Observation of dissected cadaver allows an excellent chance to study human anatomy.
 3. Physiology Credits: Lectures and demonstrations of human physiology beginning with cellular physiology to system applications provides the student with knowledge of normal body processes.
 4. Emergency Medical Technician Credits: A basic eighty-one hour (81) course in emergency care. Basic life support and techniques of care are provided in the areas of cardiopulmonary resuscitation, medical and environmental emergencies, fracture management, childbirth, trauma and psychiatric emergencies. The student is also introduced to vehicular and patient extrication.
 5. Radio Communications Credits: Introduction to the various types of communication systems and each of their components. Communication equipment currently on the market is reviewed as is FCC regulations on the use of VHF and UHF channels. Criteria for community evaluation are given in order for the communication system to meet the needs of the community. Introduction to the codes and correct voice communication techniques are given.
 6. EMS Administration Credits: The fifteen components of an EMS system are reviewed as an introduction to EMS and its relationship to the broader health delivery system. Managerial a

planning skills are taught to facilitate interaction and cooperation among individuals and agencies involved in establishing and maintaining Emergency Medical Services.

B. Summer Session Credits: 10

1. Electrocardiography Credits: 5

Basic electrocardiography with emphasis on clinical application to provide the student with an understanding of the normal electrocardiogram. The course expands to atrial, junctional, and ventricular arrhythmias, AV blocks, and disorders of rates and rhythms. The student is also introduced to the electrocardiogram in acute myocardial infarction. Lecture and application focus on acute and chronic disease processes that affect the electrical and mechanical activities of the heart. Pharmacology will be included where the drugs are pertinent to the treatment of the specific disease entity.

2. Advanced Care of Sick and Injured I Credits: 2

Emergency situations that result from external mechanisms and the pathophysiology involved in traumatic injuries will provide the student with diagnostic and treatment capabilities. Techniques of trauma management including I.V. therapy are given in laboratory sessions.

3. Introduction to the Clinical Units Credits: 3

Patient assessment including the taking of histories and performance of physical exam is given. Students spend observational time in the critical care areas of the hospital.

C. Second Semester Credits: 18

1. Advanced Care of Sick and Injured II Credits: 3

Medical emergency situations are given with regard to pathophysiology, disorder, and advanced clinical management. Pharmacology of pertinent medications will be included with the treatment of the individual disease.

2. Clinical Experience completed in each of the following facilities of the Medical Center Credits: 15

a. Emergency Room — An examination and evaluation of the emergency patient, aseptic techniques, techniques of bandaging, splinting, hemorrhage control and other emergency procedures are discussed and practiced.

b. Obstetrics — Childbirth is discussed from the standpoint of actual field situations. Techniques of management of emergency childbirth



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are discussed and observed under the supervision of physicians and nurses.

c. Intensive Care — Practical application of patient assessment and management including such techniques as venipuncture, interpretation of EKG rhythms and administration of medications under physician and nurse supervision are provided in the clinical areas of medical, surgical, pediatric and burn intensive care units.

d. Surgery — Experience with aseptic technique, hemorrhage control, endotracheal intubation, intravenous therapy and airway management are discussed and practiced.

e. Respiratory Therapy — Practical applications in the use of oxygen therapy equipment with special emphasis on assessment and management of the patient requiring respiratory therapy.

D. Third Semester Credits: 16
1. Defensive Driving & Extrication Credits: 16

Defensive driving techniques are introduced during lecture and laboratory sessions. Special laws that apply to driving emergency vehicles are discussed. Methods of removing victims from vehicles with emphasis on prevention of injury or further extension of injury is presented. The injuries, their management, and tools

used in extrication procedures are discussed and demonstrated; and students will apply the techniques.

2. Administration-Practical Experience Credits: 2

Time will be spent with EMS administrators in local services to observe the application of management skills.

3. Field Internship Credits: 12

During this period, the student will work with trained and certified Emergency Mobile Intensive Care Technicians on Type One vehicles and put into practice the skill and knowledge he has gained during the previous year. Upon completion of field internship the student is eligible to sit for the State Certification Examination for Emergency Mobile Intensive Care Technicians.

As EMS continues to grow, there will be a need for two types of personnel in the field.

1. The paramedic technician delivers the primary care to the patient. It is his job to communicate with the hospital, evaluate the patient, communicate these findings to the hospital, carry out the necessary treatment. He also makes appropriate decisions as to which hospital the patient will be transported to, whether the patient should be transported by Mobile Intensive Care or standard ambulance unit and whether treatment should be received in route.

2. As any system cannot run by itself, there must be administrative personnel. These are the managers or operators of the ambulance service, regional and state directors of EMS systems and directors of paramedic units.

This second group of people must have managerial skills to set up and run a system. This includes, of course, personnel management, the accounting skills to carry out the fiscal side of the business, complete understanding of communication systems so that integration with already existing communication links can be accomplished, the ability to develop innovative communications systems for his area, and discussions with sales representatives. Skills of the EMS administrator must not end here, however. He must understand governmental and political bodies, how to function with them, how to obtain grant money from the federal government and private sources, how to function within a governmental system, writing yearly budgets and the solving of problems that this creates. This person must be able to deal with law enforcement agencies, fire departments and other emergency service personnel.

This individual must be a professional. He must understand the EMS system and how it works. He must be able to make it work for him and his community, so that quality medical care can be delivered at all times in the pre-hospital period. At the present time, the individuals are being educated in the school of hard-knocks. There is another way. That other way is a formal collegiate educational program such as is presently available at the University of Kansas Medical Center. And it is being expanded.

It is anticipated that the present twelve month program will be phased out as the four year curriculum is inaugurated. Plans for this program include accepting the first students in the fall of 1977.

KARE & MED-ACT PARAMEDICS

In mid 1973, Kansas City, Kansas Fire Department and Wyandotte County Medical Society, working in cooperation, identified the need to develop a system based on the premise of delivering the emergency room to the patient — rather than the

patient to the emergency room. These two entities, in cooperation with Kansas University Medical Center, worked until August of 1974 to develop, train and equip such units. The system was based on a combination of the programs of Los Angeles County Fire Department and Seattle Fire Department. It was a tandem response system operating with a pumper from the Kansas City, Kansas Fire Department, which in combination delivers basic and advanced life support. In March of 1975, Johnson County, Kansas inaugurated a similar system. As of April 1976, there are six units operating in Kansas City, Kansas and Johnson County, utilizing the tandem approach and endeavoring to provide on-the-scene emergency care with whatever procedure necessary to the patient.

The tandem response is based on simultaneous dispatch of two units. First unit out is either a fire rescue vehicle or pumper. The attendants are trained in Red Cross First Aid and American Heart Association Cardiopulmonary Resuscitation or as EMT/A's. Upon arrival at the scene, the first responder evaluates the patient, begins necessary supportive care, and supervises stabilization and life support until the arrival of the Emergency Mobile Intensive Care units. Both units, then, work together to maintain life support while radio communication with the hospital is established. The patient assessment is completed and relayed to the hospital. Under physician direction, the paramedic carries out any procedure or gives any medication requested by the hospital. After stabilization and initial care has been accomplished (which requires on the average 18 minutes) the patient is transported to the hospital. Many of the runs made by the paramedic units do not require specific treatment on the scene. However, to avoid overlooking a potential real complication that could occur in transportation to the hospital, an in-depth evaluation (including a physical history, electrocardiography and EKG) must be carried out on each patient. The paramedics make their own decision on the scene, communicate via radio to the hospital and then in combination with the hospital, decide if this patient would be better handled by EMT/A or paramedic transportation. When the decision reached is that advanced

care is not necessary, either a private ambulance is called, or the fire rescue unit on the scene transports the patient to the hospital. This then frees the paramedic unit to return to service and respond to other calls.

It is the thrust of both the tandem response and the total paramedic system to avoid red light and siren transportation to the hospital. Red light and siren is utilized only in a complete cardiac arrest situation or in other situations that the Emergency Room might provide better patient care than is available in the paramedic unit. Due to the skill of the technicians, the equipment and medication carried by them, such an occurrence is very infrequent. In the past two years, less than 3% of the runs to the hospital of all calls coming into the dispatch center, have been red light and siren by the Emergency Intensive Care unit.

Total metropolitan area systems communication developed by Mid-America Regional Council Emergency Rescue (MARCER) has set up a unique communication system in the UHF band. Any hospital in the metro area can be tied to any paramedic unit in the metro area, using a combination of hard lines from Marcer Communication Center to the hospital and to various radio towers throughout the area. The paramedic units can access these radio towers from their location, utilizing the 463 and 468 UHF bands. The call can then be directed through the Marcer Communication Center to the desired hospital regardless of its location. This systems approach makes optimum utilization of all 8 UHF frequencies by relying on UHF frequencies for preliminary communications or in some instances hospital communications.

One of the reasons for establishing advanced life support units, is to provide the capability of administration of medication in the pre-hospital phase. Medications will vary from system to system depending on local medical society options. The medications carried by the Med-Act and Kare units are listed in Figure 1. All five hospitals connected with the system are aware of the capabilities of technicians and the medication carried. Coordination and training of the entire system allows for maximum utilization and responsibility given to the technicians and minimum response time by the hospital personnel.

STANDING ORDERS

CARDIAC ARREST

- 1) Check for breath - if absent ventilate x 4.
- 2) Check Carotid pulse.
- 3) Do closed CPR if indicated.
- 4) Apply EKG paddles - check scope for V-fib or asystole.
- 5) If indicated, apply 100 W/S countershock - get 5 second readout and resume CPR.
- 6) Reevaluate cardiac status.
- 7) Start IV with DSW, intubate with endotracheal tube or esophageal obturator, ventilate with high concentration of O₂.
- 8) Give two amps NaHCO₃ - repeat 1 amp every 10 minutes.
- 9) Defibrillate again if monitor continues to show V-fib.
- 10) Give 1 ml 1:1000 Epinephrine IV or intratracheal, or 5 ml 1:10,000 Intracardiac - defibrillate again.
- 11) Establish radio communication.

STANDING ORDERS WHICH MAY BE CARRIED OUT PRIOR TO INITIATING RADIO COMMUNICATIONS BY MOBILE INTENSIVE CARE TECHNICIANS INCLUDES:

- 1) Start oxygen at 6-8 liters/minute, (2 liters/minute for patients with COPD).
- 2) Perform endotracheal or esophageal intubation if unable to maintain patent airway with other methods.
- 3) Establish an IV with Lactated Ringer's in trauma or DSW in medical emergencies.

(FIGURE 2)

In order to facilitate close cooperation between Emergency Department staff and the units in the field, all residents and medical students rotating through the Emergency Department of the Medical Center spend at least one night riding with the units. Nursing staff from all Emergency Rooms participate in their training and frequently ride either for continuing education of the nursing staff or continuing education of the paramedic personnel.

Medical societies in Wyandotte and Johnson counties have approved standing orders for use in cardiac arrest situations while radio communications are being established. (Figure 2)

ADDITIONS TO STANDING ORDERS

Lidocaine 50 mm bolus may be given IV and repeated x 1 in the event of:

- 1) Unable to reach hospital emergency room in a reasonable period of time and:
 - a) more than 6 PVC's per minute or
 - b) multiple focal PVC's or
 - c) ventricular tachycardia

One Ampule of sodium bicarb may be administered to patients suffering from hypovolemic shock secondary to trauma.

Criteria for Administration includes:

1. Blood pressure below 90 mm of Hg
2. Pulse greater than 110
3. Skin pale and cool
4. Signs of cerebral hypoxia

This order may be repeated x 1, prior to hospitalization.

NOTE: See that hospital is notified both via radio & upon arrival that sodium bicarbonate has been given and the amount and time.

(FIGURE 2 CONT)

Utilizing close hospital cooperation and mutual respect between the technicians in the field and the Emergency Department staff, delay time and beginning of definitive life support measures has been kept to a minimum. This, associated with the caliber of the technicians and their level of training has resulted in a "go-home-from-the-hospital-survival-rate" of ventricular fibrillation or cardiac standstill in patients whom resuscitation attempts were carried out, approximately 25%. This is very similar to results reported by other paramedic units.

The use of anti-shock trousers, intravenous solutions, rescue equipment and medications, has similarly improved the survival rate of persons involved in traumatic situations. Considering these conditions in association with drug overdose (one of our most common

medical problems), it is the general opinion of the medical community that not only the mortality rate but the morbidity rate of patients involved in emergency situations has been dramatically improved. It is also felt that development of a good emergency medical care system has improved the level of care available to such patients by the various emergency departments.

Skill and knowledge deterioration in any field is real. A recent psychological study showed that within three months of non-use, knowledge deterioration approached 70%. This emphasizes strongly the need for continuing education. (From basic cardio-pulmonary resuscitation to intercardiac injections, endotracheal intubation, chest tube insertion and cricothyroidotomy). The Kare and Med-Act programs have one service-wide two-hour continuing education program per month. This program emphasizes the newly developing skills for use in the field, changing procedures that experience and time has indicated are appropriate. Also, didactic sessions on chest trauma, cardiology, respiratory disease, diabetes or other problems which need emphasis are given.

Daily continuing education sessions are held with the Med-Act units from 1-4:30 pm, and address a variety of problems, both operational and medical. These sessions address those things that can best be taught on a one-to-one basis, which small group discussions enhance, or which require manipulative skills. A list of such topics is noted in Figure 3. It has been found that even though a skill such as CPR is frequently used, bad habits can develop. The summation of several small bad habits can significantly affect patient care. Only constant evaluative techniques, constant written and oral testing, and observation of skill performance can solve these deficits.

Both Kare and Med-Act have training officers. Both are paramedics with field experience and excellent background. Their job descriptions include riding with the units to observe the technicians in action and evaluating their performance. The completed run reports include both flow charts for time-medication-procedure correlation, and detailed narrative summary of patient assessment information with progress of the patient while in route. These run reports are closely evaluated by the training officers, spending a lot of time going over each one individually. Suggestions are made for improvement of technique of patient care management on this run, and notes are made for future training sessions.

This three fold approach of run report and individual run evaluation, daily one-on-one continuing education programs, and the monthly 2 hour didactic sessions provide for close monitoring and updating of skills.

Like all paramedic units in the United States, Kare and Med-Act have improved the quality of medical care in the area. Systems vary in their level of skill, training, and responsibility, in various parts of the United States. It is thought that the basic training program lasting six months, and providing 342 hours of didactic lecture, 364 hours of clinical experience, and 320 hours of field internship, provides the moderately sized urban and suburban community with the optimum care available. The area wide communication system, skill of the technicians, responsibility given to them by the Emergency Department physicians, equipment carried on the units, and tandem response system, provides the citizens of the area the best possible use of that 39 minutes which the units average for each call from the time the patient accesses the system until they are delivered to the hospital.

It is with gratitude that we, in the mid-section of the country, look to the West Coast for developing the paramedic systems which have allowed for the development of the team approach in medicine. From the time the emergency unit arrives on the scene, they provide a continuous unbroken quality of medical care, until the time of discharge.

CONTINUING EDUCATION TOPICS

OPERATIONAL

- Emergency Driving
- Orthopedic Appliances
- Biomedical Communications
- Vehicle Maintenance and Cleaning
- Data Forms and Patient Report Form Review

- Rescue Equipment
- Medical Appliances
- Map Study
- 10-Codes

MEDICAL

- EKG Arrhythmias, Treatment & Diagnosis
- Patient History & Total Body Assessment
- Triage of Multiple Systems Trauma
- Airway Management & Diagnosis of Chest Trauma
- Electrolytes & Pharmacology in General
- Fractures & Sprain Management
- Cardiovascular Drugs
- Diabetic Emergencies

- Head Trauma
- Chest Trauma
- Acute Abdomen
- Anatomy & Physiology

(FIGURE 3)

END