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CORONARY CARE

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1. GENERAL INTRODUCTORY REMARKS

CORONARY CARE

1. General Introductory Remarks

Care for the acute coronary patient received a great impetus just prior to the enactment of the Regional Medical Programs Law (PL 89-239). Inasmuch as the coronary care unit embodied an entirely new concept for managing patients with acute myocardial infarction and the armamentaria for coronary care units required special accommodations in design and engineering, a host of hospitals were intrigued and sought financial support for local undertakings.

This new source of funding gave opportunity to many community hospitals to initiate this new concept. Further, it was a way by which the local RMP could establish a community service and immediate community exposure in which life-threatening events could be managed. As a result the RMPS became involved with a number of projects dealing with coronary care units. It became immediately apparent that highly specialized and trained personnel were necessary for the efficient operation of these specialized units. Nurse training programs were established to meet local and national needs. Early, the RMPS responded to the local demands and became intimately involved with training of nurses to staff the coronary care units. Physician training to deal with these newer techniques were also included.

Concurrently, computerization of electrocardiographic interpretation was gaining momentum. Efforts at regionalization from smaller hospitals to medical centers for consultation and interpretation via electronic

Devices began to develop. Based on the hope that electronic transmission could provide service, attempts were made to proliferate ECG computer systems. Here again RMPS became an involved partner.

A review of project funding in the RMPS since the inception of operational programs indicates that approximately 19 million dollars has been awarded for coronary care training and demonstrations, including equipment and facilities, and computerized ECG systems.

The following is a breakdown of the 100 individual projects which have been supported in these areas. The funding represents an estimate of fiscal investment through fiscal year 1970.

Training and Demonstration; Nurses, MDs and Allied Health (many included equipment)	\$15,284,000
87 Projects	
Mobile Coronary Care Facilities	789,000
7 Projects	
Computerized ECG Systems	3,050,000
7 Projects	
Total - 100 Projects	<u>\$19,123,000</u>

11. CORONARY CARE UNITS

II. Coronary Care Units

Regional Medical Programs Service endorses the concept of a stratified system of coronary care described in the attached report which is based upon a draft of a proposed report by the Coronary Heart Disease Study Group of the Inter-Society Commission for Heart Disease Resources. RMP regions are particularly encouraged to explore the following areas:

- A. The organizational structure to implement the system - community multidisciplinary committees concerned with acute coronary care - is non-existent in most regions.
- B. The mechanisms for entry into the system and the emergency transport systems are the phases of the system in which technology and resources are inadequately developed.
- C. The various levels of education and training within the system - public education, training of ambulance personnel, physician and nurse training required continuous up-dating and streamlining.
- D. The financing of established technology for a coronary care unit, especially when such a unit is proposed independent of a regional plan, does not appear warranted. Exceptions might be made if grave community needs exist, and alternative funding is unavailable.

INTER-SOCIETY COMMISSION FOR HEART DISEASE RESOURCES

(Draft)

ACUTE CARE FOR CORONARY PATIENTS

- I. Introduction
- II. Community Coronary Care Planning
- III. Components of a Stratified System of Coronary Care
 - A. Public Education in Early Care
 - B. Mechanisms for Rapid Entry into the System of Coronary Care
 - C. Emergency Transport and Life-Support System
 - D. Coronary Care Unit
 - E. Regional Reference Centers

ACUTE CARE FOR CORONARY PATIENTS

I. INTRODUCTION

It has been estimated that about one million Americans experience acute myocardial infarction or sudden coronary heart disease death each year, and that about 25% of these patients die before reaching medical care. (Reference: Official RMPS - U.S. Public Health Service estimate. See ICHD Atherosclerosis report for supporting documents.) The mortality in acute myocardial infarction is highest during the first few hours following the onset of symptoms. (Reference: Kuller, et al, Epidemiologic study of sudden and unexpected death due to arteriosclerotic heart disease, Circ 34:1056, Dec. 1966.) It seems probable that mortality is due most often to ventricular fibrillation, and less frequently to the consequences of brady-arrhythmias or profound pump failure manifested by shock or acute pulmonary edema. (Footnote: The definitive study of the cause of sudden death in patients with coronary artery disease has not and probably can not be done. Because of the nature of these deaths, the best judgment is that they occur secondary to arrhythmias.)

Before the establishment of coronary care units, average mortality rates of hospitalized patients with acute myocardial infarction were approximately 30%. In the past decade, there have been significant

advances in the management of this disease, most importantly the concept of surveillance and therapy in the specialized environment of coronary care units. In an effective unit a reduction of 50% of the early hospital mortality rate has already been achieved. This reduced mortality is directly related to the prompt detection, effective prevention, and treatment of potentially life-threatening cardiac arrhythmias by means of specific drug therapy, defibrillation, and pacemaker insertions. However, the prognosis of patients with other serious complications, particularly pump failure, has not changed significantly. The results of intensive research on the pathophysiology of pump failure, and the development of more successful therapy should reduce mortality in the future.

Because the fatality rate from acute myocardial infarction is so high during the first hours after the onset of symptoms, the objectives are to bring the patient rapidly and safely into an optimal system of coronary care, and to monitor him thereafter for an appropriate period of time to detect life-threatening complications, particularly arrhythmias. In order to accomplish these goals, a stratified and integrated system of coronary care is proposed to include the following components:

- a. Improved education of public and of health professionals so that the individual with symptoms of acute myocardial infarction will make an earlier decision to seek medical care.
- b. Investigation of new mechanisms to facilitate rapid entry of patients into the medical system.

c. Development of effective emergency transport systems for delivering patients to an optimal system of coronary care.

d. Establishment of emergency life-support stations where appropriate, and improvement of hospital emergency areas in rendering immediate coronary care.

e. Increase in the number and improvement of coronary care units to provide continuous monitoring and capacity for definitive therapy.

f. Designation of regional reference centers with capabilities for providing comprehensive cardiovascular care.

g. Establishment of continuous training programs for medical, nursing, and other allied health personnel in the care of coronary patients.

The implementation of such a system can diminish the waste of manpower, resources, facilities, and time which now characterize the delivery of acute care. The alternative is for each hospital to provide identical, competitive services in an isolated and autonomous fashion. The components and mechanisms of the stratified system will vary with community resources, but with innovative planning the proposed system can be developed into a coordinated network in which medical facilities perform different functions according to a systematic analysis of the needs and capabilities of each community.

II. COMMUNITY CORONARY CARE PLANNING

To implement the stratified care system, it is recommended that a standing multi-disciplinary committee be established in each community for the planning, organization, integration, evaluation, and (when necessary) the revision of the community coronary care system. The method of function of this committee will vary depending upon local circumstances. The committee should include physicians, nurses, hospital administrators, representatives of emergency services, and consumers of medical care. The functions of the committee should include:

- a. Evaluation of existing facilities and determination of the need and priorities for the various components of the stratified system of coronary care.
- b. Recommendation of policies concerning the criteria for patient admission to various levels within the system of coronary care, and suggestion of criteria for the length of stay and the time of discharge.
- c. Planning, development, and coordination of an effective public and professional educational program.
- d. Development of mechanisms for facilitating the prompt entry of patients into the system, e.g., centralized screening telephone centers.
- e. Definition of policies regarding the responsibility and authority for patient management within various components of the system.

f. Evaluation of the impact, efficiency, and cost effectiveness of the system.

g. Coordination of other community facilities for coronary care, e.g., services for the identification and treatment of individuals at high risk of developing coronary heart disease, early detection units for heart disease, rehabilitation centers, work evaluation units, etc.

Each community should recognize its responsibility to provide optimal care for patients with acute myocardial infarction. It should be recognized that not all medical facilities can or even should be expected to have the same capability, and that local circumstances will determine the nature of the components of a coordinated system whose goal is to place the patient with the symptoms of acute myocardial infarction into an optimal system of care.

III. COMPONENTS OF A STRATIFIED SYSTEM OF CORONARY CARE

A. PUBLIC EDUCATION IN EARLY CARE

The first few hours after the onset of symptoms suggestive of acute myocardial infarction are critical, since the high mortality associated with this time period is presumably due in most cases to the preventable and treatable occurrence of ventricular fibrillation. Ideally, individuals with these symptoms should be placed under competent medical surveillance within one hour after the onset of symptoms.

The most important and frequent cause for delay is the patient's indecision when he develops oppressive chest pain. (Reference: Olin and Hackett: Denial of chest pain in 32 patients with acute myocardial infarction. JAMA 190:977, 1964.) This indecision may be related to:

1. Lack of information regarding the significance of the symptoms.
2. Denial of the importance of chest discomfort because of the fear of myocardial infarction and its consequences.
3. Misinterpretation of symptoms as reflecting disorders of other organ systems.
4. Failure to establish a relationship with a personal physician, or to disturb a physician at an inconvenient time, such as night hours or weekends.
5. Failure of relatives or co-workers to encourage the patient to seek medical help.
6. Psychologic, socio-economic, and physical barriers barring rapid entry into the system.

Many of these problems can be mitigated by a major educational program directed at the public to teach the frequency of coronary artery disease, the common early symptoms of acute myocardial infarction, and the effectiveness of prompt medical care in altering the immediate prognosis of this disease. Individuals, particularly those who are

middle-aged and without a history of angina, should seek immediate entry into the system of coronary care if they develop severe pain or oppressive discomfort in the retrosternal region, especially if it radiates to the arms or neck and does not promptly disappear. Although acute myocardial infarction can present with other symptoms, the characteristics noted above are sufficiently sensitive and specific to serve as a warning message directed to the general public. Individuals at high risk for coronary artery disease, such as those with hypertension, a history of cigarette smoking, hyperlipidemia, or diabetes should constitute a particular target population for this educational message.

Patients with a history of angina pectoris should not enter the system of coronary care after every episode of angina. They should be instructed that more frequent or more severe angina, or a change in pattern, may herald acute myocardial infarction.

More education of the public will probably produce a large number of false alarms. However, the number of lives saved should justify the inconvenience and cost in terms of time and dollars. Analysis of such false alarms should result in improvement of the educational programs.

B. MECHANISMS FOR RAPID ENTRY INTO THE SYSTEM OF CORONARY CARE

When an individual makes the decision to seek medical attention for symptoms of acute myocardial infarction, access into the system should be rapid and efficient. One mechanism, if the patient has a

personal physician, is to contact him immediately. Unnecessary physician delay often results from difficulty in reaching the personal physician; the physician's hesitation in making the presumptive diagnosis of acute myocardial infarction over the telephone, or his lack of information about community facilities and resources for coronary care. It should be emphasized that almost two-thirds of the patients with acute myocardial infarction have prodromal symptoms including progressive or crescendo chest pain within one week before the onset of the acute attack and frequently consult a physician during this time.

To improve the response to the individual seeking help, physicians and other health personnel likely to make primary contact with the patient experiencing symptoms of acute myocardial infarction should be educated in the following areas:

1. Recognition of the signs and symptoms of impending acute myocardial infarction.
2. Familiarity with community resources and facilities so that the patient can be advised how to reach a monitored bed as rapidly as possible.
3. The ability to perform cardiopulmonary resuscitation.

(Reference: Definitive Therapy in Cardiopulmonary Resuscitation, AHA, 1965.)

4. Understanding by the physician of the indications and uses of basic medications in the treatment of cardiac arrhythmias. All physicians should have available atropine and lidocaine, or other appropriate medications if these are superseded in the future by more effective therapeutic agents. (Reference to Bethesda Conference)

If the patient does not have a personal physician, or if his response is not immediate, other mechanisms for entry into the system of coronary care must be available. The patient may contact an emergency room, an ambulance system, or a coronary care emergency telephone number for immediate assistance. Each community should develop its own response system, but it is suggested that a local telephone information center and community information service be developed. When an individual experiencing symptoms calls the center, he would be advised by a professional person about the need and availability of medical care. If the patient needs prompt attention, he will be directed to the nearest hospital or life support unit by the best available transportation. In the future a generally desirable option may be that of a national telephone network with a single number, such as that presently used to obtain information regarding telephone numbers in various cities.

Other approaches to the problem of prevention of arrhythmias during the first hours after onset of symptoms are currently being explored. One rational and promising concept is the use in high risk groups of

self-administered atropine or lidocaine, preferably under a physician's telephone direction, as soon as symptoms are recognized. This approach merits further investigation.

C. EMERGENCY TRANSPORT AND LIFE SUPPORT SYSTEM

After an individual with the symptoms of acute myocardial infarction has sought help, it is essential that a rapid emergency transport system be available, and that a bed in an emergency or coronary care facility be prepared to receive him. Otherwise, the time, effort, and money spent on public and professional education is wasted.

1. Emergency Transport System

Until recent years, the patient's emergency transportation has been left to his own devices. In some communities the patient can reach an emergency care system relatively quickly, while in others traffic congestion or lack of accessible medical facilities cause inordinate delay. Therefore, the emergency transport system should provide the facilities needed for the detection and therapy of cardiac arrhythmias, and should have the capacity to perform cardiopulmonary resuscitation. Two types of transport systems have these capabilities:

a. Mobile Coronary Care Units. These vehicles are designed to respond only to suspected cardiac emergencies. They are staffed by a physician (or telemetry communication), nurse, and other health personnel and are equipped with facilities for monitoring, recording

electrocardiograms, defibrillation, cardiac pacing, and pharmacologic therapy. In some vehicles a two-way communications system is established through radiotelephone, and electrocardiograms may be transmitted via telemetry from the vehicle to a receiving station. These vehicles are prepared to stabilize a patient's condition in his home and in the vehicle, then to transport him rapidly to a continuing care unit. Whether Mobile Coronary Care Units should be generally recommended or implemented in many cities is still controversial. Preliminary observations have demonstrated the effectiveness of such units in the management of life-threatening cardiac arrhythmias complicating acute myocardial infarction.

b. Emergency Transport Vehicles. These vehicles respond to all medical emergencies. They are frequently operated by allied health personnel, and are equipped with less complete facilities for dealing with acute cardiovascular emergencies. It is mandatory that the personnel who staff these vehicles receive adequate training in recognition and be competent to treat a cardiac emergency, particularly life-threatening arrhythmias. They should be authorized to initiate drug therapy or defibrillation, preferably under a physician's supervision through voice communication with a control station. Equipment should include an electrocardiograph, a battery operated defibrillator and constant monitor oscilloscope, oxygen and tracheal suction apparatus, and cardiac drugs such as atropine, lidocaine and analgesics. Telemetry transmission of the electrocardiogram from the vehicle to a control station is recommended.

The advantages of the Emergency Transport Vehicle over the Mobile Coronary Care Unit are that (1) since it is not dedicated solely to coronary care, its cost effectiveness is greater, and that (2) it does not divert medical and nursing personnel from other high priority duties.

Improvement of the present ambulance system in the United States to meet the Emergency Transport Vehicle standards described above seems a more promising approach for the future than the concept of Mobile Coronary Care Units.

2. Emergency Life-Support Station

An emergency life-support station is a unit which is strategically located in areas of population density in which patients afflicted with symptoms of acute myocardial infarction can be provided with immediate care. Its staff may include physicians, nurses, or allied health personnel, but a physician knowledgeable and skilled in the management of cardiovascular emergencies should assume administrative and supervisory responsibility. It should be equipped for the capability of providing continuous electrocardiographic monitoring, performing cardiopulmonary resuscitation, and initiating appropriate drug therapy for brady- and tachy-arrhythmias and defibrillation. Emergency cardiac pacing is seldom needed in these stations. The purpose of the emergency life-support station is, therefore, to stabilize the condition of a patient with suspected acute myocardial infarction before transfer to a coronary care unit for continuing therapy.

The Mobile Coronary Care Unit is one type of emergency life-support station which can be brought to a patient's home or to other locations. Stationary life-support units might be considered for the following locations:

- a. Areas where a large number of employees work on weekdays, such as factories, industrial plants, or large business centers.
- b. Areas where there is a constant incoming and outgoing of mass population, such as metropolitan airports and large railroad stations.
- c. Areas where there is a periodic concentration of mass population such as sport stadiums and convention halls.

However, in most communities the logical and ideal site for an emergency life-support station is the emergency department of a hospital or an adjacent area. Every hospital with an emergency area should meet the standards for an emergency life-support station specified above, and should have these capabilities on a twenty-four hour basis. The standards should be met regardless of whether the hospital has its own coronary care unit.

The specific policies of the hospital emergency areas with regard to suspected acute myocardial infarction depend on local circumstances, but it should be emphasized that a patient with a history compatible with an acute myocardial infarction should not be discharged from the emergency department on the basis of an initial "normal" electrocardiogram. If the diagnosis is in doubt, it is always advisable to transfer the patient to the coronary care unit for further observation and monitoring.

Every hospital emergency area should be able to provide life support to patients with acute myocardial infarction. This does not mean that every hospital should have a coronary care unit. The decision to establish a coronary care unit, as discussed below, should be predicated on the needs of the stratified system.

D. CORONARY CARE UNIT

1. Coronary Care Concept

At the present time, the coronary care unit is the most important and effective component of the stratified system of coronary care. It is a specialized unit within the hospital which, through continuous surveillance of patients with suspected or proven acute myocardial infarction, provides for the early detection and prompt therapy of certain complications in the initial phase of the disease. The benefits of the coronary care unit are based on the observations that (1) the sudden or early death of hospitalized patients after an acute myocardial infarction is usually due to cardiac arrhythmias, most commonly ventricular fibrillation, and that (2) these arrhythmias are largely preventable or reversible.

However, even if all patients with acute myocardial infarction were treated in coronary care units, hospital mortality would still be significant because of additional complications such as intractable heart failure and cardiogenic shock. Additional patients die from arrhythmias

and other complications after they have been transferred from the coronary care unit. Many of these hospital deaths outside the coronary care unit result from disturbances in cardiac rhythm. Therefore, if the mortality rate of hospitalized patients with myocardial infarction is to be further reduced, more effective therapeutic measures for these complications - particularly pump failure - will have to be developed, and the period of continuous monitoring of patients transferred from the coronary care unit will have to be extended.

Prolonged monitoring of hospitalized patients can be accomplished by step-down units for continued observation, preferably located near the coronary care unit. After the initial period of approximately five days in the coronary care unit, patients can be continually monitored in this progressive step-down system.

2. Establishment of the Coronary Care Unit

Hospital size alone should not be the determining factor in the decision to establish a coronary care unit. The issues bearing on this important decision should be the availability of qualified and dedicated physicians, nurses, and allied health personnel, the number of patients admitted annually with suspected myocardial infarction, and the adequacy of other area facilities.

For many small hospitals having fewer than fifty beds and admitting less than twenty-five patients annually with suspected or proven

myocardial infarction, it does not seem feasible to designate specific beds for definitive coronary care. In these hospitals a life-support station as previously described should be provided in the emergency department or adjacent to a nursing station on a medical floor. As soon as the patient's condition is stabilized, expeditious and safe transfer to the coronary care unit of a nearby larger hospital can be performed.

Paragraphs 3 (Staffing); 4 (Physical Specifications); 5 (Organization and Operation); and 6 (Step-down Units) omitted - not particularly pertinent to Council at this time.

E. REGIONAL REFERENCE CENTERS

Many institutions, often hospitals associated with medical schools, have full-time house staff, trained cardiologists, cardiac surgeons and training programs in coronary care for physicians, nurses, and allied health personnel. These institutions also have specialists in all medical fields, facilities for cardiac catheterization and angiographic studies, and programs in cardiovascular surgery. Often they have active research programs in areas which bear on the problems associated with coronary artery disease. Such institutions may be designated as regional reference centers. The functions and capabilities of these centers within the stratified system of coronary care are as follows:

1. To receive patients who have serious complications and require special diagnostic study and therapy. These complications may include:

- a. Serious cardiac arrhythmias and conduction defects, particu-

larly in those patients with indications for insertion of pacemakers.

b. Profound cardiac failure which might be helped by specialized medical therapy or by circulatory assist devices.

c. Suspected ruptured papillary muscle or perforation of the ventricular septum requiring special studies and surgical intervention.

2. To provide consulting services for neighboring hospitals such as a physician in residence, electrocardiogram interpretation by telephone transmission, or medical conferences by closed-circuit systems.

3. To maintain continuing education and training programs in coronary care for physicians, nurses, and allied health personnel.

4. To assist the community in planning for coronary care. If requested, the center might provide quality control for emergency vehicles or for life-support stations.

5. To serve as centers for data collection, analysis, and registry of patients with coronary artery disease or acute myocardial infarction to facilitate epidemiologic study and evaluation.

6. To perform research in coronary artery disease in general, and acute myocardial infarction in particular.

IV. SUMMARY

A stratified and integrated system of coronary care is proposed to treat patients with acute myocardial infarction. Because preventable deaths are occurring before patients reach medical attention, each

interval of the delay period must be shortened:

(1) The patient's period of hesitation between onset of symptoms and decision to seek medical help should be shortened by public education programs.

(2) Entry into the medical system should be facilitated by improved physician response and by new information systems.

(3) Emergency transport systems and life support stations should be developed with the capability for treating arrhythmias and stabilizing patients before transfer to a coronary care unit. All hospital emergency areas should have these capabilities.

After a patient with an acute myocardial infarction has reached a coronary care unit, he should receive monitoring and therapy for an appropriate period of time, which may be prolonged in step-down units. The specialized benefits of regional reference centers should be available when necessary.

The cornerstone of such a system is community planning to provide maximum integration of personnel and resources, and to develop local solutions to the problems in each stage of coronary care.

111. MOBILE CORONARY CARE UNITS

III. MOBILE CORONARY CARE UNITS

A. MOBILE CCU's FUNDED BY RMPS

1. General - RMPS funded seven Mobile Coronary Care Units between March 1968 and February 1970. The total cost through June 1970 was \$837,000. On August 1970 we sent a questionnaire to each Project Investigator through their respective RMP coordinators. A copy of the questionnaire is attached as Appendix I.

Four of these Units provided comprehensive services and account for \$781,000 out of the total of \$837,000. These Units are located as follows:

New York City, New York
Columbus, Ohio
Seattle, Washington
Montgomery County, Maryland

The remaining three Units accounted for \$56,000 out of the total of \$837,000. None of these Units represents a full scale operation, each for different reasons. These Units will be described separately below. They are located as follows:

Mason City, Iowa
Portland, Oregon
Waynesville, North Carolina

2. The Four Units with Comprehensive Services

a. New York City, New York

The MCCU team consists of a physician, nurse, technician, and driver who are on duty at various parts of St. Vincent's Hospital. On calls

from the Police Department they board an ordinary hospital ambulance with portable equipment. It takes the team 4½ minutes or less to board the ambulance and start on the way. Patients are taken to St. Vincent's hospital but there are plans to include other hospitals.

In nineteen months of operation, the Unit transported 729 cases, 89 of which were MI's. Of the 7 cases of cardiac arrest that were resuscitated and brought to the hospital alive, two lived to be discharged from the hospital alive. The median age was 65 and the median time to reach the patient was 8 minutes.

b. Columbus, Ohio

The MCCU team consists of a physician, technician, and two members of the Columbus Fire Dept. Emergency Squad. The vehicle is specially equipped like a Coronary Care Unit adapted to conditions in a mobile vehicle. Patients are taken to 5 hospitals.

In 15 months of operation, the Unit transported 699 cases, 160 of which were MI's. Of the 13 cases of cardiac arrest that were resuscitated and brought to the hospital alive, 5 lived to be discharged alive. The median age was 59 and the median time to reach the patient was 11 minutes.

c. Seattle, Washington

The MCCU team consists of a physician, technician, and a driver. There are two specially equipped ambulances. Patients are taken to 21 hospitals.

In 4 months of operation, the Unit transported 185 cases, 88 of which were MI's. Of the 23 cases that were resuscitated and brought to the hospital alive, 8 lived to leave the hospital alive. The median age was 59 and the median time to reach the patient was 7 minutes.

d. Montgomery County, Maryland

The MCCU team consists of a nurse, technician, and a driver, working under orders of a physician via 2-way telemetry. The physician also monitors the ECG on an Oscilloscope via the telemetry. Patients are taken to 3 hospitals.

In 3½ months of operation the Unit transported 98 cases, 36 of which were MI's. Of 5 cases that were resuscitated and brought to the hospital alive, 1 lived to leave the hospital alive. The median age was 65 and the median time to reach the patient was 6 minutes.

e. Summary (Also see Appendix II)

The cost per MI transported averaged \$1,200 at the three locations and ranged from \$690 in Seattle to \$1,500 in New York City. The cost per case that was resuscitated and left the hospital alive averaged \$29,000 at the three locations and ranged from \$7,000 in Seattle to \$60,000 in New York City.

These differences are accounted for in part by the fact that Seattle differs significantly from the other locations in two ways:

1. the high proportion of transported cases that were MI's
2. the large number of cases per month that were resuscitated and brought to the hospital alive.

If we omit Seattle from consideration for a moment, we note that the cost per MI transported averaged \$1,400 and varied only from \$1,300 in Montgomery County to \$1,500 in New York City. The cost per case that was resuscitated and left the hospital alive averaged \$50,000 and varied only from \$45,000 in Columbus to \$60,000 in New York City.

3. The Remaining Three Units

a. Mason City, Iowa

The staffing consists of a nurse, attendant, and a driver, using a specially equipped vehicle. The Unit serves 7 hospitals within a 35 mile radius in a rural area. At present, only calls from physicians are accepted, usually for transferring patients from hospitals to other hospitals with CCU's. The project had only been in operation for 12 days as of June 30, 1970.

b. Portland, Oregon

This was only intended as a feasibility study. The crews and vehicles were those of a regular Fire and Rescue Personnel. Two-way telemetry was added to three emergency ambulances for monitoring of cardiac emergency patients by a nurse at the hospital in order to demonstrate the need for on-site defibrillation by attendants acting

under verbal orders through telemetry. The demonstration was considered a success and a full scale operation is planned with local funding.

c. Waynesville, North Carolina

This was a feasibility study for rural Appalachia. Portable equipment was provided for two ambulance, one stationed at Waynesville and another at Canton. This project did not charge RMP for the ambulance. Also, they charged the patient a fee. For this reason, no attempt was made to estimate the cost per case. During the one year period from July 1969 through June 1970, there were 100 cases transported, of whom 25 were MI's. A physician was at the scene or arrived shortly after the call in 30% of the cases. There were three cases who were resuscitated and who reached the hospital alive. Of these, two left the hospital alive. The individual case reports have not as yet been submitted for review.

B. AMERICAN HEART ASSOCIATION SURVEY

At our request, the American Heart Association surveyed their 125 Chapters and Affiliates during September 1970 to determine the number of Mobile Coronary Care Units in operation and the number planned throughout the country. The findings from the chapters and affiliates that responded show 26 Units in operation and 21 more being planned.

Appendix III shows that 7 of 26 MCCU's in operation around the country used a physician. Sixteen of the 26 used either a nurse or a physician. However,

of 12 MCCU's not now in operation but with plans formulated for the future,
only two include a physician or nurse.

EVALUATION OF MOBILE CORONARY CARE AMBULANCE

RMPS Operational Project Grant

From date RMPS Grant authorized to June 30, 1970

I. General Information

- A. Sponsoring Institution _____
- B. Project Director _____
- C. Service area of Mobile Coronary Care Unit
1. Number of hospitals to which patients are customarily transported by Mobile CCU _____
 2. Square miles covered by service _____
 3. Estimated population residing or working in area served _____
- D. Date RMPS grant authorized _____
Mo / Day / Year
- E. Date Mobile CCU began operating _____
Mo / Day / Year

II. Operating procedures

- A. Hours Mobile CCU scheduled for service
(Show initial schedule and subsequent changes thru June 30, 1970)

Dates		Number of hours per week
From	To	

- B. Under the most current protocol of standard operating procedure, who is privileged to call the Mobile CCU? (Check one)

Anyone

Physicians only

Other groups (Specify) _____

III. Fiscal Data through June 30, 1970

A. First fiscal year actual expenditures, from _____ to _____
Mo / Day / Yr Mo / Day / Yr
(From date RMPS grant authorized to end of first fiscal year or
June 30, 1970, whichever is earlier)

Item of expense	Estimated allocation of total expenditures			
	Before initiation of services		After initiation of services	
	RMPS Funds	Other Funds	RMPS Funds	Other Funds
1. Personnel ²				
2. Training of personnel ² ..				
3. Equipment				
a. Special equipment ³ ..				
b. Ambulance vehicle ..				
c. Ambulance equipment				
d. Other equipment				
4. Supplies				
5. Other direct costs ⁴				
6. Indirect costs				
TOTAL				

1. Include estimated value of all services, equipment, etc., donated to the MCCU project.
2. Include all services paid for either directly or by subcontract.
3. Include ECG, defibrillator, mechanical CPA, telemetry, and voice communication equipment.
4. Include consultant services for other than training of personnel.

B. Second fiscal year actual expenditures, from _____ to _____
Mo /Day /Yr Mo /Day/Yr
(To end of second fiscal year or June 30, 1970, whichever is earlier)

Item of expense	Extimated allocation of total expenditures	
	RMPS Funds	Other Funds ¹
1. Personnel ²		
2. Training of personnel ²		
3. Equipment		
a. Special equipment ³		
b. Ambulance vehicle.....		
c. Ambulance equipment.....		
d. Other equipment.....		
4. Supplies.....		
5. Other direct costs ⁴		
6. Indirect costs.....		
TOTAL		

C. Third fiscal year actual expenditures, from _____ to _____
Mo /Day /Yr Mo /Day / Yr
(To end of third fiscal year or June 30, 1970, whichever is earlier)

Item of expense	Extimated allocation of total expenditures	
	RMPS Funds	Other Funds ¹
1. Personnel ²		
2. Training of personnel ²		
3. Equipment		
a. Special equipment ³		
b. Ambulance vehicle		
c. Ambulance equipment.....		
d. Other equipment.....		
4. Supplies.....		
5. Other direct costs ⁴		
6. Indirect costs.....		
TOTAL		

IV. Operating Problems

A. Describe difficulties with:

- 1. Vehicle _____

- 2. Electronic equipment _____

- 3. Other special equipment _____

- 4. Personnel _____

B. Estimated total number of scheduled hours Mobile CCU was not in operation ("down time") during each fiscal year.

Reason	Fiscal Year		
	First ⁵	Second ⁵	Third ⁵
Personnel or staffing problems			
Other reasons			
TOTAL			

⁵ To end of fiscal year or June 30, 1970, whichever is earlier

V. Operational Statistics through June 30, 1970

	Fiscal Year		
	First ⁵	Second ⁵	Third ⁵
A. Number of calls answered.....			
1. Number of calls cancelled en route.....			
2. Number of arrivals on scene.....			
a. Number of individuals not transported to hospital by Mobile CCU.....			
(1) Dead on arrival of Mobile CCU....			
(2) Died at scene after arrival.....			
(3) No need to hospitalize.....			
(4) Transported to hospital by other than Mobile CCU.....			
(5) Other reasons.....			
b. Number of individuals transported to hospital by Mobile CCU.....			
(1) Died en route.....			
(2) Arrived at hospital alive.....			
(a) Died in emergency room.....			
(b) Discharged from ER (not requiring hospitalization)			
(c) Hospitalized.....			
(1a) Admitted to CCU.....			
(1b) Admitted to ICU.....			
(1c) Admitted to other hospital bed.....			
B. Total Hospitalized (Same as (c) above).....			
Principal discharge diagnosis:			
1. Myocardial infarction.....			
2. Other coronary disease.....			
3. Stroke.....			
4. Other cardiovascular disease.....			
5. Non-cardiovascular disease.....			
6. Discharge diagnosis not known.....			
7. Still in hospital.....			

VI. Therapy Statistics through June 30, 1970

		Fiscal Year		
		First ⁵	Second ⁵	Third ⁵
A.	Number of individuals who received CPR and one or more defibrillations Total...			
	1. Reached hospital alive.....			
	2. Died before reaching hospital.....			
B.	Number of individuals who received CPR only Total...			
	1. Reached hospital alive.....			
	2. Died before reaching hospital.....			
C.	Number of individuals who received one or more defibrillations without CPR Total...			
	1. Reached hospital alive.....			
	2. Died before reaching hospital.....			
D.	Number of individuals who received CPR and/or one or more defibrillations and who reached hospital alive. (Sum of lines A-1, B-1, and C-1) Total...			
	1. Died in Emergency Room.....			
	2. Died in hospital.....			
	3. Discharged from hospital alive.....			
E.	Number of individuals who received medications Total...			
	1. For disturbances of rhythm.....			
	2. For discomfort or pain.....			
	3. For acidosis.....			
	4. For anxiety.....			

VII. Observations on beneficial effects other than individual therapy resulting from the existence of the Mobile CCU. (Briefly list events such as (1) activities by other organizations, (2) problems the medical community became aware of, (3) upgrading of medical or hospital services, (4) talks, seminars, or training sessions, (5) public education programs, etc.)

A. _____

B. _____

C. _____

D. _____

E. _____

Prepared by:	Date:
--------------	-------

CASE HISTORY FOR CARDIAC ARREST PATIENTS

WHO REACHED THE HOSPITAL ALIVE

I. General Information

- A. Initials or other identification of patient _____
- B. Date of episode _____
Mo / Day / Year
- C. Age _____
- D. Sex: Male Female

II. Pre-Hospital data

- A. Date and time of first symptoms _____
Mo / Day / Yr Hr / Min AM PM
- B. Date and time call for Mobile CCU received _____
Mo / Day / Yr Hr / Min AM PM
- C. Time Mobile CCU arrived at scene _____
Hr. / Min
- D. Condition of patient on arrival at scene
- | | |
|--|--|
| <input type="checkbox"/> Stable | <input type="checkbox"/> No heart beat (Pulselessness) |
| <input type="checkbox"/> Unconscious | <input type="checkbox"/> Not breathing |
| <input type="checkbox"/> Semi-comatose | <input type="checkbox"/> Pupils dilated |
| <input type="checkbox"/> Shortness of breath | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Clammy or sweaty | _____ |
| <input type="checkbox"/> Abnormal pulse | _____ |
- E. Was cardiac arrest validated by ECG monitor or tracing? Yes No
- F. If "Yes", was it Ventricular standstill?
 Ventricular fibrillation?
- G. How long was CPR applied? _____
- H. How many times was defibrillation applied? _____

I. Complications and therapy at scene or during transport

<u>Clinical</u> / <u>ECG changes</u> <u>necessitating RX</u>	<u>Therapy / Medications</u>	<u>Time</u>

III. Emergency Room

- A. Was patient taken to Emergency Room? Yes No
- B. If "Yes", did patient die in ER? Yes No

IV. Hospitalization

- A. Was the patient admitted to the hospital? Yes No

B. History of prior cardiovascular disease

Myocardial infarction

Other cardiovascular disease (Specify) _____

C. Hospital discharge diagnosis _____

V. Outcome

A. Survival (Check all applicable items)

Discharged from hospital alive _____

(Date)

Died after admittance to hospital _____

(Date)

Died within 6 months after discharge from hospital _____

(Date)

Known to be alive 6 months after discharge from hospital

Survival not known 6 months after discharge from hospital

B. Cause of death on death certificate: _____

VI. Remarks: _____

red by:	Date:
---------	-------

OPERATING COSTS AND LT AT 4 LOCATIONS

RESULTS

	New York City, N.Y.	Columbus, Ohio	Seattle, Wash.	Montgomery Co., Md.	Total
Months of Operation	19 mos.	15 mos.	4 mos.	3½ mos.	41½ mos.
No. hrs. in operation per week	105 hrs.	168 hrs.	168 hrs.	80 hrs.	
No. cases transported	729	699	185	98	1,711
No. cases transported per month	38 per mo.	47 per mo.	46 per mo.	28 per mo.	41 per mo
No. M.I.'s transported	89	160	88	36	373
Percent of cases transported that were M.I.'s	12%	23%	48%	37%	22%
No. of cases resuscitated and brought to hospital alive	7	13	23	5	48
No. of cases per month resuscitated and brought to hospital alive	0.4	0.9	5.8	1.4	1.2
No. leaving hospital alive	2	5	8	1	16
Percent leaving hospital alive	28%	38%	35%	20%	33%
<u>Costs</u>					
Initial Costs	\$30,000	\$93,000	\$103,000	\$90,000	\$316,000
Operating Costs	\$131,000	\$226,000	\$61,000	\$47,000	\$465,000
Operating cost per case transported	\$180	\$320	\$330	\$480	\$270
Operating cost per M.I. transported	\$1,500	\$1,400	\$690	\$1,300	\$1,200
Operating cost per resuscitation that left hospital alive	\$60,000	\$45,000	\$7,000	\$47,000	\$29,000

SURVEY OF MOBILE CORONARY CARE AMBULANCES

IN OPERATION

No.	City and State	Date		Physi- cians	Nurses	Trained Personnel	M.D. Meets	(See below)			
		Started Mo.	Yr.					a	b	c	d
1.	Inglewood, Calif.	8/69		-	x	x	-	x	x	x	x
2.	La Jolla, Calif.	8/70		x	x	x	-	x	x	x	x
3.	Rancho Santa fe, Calif.	-/67		-	-	x	x	-	x	-	x
4.	San Francisco, Calif.	6/70		-	-	x	-	x	x	x	x
5.	Tulare, Calif.	10/70		-	x	x	-	x	-	x	x
6.	Hartford, Conn.	?		-	-	x	-	x	-	x	x
7.	Jacksonville, Fla.	?		-	x	-	-	x	x	x	x
8.	St. Petersburg, Fla.	?		-	x	x	-	-	x	-	x
9.	Marietta, Georgia	6/70		-	-	x	-	x	x	x	x
10.	Chicago, Illinois	9/69		x	x	-	-	-	x	x	x
11.	Champaign County, Ill.*	9/70		x	x	x	-	-	x	-	x
12.	Mason City, Iowa	6/70		x	x	x	x	x	x	x	x
13.	Bethesda, Maryland	3/70		-	x	x	-	x	x	x	x
14.	Columbia, Missouri	6/58		-	-	x	-	x	x	x	x
15.	Newark, New Jersey	7/69		x	-	x	x	-	x	x	x
16.	Albuquerque, New Mexico	8/70		-	x	x	x	x	-	-	-
17.	Elmira, New York	9/70		-	-	x	-	x	x	x	x
18.	Winston-Salem, N. C.	1/68		-	-	x	-	x	-	-	-
19.	Akron, Ohio	11/69		-	-	x	x	x	x	-	x
20.	Columbus, Ohio	4/69		x	-	x	-	x	x	x	x
21.	Oklahoma City, Okla.	11/69		-	x	x	-	x	x	-	x
22.	Portland Oregon **	1/70		-	-	x	-	x	x	x	-
23.	Greensburg, Penna.	10/69		-	-	x	-	x	x	-	x
24.	Ligonier, Penna.	1/70		-	x	-	-	x	x	-	x
25.	Hanover, Penna.	-/69		-	x	x	x	x	x	x	x
26.	Seattle, Wash.	3/70		x	-	x	-	x	x	x	x
TOTAL				7	13	23	6	21	22	17	23

Ambulance equipped with:

- a. voice communication to obtain professional guidance
- b. portable electrocardiogram
- c. telemetry to monitor the ECG
- d. portable defibrillator

* Football games only

* (2 Ambulances)

SURVEY OF MOBILE CORONARY CARE AMBULANCE

PLANNED TO OPERATE

No.	City and State	Date		Physi- cians	Nurses	Trained Personnel	M.D. Meets	a b c d (See below)			
		Will Start Mo.	Yr.								
1.	Los Gatos, Calif.	1/71		-	x	-	x	x	x	x	x
2.	Orange County, Calif.	-/71		x	x	-	-	x	-	-	x
3.	San Francisco, Calif.	-/71		-	-	x	-	x	x	x	x
4.	Miami Beach, Fla.	4/71		-	-	x	-	x	-	x	x
5.	Honolulu, Hawaii	4/71		-	-	x	-	x	x	x	x
6.	St. Louis, Mo.	-/71		-	-	x	-	x	x	x	x
7.	Middlesex County, N.J.	-/71		-	-	x	-	x	-	x	-
8.	Nassau County, New York	11/70		-	-	x	-	x	x	x	x
9.	Jeannette, Penna	1/71		-	-	x	x	x	x	x	x
10.	York, Penna	-/70		-	-	x	x	x	x	x	x
11.	Columbia, S.C. (2 Units)	7/71		-	-	x	-	x	x	x	x
12.	Morris, Minn.	-/71		-	-	-	-	-	-	x	-
13.	Tulsa County, Okla	Not	Yet	Formulated							
14.	Hartford, Conn.	"	"	"							
15.	N. E. Florida	"	"	"							
16.	Tampa, Florida	"	"	"							
17.	Atlanta, Georgia	"	"	"							
18.	Mississippi	"	"	"							
19.	Winston Salem, N. C.	"	"	"							
20.	South Dakota	"	"	"							
21.	Utah	"	"	"							
TOTAL				1	2	9	3	10	9	11	10

Ambulance equipped with:

- a. voice communication to obtain professional guidance
- b. portable electrocardiogram
- c. telemetry to monitor the ECG
- d. portable defibrillator

IV. CORONARY CARE TRAINING

IV. CORONARY CARE TRAINING

A. BACKGROUND INFORMATION

Among the categorical diseases specified in the PL 89-239, heart disease is currently receiving the greatest emphasis in Regional Medical Programs as it did in the early phase of the program. This legislation reflected a growing national interest in accelerating progress in the care of patients with heart disease. In response to this interest, the American College of Cardiology and the Heart Disease Control Program in 1965 sponsored the "Second Bethesda Conference on Training Technics for the Coronary Care Unit." Proceedings of this Conference with recommendations regarding training were subsequently published. In 1967 and 1968, additional publications became available from the Public Health Service on coronary care units and physician and nurse training programs.

The proceedings from the 1968 conference, "The Outlook for Coronary Nursing," contain recommendations for training. These recommendations are further reinforced in the findings of the Cybern Education, Inc. whose two-year evaluation (Xerox Report) study was recently completed. This study of eleven nurse training programs funded by the Heart Disease and Stroke Control Program highlights the following findings:

1. that attention be given to more careful selection criteria for students with specific emphasis on the selection of those students who will be returning to already established units.
2. that programs be geared to a greater degree to adult learners' needs and previous experience when possible such as providing special

units of study for those learners who will be responsible for teaching or administration of the coronary care unit. The findings further suggest that those students without experience and those with previous experience should be taught separately when possible to adapt to their varying needs.

3. that communication between the training center and sponsoring hospital be formalized so that a regular flow of information be facilitated regarding trainee expectations, responsibilities and capabilities of trainees among: Medical Staff, Nursing Administration, Hospital Administration, and Trainees.

4. that the curriculum include more concentrated preparation in the area of fluid and electrolyte balance, non-coronary complications, EEG interpretation and renal aspects of coronary care.

5. that each training center should have access to facilities where the patient population is adequate for clinical practice at all times. (This was the most universal complaint expressed by trainees and their sponsoring hospital's supervisors.)

B. RMP CONTRACT ACTIVITY

It is anticipated that by early next year, training guidelines will be available from the Inter-Society Commission for Heart Disease Resources funded by a Regional Medical Program contract with the American Heart Association. Additional training specifics will probably continue to emanate from within regions or states such as the enclosed guidelines for

curriculum and the use of multimedia instructional systems produced by the New York Heart Assembly. (see Attachment A) The majority of committee members responsible for the work were RMP staff people from throughout New York State.

C. RMP PROJECT ACTIVITY

1. Some coronary care training programs have attempted to increase their impact on patient care by identifying and overcoming barriers to implementation of new knowledge and skills. One such example is that of the Intensive Care Training Project in Area I of California. (see Attachment B)
2. From the paucity of information available, the turnover of RMP trained coronary care nurses in units appears to vary considerably. Professional leadership in regions need to be encouraged to adopt a common language in defining turnover and in determining the length of time after training when follow-up will be done in order to provide data for evaluation.
3. As more health personnel are provided coronary care experience, the demand for short-term refresher training will increase.
4. The rate of adoption of new knowledge into the basic education of the health professional seems to be occurring at a slow pace. If integration of coronary care is to occur in basic preparation, it will be the responsibility of the professional leadership in the

educational institutions and in the coronary care training centers to cooperate in bringing about accessibility to all health professionals. It appears that the educational structure for the intern/resident physician allows him greater access to coronary care training/education than is true for other health professionals at this time.

D. RECOMMENDATIONS

The following recommendations have been developed, based upon the findings of the Cybern Report (Xerox Report) and on the three years of RMP experience in the funding of intensive coronary care courses:

1. The training project application should include an indication of the importance of the project's contribution to the cardiovascular program of the Region as well as how it contributes to the overall program goals of the Regional Medical Program.
2. It should include well defined selection criteria for students.
3. The educational design of the course should recognize the needs of adult learners; such as in providing special units of study for those who will be responsible for teaching or administration of a unit.
4. The project should include assurance of planned formalized communication between the training center and the sponsoring hospital before and after the training period to facilitate the flow of information regarding expectations, responsibilities and capabilities of trainees.

5. The training program should have documented its access to a sufficient number of facilities with available patient population to assure adequate clinical experience.

6. If courses of differing lengths are provided in the same Region, the rationale for each course should be identified and in some Regions an evaluation made of their relative effectiveness.

7. Assurance of planning for the ultimate phasing out of the RMP funding support should be included such as by integrating coronary care training into the basic preparation of students by the educational institutions of the Region or funding by some other community agency.

THE CORONARY HEART DISEASE COMMITTEE'S

TOPICAL OUTLINE OF NURSE TRAINING CONTENT

NEW YORK STATE HEART ASSEMBLY, INC.

ATCH. A

TOPICAL OUTLINE OF NURSE TRAINING CONTENT

Statement: The content, both essential and contributory, as defined meets the requirements of the Joint Position Statements regarding the role of the registered professional nurse in the care of patients with Cardiovascular Disease in the coronary care or intensive units as presented by the Medical Society of the State of New York, New York State Nurses Association and the Hospital Association of New York State. This is intended as a basic preparation for the nurse at a staff level. Continuing education is considered essential to maintain nursing expertise and proficiency in coronary nursing.

ESSENTIAL CURRICULUM CONTENT

- I. Orientation to the Program:
 - A. Course Objectives
 - B. Course Format/Plans
- II. Coronary Care Concepts:
 - A. Administrative Aspects of Coronary Care Unit
- III. Anatomy and Physiology of the Heart
- IV. Epidemiological Factors of Coronary Heart Disease:
 - A. Risk Profile
- V. Care of the Patient with Myocardial Infarction:
 - A. Pathophysiology
 - B. Diagnosis
 - C. Complications
 - D. Medical Management:
 - (1) Rest
 - (2) Drugs
 - (3) Dietary
 - Nursing Care:
 - (1) Admission of the patient
 - (2) Routine Nursing Care in Coronary Care Unit
 - (3) Transfer of the patient
 - (4) Psychological aspects of care
 - (5) Rehabilitation and Teaching of patient/family
- V. Fluid and Electrolyte Balance

- II. Electrophysiology of the Heart:
 - A. 12 L ECG - normal heart function
 - B. Cardiac monitoring concepts
 - C. Arrhythmia recognition and treatment:
 - (1) Identification, interpretation, treatment
 - (2) Drug management
 - (3) Cardioversion and Defibrillation
 - (4) Pacemakers (temporary and permanent)
 - (5) Cardiopulmonary resuscitation:
 - (a) Principles of ventilation
 - (b) Definitive therapy

- VIII. Care of the Patient with Congestive Heart Failure:
 - A. Normal anatomy and physiology of respiratory system
 - B. Pathophysiology
 - C. Diagnosis:
 - (1) Auscultation
 - (2) Early recognition
 - D. Medical management:
 - (1) Drug therapy
 - (2) Other therapies
 - E. Nursing Care:
 - (1) Nurse's role in early detection
 - (2) Subsequent care:
 - (a) Rotation of tourniquets
 - (b) Positioning of patient
 - (3) Evaluation of therapy:
 - (a) C.V.P. monitoring
 - (b) Intake and Output
 - (c) Daily weights

- IX. Care of the Patient with Cardiogenic Shock:
 - A. Pathophysiology
 - B. Diagnosis
 - C. Medical management:
 - (1) Drug therapy
 - (2) Other therapies
 - D. Nursing Care:
 - (1) The role of the nurse in early detection
 - (2) Evaluation of therapy

CONTRIBUTORY CONTENT

- I. Defibrillation:
 - A. Didactic instruction/demonstrations:
 - (1) Dog defibrillations
 - (2) Use of Resusci-Anne with lead vest chest liner
 - (3) Other training devices
 - (4) Elective cardioversion-participation
- II. ECG Experience:
 - A. Practice with ECG Technicians in routine taking of 12 lead tracings
 - B. Knowledge of various lead systems, for instance hexaxial, vector, etc.
- III. Care of Patients with Pacemakers:
 - A. Knowledge of principles involved
 - B. Assist with catheter-pacer insertions, etc.
 - C. Awareness of electrical hazards
- IV. Skills in treatment of congestive Heart Failure:
 - A. Rotation of tourniquet
 - B. Auscultation techniques
 - C. Early portable chest x-ray
 - D. Circulatory assist procedures
- V. Skills in Inhalation Therapy Techniques:
 - A. Types of respiratory equipment aids
 - B. Knowledge of special drugs; aerosols, etc.
 - C. Experience inhalation therapy teams
- VI. Special Laboratory Techniques:
 - A. Venipuncture and I. V. therapy; assisting with cut-down procedures
 - B. Urinalysis - urine specific gravity; ph determination
- VII. Skills in Therapy Related to Respiratory Failure:
 - A. Central Venous Pressure:
 - (1) Preparation for and assisting with
 - (2) Interpretation

viii. Instillation of Research Responsibilities:

- A. Role of the Nurse in Data Collection
- B. Research Trends

IX. Complements of Instruction:

- A. Use of films, video tapes, records
- B. Monitor-teaching machine for arrhythmia recognition
- C. Distribution of prepared materials from Heart Association and own mimeo prepared instructional aids
- D. Use of Nursing Rounds as a method of teaching
- E. Library resources
- F. Animal experimentation

CLINICAL EXPERIENCE

A planned, supervised clinical experience should be provided concurrently with theory presentation so that reinforcement of learning can take place. Clinical practice should focus upon the attainment of specific nursing behaviors and
ills.

pw
10/17/69

CORONARY HEART DISEASE COMMITTEE
NEW YORK STATE HEART ASSEMBLY

Multi-media coronary care instructional systems should not be used as self-contained teaching systems in the education of coronary care nurses. Instructional systems may be used as integrated, flexible tools which can be adapted for classroom teaching or independent study. Therefore, the following recommendations are made in relation to the proper utilization of special teaching systems for coronary care nurse training:

1. Teaching systems should emphasize the need for prepared nurses as instructors in cooperation with the interested physician instructor as well as the implementation of demonstrations, discussion groups, and other teaching techniques in conjunction with systems;
2. Other texts, in addition to those recommended by the special teaching systems should be utilized because no one teaching system should be depended upon;
3. Certain gaps in content are usually present in most teaching systems and these must be supplemented by structured course and class presentation as well as demonstrations essential to fulfill program excellence;
4. Local hospitals utilizing multi-media instructional systems to prepare nurses in coronary care nursing should provide concurrent planned clinical instruction in adequate facilities for clinical practice training;
5. Clinical practice should focus upon the attainment of specific behaviors and skills under qualified supervision;

Nurse teachers utilizing systems be taught educational techniques in course presentation and evaluation skills;

7. Individual nurse replacements for the Coronary Care Unit should be trained primarily by physician-nurse teams in conjunction with multi-media instructional systems.

In summary, multi-media instructional systems can be an effective adjunctive tool for training coronary care nurses if the following essential components are provided for:

1. prepared physician-nurse teams for instruction and supervision of trainees;
2. the availability of clinical facilities for the concurrent reenforcement of didactic instruction;
3. utilization of supplementary educational experiences.

It is advised that any multi-media instructional system be evaluated prior to purchase and implementation.

cbw

RECOMMENDATIONS TO CHAPTERS

It is recommended that:

1. Clarification is needed of all costs of multi-media instructional systems other than initial expenditure.
 - a) investigate maintenance costs of hard equipment
 - b) investigate maintenance and/or repair costs of tapes, film strips, and films
 - c) investigate updating of content; tapes costs, etc.
 - d) investigate cost of needed replacement materials such as pre and post tests, evaluation sheets, student workbooks, instructor workbooks, etc.
2. Evaluate distribution, transportation, and insurance costs to borrowing agencies.
3. Development of policies for lending of systems to requesting agencies.
4. Development of an orientation program for nurse teachers who will use the instructional system.

cbw

EVALUATION OF CORONARY CARE TRAINING: SOME DIRECT OBSERVATIONS OF PERFORMANCE

IN HOSPITAL PRACTICE

Rodger Shepherd, M. D.
Associate Director
Intensive Care Training Project
RMP, Area I of California

The objective of our Intensive Care Training Program is to enable physicians in cadres from small general hospitals to perform certain intensive care skills in their own hospital settings. These skills include: use of central venous catheter, use of intra-arterial monitoring catheter, interpretation of blood gas data, continuous EKG monitoring, airway care, controlled ventilation, cardioversion, and others. The staff of our ICU had visited small hospitals and identified these skills as feasible, but underused in smaller hospital ICU's.

The training program is conducted in three phases. During the first phase, the cadre and project clarify mutual objectives. During a second phase, each physician from the cadre undergoes a week-long program of one-to-one instruction at a metropolitan medical center. During a third phase, an instructor-in-residence is maintained in the cadre's own intensive care unit around the clock for 10-12 days.

The direct observations of these instructors have provided valuable anecdotal data on both the project and the resulting student performance:

1. **Standardization of Technique:** The same single standard technique for insertion of central venous catheter is advocated during each individualized instruction. The mastery of this technique is certified by the instructor. However, the student may not implement this technique in his own hospital setting. It has been observed that the failure of some physicians to support standardized technique has a disruptive effect and reduces the tendency of other physicians to implement the advocated procedure at all.
2. **Availability of Equipment:** Standardized technique depends on standard materials. Instructors have observed the lack of certain critical materials or instruments during introduction of a new technique. The attendant frustration during this critical phase may abort or seriously retard the adoption of the new practice in spite of adequately trained personnel.
3. **Supporting Services:** Interpretation of blood gas data depends on complete confidence in the data. We have encountered one hospital setting where the student's training in interpretation of blood gas data was not implemented until we had rectified certain analytical problems in the clinical laboratory.

ATCH. B