North Carolina Area Health Education Centers Program
The North Carolina Area Health Education Centers (AHEC) Program is a system of nine regional centers affiliated with the university medical centers in the state. The AHEC centers bring health professions education activities and services to their regions to help increase and improve the health care workforce in North Carolina.

The AHEC Program provides off-campus clinical and practical experiences for health science students, administers and supports primary care medical residency programs, delivers thousands of local continuing education programs, provides technical assistance and a wide range of library/information services. These services are available to health care and mental health agencies, individual health and mental health professionals and multidisciplinary groups.

The Program is administered by the School of Medicine at the University of North Carolina at Chapel Hill. The AHEC Program includes the resources of other UNC-CH health science schools and those of Wake Forest University's Bowman Gray School of Medicine, Duke University Medical Center, East Carolina University and Western Carolina University. Now in its 20th year of operation, the NC AHEC Program is one of the oldest and most comprehensive AHEC systems in the nation. The state's commitment to education and the health of its citizens is evident through the continued support of AHEC.
## AHEC Offices

<table>
<thead>
<tr>
<th>State Program Office</th>
<th>Area L AHEC</th>
<th>Charlotte AHEC</th>
<th>Eastern AHEC</th>
<th>Fayetteville AHEC</th>
<th>Greensboro AHEC</th>
<th>Mountain AHEC</th>
<th>Northwest AHEC</th>
<th>Wake AHEC</th>
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<tr>
<td>Eugene S. Mayer, M.D., Program Director and Associate Dean</td>
<td>David M. Webb, Ed.D., Director</td>
<td>W.T. Williams, Jr., M.D., Director</td>
<td></td>
<td>Harold Godwin, M.D., Director</td>
<td>Donald Smith, M.D., Director</td>
<td>Thomas Bacon, Dr.P.H., Director</td>
<td></td>
<td>Edward Abrams, Ed.D, Director</td>
<td></td>
</tr>
<tr>
<td>CB# 7165, Wing C, Medical School UNC-CH Chapel Hill, NC 27599-7165</td>
<td>PO Drawer 7368 Rocky Mount, NC 27804-0368</td>
<td>PO Box 32861 Charlotte, NC 28232-2861</td>
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<td>1601-B Owen Drive Fayetteville, NC 28304</td>
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<td>501 Biltmore Avenue Asheville, NC 28801-4686</td>
<td>300 Medical Center Blvd. Winston-Salem, NC 27157-1060</td>
<td></td>
<td>2131 South 17th Street Wilmington, NC 28402-9989</td>
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Introduction

From the Dean

In this annual report, the North Carolina AHEC Program summarizes an extraordinary set of continuing accomplishments that contribute substantially to the quality of health care available to the people of the state. Since 1974, the Program has sustained effective links between the communities of the state and its four academic medical centers. The Program has been an integral part of the School of Medicine of the University of North Carolina at Chapel Hill, and it has aided in bringing together the Bowman Gray School of Medicine of Wake Forest University, the Duke University Medical Center and the East Carolina University School of Medicine.

This partnership between the academic medical centers and the communities of North Carolina has provided high quality, easily accessible education for health professionals in all 100 counties. The AHEC Program has clearly helped improve the availability of health care providers in the cities and rural towns of North Carolina and, in my judgement, it has improved the quality of health care as well.

The success of the Program is due to its achievement of marshaling the great human resources of the academic medical centers to address the challenges and opportunities of community-based practice. The success of the Program is, first and foremost, a tribute to the commitment and capabilities of the faculty in the four medical schools and the schools of the Division of Health Affairs of UNC-CH.

The educational experience of North Carolina’s health science students and future practitioners in the health care professions is constructively influenced by the substantial experience of these students in community-based learning. Within the AHEC Program, individuals establish relationships and roots that serve to influence subsequent career choices.

Under the leadership of Dr. Eugene Mayer, the AHEC Program has been managed with great foresight, economy and sensitivity to local interests.

Built upon this solid base of achievement, the Program is now poised to contribute vitally as North Carolina’s health care system adapts to the great changes now underway. Prominent among these changes currently is the move to greater emphasis on the provision of health care in the ambulatory setting and the recruitment of physicians, especially primary care physicians, to underserved areas. AHEC’s plans for the future, along with its distinguished record of accomplishment, give sound assurance that it will be a major contributor to addressing the problems of access, scope, quality and the cost of health care in the future.

--Stuart Bondurant, M.D.
Dean, UNC-CH School of Medicine
From the Program Director

The North Carolina AHEC Program has grown and evolved in its 20-year history, but has consistently served to bridge the university and community sectors of health care through educational activities statewide.

The AHEC Program has been operating on a lean budget in the past two years due to the state's financial struggles. Despite a permanent budget reduction of nine percent during this time, the Program's core activities have been maintained, demand for AHEC services has been steady and productivity has been high. For example, since 1985 attendance at AHEC continuing education programs has grown by 57 percent, from 78,000 to more than 136,000 attendees. However, it has been difficult to initiate new program areas to meet future needs, especially in our underserved areas.

We have been fortunate to receive two grants from the Kate B. Reynolds Health Care Trust to develop new activities in health careers development. This funding enabled us to produce and distribute a health careers guide for students and adults, and to carry out a three-year pilot project to develop health careers activities in rural areas of eastern North Carolina.

Our 1990-95 Program Plan carries forward our past activities, but also focuses on several new endeavors for the AHEC system. These include:

* ambulatory-based education in primary care and rural health;
* recruitment and retention in nursing and allied health;
* improved minority presence in the health professions
* communications technology to make continuing education more accessible;
* assisting the state with programs to reduce infant mortality, child abuse and other children's issues;
* helping health and mental health professionals address substance abuse by patients.

Challenges lie ahead for AHEC, but with the continued support and cooperation of local, state and federal agencies, we can meet them with the goodwill and energy that have always characterized our Program.

-- Eugene S. Mayer, M.D.
Associate Dean and Director,
North Carolina AHEC Program
The North Carolina AHEC Program

History

The concept for the Area Health Education Centers Program in North Carolina can be traced back to the 1940s when the University of North Carolina at Chapel Hill School of Medicine expanded to a four-year program. Since then, the School has had a mandate to help meet the physician manpower needs of the state. In 1966, with funds from the Regional Medical Program and the Duke Endowment, activities bringing medical education to the community began. The General Assembly later appropriated approximately $1 million to support the development of off-campus rotations of UNC-CH medical students.

A 1970 report from the Carnegie Commission on Higher Education, titled "Higher Education and the Nation's Health," instigated the organization of the AHEC Program. The report made many recommendations for changes in medical education including the creation of 126 AHECs across the nation. Training health professionals in community hospitals through close association with university training programs was the primary purpose of these centers.

In 1971, Congress passed a bill which contained a section designed to improve the distribution, efficiency, effectiveness and quality of health manpower. In 1972, with federal funding, three AHECs were started in this state: the Area L, the Charlotte and the Wilmington AHECs. The Program expanded in 1974, through the allocation of state funds, to nine centers, each serving a region of the state. The North Carolina AHEC Program was among the first group of AHEC programs to be established in the nation and is one of the few whose funding has been assumed by its home state. Since its inception, the North Carolina AHEC Program has been regarded as a national model. Several more "generations" of AHEC programs have been funded across the country since the early 1970s. Some AHEC projects serve an entire state, as does the North Carolina AHEC, while others serve defined geographic areas or special populations. The North Carolina AHEC Program keeps in touch with other AHECs through the federal AHEC office at the US Department of Health and Human Services Bureau of Health Professions (Division of Medicine).
North Carolina's AHEC Program

The creation of the statewide AHEC Program marked the involvement of all the medical and health science schools in the state in a coordinated effort to serve North Carolina's communities. The Program is affiliated with the East Carolina University Schools of Medicine, Nursing, Allied Health and Social Work; the Bowman Gray School of Medicine of Wake Forest University; and Duke University Medical Center, as well as the UNC-CH Schools of Dentistry, Nursing, Medicine, Pharmacy, Public Health and Social Work.

The Program is based in the Office of the Dean at the UNC-CH School of Medicine. The AHEC Program Central Office oversees the entire system and is accountable to the Board of Governors of the University of North Carolina through the Dean and the Chancellor of UNC-CH.

Funding for the Program is primarily state and local. Since its inception the AHEC Program has received strong support from the North Carolina General Assembly and from the communities it serves.

In addition to health science schools and community college programs, the AHEC Program maintains strong ties to other service and health-related agencies. These partnerships have served as a framework for linking community resources in the health sciences schools and in state agencies, ensuring the efficient and effective use of public and private funds. They have included collaborative or supportive relationships with components of the state’s Department of Human Resources (including the Office of Rural Health and Resource Development, the Divisions of Mental Health, Developmental Disabilities and Substance Abuse Services, the Division on Aging and the Division of Social Services) and the Department of Environment, Health and Natural Resources.

The AHEC system consists of nine regional centers, each of which is affiliated with a medical school, a department or school of allied health, a nursing school, the UNC-CH Schools of Dentistry, Pharmacy and Public Health, and in some cases the Campbell University School of Pharmacy. While autonomous, the nine AHECs are contractually linked to the AHEC Program and negotiate an annual work plan and budget. This assures that the nine AHECs maintain a common mission and serve common goals, while maintaining flexibility to address regional needs. A community teaching hospital or non-profit community foundation oversees each of the nine AHEC centers. The centers operate as "mini-campuses," with staffs of education specialists in the full range of health and mental health fields to provide, among other services, continuing education and library information services to practicing health professionals.
The Future

The AHEC Program has been guided by a series of long-range plans since 1972. The earliest plan set forth the mission of health manpower and outreach activities in student education, primary care residency training and continuing education. The 1980-85 Plan expanded these activities and added special attention to the library/information services network and to nursing. The 1985-90 Plan continued the strengthening of all earlier activities and added special interdisciplinary activities: aging, health promotion/disease prevention, occupational/ environmental health, and management training. It also included the development of an AHEC initiative linking the four academic medical centers with the state’s community mental health system. The 1990-95 Plan, adopted in June, 1990, focuses on health manpower development with several areas of special emphasis: minority representation in the health professions, the allied health professions, and ambulatory care-based education in medicine and other disciplines. These plans have been prepared with input from community practitioners, community institutions, the AHECs and the academic health science centers.
AHEC Program Budget and Funding

The budget for the NC AHEC Program funds three primary areas of activity: 70 percent helps support the nine AHECs and their educational programs; 17 percent supports the off-campus student training and faculty teaching of the health science schools, and 13 percent goes to the AHEC-supported medical resident position grants. In addition to state funding and a small percentage of federal funding, community resources are used for direct or indirect support of the AHEC network, accounting for an estimated 40 percent of the total budget.

**Figure 1**
*Allocation of Appropriated AHEC Funds (1990-91)*

<table>
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<th>Support of AHECs</th>
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<td>Support of Health Science Schools</td>
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AHEC Partnerships in North Carolina

In the past 19 years, the AHEC Program has formed cooperative relationships with educational institutions and service agencies to address health manpower issues in North Carolina. These partnerships have served as a framework for linking community resources in the health sciences schools and in state agencies, ensuring the efficient and effective use of public and private funds. AHEC has collaborative or supportive partnerships with several branches of the state's Department of Environment, Health and Natural Resources and the Department of Human Resources, including the Office of Rural Health and Resource Development, the Division of MH/DD/SAS, the Division on Aging, and the Division of Social Services.

The nine AHECs have also co-sponsored continuing education programs with state health professional societies, health care associations, campuses of the North Carolina Department of Community Colleges and other post-secondary educational institutions,
The AHEC Mission and Activities

The mission of the North Carolina AHEC Program has remained constant since 1972:

To provide education and training to meet health manpower needs, especially in rural areas, through collaborative relationships between educational institutions and service institutions.

To target its educational activities toward the retention, geographic distribution, specialty distribution and quality of health care professionals and support personnel, with attention given to primary care and the need for improved minority representation in many health fields.

To maintain and foster collaborative relationships with other programs and agencies devoted to the planning and delivery of community health care services, in the context of AHEC's primary focus on health professions education.

To fulfill its mission, the state AHEC Program carries out a range of activities and programs. These activities are modified and expanded on a regular basis to meet changing community needs. They include:

- Monitoring the supply, distribution and demand for health professionals;
- Providing community-based education and training programs at the undergraduate, graduate and continuing education levels in nursing, medicine, dentistry, pharmacy, public health, allied health and mental health;
- Offering continuing education for health care providers based on their professional development needs;
- Providing information and biomedical communications services, as well as training in the use of information technology, through the AHEC Library/Learning Resources Network;
- Assisting educational institutions and health care agencies in bringing young people and adults into health careers;
- Developing activities to increase the representation of minority populations in health care careers;
- Providing interdisciplinary educational activities to help address health issues and needs related to aging, infant mortality, the rising level of substance abuse, the growth in the number people with HIV-related illnesses, the problems of child abuse and sexual abuse and other issues as they emerge.
AHEC Accomplishments

Educational Accomplishments

Educational facilities which were built or renovated with state-appropriated AHEC funds have been in use in 33 sites across the state since 1975. A three-year expansion and upgrading of these facilities began with receipt of the first phase of a $4.5 million state appropriation in 1989.

Since 1977, more than 101,000 student months of training in dentistry, medicine, nursing, allied health, public health and pharmacy have taken place in communities in the AHEC regions (see pages 16-20).

Approximately 250,000 hours of continuing education have been offered in the AHECs to more than one million professionals since 1977 (see pages 25-26).

In 1990-91, the Library/Learning Resources Center Network provided more than 126,000 circulation services, filled over 51,000 information requests, conducted 7,540 electronic database searches and arranged 27,564 inter-library loans for practitioners and students throughout the state (see pages 23-24).

More than 3,500 consultation clinics serving over 10,000 patients were held in 1990-91, conducted by medical faculty in towns across North Carolina (see page 22).

AHEC’s Medical Air Operations has logged over 12.5 million passenger miles in its 23 years of service, flying health sciences faculty and university officials to communities across the state for educational activities (see page 28).

Since 1977, 68 percent of the AHEC family practice residents have remained in the state to practice (see page 21).

More than 200 nurses have received the BSN degree from AHEC-supported off-campus degree programs since 1982 (see page 27).

Over 25,000 copies of "North Carolina Health Careers '90," a comprehensive guide to health careers and educational opportunities in the state, were distributed to middle schools, high schools, college and public libraries and hospitals in 1990-91 (see page 32).
Manpower Accomplishments

The distribution of physicians across the state is a major concern to the AHEC Program. Each year the Program studies the distribution of physicians compared to the population of each of the 100 counties in the state. The maps below show the change in physician/population ratio by county for the years 1963-1973, prior to the AHEC Program and the same information for 1973-1983. From 1963-1973, 50 counties experienced a worsening physician-to-population ratio. In the years 1973-1983, after the creation of the AHEC Program, the Office of Rural Health and Resource Development (formerly the Office of Rural Health Services), and other health provider development programs, 86 counties experienced an improved physician-to-population ratio.

Figure 2

Change in ratio of physicians/10,000 population, by county, for the state's 100 counties

1963-73
1973-83

The dark colored counties are those which had an increase in total active, non-federal physician/10,000 population ratio for the indicated time period. The counties in white had a decrease in total active, non-federal physician/10,000 ratios.

A comparison of the maps for 1978-83 and for 1983-88 on the next page shows a reversal of the trend for the later period. The number of counties with a worsening physician-to-population ratio increased to 34 in 1983-88. Though the trend appears negative, the majority of these counties are still in a better situation than 10 years ago. Data for 1990 show that this trend has not changed.

In the past 19 years, several state agencies have worked to improve provider distribution, and indeed, they have increased the number of physicians in the state. It must be emphasized, however, that the recent downward trend reflects forces that are more powerful than the programs currently in place. These forces include:

- The declining economic base of rural communities;
- The economic deterioration of the rural hospital;
- The cost of professional liability insurance for physicians delivering babies in rural areas;
- The dramatic cutback in the National Health Service Corps;
- The poor reimbursement of primary care physicians in rural areas.
Figure 3

Changing Patterns of Physician Distribution in the State
(for active, non-federal physicians)

1978-83

Change in ratio of physicians/10,000 population, by county, for the state's 100 counties

- Ratio Improved/Unchanged (83)
- Ratio Worsened (17)

Change in the number of physicians, by county, for the state's 100 counties

- during 1978-83, 8 counties lost a total of 15 physicians.

1983-88

Change in ratio of physicians/10,000 population, by county, for the state's 100 counties

- Ratio Improved/Unchanged (66)
- Ratio Worsened (34)

Change in the number of physicians, by county, for the state's 100 counties

- during 1983-88, 24 counties lost a total of 69 physicians.

Sources:
North Carolina Board of Medical Examiners files maintained by UNC-CH Health Services Research Center.
This combination has caused the recent decline in the number of physicians in North Carolina. Rural areas have been particularly stressed by the loss of physicians. Yet, without the programs currently in place to increase provider distribution, it is likely that the current maldistribution problem would be even worse. The AHEC Program and other programs in the state remain committed to enhancing physician distribution and have proposed new initiatives to extend health professions training further into rural and underserved areas. It is expected that this initiative will provide more services to rural and underserved communities while helping to recruit and retain practitioners for these areas.

Figure 4
Median Physician/10,000 Population Ratios
Comparison of non-metropolitan counties of North Carolina and non-metropolitan counties of the United States (1972-90)

Note: Data not available for 1979, 1981, 1984, 1987

North Carolina's non-metropolitan counties have shown much more improvement in their average physician/population ratios than have comparable non-metropolitan counties nationwide.
Allied Health Manpower

The allied health professions include a range of diagnostic, supportive and therapeutic occupations, many of which are highly technical and skilled. They include the clinical laboratory sciences, dietetics, dental assisting, dental hygiene, hospital social work, medical record administration, occupational therapy, physical therapy, various radiologic technologies, respiratory care, recreation therapy, rehabilitation counseling, speech/language pathology and audiology and many subspecialties of these careers.

In North Carolina, shortages in the allied health professions have been increasing since the NC AHEC Program first conducted four allied health manpower surveys in 1981. Surveys of seven allied health disciplines conducted in 1986 also documented significant vacancy rates. Although no AHEC surveys have been conducted since 1986, there has been considerable evidence that the situation has not improved.

Formation of the Council for Allied Health

Since 1988, the NC AHEC Program has worked with other organizations in the state to focus attention on the growing crisis in the allied health workforce. With leadership from AHEC, an informal statewide steering committee was organized to examine the issues. This group worked with AHEC and other agencies to hold two statewide invitational conferences on allied health manpower in 1989 and 1990. This process led to the establishment of a formal coalition, the Council for Allied Health in North Carolina. The Council, which includes representatives of allied health employers, educators and professional associations, will carry forward to its constituent organizations a set of written strategies that have been developed over a two-year period. The Council's first Chair is Dr. Eugene S. Mayer, AHEC Program Director, and the AHEC Program provides staff support.
Nursing Manpower

In the past decade nurses have been asked to undertake an increasingly complex and demanding set of roles in the delivery of health care. Advances in nursing science and health care technologies, as well as changes in patient populations and the health care delivery system, have placed additional responsibility on the nursing practice, demanding more knowledgeable and caring nurses.

The shortages of nursing personnel reported in 1988 and 1989 were more serious and persistent than those previously encountered. For example, although the supply of registered nurses continues to grow in North Carolina, that supply has not kept up with demand. In fact, North Carolina is not very different from national population-to-registered nurse ratios — showing an improvement of 25 percent over the past ten years. Looking to the future, there are several reasons why the greatest projected demand appears to be for nurses with baccalaureate and higher degrees.

In the acute care setting the delivery of care for the more critically ill patient demands a lower nurse-to-patient ratio and requires nurses to act in expanded roles such as advanced nursing practitioners, clinical specialists in critical care, discharge planners and managers. Similarly, with the increasing complexity of problems faced by patients outside the hospital setting, there is an increasing demand for nurses with specialized health promoting acute and rehabilitative skills in outpatient services, such as home health agencies, hospice, rehabilitation units, outpatient clinics, health maintenance organizations and long-term care centers.
Proposed Strategies
Strategies proposed to address the continuing demand for nurses must also acknowledge that the traditional pool of candidates for nursing programs is shrinking because of demographic trends. Nursing programs will have to find new strategies to expand the potential pool of candidates. This expansion of the nursing resource pool might include the under-represented populations of black and native Americans, displaced workers from other occupations, men, second-degree students and individuals who are interested in new second careers.

The 1989 session of the North Carolina General Assembly appropriated funds for nursing scholarships and other new initiatives. These initiatives include: recruitment into nursing, facilitating educational and career mobility, encouraging the efficient and appropriate utilization of all health services personnel, and improving the professional practice environment in order to retain nurses in the profession. A coordinated effort to address these areas will be of critical importance throughout the 1990s.
Training for Health Science Students in the AHEC Regions

Health science students from many North Carolina colleges and universities receive some portion of their training under AHEC auspices in community hospitals, physician’s offices, public health departments, mental health centers and other health-related settings. Tables 1-3 on pages 17 and 19 show rotations of medical residents and students, and other health science students in the AHEC regions. The AHEC Program has agreements with its affiliated health science schools to provide logistical help, travel reimbursement, housing assistance and supervisory support for these rotations.

Three fundamental principals guide AHEC’s support for student rotations to off-campus sites:

1. Health professionals make important career decisions about where and how to practice during the practical and clinical parts of their professional education; therefore, those who receive training under competent practicing professionals in community and rural settings are more likely to choose to work in similar situations in North Carolina after graduation.

2. Community-based “real life” experience is an excellent way to prepare health professionals to provide quality medical care.

3. Practicing health professionals who have the opportunity to supervise and teach students find that the experience contributes to their professional growth and job satisfaction.

Figure 5
Locations of AHEC Rotations for Medical Students (1990-91)
Medicine
AHEC provides organizational support for off-campus rotations of medical students from the four schools of medicine. Students gain experience in family medicine and in primary medical care from AHEC-based medical faculty and community physicians who provide their time, knowledge and guidance to students, primarily those in the third and fourth years of medical school. The goal of this early exposure to high quality community practice is to interest these students in specializing in primary medical care and in practicing in a North Carolina community.

The community rotations vary in focus and duration according to the students' levels of training as shown in Table 1. Exposure to community medical care is relatively brief during the early, non-clinical years of medical school. For example, first and second year students from ECU do three-day preceptorships with private physicians; students in the third and fourth years complete much longer rotations. UNC-CH medical students in the fourth year spend up to 35 percent of their clinical training in an AHEC region.

Table 1

<table>
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<th>AHEC Rotations of Residents (1990-91)</th>
<th>Medicine</th>
<th>Ob/Gyn</th>
<th>Pediatrics</th>
<th>Psychiatry</th>
<th>Family Medicine</th>
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Table 2

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<th>Ob/Gyn</th>
<th>Pediatrics</th>
<th>Psychiatry</th>
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<tr>
<td>UNC-CH</td>
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The tables above show selected AHEC medical student and resident rotations. The scope and length of these rotations are a function of class size and curriculum design, which varies among the medical schools.
**Allied Health Professions**

Training in several community settings is available for students in physical therapy, occupational therapy, radiologic technology, medical technology, rehabilitation counseling, respiratory therapy and speech and hearing sciences. Training opportunities are also available in medical record administration, nutrition and community health.

In addition to the primary affiliated university schools at UNC-CH, ECU and Western Carolina University, other allied health schools use clinical sites in the AHEC regions as part of their students' training. These include private colleges and campuses of the community college system.

**Dentistry**

Dental students at the UNC-CH School of Dentistry participate in a wide variety of required and elective community training experiences in the AHECs during their four-year program. In 1989-90, dentistry students completed 370 student months of training in the AHEC regions.

Educational facilities and new programs were added in 1990. A special care facility was established in Huntersville with support from the Charlotte AHEC and the Mecklenburg County Hospital Authority. At this facility, students learn the complexities of health care for the elderly and deliver dental care to indigent geriatric patients under the supervision of a preceptor. The Northwest AHEC also established a new geriatric care facility at the Salisbury Veterans Administration Medical Center. Students are exposed to the medical and dental problems of patients in the hospital as well as the skilled nursing home component. In the Fayetteville region, the Tri-County Migrant Health Program in Newton Grove was approved for student extramural programs, and students provide dental care to migrant workers of all ages.

**Nursing**

Students in baccalaureate, graduate and associate degree nursing programs receive clinical training at sites throughout the AHEC regions. Training takes place in community hospitals, health departments, extended care facilities and other settings. Practical nursing and nursing assistant students also receive training at AHEC sites.
Table 3
AHEC Rotations of Health Science Students  1990-91
(In student months*)

<table>
<thead>
<tr>
<th>AHEC Site</th>
<th>Allied Health</th>
<th>Dentistry</th>
<th>Medicine</th>
<th>Nursing</th>
<th>Pharmacy</th>
<th>Public Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area L</td>
<td>12.4</td>
<td>0.0</td>
<td>77.0</td>
<td>58.0</td>
<td>58.0</td>
<td>0.8</td>
</tr>
<tr>
<td>Charlotte</td>
<td>17.0</td>
<td>35.0</td>
<td>367.1</td>
<td>0.0</td>
<td>80.0</td>
<td>3.3</td>
</tr>
<tr>
<td>Eastern</td>
<td>662.8</td>
<td>4.4</td>
<td>329.0</td>
<td>597.0</td>
<td>85.0</td>
<td>9.6</td>
</tr>
<tr>
<td>Fayetteville</td>
<td>6.5</td>
<td>56.3</td>
<td>246.4</td>
<td>35.5</td>
<td>97.4</td>
<td>8.6</td>
</tr>
<tr>
<td>Greensboro</td>
<td>11.0</td>
<td>6.6</td>
<td>431.4</td>
<td>54.1</td>
<td>77.0</td>
<td>29.2</td>
</tr>
<tr>
<td>Mountain</td>
<td>43.1</td>
<td>30.1</td>
<td>187.4</td>
<td>37.5</td>
<td>50.0</td>
<td>6.8</td>
</tr>
<tr>
<td>Northwest</td>
<td>24.5</td>
<td>15.4</td>
<td>675.8</td>
<td>4.0</td>
<td>78.0</td>
<td>36.1</td>
</tr>
<tr>
<td>Wake</td>
<td>6.5</td>
<td>52.5</td>
<td>981.5</td>
<td>182.4</td>
<td>52.0</td>
<td>127.5</td>
</tr>
<tr>
<td>Wilmington</td>
<td>3.0</td>
<td>0.0</td>
<td>155.7</td>
<td>5.5</td>
<td>48.0</td>
<td>5.4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>786.8</td>
<td>200.3</td>
<td>3451.3</td>
<td>974.1</td>
<td>625.4</td>
<td>227.3</td>
</tr>
</tbody>
</table>

Table 3 shows AHEC health science student rotations. The scope and length of these rotations are a function of class size and curriculum design, which varies among the health sciences schools.

*One student month equals 20 working days
Pharmacy
All undergraduate pharmacy students from the UNC-CH School of Pharmacy participate in a one-semester Academic Internship Program (AIP) in off-campus settings. The AIP provides extensive practice experience in community and hospital pharmacies and in other clinical training sites. During the 1990-91 academic year, 175 students participated in the AIP, and all 12 Doctor of Pharmacy (Pharm.D.) students did selected clinical clerkships in the AHECs. In all, pharmacy students completed 708 student months of experiential education coordinated by the Pharmacy AHEC Program. Each AHEC has one or more UNC-CH pharmacy faculty on staff who precept and direct student learning. They are assisted by more than 450 volunteer pharmacist preceptors from over 200 practice sites across the state.

Public Health
Students at the undergraduate and graduate levels at the UNC-CH School of Public Health participate in required off-campus training with a wide variety of agencies and health facilities in the AHEC regions. A total of 187 students from five departments participated in field placement rotations through AHEC regions in 1990-91. Participating departments were: Health Behavior and Health Education, Health Policy and Administration, Maternal and Child Health, Nutrition and Public Health Nursing. Students in Community Health Education at ECU were also involved in off-campus field training.

In 1989-90 the School began holding an annual “Faculty Seminar” for AHEC public health, mental health, nursing and allied health coordinators. Faculty members from these departments made presentations to coordinators on current research and service projects.

The Department of Public Health Policy and Administration of the UNC-CH School of Public Health has awarded more than 210 MPH degrees to practicing professionals across the state through off-campus programs. Two such programs are held concurrently at AHECs in separate parts of the state, and are described in detail later in this report.
A primary mission of the AHEC Program from the beginning has been to improve the distribution and retention of primary care physicians in the state. To meet that goal, the nine AHECs participate in the community-based training of medical residents who have chosen to specialize in primary care areas such as family medicine, internal medicine, pediatrics and obstetrics/gynecology.

In primary care, 484 new residency positions have been created since 1974. The AHEC Program has state funding to provide partial support for 277 positions. Of these, 140 are in family practice, with the remainder in pediatrics, internal medicine and obstetrics/gynecology.

The Mountain, Charlotte, Fayetteville and Greensboro AHECs operate Family Practice Residency Programs. The Eastern AHEC provides support for the Department of Family Medicine at ECU; the Northwest AHEC supports the Department of Family Medicine at Bowman Gray. In addition, the AHEC Program provides support to the Family Practice Residency Programs at Duke and UNC-CH.

The Wilmington, Charlotte and Greensboro AHECs have expanded residency programs in internal medicine, pediatrics and obstetrics/gynecology which were already in place at their sponsoring community teaching hospitals. The Wake AHEC provides extensive teaching to the residents on rotation from the UNC-CH School of Medicine to Wake County Medical Center. In addition to the AHEC-based resident training, the AHECs also sponsor rotations of psychiatry residents from the four medical schools to community mental health centers. In 1990-91, the AHEC Program was involved in approximately 7,000 months of student and resident rotations.

The percentage of Family Practice residents has increased from 8.6% in 1973-74 to 23% in 1990-91.

### Table 4

<table>
<thead>
<tr>
<th>Retention of AHEC Family Practice Residents</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total AHEC Family Practice Residents Completing Training (1977-88)</td>
<td>251</td>
<td>100%</td>
</tr>
<tr>
<td>AHEC Family Practice Residents Remaining in NC to Practice (1977-88)</td>
<td>170</td>
<td>68%</td>
</tr>
<tr>
<td>AHEC Family Practice Residents Originally Settling in Towns Under 10,000 Population (1977-88)</td>
<td>73</td>
<td>43%</td>
</tr>
</tbody>
</table>
Medical Specialty Consultation Clinics

More than 3,700 consultation clinics are conducted each year by faculty from the state's schools of medicine. In 1991, the clinics were held year-round at over 75 locations including AHECs, health departments and other community facilities. These consultation clinics provide opportunities for local physicians to refer cases to visiting faculty specialists on a consultation basis. This serves as an educational and professional service to the local physicians or health departments, enabling them to obtain assistance for their patients without traveling great distances to university medical centers for specialty consultation.

The clinics are usually one day in length and are held on a weekly or monthly basis. They also serve as educational experiences for the medical residents, medical students or dental students who accompany the faculty member to the AHEC sites and assist in or observe the consultation process. If the clinic occurs near an AHEC residency program, the day often includes case presentations by the AHEC residents and faculty.

University faculty from the four schools of medicine conducted clinics in all nine AHEC regions in pediatrics, internal medicine, obstetrics/gynecology, psychiatry, radiology, surgery, orthopedics, dermatology and family medicine.

Figure 7
Location of AHEC Consultation Clinics (1990-91)
Health professionals in the 1990s are deluged with information from many sources. The statewide AHEC Library and Information Services Network helps community health professionals obtain the information they need by linking AHEC libraries directly to regional health care agencies and to the state's four academic health sciences libraries. As members of the National Biomedical Communications Network, the libraries have direct access to the resources of the National Library of Medicine and many other health sciences libraries nationwide.

Each AHEC library, staffed by professional librarians, maintains collections of books, periodicals and audiovisual equipment which are shared through interlibrary loan to meet the specific needs of professionals in the region.

The Duke Endowment has awarded grants in eight of the nine AHEC regions for the purchase and installation of microcomputers, CD-rom drives, telefacsimile machines, software packages and CD-rom subscriptions in hospital libraries. Fifty hospitals in the Fayetteville, Mountain and Northwest AHECs received equipment to extend their library services this year. Charlotte, Area L and Wilmington AHEC hospitals will receive equipment before the end of the fiscal year. The Greensboro and Wake AHECs have completed the first year with all hospital libraries fully equipped. With the new equipment in place, each hospital library will be able to do the following: connect directly with health sciences databases nationwide, provide end-user computerized health sciences literature searches in-house and send and receive interlibrary loan requests via the National Library of Medicine's DOCLINE.

Installation of LINCNET telecommunications nodes was extended to seven of the NC AHEC sites providing AHEC staff access to resources at state universities and, through the Internet connection, university resources nationwide. With the installation of Local Area Networks in AHECs, library resources are brought to desktop workstations.

Expanded student clerkship rotations and off-campus degree programs in the AHEC regions have extended the AHEC libraries' role in student educational support. AHEC librarians are providing more instruction to health care personnel in the use of computers in libraries. Mountain AHEC received a National Library of Medicine GRATEFUL MED training contract for the region. The Fayetteville AHEC completed an addition to its building which included a computer-equipped classroom in the library, enabling instruction in computerized literature searching and the use of computer software programs.
Learning Resources Centers and Media Services

Ever-changing technology has made it possible for health professionals to receive information via satellite, computer, videocassette recorder and other media. The AHECs use audiovisual productions and equipment for continuing education programs. The Learning Resource Centers of the AHECs help provide the technical expertise required to operate advanced communication equipment and to produce educational materials such as slides, videotapes and informational displays. Also, the AHECs can create or help other health-related agencies use audiovisual materials for in-service training or public education. The biomedical communications staffs of the AHECs routinely assist in producing audio and video presentations for employee orientation at area hospitals, training programs on new procedures and policies and other topics. In 1990-91, the AHEC Learning Resource Centers produced thousands of audiovisual items for use across the state. The audiovisual staffs of the AHECs also provide equipment for AHEC-sponsored continuing education programs and presentations.
Continuing Education and Technical Assistance

The AHECs offer a variety of continuing education programs and technical assistance to practicing health professionals and agencies in all areas of the state. These programs are often carried out in association with the AHECs' affiliated health sciences schools. The programs range from highly focused clinical lectures to full-semester off-campus courses. The primary purpose of AHEC's CE activities is to assist health professionals in providing the best quality care by maintaining and updating their professional skills. Another purpose for the delivery of regional CE is to encourage health professionals to remain in rural or underserved areas by providing easy access to professional growth opportunities. Faculty at the university health sciences schools are active in outreach education through the AHECs providing a link between the academic and practice settings, no matter how distant they may be geographically. Conversely, the challenges and innovations of the "real life" practice stimulates the faculty and the health sciences schools to stay current with the needs of the state.

AHEC CE programs are based on regular needs assessments of each region and for each professional group, agency or community. All AHECs employ CE coordinators who relate to one or more professional categories, such as nursing, or to conceptual categories such as aging or public health. These coordinators are guided by advisory groups comprised of local health professionals. They also visit health facilities in their regions for input. The affiliated university health sciences schools, all of which have a designated AHEC liaison, serve as major resources for program planning and teaching for the AHEC CE staffs.

The AHECs conduct their CE programs for all health disciplines and also for multidisciplinary audiences concerned with health issues such as aging, health promotion skills, developmental disabilities, management and AIDS.

Table 5

| Continuing Education Programs Provided by AHECs (1990-91) |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|             | Allied Health | Dentistry | Medicine | Nursing | Pharmacy | Public Health | Mental Health | Info. Serv. | Other | Multi-disc. | TOTAL |
| Total # programs | 350 | 126 | 2602 | 935 | 158 | 138 | 361 | 93 | 147 | 433 | 5343 |
| Total # hours | 1848 | 1679 | 3652 | 6617 | 406 | 897 | 2290 | 428 | 851 | 1120 | 19,786 |
| Total attendance | 10,655 | 5005 | 49,010 | 24,999 | 6494 | 7119 | 15,668 | 748 | 2845 | 13,702 | 136,245 |
| Total contact hours | 72,218 | 44,948 | 88,076 | 186,960 | 18,427 | 44,993 | 116,430 | 3601 | 20,716 | 44,636 | 641,008 |
Figure 8

Continuing Education Attendance, NC AHEC Program, 1985-1991

Participation in AHEC continuing education programs has increased by 58% since 1985.

Technical Assistance
Technical assistance is designed to address specific problems. For example, it could include on-site consultations, planning with individual agencies or groups, patient consultation in specialty areas and other related services. An AHEC CE coordinator may help a community organization plan a conference on a health care concern such as substance abuse or the local management of hazardous waste.

Computer Training
Because of the growth in technology and the need for health professionals to apply computer skills in their work, the AHECs have provided microcomputer training workshops targeted at healthcare managers and health professionals such as medical technologists, speech/language pathologists and physical therapists. The AHEC Program maintains laptop computers, printers and educational supplies, as well as computer classrooms at some AHECs. Currently, computer labs are in operation in the Charlotte, Eastern, Fayetteville, Mountain, Northwest, Wake and Wilmington AHECs.
Seven health science schools have established off-campus baccalaureate and master's degree programs with AHEC assistance. These include the schools of Nursing at UNC-CH, ECU, UNCC, WCU and UNCG, the UNC-CH School of Public Health and the ECU School of Social Work. These degree programs are the complete equivalent of those provided on campus, including course requirements, standards of admission and faculty. They have provided practicing health professionals with the opportunity to obtain a degree and advance professionally while continuing to work and live in their home communities. Education and skills can be immediately applied on the job, benefiting the employing agencies. The AHEC Program has provided significant assistance to these programs including faculty support and travel. The AHEC centers provide on-site assistance, such as classrooms, library materials, information services and logistical help.

Table 7

<table>
<thead>
<tr>
<th>AHEC-Supported Off-Campus Degree Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program: Nursing (Baccalaureate and Master's Degree in Nursing)</td>
</tr>
<tr>
<td>UNC-CH</td>
</tr>
<tr>
<td>UNCC</td>
</tr>
<tr>
<td>WCU</td>
</tr>
<tr>
<td>UNCG</td>
</tr>
<tr>
<td>ECU</td>
</tr>
<tr>
<td>ECU</td>
</tr>
<tr>
<td>UNCG</td>
</tr>
<tr>
<td>ECU</td>
</tr>
</tbody>
</table>
| UNC-CH | ECU 
Wilmington (MSN) | '85 | 28 |
| ECU | Edenton (BSN) | '86 | 20 |
| ECU | Morehead City (MSN) | '90 | 50 |
| ECU | Wilson (BSN) | '89 | 26 |
| ECU | Wilson (BSN) | '93 | 29** |
| ECU | Charlotte (BSN) | '92 | 32** |

*Preceeded AHEC support
** Currently enrolled
AHEC's Medical Air Operations (MedAir) began before the formation of the AHEC Program under the auspices of the UNC-CH School of Medicine. One plane and one physician-pilot flew to rural locations across the state to provide medical education. More aircraft were obtained in the 1970s with the assistance of the Medical Foundation of North Carolina, Inc., a non-profit foundation associated with the UNC-CH School of Medicine. This original fleet was replaced and updated in 1988.

MedAir transports health sciences faculty, medical residents, health sciences students and university officials to all areas of the state for educational activities. The fleet of five Beechcraft Barons, based at the Horace Williams Airport in Chapel Hill, are flown by six full-time pilots. In 1990-91, MedAir logged more than 685,000 passenger miles transporting 5,000 passengers to over 60 locations in the state. This service makes it possible for faculty to reach very remote sites in the state, allowing them to take programs or courses to community health practitioners. This is especially important for continuing education programs, consultation clinics and off-campus courses.

All MedAir pilots have FAA Airline Transport Pilot certificates and an average of 10,000 hours of flight experience. Highly qualified aircraft mechanics and administrative support personnel complete the MedAir staff. In 1990, MedAir received the "Corporate Business Flying Award" from the National Business Aircraft Association, Inc., recognizing its accident-free operation. The University flight service has logged more than 12 million passenger miles.
Special State-Funded Activities

Nursing
Throughout the 1980s, the AHEC nursing faculty have recognized that solutions to some of the field’s educational and manpower issues are very complex and not readily resolved. They required an innovative, coordinated and comprehensive response, utilizing a variety of education strategies, programs and services. A combination of continuing efforts and new strategies were needed and explored by health care and educational institutions, the nursing profession, the state legislature and the NC AHEC Program. The North Carolina AHECs will continue to assess needs and respond to nursing issues throughout the 1990-95 period.

The 1989 and 1991 sessions of the North Carolina General Assembly appropriated funds for many new initiatives to address nursing shortages. The NC AHEC Program was identified in many parts of the legislation and has expanded ongoing nursing activities and developed a broad range of new initiatives which will be evaluated for continued programming during the 1990-95 planning period.

Health Manpower Development
AHECs continue to cooperate with many educational and service institutions that have developed a variety of strategies to interest and recruit the school-age population into health careers in general, and nursing in particular. AHECs have designed and distributed brochures describing nursing careers and the regional resources for such education. The AHEC nursing faculty have also provided orientation training for the members of regional nursing speaker’s bureaus, school counselors and health occupation teachers to familiarize them with current information and educational requirements for various health careers. Recruitment materials, both print and audiovisual, are available in AHEC libraries. The AHECs are coordinating the clinical component of a statewide RN refresher course, which includes self-directed independent study modules. The self-study approach is geared to increase the availability and accessibility of required training, thus bringing inactive nurses back into practice. Finally, AHECs are helping nursing programs develop new clinical education sites in areas of need.

Retention/Work Environment
Attracting both younger and non-traditional students into nursing will require improved and more flexible avenues for career progression. A specified and coordinated sequence of educational experiences, as well as a positive and rewarding work climate for nursing, will be necessary. The AHEC Program views education and training initiatives, which increase the likelihood of workplace retention of practicing nurses, as complementary to the efforts in career recruiting.
Educational Mobility/Career Advancement

There has been heightened interest in improving the availability of academic programs for qualified RNs leading to a baccalaureate or masters degree in nursing. The ongoing and expanding outreach programs will continue to represent a cooperative effort of the NC AHEC Program, UNC General Administration and the administrations, extension divisions and schools of nursing of the UNC universities.

Maintaining and Improving Nursing Excellence

In order to assist in the retention and appropriate distribution of nurses across a variety of work settings, the AHEC Program provides educational opportunities which allow practicing nurses to develop and maintain new skills. Continuing education workshops addressing clinical practice excellence, advanced certification, management and professional leadership training have been conducted on local and statewide levels. Such programming challenges work-setting models which promote professional practice and improved methods of delivering nursing care. This assists in nurse retention and positive health outcome for patients.

As direct providers of educational programs, consultation and technical assistance for nursing, the nursing faculty in the nine AHECs were involved in conducting 935 programs, totaling more than 186,000 contact hours for approximately 25,000 participants in 1990-91.
AHEC Mental Health Initiative

In January, 1985, the North Carolina General Assembly appropriated funds enabling the AHEC Program to address manpower training needs in the state’s community mental health system. Since that time, AHEC has developed a wide range of educational activities.

In 1983, the Secretary of the Department of Human Resources (DHR) formed a task force to address manpower concern in the state’s community mental health programs which are administered by the DHR’s Division of Mental Health, Developmental Disabilities and Substance Abuse Services (MH/DD/SAS). Focusing on a strong concern for the shortage of psychiatrists in the public programs, the task force recommended the AHEC model. The Mental Health Study Commission, an advisory group to the state legislature, subsequently endorsed the recommendations to the state General Assembly and activities began in 1985 under a targeted state appropriation.

Under this plan, AHEC supports the rotation of psychiatry residents from the four medical schools to community mental health facilities in the state. The goal is to expose psychiatrists-in-training to challenges and opportunities of community practice, and to interest them in selecting a similar practice setting after graduation. In 1991-92, psychiatry residents are training in 22 Area Programs across the state. There has been substantial success in increasing the number of graduating psychiatrists entering public psychiatry practice in North Carolina. Since 1988, more than 36 psychiatrists who experienced AHEC rotations have chosen a full- or part-time public sector position in the state.

The AHECs have extended their continuing education programming to mental health, developmental disability and substance abuse professionals, taking programs to their facilities. Each AHEC has one or two mental health education coordinator(s) to organize the CE offerings in mental health for their regions. They work with local Area Programs and the Division of MH/DD/SAS. The CE programs are taught by faculty and teachers from universities and agencies in North Carolina and across the nation. In addition to workshops and conferences, the AHECs offer in-depth training such as substance abuse certification courses and curricula on the care of the severely and persistently mentally ill. In 1990-91 the AHECs provided 2,290 hours of CE to 15,668 participants.

The AHEC libraries have added texts, films and journals on mental health topics to their collections and have extended outreach activities to the mental health facilities in their regions.
In each of its five-year plans, the Program identifies issues which will require careful attention in the upcoming five years. The 1990-95 Plan, adopted in June, 1990, identified the following as areas requiring special attention.

**Ambulatory Education in Primary Care:** Health professions educators agree that more teaching needs to take place in ambulatory settings because more services are delivered on an outpatient basis. However, two major issues must be addressed before AHEC can develop such a program. First, the number of hours faculty will devote to ambulatory education. Second, the development of specific curricula to make the ambulatory experience beneficial. These issues are being addressed.

**Aging:** The population of North Carolinians over 65 is expected to increase from 603,000 in 1980 to 1.2 million by 2010. The AHEC Program is preparing to meet the needs of health professionals caring for this aging population. The number of continuing education courses targeted at those dealing with the elderly has steadily increased, and the AHECs have assisted the NC Division of Social Services and the UNC-CH School of Social Work in delivering training to social workers to meet the special needs of the elderly.

**AIDS:** The decade of the '80s was a preview of how the AIDS epidemic will affect health care professionals. The AHEC Program has conducted special programs aimed at physicians, nurses, community caregivers, laboratory technologists, mental health personnel, dental personnel and others about the different aspects of AIDS. This item circulates for a 4-week period and is due on the last date stamped below. It may be renewed for one additional 4-week period. The fine for late return is 50¢ per day.
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