AFFILIATED MEDICAL SCHOOL PROGRAM

TO INCREASE HEALTH MANPOWER

REPORT TO

THE GOVERNOR

AND

THE GENERAL ASSEMBLY OF VIRGINIA

COMMONWEALTH OF VIRGINIA
Department of Purchases and Supply
Richmond
1972

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AFFILIATED MEDICAL SCHOOL PROGRAM TO INCREASE HEALTH MANPOWER

REPORT OF THE

COMMISSION TO STUDY THE ADVISABILITY AND FEASIBILITY OF UTILIZING CERTAIN MEDICAL FACILITIES AS AN AFFILIATED OPERATION OF THE UNIVERSITY OF VIRGINIA SCHOOL OF MEDICINE

TO

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AFFILIATED MEDICAL SCHOOL PROGRAM TO INCREASE HEALTH MANPOWER

REPORT OF THE COMMISSION TO STUDY THE ADVISABILITY AND FEASIBILITY OF UTILIZING CERTAIN MEDICAL FACILITIES AS AN AFFILIATED OPERATION OF THE UNIVERSITY OF VIRGINIA SCHOOL OF MEDICINE

Richmond, Virginia
December 21, 1971

To: HONORABLE LINWOOD HOLTON, *Governor of Virginia*

and

THE GENERAL ASSEMBLY OF VIRGINIA

The Commission initiated its study in 1968 pursuant to Chapter 547 of the 1968 Acts of Assembly, as follows:

> An Act to create a Commission to study the advisability and feasibility of utilizing certain medical facilities in Virginia for clinical instruction of medical students and for training of students in allied health fields.

Whereas, health manpower needs in this State and nationally are not being met adequately; and

Whereas, a great portion of the extremely high cost of a medical education is related to the basic science education of medical students in their first two years; and

Whereas, the cost of starting a completely new medical school presently is estimated to be seventy-five million dollars; and

Whereas, both State-supported medical schools are currently expending their basic science capabilities considerably in terms of facilities and personnel as well as educational and research functions; and

Whereas, Norfolk continues to work toward an independent medical school which will enhance medical education and high quality medical care in the Tidewater area; and

Whereas, the western area does not have appropriate clinical training affiliations to fully utilize its medical resources and facilities; and

Whereas, Roanoke is the major population, industrial and medical center for western Virginia having two major community type hospitals with a major veterans hospital within a short distance; and

Whereas, it would seem desirable to further exploit these resources and to involve them in the health education potential of our State as well as to further utilize these facilities as a clinical center for the area; and

Whereas, such a development could have a great impact upon health training and medical care in our State at minimal cost; now, therefore,

Be it enacted by the General Assembly of Virginia:

1. § 1. There is hereby created a Commission to study the advisability and feasibility of utilizing the medical facilities, resources and professional personnel of Roanoke and other communities in the western part of the State as an affiliated operation of the University of Virginia directed toward participation in the education of medical students in their clinical years, post graduate residency training and continuing education, as well as training the allied health professions.

§ 2. The Commission shall consist of eleven members; two of whom shall be appointed by the President of the Senate from the membership thereof; three of whom shall be appointed by the Speaker of the House of Delegates from the membership thereof; and six of whom shall be appointed by the Governor from the State at large. The members of the Commission shall receive no compensation for their services, but may be reimbursed for their necessary expenses incurred in attendance upon meetings of the Commission. The Commission may employ such consultant and secretarial services as may be necessary in the conduct of the study.

§ 3. The Commission shall complete its study and make its report to the Governor and the General Assembly of Virginia not later than November one, nineteen hundred sixty-nine. The Commission, from time to time and prior to such date, may submit such interim reports and recommendations to the Governor as it may deem expedient.

§ 4. The Commission is authorized to accept and expend funds, gifts and grants from private and public sources, including federal grants or contracts, for the purposes of carrying out its study.

The Commission rendered its report and recommendations to the Governor and General Assembly. At the 1970 Session of the General Assembly, the Commission was extended for another two years by Chapter 490, as follows:

> An Act to continue the Commission to study the Advisability and feasibility of utilizing certain medical facilities in Virginia for clinical instruction of medical students and for training of students in allied health fields and to appropriate funds to the Commission.

Whereas, the 1968 General Assembly of Virginia enacted Chapter 547 of the 1968 Acts of Assembly which created a Commission to study the advisability and feasibility of utilizing certain medical facilities in Virginia for clinical instruction of medical students and for training of students in allied health fields; and

Whereas, this Commission in its report to the 1970 General Assembly stated inter alia that the use of affiliated programs between the University of Virginia School of Medicine and Medical Center and certain other medical communities to increase health manpower and achieve other objectives are highly desirable and feasible and further development and expansion of such programs should be undertaken immediately; and

Whereas, more detailed development of educational training and curriculum opportunities in such affiliations and further analysis of the logistical, housing and communication problems involved in such programs is essential; and

Whereas, the use of such affiliation programs would increase the number of graduates of the University of Virginia School of Medicine, thus making more physicians available in the State, at a minimal cost to the State; now, therefore

Be it enacted by the General Assembly of Virginia:

1. § 1. The Commission to study the advisability and feasibility of utilizing the medical facilities, resources and professional personnel of Roanoke and other communities in the State as an affiliated operation of the University of Virginia School of Medicine and Medical Center is hereby continued with its present membership. Any vacancy occurring shall be filled by appointment of the Governor. The members of the Commission shall receive no compensation for their services, but may be reimbursed for their necessary travel expenses in attending meetings of the Commission.

§ 2. The Commission may employ such expert and secretarial assistance as it may deem necessary to develop the educational training and curriculum opportunities in such affiliations, the possible inclusion of all interested communities, to analyze the logistical, housing and communication problems involved in such programs, and to render it any other assistance, advice and information it may deem necessary. For this purpose, there is hereby appropriated from the contingent fund of the General Assembly a sum sufficient not to exceed thirty thousand dollars.

§ 3. The Commission shall complete this study and make its report to the Governor and the General Assembly of Virginia not later than November one, nineteen hundred seventy-one.

Membership of the Commission was unchanged from the original appointees, who were: Honorable Willis M. Anderson, Roanoke; Dr. K. R. Crispell, Charlottesville; Dr. Charles L. Crockett, Jr., Roanoke; Honorable Russell L. Davis, Rocky Mount; William H. Flannagan, Roanoke; Honorable Kossen Gregory, Roanoke; Senator William B. Hopkins, Roanoke; Honorable Joseph P. Johnson, Jr., Abingdon, Senator J. Harry Michael, Jr., Charlottesville; Frederic W. Scott, North Garden; and John W. Williams, Charlottesville.

The Virginia Advisory Legislative Council and the Division of Statutory Research and Drafting made staff and facilities available to carry out this study; they assigned the necessary employees to assist the members and the study group at all times.

SUMMARY OF RECOMMENDATIONS

Recommendation No. 1: This Commission recommends the full implementation of the University of Virginia School of Medicine plans for expansion and the Affiliated Hospital Program, and the required budgetary support.

Recommendation No. 2: This Commission recommends full budgetary support of educational programs in family practice proposed by the University of Virginia and the Medical College of Virginia.

Recommendation No. 3: The Commission recommends the development of a grant proposal to establish an Area Health Education Center as a part of the University of Virginia Affiliated Hospital Program.

Recommendation No. 4: As the State begins to analyze its emergency health care system and especially the helicopter movement of trauma patients to major medical centers, the Commission recommends that consideration be given to the helicopter transportation of medical faculty and students as a

means of achieving higher levels of utilization of the equipment and flight personnel.

Recommendation No. 5: The Commission recommends that a coordinated, long-range plan for the use of television, computers and other educational technologies in health education be developed and implemented.

Recommendation No. 6: This Commission recommends that its activities be continued for further expansion of the University of Virginia Affiliated Hospital Program, particularly an area health education center, and continued development of the University of Virginia program in Family and Community Medicine. The Commission should include representatives from the Senate, the House of Delegates, the University of Virginia, Virginia Commonwealth University, the State Council of Higher Education and the public.

INTRODUCTION

After the 1970 General Assembly enacted legislation continuing this Study Commission, it resumed its activities in April, 1970. Among its first actions, it established or invited liaison with the Medical College of Virginia—Health Sciences Division Virginia Commonwealth University,[1] the State Council of Higher Education,[2] and the VALC Committee Studying the Shortage of Family Physicians, as well as continuing liaison previously established.[3] During its first meeting, it approved the appointment of two consultants, Dr. James Lewis of the University of Virginia medical faculty and Dr. Donald Shotton from the Lynchburg community and later of the University of Virginia medical faculty, effective September 1, 1970. Subcommittees to study various aspects of the Commission's planning were appointed.

The University of Virginia School of Medicine administration and faculty were quite cognizant of the continued interest of the Commission in the progress of the Affiliated Hospital Program, the family and community medicine program, and various proposals concerning curriculum and class expansion being considered. Accordingly, the School of Medicine and the Study Commission kept each other mutually informed of progress in these various areas.

This report will describe the expansion of the Affiliated Hospital Program into various communities; the development of the family and community medicine program at the University of Virginia and in Roanoke; the considerable expansion of the 1971 entering class at the University of Virginia School of Medicine; various studies of this Commission pertinent to the continued development of the above; important new opportunities for future development; and this Commission's recommendations to the Governor and the General Assembly. Readers are also referred to the Commission's first report of November 1969. Summary, conclusions, and recommendations of that study are shown in Appendix A.

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[1] Dr. Kinloch Nelson, Dean, and Dr. M. Pinson Neal, Assistant Dean

[2] Dr. Roy E. McTarnaghan, Director

[3] John J. Butler, President, and Dr. Frank Mays, Executive Director, the Roanoke Valley Regional Health Services Planning Council; Dr. John Hortenstine, Winchester Memorial Hospital; Dr. Alexander McCausland, Chairman, Medical Education Committee of the Medical Society of Virginia; and Dr. John A. Martin, Roanoke Academy of Medicine

For better orientation, we will describe below in broad terms the current medical school curriculum and define certain terms and programs to be alluded to in this report.

By tradition, medical schools have had two major divisions: (A) the basic science division; and, (B) the clinical division.

(A) The basic science division includes the Department of Anatomy, Biochemistry, Physiology, Pharmacology, Pathology, Microbiology, and Laboratory Medicine for the instruction of medical students and graduate students. Such departments require considerable capital outlay for the rather extensive and complex educational and laboratory facilities necessary for teaching and research. They are usually in separate geographic areas connected to clinical departments of a school of medicine. Medical students in the past have customarily spent their first two years in the basic sciences, and their final two years in clinical training. Recent changes in many medical schools have seen curriculums become more flexible so that the time devoted to basic science instruction has been reduced for many but not necessarily all students.

(B) The clinical division of a medical school includes the various departments of clinical medicine in the associated and affiliated hospitals related to a particular school of medicine. Included in the function of such departments are the clinical care of ambulatory out-patients, hospitalized patients, the clinical education and training of medical students, the graduate education and training of interns and residents, research in clinical problems of medicine, and, more recently, the study of improved methods of the provision of health care to the citizenry. This portion of the medical student's training in today's medical curriculum might be considered to occupy one-half to two-thirds of his over-all program.

The "Affiliated Hospital Program" refers to the affiliations with community hospitals to provide part of the clinical education and training of medical students from the University of Virginia.

The Division of Family and Community Medicine was established at the University of Virginia to lend special emphasis to these very important aspects of the student's education, particularly in preparation for a career in family practice. Students interested in such a career after graduation from medical school spend an additional three years in a Family Practice residency training program, the first year being the internship year.

The efforts of the Commission have been directed toward relating new trends in medical education to supplying the needs of health manpower in the State through cooperative programs between the University of Virginia and participating communities. Among the objectives of the Affiliated Hospital Program are: (1) an economical increase in the number of physician graduates from the University of Virginia School of Medicine; (2) a broadening of the physician graduates' educational experience, particularly in family practice and community medicine; (3) an increase in the number of family physicians; (4) increased retention of physician graduates in Virginia; and (5) expanded continuing education programs for practicing physicians and other health professionals.

The concept of the Affiliated Hospital Program developed by the Commission parallels the recommendation of the Carnegie Commission's recent report, *Higher Education and the Nation's Health*. The Carnegie Commission recommended: "the development of area health education centers in areas at some distance from university health science centers which do not have sufficiently large populations to support university health science centers of their own, and in a few metropolitan areas needing additional training facilities

but not full health science centers. These area centers would be affiliated with the nearest appropriate university health science center and would perform somewhat the same functions recommended for university health science centers, except that the education of M.D. and D.D.S. candidates would be restricted to a limited amount of clinical education on a rotational basis, and research programs would be largely restricted to the evaluation of local experiments in health care delivery systems."

Thus it is apparent that the basic concepts of the Affiliated Hospital Program have prestigious national support for meeting the need for expanded physician education in Virginia.

I. Following the initial report of the Commission and the action of the 1970 General Assembly, the University of Virginia School of Medicine has accomplished the following:

A. Affiliated Hospital Program expanded:

1. Full-time faculty members in Family and Community Medicine, Internal Medicine, and Surgery have been appointed in Lynchburg, Roanoke, and Winchester.

2. Medical student rotations have been initiated in Lynchburg, Roanoke, and Winchester.

3. Family Practice Clinic and residency program in Roanoke.

4. Affiliated residency programs in Roanoke in eight (8) departments.

5. Search Committee for Associate Dean in Roanoke, activated.

B. Division of Family and Community Medicine, University of Virginia School of Medicine established:

1. Family Practice Clinic in Charlottesville.

2. Family Practice residency programs in Charlottesville.

3. Student rotations in Family Medicine.

C. Expansion of 1971 entering class at the University of Virginia School of Medicine to 124 students.

D. Formal liaison with the Medical College of Virginia through regular meetings [4] and the current Study Commission.

II. The Commission's activities and studies during the current biennium include:

A. Study of logistical problems:

1. Transportation for students, visiting faculty, and patients.

2. Housing for students and visiting faculty.

B. Communications linkage between University of Virginia and affiliated institutions:

1. Audiovisual technology.

2. Television.

3. Computers.

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[4] ICMIC

C. Curriculum Study and Planning:

1. Family practice programs.

2. Multiple track curriculum allowing for variable medical school curricula and variable time to receive M.D. degrees.

3. Basic clinical clerkships and electives in affiliated hospitals.

4. Allied Health professional programs.

D. Long-range planning for affiliations:

1. Variable types of programs.

2. Number and location of communities.

3. Area Health Education Center as proposed by Carnegie Commission Study of Higher Education.

4. Study of programs in other states.

E. Liaison with health professionals and institutions in Lynchburg, Roanoke, and Winchester; Medical College of Virginia (Virginia Commonwealth University); and, State Council of Higher Education.

IMPLEMENTATION OF THE AFFILIATED HOSPITAL PROGRAM UNIVERSITY OF VIRGINIA FACULTY ACTION

The University of Virginia, as a pilot program in 1968, began sending a few fourth year medical students to Roanoke for certain elective courses. Since then, steadily increasing numbers of students have requested rotations in affiliated hospitals in Lynchburg, Roanoke, and Winchester and students, faculty, and participants in the communities have all been quite satisfied with the results of the program. (See Appendices B, C, and D) Members of the faculty and administration of the University of Virginia School of Medicine have been studying the potential of the Affiliated Hospital Program since the creation of this Commission in July, 1968; have kept the Commission informed of progress of the program; and been intimately involved in its on-going deliberations. As a result of these deliberations, and satisfaction with the student electives, the Faculty of the University of Virginia School of Medicine in May, 1971, voted its approval of the following proposals relative to the Affiliated Hospital Program:

1. All basic science courses [5] would be taught at the University of Virginia School of Medicine.

2. The same basic clerkships [6] which are taught at the University of Virginia (Medicine, Neurology, Obstetrics, Pediatrics, Psychiatry, and Surgery) would also be provided in Roanoke.

3. There would be interchangeability between the clerkships offered at the University of Virginia and at affiliated hospitals in that a student could take all or a portion of his clerkships in either setting.

4. An appropriate search committee would be named to appoint a Director for the Affiliated Programs in Roanoke, who would also be Associate Dean, University of Virginia School of Medicine.

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[5] Basic Science Courses—Those courses normally taught during the first half of the medical school curriculum such as anatomy, biochemistry, etc.

[6] Clerkship—The medical student's initial educational experience involving clinical contact with patients under faculty supervision, usually occupying the entire third year of a four-year medical curriculum.

5. The Director for the Affiliated Programs, in Roanoke, in consultation with the Dean of the School of Medicine, appropriate University of Virginia Department Chairman, and other members of the administration, would be responsible for recruiting full time faculty in all clinical departments offering basic clerkships and for the educational program and hospital arrangements.

6. The target date for all basic clerkships to be available in Roanoke would be January, 1973, at which time the class of 120 students entering in September, 1971, would be beginning their clerkships.

7. Elective offerings would continue as at present and it would be anticipated that the number of students taking elective experiences at these hospitals would continue to increase.[7]

8. An affiliation agreement between a participating hospital and the University of Virginia School of Medicine would be established.

Thus, after finishing their basic science courses, students might spend varying periods of time at one or more affiliated institutions, from as little as one month to an entire year or more, depending upon interests and ultimate career plans. A third year student particularly interested in entering family practice, for example, could elect to take as much as the entire last half of the medical school curriculum for his clinical clerkships and electives in the Affiliated Hospital Program. In the affiliated hospitals, students receive part of their instruction from interested and dedicated practicing physicians contributing varying amounts of time to the program. A small nucleus of faculty members, based full-time in the affiliated institutions, complement and supplement this instruction and are responsible for the over-all direction and supervision of the student program. The University of Virginia School of Medicine and the participating institutions share in the financial support of these faculty members. In addition to this support of faculty members and the teaching contributed by staff physicians, the participating hospitals provide their physical facilities, meals, and housing for some students, and many other tangible and intangible contributions. These community efforts obviously represent a significant contribution to the State's medical education obligations.

Since the time of the Commission's report two years ago, when Virginia was among the first of a few states looking at expansion of its medical schools through community hospital affiliations, many other medical schools around the country have begun to follow suit in this approach. At the recent annual meeting of the Association of American Medical Colleges in October, 1971, one of the key speakers called for the expansion of university hospital teaching to include community hospitals on an equal basis. Representatives of the Commission have visited the University of Illinois, which is developing semi-autonomous medical schools in Peoria, Rockford, and other cities and have had discussions with individuals active in the development of such programs elsewhere. In September, 1971, the Association for Hospital Medical Education held a special institute on "Community Hospital-Medical College Associations" to bring together representatives of such affiliations from many different areas. The Commission sent representatives to this very informative meeting which revealed that the University of Virginia Affiliated Hospital Program is farther along in its development than the majority of other programs. It is noteworthy that the University of Virginia program has received national attention. *(Medical World News*, June 11, 1971, p.361)

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[7] Electives—Clinical educational experiences of one month's duration or more, usually occupying the fourth-year of medical school.

With the opening of its new basic science education building, and in anticipation of utilizing the potential educational resources of the Affiliated Hospital Program, the University of Virginia accepted an entering class of 124 students in September, 1971, representing a *30% increase* over the previous year, and *50% over 1966*. The latter exceeds the national average increase in class size of only 30% over the past five years. These actions definitely committed the University of Virginia to a program of expansion, providing many advantages to the State as previously enumerated.

Among these is the capability the affiliated hospitals have of providing an excellent setting for more intern and residency educational programs in family practice and other specialties. It is most important that these be fully developed since recent studies reaffirm the findings that the state in which the physician serves his internship and residency is the greatest single determinant of his ultimate location for practice.[8] Therefore the affiliated program can be very instrumental in the retention of practicing physicians in Virginia.

This expansion of class size and development of the Affiliated Hospital Program will require, and are contingent upon, appropriate budgetary support. *This Commission* believes that the University of Virginia School of Medicine and the participating affiliated institutions are *to be commended* on these very responsible and innovative approaches to some of the problems and costs of medical education, and the favorable effect they will have upon health care in Virginia.

This Commission recommends the full implementation of the University of Virginia School of Medicine plans for expansion and the Affiliated Hospital Program, and the required budgetary support.

FAMILY PRACTICE PROGRAMS

The University of Virginia, and the affiliated institutions, are cognizant of the relative shortage of family physicians in the State and, therefore, made a strong commitment to the teaching of family medicine to students, and the education and training of family physicians with the opening of the State's first individual model practice unit in September, 1971, at the University of Virginia and at the Roanoke Memorial Hospital later that same month. The two educational programs will be affiliated. Each of these model units for educating family physicians will offer 18 positions in the three-year residency training program for a total of 36.[9] There is a further potential for the development of an additional 24-30 such positions in the University of Virginia Affiliated Hospital Program, including Lynchburg, Roanoke, Winchester, and perhaps other communities, during the next two years. These units will also provide the setting for University of Virginia medical students' educational program in family medicine. Both of these programs have full-time faculty committed to them, and teaching from all other clinical departments on a part-time basis to provide the greatest expertise possible to students, interns, and residents in family medicine.

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[8] In the context of physician training, then, the most effective way to attract physicians to a location is to increase the number of interns and residents that are being trained in that area. "The Relationship Between Medical Education and the Statewide Per Capita Distribution of Physicians", Scheffler, R.M.: *Journal of Medical Education*, Vol. 46, November, 1971, p. 995.

The report of the Carnegie Commission on "Higher Education and the Nation's Health" stated the following: "Since the majority of students undertaking residency training remain to practice in the states where they receive their training as indicated above, it is decidedly in the interest of states to contribute to the construction and development of institutions where residents are to be trained including university health science centers and area health education centers."

[9] Each program plans to enter six physicians into the three-year training program each year.

This Commission commends the University of Virginia and the affiliated hospitals for the extensive commitments they have each made to these very important programs in the teaching of family medicine, and education of family physicians to help increase their supply in Virginia.

This Commission recommends full budgetary support of educational programs in family practice proposed by the University of Virginia and the Medical College of Virginia.

THE AFFILIATED HOSPITAL PROGRAM AND THE CARNEGIE COMMISSION REPORT

The Carnegie Commission's 1970 report, *Higher Education and the Nation's Health*, substantiated this Commission's earlier recommendations to develop an Affiliated Hospital Program in Roanoke, with its designation of Roanoke as an "Area Health Education Center". The Carnegie Commission's description of an area health education center is much the same as the concept developed by this Commission's original study in that such centers:

1. "Would be satellites of the university health science centers and would be visited on a regular basis by the faculty of the health science centers with which they were affiliated. Their educational programs would be developed and supervised by the Health Science Faculty, and their patient care functions would rely on the expertise of the health science personnel. The area centers in turn would provide assistance and counsel to the community and neighborhood health care facilities including the private practitioner.

2. "The nucleus of an area health education center would be a hospital, usually a community hospital, but perhaps in some cases a Veteran's Administration Hospital. The house officers at the Hospital would receive instruction from the faculty of the medical school with which the center was affiliated, in most cases on a visiting basis, but there would be a need for a small group of faculty members permanently located in the center to plan and administer both the educational programs for the house officers and continuing education programs for physicians and other health workers in the surrounding area. M.D. and D.D.S. candidates would receive part of their clinical instruction in such centers on a rotating basis. Within the hospital, or adjacent to it, there would have to be office space for faculty members and other administrators of the educational programs as well as classrooms. Like the university health science centers, the area centers should cooperate with comprehensive colleges and community colleges in the area in planning curricula for allied health workers." (pp. 56-57)

The Carnegie Commission enumerated the functions of area health education centers as follows:

1. To maintain a community hospital of outstanding quality, many of whose patients would be admitted on a referral basis from smaller communities in the surrounding area.

2. To conduct educational programs under the supervision of the faculty of the University Health Science Center with which the area center is affiliated.

3. To have these educational programs include:

a. Residency programs.

b. Clinical instruction for M.D. and D.D.S. candidates who would come there from the University Health Science Center on a rotating basis.

c. Clinical experience for students in allied health programs.

d. Continuing education programs for health manpower in the area, conducted in cooperation with local professional associations.

4. To provide guidance to comprehensive colleges and community colleges in the area in the development of training programs for allied health professions.

5. To cooperate with hospital and community agencies in the planning and development of more effective health care delivery systems.

In response to these very practical suggestions for using existing resources, Congressional legislation establishing such "area health education centers" is expected to be passed before the end of 1971. "Area health education centers" are envisioned by the Bureau of Health Manpower as follows:

"Introduction

"Area health education centers will be developed and supported for the purpose of increasing the opportunities for training, retraining and advanced training, including continuing education, of health personnel. Increasing the opportunities for educating health personnel in underserved areas will also increase the likelihood of trained personnel remaining in the area, thus having a positive effect on the current maldistribution of personnel delivering health care services.

"The network of institutions linked together to carry out the functions of the center will provide a means of extending advancements in health care services, including more effective delivery systems, to local communities. By utilizing existing health care facilities in combination with educational institutions to educate needed health personnel, both the quality and quantity of health care can be increased in underserved areas.

"Linkage between health service organizations and educational institutions will be established to provide students both academic education and clinical practice appropriate to their discipline. Students will have the opportunity to learn their skills in settings which promote the team concept of comprehensive health services. Such a setting will allow clinical practice to influence health curricula in a constructive manner. As the roles of health personnel alter, appropriate changes to reflect the new roles of health personnel can be made in the curricula.

"Functions of a Center

"The functions of an AHEC include, but are not limited to, the following:

A. Conducting the following educational programs:

1. Continuing education for health practitioners in the area served by the center. (Continuing education means training which is in addition to that usually considered appropriate for qualification or entrance into the health field. Internship and residency programs are not considered to be continuing education.)

2. Residency training in primary care (family, internal or pediatric medicine).

3. Undergraduate professional education in one or more health disciplines; e.g., nursing, medicine, dentistry, medical technology, physical therapy, etc.

4. Programs for training of health personnel as a health care delivery team.

B. Providing assistance to educational institutions and health care facilities in the area in the development of training programs for health personnel, including technical assistance to educational institutions offering preprofessional education required for admission to health occupations curricula.

C. Providing outpatient and inpatient medical services and serving as a referral center for other patient care facilities in the area.

D. Assisting in the manpower planning and implementation of effective health care delivery systems for the area.

"The AHEC will develop and provide training programs to meet identified health manpower needs, utilizing existing resources to the maximum extent possible. Training programs include undergraduate professional education to prepare students to enter the health field, advanced training, continuing education, and retraining of health personnel. The AHEC will be expected to sustain or augment its health service function.

"Close liaison with Comprehensive Health Planning Agencies and other planning organizations will be established. The AHEC will, when possible, be responsive to manpower training needs identified by local planning agencies.

Location

"Area health education centers will be established in locations that have or can develop the educational and training resources to conduct effectively the health education functions described above. Initial priority will be given to remote or urban areas that are generally recognized as being underserved by existing health care delivery systems.

"Factors to be considered in evaluating a proposed AHEC site include:

Its location vis a vis existing communication and transportation networks, such as those that define integrated economic trade areas; the number, type and size of health care facilities in the site area; the distribution and type of existing health education and training programs in the area; the proximity and nature of accredited educational institutions in the area; the size, mortality and morbidity rates, and other health care indices of the population to be served by the proposed AHEC.

"Finally, of course, the willingness and capability of the institutional complex proposing an AHEC to undertake the longterm commitment required, as evidenced by dedication of other resources to go along with BHME support, will be a major factor in initial evaluation of proposed AHEC site locations.

Eligible Participants

"Agencies, institutions, organizations or consortia which have established linkage between institutions providing medical services and accredited educational institutions or which can demonstrate that, with the aid of a health manpower education initiative award, such linkage can be achieved are eligible to receive support for the development and maintenance of an area health education center.

"A lead agency will be responsible for the development of the linkage

between participating institutions and will serve as the responsible fiscal agent and manager of the activities carried out by the network of institutions forming the center."

It is apparent that the foregoing concepts, and the plans originally developed by this Commission, the University of Virginia, and the participating institutions in the Affiliated Hospital Program are virtually identical. In 1970 the General Assembly acted favorably upon this Commission's recommendation to provide funding for the first phases of this program, as well as continuation of the Commission's planning with the University of Virginia and the participating institutions. As a part of this planning, this Commission requested one of its consultants to meet with the Associate Director of the Bureau of Health Manpower Education concerning area health education centers. The Virginia Regional Medical Program, having expressed interest in such a program, also sent a representative to this meeting. The consensus of opinion was that legislation providing for these centers will be passed; and that the University of Virginia Affiliated Hospital Program, with continued implementation and State support, would particularly qualify for additional federal support and development under this legislation.

Such a center has a tremendous potential for extending programs, not only in the Western Virginia and Appalachia regions, but also into many other areas of the State for the education and training of all types of health professionals, and improving health care delivery. The basic concepts and principles of the University of Virginia Affiliated Hospital Program for medical students would seem to be applicable to educational programs in nursing and other health professions. It is expected that the major financial support of such centers would come from extensive federal funding. Such funding might be of particular benefit in the development of certain facets of the Affiliated Hospital Program such as television, computers, and air transportation. The budgetary support of the University of Virginia's Family and Community Medicine Program and its Affiliated Hospital Program should demonstrate the State's commitment to the concept of such a Center. This Commission, the University of Virginia, and the affiliated hospitals have already started developing an appropriate grant proposal. We believe that the continuation of this Commission would help insure continuity in the development of plans for an area health education center. This could be accomplished with quite modest funding for the Commission. The Commission has been encouraged that the Virginia Regional Medical Program may assist with funding and believes that other local sources and agencies might also participate. Among its recommendations, the Carnegie Commission stated that "the states, in cooperation with universities and with regional and local planning bodies, should also play a major role in the development of plans for the location of university health science centers, area health education centers, and comprehensive colleges and community colleges providing training for allied health personnel." To reiterate, the Commission cannot over-emphasize the very important and significant opportunity that the development of such an area health education center affords the State.

The Commission recommends the development of a grant proposal to establish an Area Health Education Center as a part of the University of Virginia Affiliated Hospital Program.

ACTIVITIES OF THE COMMISSION 1970-72

The Commission's first report to the Governor and the General Assembly demonstrated that the Affiliated Hospital Program was a feasible approach to increasing the number of physicians graduating from the University of

Virginia. In Appendix J of that same report, the Commission suggested the scope of its efforts for the 1970-72 biennium. The planning and development studies outlined at that same time included the following: (1) Study of logistical problems; (2) Communications linkage between University of Virginia and affiliated institutions; (3) Curriculum study and planning; and (4) Long-range planning for affiliations. These topics are treated in the following paragraphs.

Studies of Logistical Problems

The studies of logistical problems focused on the problems of housing and transportation for students and visiting faculty participating in the Affiliated Hospital Program. Individual studies of these topics were prepared for the Commission's consideration and they are included as Appendices E and F to this report. Summaries of these reports are presented below.

Transportation

The potentially high travel times in the affiliated program as it is now envisioned caused the Commission to consider the feasibility of using private aircraft as an alternative to surface travel by automobile. The dollar value of the potential faculty time savings generated through the use of aircraft rather than automobiles is estimated at $90-100,000 per year. However, if business discussions, dictation, or other work-related thought, is accomplished during the automobile trip, savings would be less.

Concerning mileage costs, there is no firm basis, at present, for estimating the volume of travel between the several possible origins and destinations. It appears that the completion of I-64 in the interstate highway system and the four-laning of U. S. 29 in the arterial highway system will be completed by the time this program would be generating a great volume of trips. These improvements to the highway system are important considerations because they further enhance the automobile's characteristics as a low-cost, highly flexible carrier. From the point-of-view of the State, the already low cost per mile of surface travel is reduced further by the fact that the current 9 cent per mile reimbursement for private cars is below the actual cost of operation.

The University of North Carolina Medical School has an extensive private aircraft operation which furnished a nearby model for the Commission's consultants to study. In North Carolina the aircraft problem is considered to have been instrumental in making the Medical School truly a statewide institution. When the value of personnel time lost in travel is added, conventional aircraft show an average total cost per trip that is lower than that for automobiles. (See Table 1 below.)

Table 1

Comparative Operating and Time Costs

for an Average Trip

	Auto	*Conventional Aircraft*	*Helicopter*
Operating Costs [a]	$ 9.90	$17.65	$58.80
Value of a Passenger's Time [b]	32.25	16.01	15.06
	$42.15	$33.66	$73.86

[a] Auto at 9¢/road mile with driver/passenger.
Conventional Aircraft at 18¢/air mile.
Helicopter at 60¢/air mile.

[b] Value of the passenger's time based on a $25,000 annual salary.

SOURCE: Staff Computations

Nationally, there is rapidly growing interest in and use of conventional aircraft and helicopters for transportation of emergency patients. Much of this interest can be traced to the Vietnam experiences with helicopters and to the availability of highway safety funds for their purchase and operation.

It is clear that helicopters are going to become more widely available to State and local governments as the Vietnam War winds down. Their important potential for transporting trauma patients as an integral part of the State's emergency medical system should be developed fully. The several airplanes and the two helicopters now owned by the State should be made a part of the emergency health care transportation system to the maximum extent consistent with other demands for their use. As the State begins to analyze its emergency health care system and especially the helicopter movement of trauma patients to major medical centers, *The Commission recommends* that consideration be given to the helicopter transportation of medical faculty and students as a means of achieving higher levels of utilization of the equipment and flight personnel.

Housing

Exact figures on the need for student and visiting faculty housing depend on the mechanics of the Affiliated Hospital Program, i.e., will students go to one of the cities for a full academic year's education or for lesser periods? At this point, it appears likely that students will be able to select combinations of activities that will run the gamut from one month to two academic years. In the latter case, i.e., an academic year or longer in one of the cities, the student will be responsible for his own housing just as if he were living in Charlottesville. The Commission believes that students assigned to affiliated hospitals for lesser periods should have housing provided, since such assignments could create certain problems. For example, the student may have a spouse employed in Charlottesville or children in Charlottesville schools, and hence, be forced either to maintain two residences or accept the loss of his spouse's income or shifting of his children's school. In an attempt to alleviate some of these problems and to assist the development of the Affiliated Hospital Program, each of the hospitals has agreed to provide some living accommodations at its own expense. Current plans call for housing to be provided to the students without obligation to their families.

As the Affiliated Hospital Program develops further and the need for student and faculty housing becomes more clearly known, recommendations will be made later as to the amount and type of housing that should be available.

Biomedical Communications

The Commission's studies of biomedical communications, have focused on improved medical education through the use of advance audiovisual, television, and computer technology. The effective use of this technology in the Affiliated Hospital Program demands systematic planning which links the University of Virginia Medical Center and the participating hospitals through a coordinated development program. (See Appendix G)

It is apparent that this planning and development of a biomedical communication system for the Affiliated Hospital Program must begin by building a strong core at the University of Virginia Medical Center. The quality and effectiveness of any such connecting network will depend on how well this core is developed and managed.

Audio-Visual Technology

Modern medical education programs make broad use of audiovisual technology, including slides, filmstrips, motion picture films, and often television and computers.

Television and its various modifications are different in that they are expensive, sometimes require technical expertise to operate them, and demand professional quality production of the educational programs. However, television has dual potential in the Affiliated Hospital Program since it may be used both as an instructional aid and as a communication device. Ultimately, it may be desirable to have the capability to produce and transmit live, color programs of network broadcast quality between any or all of the seven points in the proposed network: University of Virginia Medical Center, Roanoke Memorial Hospital, Community Hospital of Roanoke, Veteran's Administration Hospital (Roanoke-Salem), Winchester Memorial Hospital, Lynchburg General Hospital, and Virginia Baptist Hospital (Lynchburg).

On a lesser scale but still with great potential for medical education, video-records (tapes, discs, EVR) could be used. The promise of these television devices lies in the fact that the playback machine attaches to a conventional television receiver and the technical expertise required of the operator is about the same as that needed to operate a home record player. Program material may be purchased, rented, and/or produced locally depending on the need and the availability of appropriate material. Physician education is only one of a broad range of health related applications which include programs for other health professionals and/or hospital employees at all levels.

Program material feasibly could be broadcast over commercial cable television (CATV) systems to local hospitals, physician's offices, and classrooms. Eventually, a stationwide educational television network could be used for those purposes, also.

The University of Virginia Medical School is a member of the Southern Regional Dean's Group which has placed its priorities on coordinating the development of Biomedical Communications, especially television and computer applications, among the twenty-six Southern Medical Schools. This Group has recently received a grant which will enable it to begin this effort.

Computers

Computer-assisted instruction (CAI) and computer-managed instruction (CMI) are undergoing widespread development as medical educational devices. The principal advantage of these teaching techniques is flexibility. Faculty and students can work with the equipment at their convenience on a 24-hour schedule of operations. Program material can be modified easily in both structure and content. The material is adapted easily to various learning styles. Through the use of CAI/CMI, the student is able to advance at a pace based on his existing knowledge and his rate of learning. The actual equipment involved may serve multiple purposes.

Other advantages of CAI/CMI are that the user receives immediate feedback to his responses and he is actively, rather than passively, involved in the learning experience. CAI/CMI also make possible the accomplishment of some educational outcomes that would be difficult by other means, e.g., simulation of "real-world" situations or forced "overlearning" of crucial, but often forgotten, information. In a sense, CAI/CMI enable duplication of normal student-tutor interaction.

A number of computer learning programs have been developed at other universities and medical schools and there is now sufficient experience with them for medical educators to say that they are extremely effective. The University of Virginia Medical Center is on-line to an IBM 360/40 at the Ohio State University School of Medicine and students and faculty are being exposed to this advanced form of educational technology. Further study of that program has resulted in a proposal to provide CAI to the University of Virginia and its affiliated hospitals. The program material is available without cost (other than reproduction costs).

CAI/CMI also are not limited to applications in physician education. They can be used successfully by other health personnel in the allied health fields and by hospital employees.

The Commission has given careful consideration to the feasibility and cost of using television, computers, and other education technology in the Affiliated Hospital Program. *The Commission recommends* that a coordinated, long-range plan for the use of these educational technologies in health education be developed and implemented.

COMMISSION RELATIONSHIPS

Early in the Commission's existence, it recognized that it could be broadly related to other study groups, institutions, and communities than the University of Virginia Medical Center and the initial group of affiliated hospitals. The focus of these relationships is concern over the present and future supply of primary care practitioners in Virginia, especially in the rural areas and in the inner-city areas of the major urban centers. This problem is a well-documented national one, not limited to Virginia. In the Commonwealth, there is an obviously high degree of official concern as demonstrated by the concurrent establishment in 1970 of the Virginia Advisory Legislative Council's Committee Studying the Shortage of Family Physicians, the Rural Affairs Study Commission Subcommittee on Rural Health, and this Commission's continuation.

The VALC has been interested in how and why the problem developed, what were its dimensions, and what was being planned to eliminate or at least alleviate the family physician shortage in Virginia. The Rural Affairs Study Commission has been interested in the impact of the physician shortage on rural life and rural development and in determining the magnitude of the

problem. This Commission, among other objectives, has been interested in determining how greater numbers of students, with a broader curriculum including family and community medicine, can be educated in a more economical fashion. Thus, these three efforts were directed at different aspects of closely related problems. In recognition of the common focus of these efforts, this Commission invited liaison with the VALC Committee and invited its members to a meeting in Richmond during the 1970 session of the General Assembly. It has had informal liaison with the Rural Affairs Study Commission Subcommittee on Rural Health through a University of Virginia faculty member on that body.

As a result of these relationships and of its own deliberations, it appears that the problems of physician supply and distribution, increased productivity of the medical schools, and improved medical education are long-term problems requiring on-going efforts for their solution. The University of Virginia Affiliated Hospital Program specifically will require continued planning for further expansion; curricular changes; potential uses of television, computers, and other communications technology; transportation; and logistics. A mechanism may be needed for the receipt and disbursement of funds other than those specifically appropriated to the school by the State.

This Commission recommends that its activities be continued for further expansion of the University of Virginia Affiliated Hospital Program, particularly an area health education center, and continued development of the University of Virginia Program in Family and Community Medicine. Although this Commission's efforts initially were directed at studying expansion of the University of Virginia School of Medicine through affiliations with certain community hospitals, the Commission, the University of Virginia, and the affiliated hospitals agreed that there might be activities of mutual interest to the Medical College of Virginia. Examples and objectives of similar programs already existing, as well as being developed, on a statewide basis from the School of Medicine of the Medical College of Virginia are detailed in Appendix H. Therefore, it is important that the two medical schools continue to coordinate and maintain close liaison in undergraduate, graduate and continuing medical education to achieve the most effective and efficient programs for the Commonwealth of Virginia. Accordingly, liaison representatives from the Medical College of Virginia have been meeting regularly with the Commission and University of Virginia representatives during this biennium and there is mutual agreement that, if the Commission is continued as recommended, its composition should include formal representation by the Dean of the School of Medicine from both institutions. The State Council of Higher Education should also be represented. This would not alter the Commission's focus on the further study and development of the various University of Virginia programs and area health education center as already described, but would allow for mutual planning and coordination between the two schools where indicated.

The Commission's responsibilities should include the following:

1. Continued study and planning for the further development of the University of Virginia Affiliated Hospital Program for undergraduate, graduate, and continuing education programs for family physicians, other medical specialists, and other health professionals.

2. Planning for, and development of, an Area Health Education Center.

3. Assure that momentum is sustained toward increasing the number of family and other type physicians in Virginia, by encouraging further development of such programs and alerting the General Assembly to the need for additional programs to prevent future health manpower shortages.

4. Assist in coordination between the medical schools as they develop affiliations with communities for undergraduate, graduate, and continuing education programs for family physicians, other specialists, and other health professionals. This could include pilot studies in use of computers, television and transportation modalities.

5. Study of such other problems related to medical education and health as might emerge at the discretion of the General Assembly and the Governor.

6. The Commission should make a report to the Governor and General Assembly by November 1, 1973. An interim report and recommendations may be submitted as the Commission may deem expedient, or as requested by the Governor or General Assembly.

The Commission should consist of members of the Virginia Senate (2) and House of Delegates (3); the Dean of the University of Virginia School of Medicine or his representative; the Dean of the School of Medicine, Medical College of Virginia, Virginia Commonwealth University or his representative; the Director of the State Council of Higher Education or his representative; and, four public members to be appointed by the Governor.

Liaison should be established with the State Council of Higher Education Committee on Education for Health Professions and Occupations, affiliated hospitals, and other institutions, agencies, and organizations as appropriate. The Vice-President for Health Sciences of both the University of Virginia and Virginia Commonwealth University should be non-voting members.

The Commission should receive an appropriation in the amount of $20,000 to provide for secretarial assistance, consultative staff, and travel.

Suggested legislation to implement this recommendation is contained in Appendix I.

SUMMARY AND CONCLUSIONS

1. This Commission reaffirmed in general its report to the Governor and the 1970 General Assembly that there is a shortage of physicians and other health manpower nationally and in Virginia. The State should provide full budgetary support for the University of Virginia Affiliated Hospital Program and Family and Community Medicine Program because of their impact upon the alleviation of these and other related problems.

2. Affiliated programs with hospitals in other communities are an economically feasible mechanism for expanding education programs of the University of Virginia School of Medicine. The Affiliated Hospital Program has been expanded to the communities of Lynchburg, Roanoke, and Winchester. Full-time faculty members and voluntary teaching faculty have been appointed in each of these communities. The participating affiliated hospitals in these communities represent an aggregate of 3200 hospital beds. Students, faculty, and community participants have all expressed great satisfaction with the educational programs resulting in a steadily increasing request for rotations in the affiliated hospitals by University of Virginia medical students.

3. With the combination of its new basic science education building and the potential resources of the Affiliated Hospital Program, the University of Virginia accepted an entering class of 124 students in 1971, representing a 30% increase over the previous year and 50% over 1966, considerably in excess of the national average of class expansion during this period.

4. In response to the shortage of family physicians in Virginia, the University of Virginia and the Roanoke Memorial Hospital opened the State's first two model family practice units in September, 1971, to serve as the educational setting for medical students and residents in family practice. These two programs, which are affiliated, will each offer six positions in each of the three years of the prescribed residency training program for a total of thirty-six. There is a further potential for the development of an additional 24-30 such positions in the University of Virginia Affiliated Hospital Program in Lynchburg, Roanoke, Winchester, and other communities.

5. The Affiliated Hospital Program provides additional internship and residency graduate training opportunities of high quality in family practice and other specialties. It has been demonstrated that the availability of such programs will increase the retention of physicians in the State.

6. The Carnegie Commission's 1970 report on "Higher Education in the Nation's Health" designated Roanoke as one of one hundred twenty-six "Area Health Education Centers" for the nation, the only locality in Virginia to be so designated. Congressional legislative action is in progress to establish these centers, and their close similarity to the University of Virginia Affiliated Hospital Program should place Virginia in a strong position to obtain a very significant federal grant for the establishment of such a center.

7. There is an important potential in the use of conventional aircraft and helicopters, for patient transportation; but also for students and faculty in the Affiliated Hospital Program.

8. Participating affiliated hospitals are now providing housing and meals on a limited basis for medical students in the Affiliated Hospital Program and more definitive plans will have to be developed later as the number of students going to various communities becomes more clearly known.

9. There is an excellent potential for the use of various forms of television

and computers in medical education. These media not only have great potential as learning techniques but could ultimately prove economical.

10. Because of the excellent progress of the University of Virginia's Family Medicine Affiliated Hospital Programs, expansion of the entering class and other developments, the continuation of this Commission could be most important in sustaining momentum and optional development of these programs. The planning, application for, and development of an Area Health Education Center would be a major objective of the Commission's activities. If continued, the Commission's representation should be broadened to provide coordination between the University of Virginia and the Medical College of Virginia Health Sciences Division of Virginia Commonwealth University, and the State Council of Higher Education in health educational programs. This study and planning will need financial support for administrative, consultative, clerical, and related services, and travel up to $20,000.

Respectfully submitted,

CHARLES L. CROCKETT, JR., *Chairman*

WILLIAM H. FLANNAGAN, *Vice Chairman*

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APPENDIX A

Summary, Conclusions and Recommendations of the 1968-1970 Study

SUMMARY AND CONCLUSIONS OF STUDY COMMISSION REPORT

1. The National Advisory Commission on Health Manpower, the Association of American Medical Colleges (AAMC), and the American Medical Association (AMA) all agree that there is a severe medical manpower shortage culminating in a joint statement by the latter two groups that, "All medical schools should now accept as a goal expansion of their collective enrollments to a level that permits all qualified applicants to be admitted." The AAMC further stated that, "All schools should immediately increase the number of entering students accelerating expansion by redistributing temporarily the use of existing resources."

2. The latest available study for the year 1967 revealed that Virginia had 104.5 physicians per 100,000 population compared to the national average of 132 physicians per 100,000 with only 19 of the 50 states having fewer active physicians per 100,000 than Virginia. The study also showed that the state is losing general practitioners faster than it is other types of physicians, and that the rural areas are losing physicians at a faster rate than urban areas.

3. Studies indicate that Virginia should have a goal of 400 physician graduates per year by 1975. This Commission finds that current plans of the State's two existing medical schools, the Medical College of Virginia and the University of Virginia School of Medicine, would provide approximately 240 physician graduates by 1975. It is, therefore, imperative that we graduate more physicians in Virginia if we are to alleviate the State's shortage of physicians and keep it from becoming more critical.

4. The University of Virginia could increase the number of its physician graduates and trainees through the utilization of the medical facilities, resources, and professional personnel of other medical communities in affiliated programs involving medical students, graduate training, and continuing education of health professionals.

5. Because of geographic proximity, existing educational programs, excellent hospital facilities and professional personnel, and enthusiastic acceptance by institutions and physicians, several affiliated programs between the University of Virginia and the Roanoke medical community already are functioning quite effectively and several physicians in the area hold faculty appointments at the University of Virginia School of Medicine as participants in these programs which are coordinated through an Assistant Dean based in Roanoke. The Community Hospital of Roanoke Valley with 400 beds, the Roanoke Memorial Hospitals with 725 beds, as of 1970, and the Veterans Hospital with 250 general medical and surgical beds, meet appropriate criteria for affiliations. There has been enthusiastic acceptance of affiliated programs by the Roanoke Academy of Medicine, the three hospitals named above, the Roanoke Valley Regional Health Services Planning Council, and the University of Virginia School of Medicine Administration and Faculty. An affiliated program with Winchester has also been initiated.

6. The objectives and benefits of affiliated programs are: (a) an economical increase in the number of physicians for the State; (b) through having training in the community setting, more students could see family practice and perhaps

be attracted to it; (c) affiliated programs could greatly strengthen internship and residency training programs and it has been shown that the place of the latter is a very important factor in the determination of the physician's location for practice; (d) affiliated programs would enhance opportunities for studying and improving our system of providing health care; (e) an affiliated program in the Roanoke area could have a favorable influence upon the development of facilities in that area of the State for specialized patient care and continuing education for health professionals.

7. Affiliated programs of various types are being approached enthusiastically in several other states, including North Carolina, Indiana, Illinois, Michigan and Connecticut.

8. As an alternative to increasing the number of physician graduates, a completely new State-supported and financed school for 64 to 80 entering students would entail, in all probability, a minimum of $60,000,000 in capital outlay, a $3,000,000 annual operating budget and probably not enter its first physician graduates into practice until after 1980. The State Council of Higher Education's report of 1964 had earlier concluded that "it is unlikely that there will be sufficient tax funds available for the construction and operation of a third State-supported school for medicine."

9. Under the affiliated program envisioned, the University of Virginia School of Medicine, with appropriate increases in faculty support, could increase its entering class about 20% in 1971, with subsequent increases up to 33% or even 50%. Following basic medical education there, some students would receive varying amounts of their clinical training in the latter two years of medical school in affiliated community hospitals. Instruction in the community setting would be provided both by practicing physician-faculty appointees, and a small nucleus of full-time faculty members based in the affiliated institutions.

10. This Commission's study and planning should be extended during the next biennium for more detailed development of the educational, training and curriculum opportunities in such affiliations, the possible inclusion of additional interested communities, and further analysis of the logistical, housing, and communication problems involved in such programs. Such study and planning will need financial support for administrative, consultative, clerical, faculty, travel and related services, up to $50,000.

RECOMMENDATIONS

As a result of its study, this Commission recommends:

(1) Affiliated programs between the University of Virginia School of Medicine and Medical Center and certain other medical communities to increase health manpower and achieve other objectives are highly desirable and feasible, and further development and expansion of such programs should be undertaken immediately.

(2) The University of Virginia School of Medicine should be provided faculty and administrative budgetary support in the coming biennium for the continued development and implementation of affiliated programs already initiated in Roanoke and Winchester.

(3) More detailed planning for necessary curriculum changes, the inclusion of other communities, housing, communications, and other logistical problems related to affiliated programs should be specifically studied and planned by this Commission during the next biennium. As a result this study should be con-

tinued and expert knowledge and assistance should be obtained at a cost not to exceed $50,000.

(4) The University of Virginia School of Medicine and Medical Center should plan continually for future health manpower needs in the State and their role in fulfilling these needs.

APPENDIX B

The Affiliated Hospital Program in Lynchburg

Dr. Donald Shotton, Associate Professor of Family and Community Medicine-Internal Medicine at the University of Virginia and Director of Medical Education, is in the Lynchburg Community in a cooperative program between the Lynchburg General-Marshall Lodge Hospital and Virginia Baptist Hospital and has been involved with the Affiliated Community Hospital Program since September of 1970. The Lynchburg Academy of Medicine, representing the physicians of the entire community, is working closely with the hospitals in their efforts to provide the community with its expanding health care needs and delivery of health services. The hospitals are open-staffed, allowing total medical community cooperation, and this has facilitated development of the Affiliated Hospital Program. The Director of Medical Education works cooperatively with both hospitals.

The Lynchburg hospitals have committed space for faculty offices, classrooms, and student housing for the Affiliated Hospital Program. Students are actively participating in this community in the elective programs of medical education. Physicians in the community are cooperating in the "second faculty" concept in their responsibilities for teaching students in their community training experience.

Description of the Elective Program

LYNCHBURG COMMUNITY AFFILIATED HOSPITAL PROGRAM

Elective: Lynchburg Community Affiliated Hospital Program

Rotation Supervisor: Donald Shotton, M. D.

Prerequisites: Clinical Clerkship in Medicine

Duration: Maximum: 8 weeks Minimum: 4 weeks
Desirable length of rotation: 4 - 8 weeks
Offered the entire year.

Number of students per rotation: Maximum: 6 Minimum: 2

Course description:

This program is under the direction of Dr. Donald Shotton, Associate Professor-Family and Community Medicine-Internal Medicine, University of Virginia School of Medicine and Director of Continuing Medical Education for the Lynchburg Community Affiliated Hospital Program. Students may choose electives at the Lynchburg General and Virginia Baptist Hospitals. These electives are by arrangement and duration is one or more months. The hospitals provide room and board for students.

The specialty areas in which electives may be chosen include:—

(1) Family Practice, (2) Internal Medicine, (3) Radiology, (4) Obstetrics, (5) Pathology, (6) Pediatrics, (7) Neurology-Neurosurgery, (8) General and Thoracic Surgery, (9) ENT, (10) Eye, (11) Dermatology, (12) Orthopedics, and (13) Urology.

Students are assigned to qualified attending physicians in the various

specialties and share responsibility for their patients in hospitals, clinics and offices. Daily hospital rounds are held with the attending physician who is available to the students on a twenty-four hour basis. There are regularly scheduled meetings, conferences and seminars in Medicine, Surgery, Pediatrics, Radiology, Pathology, Neurology-Neurosurgery, and also Tumor Conferences. Throughout the year programs on selected subjects are presented and discussed in depth by visiting faculty from the University of Virginia School of Medicine and other medical schools. Faculty members from the University of Virginia School of Medicine conduct conferences and clinics in Pediatric Diabetes, Endocrinology, and Hematology on a regular schedule. Dr. Shotton is available for student conferences and discussions.

The Lynchburg Community Affiliated Hospital Program combines cooperatively the facilities of the Lynchburg General-Marshall Lodge and the Virginia Baptist Hospitals with a total bed capacity of 600. Each hospital is fully accredited, open-staffed, and only five minutes apart. There are approximately 140 physicians in the community with representation from each specialty by Board certified physicians with positive interest in medical student education and continuing medical education.

Each hospital has excellent intensive, coronary, CPR, neurological, and respiratory care units. A fully-staffed emergency room in the Lynchburg General-Marshall Lodge Hospital serves the community. Four full-time radiologists and five full-time pathologists are available in the hospitals. Approved schools of professional nursing are an integral part of each hospital. Good library facilities are available in each hospital with full-time librarians. There are training programs for radiology, laboratory, and medical records technicians in conjunction with Lynchburg College and Central Virginia Community College.

Lynchburg is approximately one hour and fifteen minutes commuting distance from Charlottesville (south on Route 29) and is a metropolitan area of 125,000 population with the hospital community serving a population area of 200,000 people.

For arrangements contact Dr. Shotton through the elective secretary at the University of Virginia School of Medicine or at Virginia Baptist Hospital, Lynchburg, Virginia—telephone 384-4594.

APPENDIX C

The Affiliated Hospital Program in Roanoke

Dr. Charles L. Crockett, Jr., Associate Professor of Family and Community Medicine, Internal Medicine, University of Virginia, and Medical Director, Roanoke Memorial Hospital, has been one of the principal developers of the Affiliated Hospital concept and involved with it since its inception. Additional full-time faculty members have recently been appointed and several members of the voluntary teaching faculty also hold University of Virginia faculty appointments.

Space for faculty offices, classrooms, and student housing is available in the participating Roanoke hospitals and has been committed to this program.

The details of the Affiliated Hospital Program as it is being developed in Roanoke are as follows. The area's health education resources include three participating hospitals, and an extensive array of health professionals. The Community Hospital of Roanoke has 400 beds, Roanoke Memorial Hospital has 725 beds, and the Veteran's Administration Hospital in Salem has 1200 beds (250 general; 950 neuropsychiatric).

The Community Hospital has an approved internship and its surgical residency is affiliated with the University of Virginia Medical Center. A urology resident from the University of Virginia spends part-time there. The Roanoke Memorial Hospital has an approved internship; its own residencies in pathology, radiology and surgery and its approved General Practice residency has been converted to a Family Practice residency with the opening of a new Family Practice Center in September, 1971. Its surgical residency is affiliated with the University of Virginia and residents from the University of Virginia Medical Center rotate to Roanoke Memorial Hospital in neurosurgery, orthopedics, otolaryngology, and urology. The Veteran's Administration Hospital is affiliated with the University of Virginia Medical Center through rotating residencies in surgery, orthopedics, and urology. Additional residency affiliations with the above mentioned hospitals in the Roanoke area are being planned in internal medicine, obstetrics, pediatrics and psychiatry.

The Roanoke area has some 225 practicing physicians. There are also certified educational programs in professional nursing, licensed practical nursing, laboratory, and radiologic technology, laboratory assistants, and others in progress. Virginia Western Community College in Roanoke is beginning to offer two-year allied health training programs. The four-year Roanoke and Hollins Colleges are also located there. In sum, the area has the health facilities and manpower resources for a sound Affiliated Hospital Program.

Students have been taking rotations in Roanoke increasingly since 1968 in all clinical departments for senior electives. They now may go to Roanoke for parts of their more basic clinical education as second or third year students and as a result of the faculty's action in May, 1971, could take all of their clinical education for the last half of medical school in Roanoke in the affiliated program.

ROANOKE MEMORIAL HOSPITALS

Elective: Roanoke Memorial Hospital

Rotation Supervisor: Charles L. Crockett, Jr., M.D.

Prerequisites: Clinical Clerkship in Medicine

Duration and Number of Students per rotation: Consult Dr. Crockett.

Course description:

Roanoke: The objective of such clerkships is to provide the opportunity of seeing various medical disciplines, the spectrum of disease and socio-economic problems encountered, how practicing physicians function in a community setting, broaden their clinical horizons and increase their opportunities for developing clinical maturity and responsibility. The insight gained from such experiences may be quite helpful in such important decisions as type and location of residency training and practice. Roanoke serves a metropolitan population of nearly 200,000 and is a referring medical center for approximately 600,000. There are well-trained specialists in all fields in the Roanoke medical community, including several with faculty appointments at the University of Virginia. Recent faculty action has approved Roanoke for basic clerkships as of January, 1973. It is possible that basic clerkships, as well as electives, may be taken on some services before that date in consultation with Dr. Crockett and respective Department Chairmen.

Clerkships may be taken at the Roanoke Memorial Hsopital, the Community Hospital of Roanoke Valley, the Veterans Hospital, or as preceptorial assignments under practicing physicians in the community in a wide variety of specialties. Clinical clerkships are available in Internal Medicine, Family Medicine, Surgery, Pediatrics, Obstetrics and Gynecology, Neurosurgery, Emergency Room, Outpatient Clinics, Orthopedics, Radiology, Otolaryngology, Urology, and other programs as requested. Students will be assigned to individual attending physicians in a close tutorial relationship, gaining experience and increasing responsibility in the diagnostic and therapeutic management of a wide variety of clinical problems. Clerkships may be arranged at various times during the year. Board and room are provided. Those interested should contact Dr. Charles L. Crockett, Jr., Associate Professor of Medicine and Assistant Dean for Continuing Education, through the Dean's Office, or in care of the Roanoke Memorial Hospital, Roanoke, Virginia 24014 (telephone 981-7228).

The Roanoke Memorial Hospital is a 725-bed institution. There are over 1,700 deliveries annually and approximately 55,000 clinic and emergency room visits. There is an active intern program filled with twenty-two interns, and approved residencies in Surgery, Radiology, Pathology, and Family Practice, and affiliated residency programs with the University of Virginia in Orthopedics, Otolaryngology, and Urology. In addition to daily teaching rounds with the student's attending physician, there are clinical conferences once or twice each day, with weekly Grand Rounds in Surgery and Medicine, weekly X-ray conferences, regular C.P.C.'s, and special teaching conferences with members of the full-time and part-time faculty. There are visiting professors from the University of Virginia and other medical centers weekly. Full-time teachers at the Roanoke Memorial Hospital are Dr. Charles Crockett, Medical Director, Roanoke Memorial, Associate Professor of Medicine, University of Virginia; Dr. Robert Berry, Director of Surgical Education, Roanoke Memorial, and Assistant Professor of Surgery, University of Virginia; Dr. Philip Shiner,

Director of Cardiopulmonary Lab, Roanoke Memorial, and Instructor in Medicine, University of Virginia; Dr. Earle Glendy, Director of Cardiology; Drs. Hayden Hollingsworth and Chris Alexander and others also hold faculty appointments at the University of Virginia, and a full-time Director of Family Practice is to be appointed soon. In addition, there is a four-man group of physicians for full-time supervision and teaching in the Emergency Room.

The Community Hospital of Roanoke Valley is a 400-bed institution with an internship and Surgical Residency program, approximately 1,700 deliveries and also a very active Emergency Room with full-time staff.

The Veterans Hospital is a 1,500-bed institution with approximately 300 beds for general medical and surgical patients. There is a senior Surgical Resident and two junior Surgical Residents from the University of Virginia at all times, a third-year Orthopedic Resident, and a senior Urology Resident. Dr. Francis Brochu is the Chief of Surgery and Associate Professor of Surgery at the University of Virginia School of Medicine. Dr. William Reefe is the Chief of Medicine, as of July 1, 1971, and Associate Professor of Medicine at the University of Virginia.

APPENDIX D

The Affiliated Hospital Program in Winchester

Dr. John C. Hortenstine, Associate Professor of Family and Community Medicine and Director of Medical Education, Winchester Memorial Hospital, also has been involved with the Affiliated Hospital Program from its inception. In the Winchester program, at present, students may elect clerkships on a preceptorship basis where they are assigned to work with individual attending physicians. This enables the student to enlarge his experience in diagnosis and treatment of patients with diseases encountered in the community setting. Programs can be tailored to meet the interests and needs of the individual student in any phase of clinical practice, both office and hospital, whether specialty oriented or in general practice. In addition, programs can be arranged in tissue and clinical Pathology, Anesthesiology, and Emergency Room Medicine.

Space for faculty offices, classrooms, and student housing has been committed to the program by Winchester Memorial Hospital. The medical staff consists of 93 physicians of whom 82 are in specialty practice and 11 in Family Practice. All major specialties are represented.

Description of the Elective Program

WINCHESTER MEMORIAL HOSPITAL, WINCHESTER, VIRGINIA

Elective: Winchester Memorial Hospital, Community Hospital Program.

Rotation Supervisor: John C. Hortenstine, Associate Professor of Internal Medicine

Prerequisites: Completion of Clinical Clerkship in Medicine

Duration:

Maximum: 4 weeks Minimum: 4 weeks
Desirable length of rotation: 4 weeks
Offered the entire year.

Number of Students per rotation: Unlimited.

Course description:

Winchester: Students may elect clerkships on a preceptorship basis being assigned to individual attending physicians so that they may enlarge their experience in diagnosis and treatment of patients with diseases encountered within the community setting. Programs can be tailored to meet the interests and needs of the individual student in any phase of clinical practice, both office and hospital, whether specialty oriented or in general practice. In addition, programs can be arranged in tissue and clinical Pathology, Anesthesiology and Emergency Room Medicine. Doctor Hortnestine will supervise the work of the student and will be available to him for consultation and advice.

Winchester is 94 miles north of Charlottesville. The population of Winchester-Frederick County is approximately 45,000 and it is estimated that the population within a 20-mile radius is about 167,000, including 102,000 Virginians and 65,000 West Virginians.

The Winchester Memorial Hospital is now licensed for 389 beds plus 46

bassinets. During 1970 there were approximately 15,000 admissions and 122,000 patient days excluding newborns. The hospital is approved by J.C.A.H., is affiliated with Shenandoah College School of Nursing Education, has a state approved School of Practical Nursing, and a school of X-Ray technology approved by the American College of Radiology and by the American Medical Association. A school for Inhalation Therapists has been in operation for several years and has AMA approval.

The medical staff consists of 93 physicians of whom 82 are in specialty practice and 11 are in Family Practice. All major specialties are now represented with the addition of Neurosurgery in 1967 and Neurology in 1968.

There is a four-man Department of Radiology performing approximately 47,000 procedures annually. The clinical laboratory and pathology department consists of four full-time pathologists and performs approximately 371,000 procedures annually. The Department of Anesthesiology is supervised by five full-time physician anesthesiologists and five nurse anesthetists. The emergency and outpatient service is directed by four full-time physicians and is presently handling patients at an annual rate of 30,000. There is a well-equipped Intensive Care Unit of 11 beds of which 7 are monitored. There is a 7-bed Coronary Care Unit, all of which are monitored. The surgical recovery room accommodates 10 patients. There are active departments of Inhalation Therapy, Physiotherapy, and Pharmacy.

The clinical educational programs at the Winchester Memorial Hospital consist of the following:

1. Daily hospital rounds for patient care.
2. Wednesday lunch clinical conference weekly.
3. Tumor Clinic—every Wednesday at 1:30 p.m.
4. Friday lunch clinical conference weekly.
5. Monthly meetings of each clinical department.
6. A fall and spring postgraduate program of approximately 15 hours each.
7. Arrangements can be made for the student to attend departmental meetings, medical staff meetings and medical staff committee meetings (audit, utilization, infections). This means he may have the opportunity to observe the internal activities of the Hospital Medical Staff.

APPENDIX E

Transportation—An Interim Report to the
Medical Facilities Commission
December 18, 1970

The cost and the faculty time that would be expended in the affiliated hospital program in moving between Charlottesville, Roanoke, Winchester, and Lynchburg caused the Commission to consider the feasibility of using private aircraft as an alternative to surface travel by automobile. The staff has collected information on both conventional aircraft and helicopters from manufacturers and operators, including the Virginia State Police and the University of North Carolina Medical School.

The dollar value of the potential time savings alone is significant with the amount estimated at $90-100,000 per year. This figure is based on a comparison of portal-to-portal travel time by airplane or helicopter with travel time by automobile.

Given that air transportation might yield these kinds of savings, what are the relative advantages and disadvantages of conventional aircraft and helicopters? Their unique vertical take-off and landing (VTOL) capability makes helicopters very attractive from the standpoint of reducing time spent in ground travel to and from airports. However, their disadvantages include very high initial costs (about two-three times that of an airplane), high operating costs, high maintenance costs, and only moderate speed. Figures bearing out these observations are presented in Table I. The figures are presented for two classes of similar aircraft rather than for specific models or makes.

Excluding initial capital outlay, a break-even operation can be run using conventional aircraft by charging the same 9 cents/mile figure currently used by the state. The exception to this would come in the cases of single-passenger or messenger flights where it would be necessary to charge two fares to break even.

At 9 cents a mile it is impossible to run a break-even operation with helicopters. The charge would have to be 30 to 35 cents per mile (commercial rates average out to $1.30 per mile) just to break even. It is possible, of course, that the unique capabilities of helicopter transportation might make these costs reasonable.

The State of Virginia owns at least 9 airplanes and 2 helicopters. Six of the airplanes and the two helicopters are operated by the State Police with an airplane in each State Police District and the helicopters based in Richmond and Roanoke. Three of the airplanes are operated by the State Division of Aeronautics. The latter aircraft can be chartered by any state agency at rates which appear to be slightly over cost but which also are about one-third of commercial rates.

RECOMMENDATIONS:

1. The Medical Facilities Commission should investigate the possibility of basing one of the state airplanes and a pilot at Charlottesville for a period of six months to a year for use by the Medical Center faculty in their work.
2. Funds in the amount of $45,000 should be made available to the

Commission to pay the State Aeronautics Division for up to one thousand flight hours in their 4-passenger aircraft.

3. The Commission should explore with the State Police the possibility of the use of their Roanoke-based helicopter in the affiliated hospital program. This would have two purposes: (1) to help the Commission determine whether the unique capabilities of helicopters outweigh their high costs; and (2) to determine the actual level of use of helicopters in the program prior to any decision either to purchase one or to accept one as a gift.

Table I.—Comparison of Airplanes and Helicopters

	Airplanes	*Helicopters*
Passengers	5	4
Speed (mph)	180	140
Initial Cost	$65,000	$135,000
Annual Maintenance [a]	$ 6,000	$ 27,500
Annual Insurance (Hull & Liability)	$ 2,000	$ 28,000
Cost per Flight Hour	$ 25.00	$ 84.00
Cost per Mile	$ .18	$ .60
Break-even Load @ 9¢/mile	2.0 passengers	6.6 passengers [b]

[a] Based on 1,000 flight hours/year and including parts.
[b] Note that this is 2.6 passengers more than the craft will carry.
Sources: Virginia State Police
University of North Carolina Medical School
Staff computations from manufacturer's data

APPENDIX F

Facilities and Programs—An Interim Report to the Medical Facilities Commission May 27, 1971

This interim report on facilities and programs is largely an inventory of what is currently in existence. Such an inventory is essential, however, in order for the Commission to address these questions:

(1) What additional facilities (space and equipment) are necessary to the success of the affiliated hospital program?

(2) What kind of long-range planning is required to ensure that the space and equipment will be provided at the time of need?

(3) What agency or agencies will provide the financial support necessary to securing this space and equipment?

These questions have been perennials in the meetings of the Commission as well as at those of its Subcommittee on Housing and Logistics. The information provided in the three tables in this interim report should set the stage for reaching answers to the questions posed above.

This report is based on information received from the six hospital administrators, the three Directors of Medical Education, and the Annual Guide Issue of *Hospitals*, J.A.H.A., for August, 1970. The situation is changing rapidly in each of the hospitals, and the inventory data presented in this report are subject to revision.

Space

Space for educational needs and for student housing is critical to the affiliated hospital program. As Table I shows, there appears to be sufficient space available now for the 20-30 students projected to be in the program by January, 1973. As presently envisioned, the program would go into full operation in Roanoke, in January, 1973; in Winchester, January, 1974; and in Lynchburg, January, 1975. It appears that this time-phasing will enable Winchester and Lynchburg to make the necessary provisions for space.

Current plans call for housing to be provided only for single students. The question of married students has arisen and been discussed thoroughly, but no final answer has been reached. However, as the affiliated hospital program develops, it will be possible for a student to arrange a full 9-12 months sequence in any one of the cities. When this is the case, a married student will be responsible for his own housing arrangements the same as if he were in Charlottesville.

From the educational standpoint, the greatest space needs appear to be in Winchester where both conference rooms (seating 8-20 people) and an auditorium (seating 100) are needed. Faculty offices are in short supply in Lynchburg.

The several libraries should be examined by a qualified consultant who would determine whether additional space is required, what the future pattern of acquisitions should be, and what staff will be required. In Roanoke and Lynchburg some sort of cooperative cataloging and acquisition system should be developed to eliminate unnecessary duplication of purchases (there may be

some necessary duplication). The libraries are linked by telephone to the Virginia Medical Information System (VAMIS). VAMIS provides library bibliographical services as well as furnishing copies of requested items and is a joint effort of the Medical Libraries at UVa and MCV with financial support from the Virginia Regional Medical Program. The two Medical Libraries are backstopped by a direct link to the National Library of Medicine in Bethesda, Maryland.

Allied Health Educational Programs

Traditionally, hospitals have found it necessary to become educational institutions training allied health manpower largely for their own use. In Virginia, it appears that the Community college system, as it develops will take over much of this training while the hospitals continue to provide the site and facilities where the student can obtain practical experience. Table II lists the allied health educational programs and indicates whether they are hospital-based, hospital-affiliated, or college-based. (The development of allied health problems is in such a state of flux that the list in Table II is subject to revision.) In Roanoke, with but one exception, these are entirely hospital-based programs, while in Lynchburg and Winchester, they have developed between the hospitals and local two-year and four-year colleges.

It would appear that a side benefit to the state from the affiliated hospital program would be the encouragement of more allied health programs in these cities.

Facilities and Services

Exposure to a wide array of modern facilities and services is a vital part of the educational process for medical students. The facilities and services listed in Items 1—35 in Table III indicate that, for the most part, the participating hospitals have sophisticated facilities and services for the provision of excellent patient care. And, of course, an underlying premise of the Commission's existence is that this kind of hospital and its patients will provide the student with a more realistic exposure to the practice of medicine than can be obtained in the University Medical Centers.

As the affiliated hospital program develops and advances in medical technology and medical care take place, some of these services and facilities may become obsolete and other services may be introduced. In all cases, the Commission's interest should be that the student has the opportunity for a balanced educational experience in the community hospitals and that the facilities and services necessary to that end are provided.

General characteristics of the hospitals are listed in Items 36 - 41 in Table III.

Conclusion and Recommendations

The initial success of the affiliated hospital program will depend, to a large degree, on our ability to make use of currently available space for educational programs and student housing. The attainment of long-term success, however, will require a long-range planning effort based on some experience with the program and a clear-cut decision as to where lies the financial responsibility for construction and large scale renovation of space.

Specific recommendations are as follows:

(1) The Commission should establish a long-range planning committee to be charged with developing a capital construction and financing plan for the affiliated hospital program.

(2) The Commission should retain a medical library consultant to evaluate and make recommendations with respect to the existing hospital libraries.

(3) The Commission should explore with the participating hospitals, local colleges, and the Virginia Department of Community Colleges the potential for additional allied health educational programs in the three cities.

(4) The Commission should assist the participating hospitals in the cooperative and complementary development of facilities and services with the guidance and assistance of the respective areawide comprehensive health planning agencies.

TABLE I

Space Inventory

	Roanoke			Lynchburg		Winchester
	RMH	CH[a]	VA	LGH	VB	WMH
Auditoriums (seating capacity)	2(250,150)	1(200)	1(400)	2(125,50)	2(150,100)	0
Conference Rooms	15	6	10	3-4	5	2(60,40)
Classrooms	6	tba	5	5	7	2
Faculty Offices	8	tba	2	1	1	3(temp.)
Libraries[b]	1	1	1	2	2	1
Student Housing[c]	[d]	tba	[e]	[e]	4-6 [g]	12 [h]

[a] Community Hospital of Roanoke owns a 10-story building adjacent to the hospital. The Community Hospital School of Nursing occupies the top four floors of this building and community service programs occupy fifth floor space. The remainder of the building can be renovated to fit specific needs as is indicated by "tba".

[b] The libraries vary in size and quality. Any need for expansion or improvement would have to be determined by a qualified medical library consultant. The RMH, LGH, VA, and VB libraries have full-time librarians; it is believed that the others have part-time librarians.

[c] This refers to the number of rooms available for use by a single individual.

[d] RMH owns the renovatable Ferguson Mansion and has six apartments.

[e] VA and LGH have agreed to make an unspecified number of dormitory spaces available to students.

[f] VB plans to purchase an adjacent and renovatable school building.

[g] Housing is currently available for 3-5 students and by 1973 WMH will be able to house 12.

SOURCE: Medical Facilities Commission

TABLE II

Allied Health Education Programs

	Roanoke			*Lynchburg*		*Winchester*
	RMH	CH	VA	LGH	VB	WMH
Hospital-Based						
Cytotechnology		X				
Medical Technology	X	X		X		
Practical Nursing	X	X		X		X
Professional Nursing	X	X		X	X	
Radiologic Technology	X	X				X
Laboratory Aide						X
Operating Room Technician						X
Hospital-Affiliated						
Inhalation Therapy						a
Professional Nursing						a,b
Medical Technology (4 yr)				c	c	
(2 yr)					d	
Medical Records Librarian				d	d	
Radiological Technology				d	d	
Medical Laboratory Technician (2 yr)				d		
College-Based						
Dental Assistant (1 yr)	Virginia Western Community College (Roanoke)					

[a] Shenandoah College

[b] Lord Fairfax Community College

[c] Lynchburg College

[d] Central Virginia Community College

SOURCE: *Hospitals J.A.H.A.*, Guide Issue, August, 1970.
Virginia Department of Community Colleges

PRELIMINARY INVENTORY OF HEALTH RESOURCES
ROANOKE, LYNCHBURG, WINCHESTER

	Roanoke			Lynchburg		Winchester
	RMH	CH	VA	LGH	VB	WMH
Facilities and Services						
1. Intensive Care Unit	X			X	X	X
2. Intensive Cardiac Care Unit	X	X		X	X	X
3. Open-Heart Surgery Facilities	X					
4. Postop. Recovery Room	X	X	X	X	X	X
5. Premature Nursery	X	X		X	X	X
6. X-ray Therapy	X	X		X	X	X
7. Cobalt Therapy	X	X		X	X	X
8. Radium Therapy	X	X		X	X	X
9. Radioisotone Facility	X	X		X	X	X
10. Histopathology Laboratory	X	X	X	X	X	X
11. Organ Bank		X				
12. Blood Bank	X	X		X	X	X
13. Electroencephalography	X	X	X	X	X	X
14. Physical Therapy Dept.	X	X	X	X	X	X
15. Occ. Therapy Dept.	X		X	X		
16. Inhalation Therapy Dept.	X	X		X	X	X
17. Full-Time Req. Pharmacy	X	X	X	X	X	X
18. Part-Time Req. Pharmacy						
19. Dental Services	X		X	X	X	X
20. Renal Dialysis—Inpatient						
21. Renal Dialysis—Outpatient						
22. Self-Care Unit				X	X	X
23. Major Emergency Department	X	X		X		
24. Psych. Inpatient Unit	X		X		X	X
25. Psych. Outpatient Unit	X		X			
26. Psych. Partial Hospitalization Prog.			X			
27. Psych. Emergency Service	X			X	X	X
28. Social Work Dept.	X	X	X	X		X
29. Family Planning Service			X			
30. Extended Care Unit	X			X		
31. Rehab. Services Inpatient Unit	X		X			
32. Rehab. Services Outpatient Unit	X		X			
33. Home Care Program						
34. Hospital Auxiliary	X	X	X	X	X	X
35. Organized Outpatient Dept.	X	X	X		X	
36. Psych. Foster and/or Home Care			X			
37. Basic Emergency Department						X
38. Control	NP[f]	NP[f]	VA[a]	NP[f]	Church	NP[f]
39. Service	GMS[b]	GMS[b]	Psyc	GMS[b]	GMS[b]	GMS[b]
40. Beds	475[c]	400	1643	392[d]	178[e]	385
41. Admissions	16,818	15,334	4957	11,891	8054	14,651
42. % Occupancy	105.1	93.0	78.7	82.4	84.8	84.9
43. Census	499	372	1307	323	151	327

[a] Veteran's Administration
[b] General Medical and Surgical
[c] 725 total by 1972
[d] 362 total by 1972
[e] 250 total by 1972
[f] Non-Profit

Source: *Hospitals* J.A.H.A. Guide Issue August, 1971

APPENDIX G

Biomedical Communication—An Interim Report to the Medical Facilities Commission December 18, 1970

This interim report on biomedical communication focuses on television and computer transfer of information. At the same time, we recognize that, in the broader sense, all teaching and publication are forms of biomedical communication. The Commission staff has addressed itself to two related questions:

(1) How might television and computers be used in the affiliated hospital teaching program?

(2) How much will it cost to use these media in the program?

As we attempt to give preliminary answers to these questions, a third question arises: What is the administrative structure for biomedical communication in the University of Virginia Medical Center?

This report is based on interviews with members of the Medical School faculty, the directors of the three audio-visual divisions of the Medical Center, representatives of medical and educational television facilities in South Carolina, Ohio, Tennessee, and California. An important source of assistance was the consulting group from the National Medical Audio-Visual Center which visited the University of Virginia Medical Center on December 3-4, 1970. Mr. Charles Farmer and Mr. Joseph Mingioli met with several representatives of the Medical Center and the Commission, including Dr. Charles Crockett and Dr. John Hortenstine. Their comments were most helpful to the Commission staff.

TELEVISION

Television may be used both as an instructional aid and as a direct communication device in the affiliated hospital program. It would be desirable to have the capability to transmit live, color programs of network broadcast quality between any or all of the seven points in the proposed network: UVA Medical Center, Roanoke Memorial Hospital, Community Hospital (Roanoke), Veterans Administration Hospital (Salem), Winchester Memorial Hospital, Lynchburg General Hospital, and Virginia Baptist Hospital (Lynchburg). However, this capability should be considered the mark of an ultimate system; and one which can be built toward through the purchase of appropriate equipment over a period of time.

It is a truism, yet one well worth repeating, in the field of instructional television that the equipment or hardware costs and the technical problems are of much less significance than the people-related problems. The latter include deciding what material will be broadcast, how it will be produced, who will utilize it, who is going to obtain the talent, how the talent will be paid, who will operate the equipment, and a host of similar questions.

At this point, it seems appropriate to point out that first-year costs for the ultimate television system would approach one million dollars. For this sum, however, the state would have a first-quality, private transmission system, with full color capability in each of the four cities, and very high fidelity audio transmission. In addition, the system could handle computer communication

and various types of telemetry for monitoring pulse rate, blood pressure, etc. Second and following year requirements should drop to about $400,000 per year for personnel and other operating costs.

On a lesser-scale, we could rely on videotaped material that could be purchased, rented, copied from the library of the National Medical Audio-Visual Center, or produced in the UVA Medical Center studios. This would necessitate transporting the tapes between the six hospitals and the Medical Center by car, bus, mail, or other means. The manpower and equipment requirements for this approach would be as follows:

1. Development of a quality color videotape production facility at the Medical Center emphasizing a mobile capability;
2. Installation of color-capabable video tape replay and monitoring equipment in each of the six hospitals and the Medical Center (with a minimum of one unit in each);
   Employment of an audio-visual technician in each of the six hospitals who would be responsible for operating the equipment; and
3. Employment of a producer-director, a cameraman, a technician, and a secretary to work with the present director of Medical Television at UVA.
4. First-year costs for this level of operation would approximate $300,000 with second and following year requirements of some $100,000 for salaries and other operating costs.

First-year costs for this level of operation would approximate $300,000 with second and following year requirements of some $100,000 for salaries and other operating costs.

The proposed expansion of the Medical Center television facility will provide a good opportunity to strengthen the administrative framework within the Medical Center to assure the provision of quality instructional services and technology to teaching faculty. The three audio-visual divisions of the Medical Center now report to the Dean of Medicine and the Medical Center Audio-Visual Committee through their separate administrative heads. Furthermore, there are no firm state funds in the Medical Center budget to provide for instructional services in support of teaching faculty. The first of our recommendations refers to this problem.

RECOMMENDATIONS

1. The consultants from the National Medical Audio-Visual Center recommended that a Division of Instructional Services (or Biomedical Communication) headed by a person of recognized professional stature in the fields of educational technology and biomedical communication would be most helpful to the educational efforts of the affiliated hospital program.
2. The present director of Medical Television should provide all teaching faculty with lists and catalogs of available videotaped materials. He should be given the financial support necessary for the acquisition of videotapes requested by faculty. Until a color television capability can be developed at the Medical Center, the director should be encouraged to and receive financial support for introducing the teaching faculty to the many kinds of excellent black and white videotaped material now available from the National Medical Audio-Visual Center and other sources.
3. The Medical Center should be given financial support sufficient for the

development of a first-quality videotape production facility, emphasizing mobile production capability.

4. Color-capable videotape playback and monitoring equipment should be installed in large, comfortable, easily accessible viewing areas in each hospital.

5. A private telephone line or SCATS telephones should be installed in the television viewing areas of each hospital to permit conference calls during and after videotape presentations.

6. An equipment technician who could double as a general audio-visual technician should be employed for each hospital.

7. Evaluation of the utilization and effectiveness of television in medical education should continue in order to provide a factual basis for determining whether further steps toward the ultimate medical television system should be taken.

8. The hospitals in the affiliated program should be encouraged to use the television equipment for training of allied health and housekeeping personnel in order to maximize its use.

COMPUTERS

Computer assisted instruction (CAI) and computer managed instruction (CMI) have undergone extensive development for medical students at the Ohio State University School of Medicine. Much of the basic work in this development was done by Dr. Ralph Ingersoll who is now an Assistant Dean in the University of Virginia School of Medicine. Dr. Ingersoll furnished the Commission staff with the following report.

Computer needs for computer assisted and computer managed instruction

A responsive computer system is essential to the development of CAI. Faculty members and students should have access to the system 24 hours a day. The language capable of handling branching and other instructional demands of Course Writer III. This language developed by IBM allows faculty to work directly with the computer, and to make immediate instructional changes.

Computer learning programs have been developed at other universities and are working extremely well. The University of Virginia is currently on line to an IBM 360-40 at Ohio State University, College of Medicine.

In general, the major strength of CAI rests in its extreme flexibility. The specific ways in which this flexibility is manifested in educational or informational applications are as follows:

1. CAI instructional or informational programs are readily modifiable with respect to both structure and content. By means of built-in monitoring techniques, authors can continually evaluate users' responses in order to identify areas which seem to be inadequate. Alternative approaches can then be devised and easily substituted in the program. This feature is especially useful in subject matter areas in which rapid technological changes are taking place. New developments can be incorporated into existing programs almost as soon as they are validated.

2. CAI programs can be designed so as to adapt to various learning styles. For example, one individual may be able to learn a considerable amount of factual data before he understands how it all interrelates while another may need to see an overall structure in order to learn details. In

developing programs, these alternative approaches can be incorporated in such a way that inadequate student performance can serve as the signal which calls forth another approach.

3. A CAI presentation can readily adapt to the individual's level of existing knowledge and to his rate of learning. Through a continual quizzing of the user and an evaluation of his responses, a running indication of the user's knowledge can be obtained. In instances where he has adequate knowledge, the user can be moved rapidly into the next major instructional sequence. During those times in which he is having difficulty, the user can be transferred into a drill-and-practice sequence or can be given an alternative explanation.

   In CAI (as in all forms of programmed instruction) the user is not required to learn in accordance with an externally imposed rate. He has time to reread informational materials and to think through a problem before responding.

4. The equipment (computer terminal) which the user employs in CAI can also serve other purposes. It can be used as an input-output station in a hospital information system or as a device for obtaining information about patient care procedures in emergency situation.

   Most computers are in operation around the clock or nearly so; consequently, the scheduling of CAI would pose no problem. A nurse on night duty, for example, would have no more difficulty scheduling a time for CAI than would one working during the day.

Another advantage of CAI is its ability to furnish the user with an immediate feedback each time he responds. Needless to say, there is an overwhelming amount of research indicating the importance of reinforcement both in the enhancement of learning and in the prevention of forgetting. It is to be noted, moreover, that CAI requires an active, not a passive, user. In learning through the use of this method, therefore, the user participates in a total fashion, i.e., not only intellectually, but also physically.

In addition to the above, the use of CAI makes possible the accomplishment of some educational outcomes that would be difficult by other means. For example, interesting forms of repetition can be incorporated into the program where there is a need to bring about "overlearning" of crucial, but often forgotten, information. Simulation techniques can be used to enhance the meaningfulness of material by embedding them in "real-life" situations. For instance, information could be presented within the context of a clinical circumstance or in a manner which closely duplicates a normal student-tutor interaction.

In describing the uses of computers in education Patrick Suppes writes: "—A recent report of the National Academy of Sciences states that by mid-1965 more than 800 computers were in service on the campuses of various American universities and that these institutions spent $175 million for computers that year. The report goes on to forecast that by 1968 the universities' annual budget for computer operations will reach $300 million and that their total investment in computing facilities will pass $500 million,"

With respect to CAI, he states:

"It is widely agreed that the more an educational curriculum can adapt in a unique fashion to individual learners—each of whom has his own characteristic initial ability, rate, and even "style" of learning—the better

the chance is of providing the student with a successful learning experience." [1]

COSTS OF CAI AND CMI

Detailed cost estimates for this aspect of the affiliated hospital program have not been developed as yet. A very rough estimate would place first-year costs at $150,000 and second and following year costs at $75,000.

RECOMMENDATIONS

1. The Commission should continue to investigate the use of CAI and CMI with the University of Virginia School of Medicine, administration and faculty and should they decide that such instructional technology is practical the Commission should recommend financial support for its development at UVA.
2. Funds should be made available to permit members of the teaching faculty to visit the Ohio State University facility for on-site investigation and evaluation.

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[1] Suppes, Patrick, *The Uses of Computers in Education* in INFORMATION, Dennis Flanagan, Editor, W. H. Freeman and Company, 1966.

APPENDIX H

The Affiliated Hospital Program of the School of Medicine, Medical College of Virginia, Virginia Commonwealth University

BACKGROUND

The Medical College of Virginia School of Medicine has been sharing its house staff, faculty, paramedical and administrative resources with community hospitals more than 25 years.

In the earliest efforts of the affiliation prior to 1946, interns from the Medical College of Virginia served in three private hospitals in Richmond. In 1946, Dr. W. T. Sanger, then President of the Medical College of Virginia, initiated the cooperative program in which the Medical College of Virginia wished to share with community hospitals those resources which met their needs best.

In July, 1949, the University of Virginia joined the program and appointed Dr. H. B. Mulholland to assist Dr. Kinloch Nelson of the Medical College of Virginia with the direction of the program. Since then the program has consisted mainly of faculty members from the two schools visiting hospitals in several communities in the State for lectures and other efforts in continuing education for medical staff members. Each of the schools has certain communities it has worked with singly, and other communities have been served by a joint program between the two schools.

CURRENT PROGRAMS:

Medical Students. Since 1967, MCV's third-year (junior) medical students have been required to spend one month of their clinical clerkship in a community hospital, the primary goals being to expose them to patients, practices and concepts not ordinarily seen or illustrated in the metropolitan university hospital and to create interest among them in community health needs and systems of health-care delivery outside the university setting. Initially, the hospital at Abingdon, the Northampton-Accomack Hospital at Nassamadox, and the DePaul Hospital in Norfolk participated; since these, three more hospitals have been added: the Riverside Hospital at Newport News (1969), the Richmond Memorial Hospital (1970) and the Petersburg General Hospital (1971).

At each of these hospitals a physician is responsible for the orientation, general direction, supervision and evaluation of the medical students. These physicians were appointed to the faculty without remuneration and are required to meet periodically with the Dean of the School of Medicine and his staff at the Medical College of Virginia to evaluate the program, make adjustments and share experiences.

On returning from the community practice rotation, each student is interviewed personally by the Dean and his staff to discuss the strengths and weaknesses of his experiences and make suggestions for improvement.

The performance of each student is evaluated by the responsible program director and the involved medical staff in the community hospital; this becomes a formal part of the student's record and an important consideration in promotion.

In general, the strongest programs result directly from the interest and enthusiasm of the responsible physicians, while weaknesses seem to arise where community hospitals lack facilities or interested staff.

So successful have some programs become that many fourth-year (senior) medical students have elected to return for one or more months of training to the community hospitals.

In general, medical students have listed the following items as important in successful programs:

a. Variety of clinical "material" and exposure to "private" patients.

b. Close working relationship with physicians responsible for the patients.

c. Direct responsibility for patient care under the physician's supervision without the interposition of housestaff.

d. Superior assistance from nurses who are generally more helpful and cooperative than nurses in the university hospital setting.

e. Opportunity to examine patients with emergencies and new medical problems before the physicians or housestaff have recorded their impressions and diagnoses.

THE FUTURE:

Based on the experience of the past 25 years, it is the opinion of many faculty members and the Dean's staff at the Medical College of Virginia that affiliation with community hospitals should be encouraged and expanded. Two potent arguments in favor of expansion are:

The increasing size of medical school classes will soon exceed the university hospitals' capacity to provide adequate patient "material" both in quantity and quality.

The community hospital can provide experience with a spectrum of patients in the middle and upper socio-economic strata not ordinarily available for teaching in the university setting, and with minor and less advanced disease entities and elective surgical procedures.

Such experiences are necessary to broaden the student's and housestaff's exposure to a variety of illnesses in all categories of patients and to prepare them better for the practice of medicine than training which utilizes only the indigent segment of the community and an unusually high proportion of patients with major injuries, far-advanced disease and rare illnesses.

Experience dictates that successful affiliation depends mainly on two factors:

1. Interested physicians in the community hospital who enjoy teaching and a working association with an academic institution and its faculty.

2. The appointment of responsible community hospital physicians to the faculty of the medical school and adequate financial remuneration of these physicians for the effort and time expended in teaching.

CONCLUSIONS:

Affiliation of community hospitals with a university hospital is practical and rewarding for both types of instruction as demonstrated by the experience of the past 25 years.

Affiliation provides a means for exchange of knowledge and resources and has important implications for undergraduate and graduate medical education. It is also a mechanism for studying the roles of the university hospital and the community hospital in the delivery of health care and for establishing cooperative educational and service programs which ultimately must lead to improved co-ordination of health services and medical education on a state-wide basis. Neither the community nor its governing bodies can afford any longer the waste that results from the isolation of the university medical center from the community's physicians and hospitals.

Appendix I

Recommended Legislation

A BILL

To continue the Medical Facilities Commission, to prescribe its members and duties and to appropriate funds.

Whereas, the problems of physician supply and distribution, increasing productivity of the medical schools and improving medical education are long-term problems requiring on-going efforts for their solution; and

Whereas, the University of Virginia Affiliated Hospital Program requires continued planning for further expansion, curricular changes, use of television, computers and other communication technology; and

Whereas, an area health education center in Virginia would be highly beneficial and is a possibility which needs to be explored and developed; and

Whereas, coordination and cooperation between the State's two schools of medicine would be fostered by joint membership on a commission; now, therefore,

Be it enacted by the General Assembly of Virginia:

1. § 1. The Commission established to study the advisability and feasibility of utilizing the medical facilities, resources and professional personnel of Roanoke and other communities in the State as an affiliated operation of the University of Virginia School of Medicine and Medical Center is continued for a period of two years and shall hereafter be known as the Medical Facilities Commission.

§ 2. The Commission shall consist of twelve members, two to be appointed by the President of the Senate from the membership thereof, three to be appointed by the Speaker of the House of Delegates from the membership thereof, four to be appointed by the Governor from the State at large, the Director of the State Council of Higher Education or a representative designated by him, the Dean of the School of Medicine of the Medical College of Virginia, Health Sciences Division, Virginia Commonwealth University and the Dean of the School of Medicine of the University of Virginia. The Vice-President for Health Sciences from the University of Virginia and the Vice-President for Health Sciences from Virginia Commonwealth University shall be non-voting members.

§ 3. The members of the Commission shall receive no compensation for their services but shall be reimbursed for their necessary expenses incurred in the performance of the duties of the Commission.

§ 4. The Commission shall have the following duties:

a) It shall continue studying and planning the development of the University of Virginia Affiliated Hospital Program for undergraduate, graduate, and continuing education programs for family physicians, other medical specialists, and other health professionals.

b) It shall plan for and develop an Area Health Education Center.

c) It shall seek to assure that momentum is sustained toward

increasing the number of family and other type physicians in Virginia by encouraging further development of such programs and alerting the General Assembly to the need for additional programs to prevent future health manpower shortages.

d) It shall encourage coordination between the State's two medical schools as they develop affiliations with communities for undergraduate, graduate, and continuing education programs for family physicians, other specialists, and other health professionals.

e) It shall encourage coordination between the two medical schools in pilot studies in use of computers, television and transportation modalities.

f) It shall study such other problems related to medical education and health as the General Assembly or the Governor may request.

§ 5. For the purposes of this study, the Commission may employ such technical and other assistance as may be necessary.

§ 6. The Commission shall conclude its activities and report to the Governor and the General Assembly no later than November one, nineteen hundred seventy-three. The Commission shall make an interim report if so requested by the Governor or the General Assembly or if it so desires.

2. For the purposes of this act, there is hereby appropriated from the contingent fund of the General Assembly the sum of twenty thousand dollars.