In 1986 the Institute of Higher Education at the University of Georgia began a statewide needs assessment of the supply of and demand for health care professionals. This work force assessment sought answers for the following questions: What is the relationship between supply and demand for selected health care professionals in Georgia? Is current demand being met and will future supply and demand be balanced? How will related environmental factors affect the work force? What national educational and employment trends will impact on the work force in Georgia?

This statewide study collected and assessed data in five areas: (a) current supply of practitioners in Georgia and nationwide, (b) current demand for practitioners in Georgia, (c) future supply in Georgia and nationwide, (d) future demand in Georgia, and (e) environmental factors affecting the work force (e.g., population growth and economic factors).

Because of the broad base of the assessment, the data collection techniques were varied. The national study entitled Occupational Therapy Manpower: A Plan for Progress (AOTA, 1985) provided valuable national data. Data on Georgia's active work force and educational supply were provided by the Georgia State Board of Occupational Therapy (State of Georgia, 1986), the Georgia Occupational Therapy Association (Manns, 1986), and the University System of Georgia (1981-1985). To collect comprehensive data on the current and future demand for therapists in Georgia, Georgia's major health care employers were surveyed.

Prior statewide studies were of little use in building a current occupational therapy database; the most recent comprehensive analysis of Georgia's health care professions, a 1982 study by Fincher, was conducted at a time when only 25 occupational therapists were active in Georgia and there was no educational program. A more recent study of the occupational therapy work force was limited to a geographical assessment of licensees living in Georgia in 1983 (Wright, Jablonowski, Butler, Hebbeler, & Hunter, 1985).

Although the AOTA assessment found that, nationwide, the demand for occupational therapists exceeded the supply, the current and future status of Georgia's work force supply could not adequately be assessed on the basis of the national data; therefore, I examined the extent and severity of the occupational therapy undersupply at the state level, where local educational, financial, and employment resources could be considered. The results of this study are offered to encourage similar studies in other states and to focus attention on a growing problem: the undersupply of occupational therapists nationwide and in Georgia.

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This article was accepted for publication July 20, 1988.
Table 1
1986 Survey of Health Care Facilities in Georgia

<table>
<thead>
<tr>
<th>Facility</th>
<th>Respondents</th>
<th>Nonrespondents</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Hospitals</td>
<td>211</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Nursing homes</td>
<td></td>
<td></td>
<td>333</td>
</tr>
<tr>
<td>Home health care</td>
<td></td>
<td></td>
<td>73</td>
</tr>
<tr>
<td>Freestanding ambulatory</td>
<td>21</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>surgical centers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total surveyed</td>
<td>638</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Method
All 638 of the major institutional health care employers in Georgia were surveyed by questionnaire (see Table 1), and three rounds of mailings produced a 50% response rate (n = 321). The hospital respondents represented 55% of Georgia's hospitals and 66% of the beds statewide. The respondents were geographically representative of the rural and urban hospitals.

Employment demand in over 25 health care professions was measured by questionnaire with items tailored to allow for structured and unstructured responses. Five categories of employment data were collected: (a) the number of health care professionals currently employed (full-time and part-time), (b) the number of current vacancies (full-time and part-time), (c) the number of separations over the previous 12 months (i.e., attrition), (d) the length of time needed to fill a vacancy (i.e., hiring time), and (e) projected employment levels in 1990 and 1995. As part of the open-ended questions, the administrators were asked to list occupations for which recruitment and retention were serious problems.

Estimating the required number of practitioners based on actual need for occupational therapy services in the population was beyond the scope of this study; however, it should be noted that actual health care needs are probably greater than the need revealed through the utilization of services or employment demand. Likewise, a survey of all nontraditional and private practice settings in Georgia for current and projected employment was not feasible; rather, the employment demand as represented by the traditional health care institutions was used as a prime indicator of the current and future demand for occupational therapists in Georgia.

Current Demand in Georgia
The following paragraphs describe the employment demand for occupational therapists in Georgia's hospitals, nursing homes, and home health care agencies as collected by questionnaire. (Freestanding ambulatory surgery centers are not included in this section because these centers reported that they did not employ occupational therapists.)

Hospitals
The data show that Georgia hospitals have serious vacancy problems in occupational therapy (see Table 2). The administrators reported 24 full-time and 3 part-time vacancies—a vacancy rate of 16.1% for all responding hospitals. The vacancy rate in the subset of general hospitals (n = 92) averaged 18.5% (not shown in Table 2). Of the 116 hospitals, 20 listed an occupational therapy vacancy. The reported vacancies were located in all regions of the state, with 10 of the 25 vacancies reported in rural areas. Occupational therapy yielded the highest vacancy rate of all the occupations surveyed in the hospital questionnaire. The hospital respondents said occupational therapists were very difficult to recruit, and some respondents replied that there was no point in listing an occupational therapy vacancy because they would never be able to recruit an occupational therapist to their area.

Another measure of supply and demand is the length of time needed to hire a professional when a vacancy occurs. When supply and demand are in near balance or when the professional supply is greater than the demand, professionals usually can be hired very quickly. Fewer than 20% of hospital respondents reported occupational therapy hiring times, because many did not maintain records in this area; however, those reporting hiring times gave a range of 0 to 280

Table 2
Occupational Therapy Employment in Georgia's Major Health Care Facilities

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Current Personnel</th>
<th>Budgeted Vacancies</th>
<th>Total</th>
<th>Vacancy Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FT</td>
<td>PT</td>
<td>FTE</td>
<td>FT</td>
</tr>
<tr>
<td>Hospitals</td>
<td>132.8</td>
<td>20.0</td>
<td></td>
<td>24.3</td>
</tr>
<tr>
<td>Nursing homes</td>
<td>35.8</td>
<td>18.0</td>
<td></td>
<td>2.3</td>
</tr>
<tr>
<td>Home health care</td>
<td>11.8</td>
<td>20.0</td>
<td></td>
<td>1.4</td>
</tr>
<tr>
<td>Total</td>
<td>178.4</td>
<td>58.0</td>
<td></td>
<td>31.7</td>
</tr>
</tbody>
</table>

Note: FT = full-time; PT = part-time; FTE = full-time equivalent. FTEs were calculated by the respondents on the basis of a 40-hr workweek. One FT employee = one FTE. PT employees represent a portion of one FTE (e.g., 20 hr = 0.5 FTE).
days, with 80 days as average. Hiring time averages of slightly less than 1 month were common for most of the other surveyed occupations (Morris, 1987).

Attrition in hospital employment also posed a problem. According to the administrators, 31 occupational therapists severed employment during the preceding 12 months (turnover rate of 22%). Occupational therapy, however, was not alone in high turnover rates; 8 of 20 employment categories in the hospital setting posted attrition rates equal to or greater than 20%.

Nursing Homes
Georgia's nursing homes also employ occupational therapists although in lower numbers than the hospitals. The 163 nursing home respondents (50% response rate) employed 26 full-time and 18 part-time occupational therapists. The nursing home administrators reported employing contractual health care professionals, especially for more specialized services, and this practice partially suppressed the number of budgeted vacancies. Several administrators expressed an interest in hiring more full-time professionals if they could be located and afforded.

Although the nursing home respondents did not provide sufficient hiring time and attrition data to render meaningful aggregated data, they did list occupational therapists as difficult to recruit.

Home Health Care
Home health care in Georgia is a growth industry, and like nursing homes, this sector is dependent upon many contractual and part-time occupational therapists. Although only slightly over one third of Georgia's home health agencies (n = 27) replied, those agencies that did reply employed 6 full-time employees and 20 part-time employees. With one full-time and four part-time vacancies, the home health care respondents posted an 18.6% vacancy rate, which is similar to the vacancy rate in the hospital setting. Again, the hiring time and attrition data reported were insufficient; however, 20% of the respondents listed occupational therapy as an area of "persistent recruitment problems."

Summary
Collectively, the surveyed health care settings employed 155 full-time and 58 part-time occupational therapists. Respondents reported 27 full-time and 10 part-time vacancies (average vacancy rate of 15%). All of the health care settings listed occupational therapists as difficult to recruit. Hospitals also reported attrition as a major problem.

Future Demand in Georgia
Respondents' Data
To assess the future demand for occupational therapists, the respondents were asked to project their total employment (full-time equivalent positions) of occupational therapists in 1990 and 1995. As can be seen in Table 3, the respondents projected large increases in employment. The greatest numerical growth was predicted by the hospital sector, and the greatest percentage growth was predicted by the home health care market. Reflecting the rapid growth of occupational therapy in the home health care sector, the small number (27) of home health care agency respondents predicted one third as many new positions by 1995 as did the much larger number (116) of hospital respondents.

Collectively, the respondents projected the addition of 66 full-time occupational therapy positions by 1990 and an additional 21 positions between 1990 and 1995. According to these projections, the growth in employment for the entire period will be greater than 40%. It should be noted that the data reported for all of the surveyed occupations showed a slowing in employment growth after 1990. Many respondents were reluctant to predict employment beyond 1990 and many chose to project the same employment level in 1995 as was estimated for 1990.

Extrapolated Data
To examine the demand for occupational therapists in all of the surveyed settings, the respondents' data were extrapolated to account for nonrespondents. As reported earlier, the respondents represented one half of the major employers; therefore, the most liberal interpretation of demand would double the respondents' employment and vacancy data to represent nonrespondents. The hospital respondents, however, represented almost two thirds of the beds in the state; consequently, to avoid overstating the vacancies and growth in the nonrespondent settings, the re-

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals</td>
<td>158</td>
<td>201</td>
<td>215</td>
<td>57   36</td>
</tr>
<tr>
<td>Nursing homes</td>
<td>37</td>
<td>48</td>
<td>48</td>
<td>11   30</td>
</tr>
<tr>
<td>Home health care</td>
<td>15</td>
<td>27</td>
<td>34</td>
<td>19   127</td>
</tr>
<tr>
<td>Total</td>
<td>210</td>
<td>276</td>
<td>297</td>
<td>87   41</td>
</tr>
</tbody>
</table>

Note: All projections are rounded to the nearest whole number. FTE = full-time equivalent.
spondents were considered to represent 60% of the demand in employment in traditional health care settings statewide and the nonrespondents, 40%.

Table 4 shows the employment demand when the current vacancies and projected growth until 1990 are calculated for both respondents and nonrespondents. To fill the current vacant budgeted positions and satisfy the projected growth in demand, a minimum of 163 additional occupational therapists will be needed by 1990. It should be noted that this is a conservative estimate of demand in Georgia because these data do not reflect the growing demand for occupational therapists in nontraditional and private practice settings. The number of additional occupational therapists based on total demand in all employment settings would be even greater than 163. These data raise the question, Can the active supply and new educational supply meet this demand?

Current and Future Supply

According to AOTA, the overall supply of occupational therapists is expected to climb steadily in the 1990s as more graduates are added than will be lost through death or retirement. Between 1980 and 1983, the total supply of therapists nationwide increased dramatically, from 5,000 in 1960 to over 27,000 in 1983 (AOTA, 1985). By 1990, an estimated 38,000 occupational therapists will be active in the United States (U.S. Department of Health and Human Services, 1984); however, the distribution of occupational therapists nationwide is greatly uneven, and the projected growth in national supply is not likely to satisfy regional inequities. The demand nationwide in occupational therapy (as well as in nursing and physical therapy) continues to outpace the supply of new graduates (Wilkinson, 1987). Therefore, underserved regions experience difficulty meeting their demands through out-of-state recruitment efforts.

When examined by practitioner-to-population ratios, the current supply of occupational therapists in Georgia and the South is far below the national supply. In 1983, the supply ratio range by state varied from a high of 29.1 therapists per 100,000 population in New Hampshire to a low of 2.2 per 100,000 in West Virginia. The U.S. ratio in that year averaged 11.7 (AOTA, 1985). In Georgia, the 1983 ratio stood at 5.6 per 100,000, or half the national average; yet, Georgia’s ratio was one of the South’s highest, with four of five bordering states faring even worse (AOTA, 1985). Wright et al. (1985), in an assessment of the geographical distribution of therapists in Georgia, calculated a slightly higher 1983 ratio of 6.5 per 100,000. In addition, a serious statewide maldistribution was found: 9.4 therapists per 100,000 population in the Georgia urban counties versus 1.6 per 100,000 in the rural counties.

The future supply, both nationwide and in Georgia, is affected by the number of graduates of accredited educational programs, and over the past 15 years the number of accredited professional level programs has grown steadily, increasing from 37 to 62 baccalaureate level programs between 1970 and 1987. As the number of programs has increased, so have enrollments and graduates. In 1970, graduates totaled 720, and by 1977, graduations had risen to 1,936 (AOTA, 1985). Since 1977, however, the number of graduates has remained steady, resulting in 2,295 professional level graduates in 1986 (AOTA, Research Information and Evaluation Division, personal communication, December 1987).

Georgia’s one accredited occupational therapy program produced 206 baccalaureate graduates between 1980 and 1986. In 1980, 19 students graduated and 2 years later, a peak was reached with 37 graduates. Between 1980 and 1986, the annual number of graduates averaged slightly below 30 (University System of Georgia, 1981–1985).

Although the number of occupational therapy practitioners is projected to increase by 61% nationally, between 1983 and 1995, Georgia’s supply will not experience this kind of growth unless substantial state in-migration occurs. A review of the Georgia licensure roster showed, after adjustment for nonresidents, a net drop of seven therapists between 1983 (n = 353) and 1986 (n = 346) (State of Georgia, 1986). Between 1990 and 2000, Georgia’s supply will continue to fall below the 1983 national ratio of 11.7 per 100,000 population. Assuming a 1990 state population of 6.58 million and the addition of 30 new graduates annually to the 1986 available work force, Georgia’s supply deficit will number 304 in 1990. At the turn of the century, assuming a projected 8.3 million Georgians, the deficit will remain: 971 therapists will be needed and 766 will be available. Previous trends indicate that the deficits in Georgia will be much larger because these calculations are based on the assumptions that (a) all Georgia graduates accept employment within the state and (b) no separations from the work force occur.

### Table 4

<table>
<thead>
<tr>
<th>Current Vacancies and Projected Growth in Georgia, 1986–1990</th>
<th>1986 Budgeted Vacancies (FTEs)</th>
<th>1990 Projected Growth (FTEs)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondents’ data</td>
<td>32</td>
<td>66</td>
<td>98</td>
</tr>
<tr>
<td>Extrapolated data for nonrespondents</td>
<td>21</td>
<td>44</td>
<td>65</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>110</td>
<td>163</td>
</tr>
</tbody>
</table>

*Note: FTE = full-time equivalent.*
Environmental Factors Affecting Supply and Demand

The demand for health care professionals is affected by at least three important environmental factors: population growth, demographics, and the economy.

First, Georgia's current undersupply is exacerbated by the state's rapid growth in population. Between 1960 and 1980, Georgia's population increased by over 38%, whereas the U.S. population grew by 26%. Reflecting the rapid growth in the Sunbelt states, Georgia's population is projected to increase from 5.4 million to over 8 million between 1980 and 2000 (Myerson, 1988).

Second, health care utilization is directly related to demand for practitioners and is known to increase with age. Nationally, the cohort of people over age 65 years is growing, and in Georgia this group is growing at twice the rate of the overall population. This growth is explained by the fact that Georgia ranks as the second fastest growing retirement state in the South, second only to Florida (Georgia: 2000 Committee, 1986).

Third, Georgia's economy is improving and is predicted to outperform the national economy by as much as 20% in certain categories over the next few years (Georgia: 2000 Committee, 1986). The general population's ability to secure employment and health care coverage certainly influences the demand for professionals. The demand for health care workers in Georgia, as evidenced by the projected growth in employment in the surveyed settings, will continue to grow as the population ages, grows, and becomes more prosperous.

Conclusions and Recommendations

As the data reveal, the current demand for occupational therapists in Georgia is not being met, and the projections of future supply and demand reveal a supply shortage that will continue until the turn of the century. Georgia data show that in 1986 occupational therapy vacancies in the hospital setting averaged over 16%, budgeted vacancies in all surveyed settings were estimated to number over 50 full-time positions, and projected employment growth in the traditional settings would add 110 full-time positions by 1990.

Although national education data point to a continuing steady growth in practitioners nationwide, the growth in the licensed supply in Georgia has been insufficient to meet demand. Georgia's practitioner-to-population ratio is far lower than the national average and has made no gains in recent years. Although the Medical College of Georgia graduates approximately 30 occupational therapists annually, the number of graduates between 1983 and 1986 was insufficient to offset a net loss due to out-migration and other kinds of separation. On the basis of budgeted vacancies and projected growth in demand until 1990, Georgia's new graduates are insufficient in number to meet demand. It is likewise not surprising that Georgia has had little in-migration, because occupational therapy deficits and low practitioner-to-population ratios in adjoining states effectively negate the possibility that states may solve imbalances by heavy in-migration of professionals. Based on the demand expressed by the major health care providers in Georgia, a state ratio of 12 practitioners to 100,000 people would be a reasonable goal and would substantially ease the current and projected future undersupply.

The AOTA study reported that almost 71% of therapists work full-time, and the Georgia Occupational Therapy Association in a demographic study found that of the respondents (67%), almost 80% worked full-time (Manns, 1986). Although women may temporarily drop out of the work force for child-rearing and family responsibilities, many apparently work full-time, and the newly created demand for therapists cannot be satisfied by encouraging large numbers of part-time occupational therapists to return to full-time work.

Much like occupational therapists nationally, Georgia therapists work in various work settings: 47% work in hospitals; 15% in educational facilities; 7.1% in private practice; 3% each in home health agencies, nursing homes, and freestanding outpatient clinics; and 19% in other settings (Manns, 1986). Such diversity in employment opportunities is beneficial to the professional but often problematic for settings such as hospitals and nursing homes that must staff around the clock. Demand in other settings for occupational therapists has placed hospitals in direct competition for graduates, and the acute and long-term care facilities, at least in Georgia, are feeling the shortage.

The growing imbalance between supply and demand for occupational therapists needs attention not only at the national level, but also at the state and regional level if a balance is to be attained in the future and if quality health care is to be made available to all persons in need. Without increases in the numbers of practitioners nationally and locally, it is becoming increasingly clear that the provision of occupational therapy services will be curtailed in certain health care settings and to certain populations. Ways to cope with the current undersupply and methods for bringing supply and demand into balance are needed.

Several recommendations are offered on the basis of the national data and the results of this study. First, educators and professionals must document local and regional shortages and bring these undersupplies to the attention of education and government leaders. Second, a massive recruitment effort both nationally and regionally is needed to bring
more students into this demanding course of study. Health care and education policymakers must acknowledge the problem and join in an effort to establish policies and provide conditions and resources that are conducive to successful recruitment. The profession’s name and job recognition among the general public must be increased to attract students. Students do not choose to study in fields with which they are unfamiliar.

Educators are encouraged to systematically assess ways to reach male students and nontraditional students and to share through publication successful approaches in these areas. A profession that nationally and in Georgia is over 90% female and 90% white is drawing students from less than half of the potential pool. Career information programs aimed at recruiting minorities and boys at the middle school and high school level could broaden the pool of student applicants. Students should also be told of the diversity of employment opportunities in an effort to dispel a possible myth of therapists working only in hospitals.

Nationally and locally, outside funding for programs and students must be sought. This study recommended to the Georgia Student Finance Authority that service-cancelable loans be made available to students studying occupational therapy. These loans would be canceled through employment in approved sites after graduation. To allow the broadest participation possible in occupational therapy will require creative financial aid packages. Educators are encouraged to seek federal, state, and local assistance (e.g., from individual health care centers and hospitals) to provide grants and loans to students in undersupplied health fields.

Professionals in states that are undersupplied are encouraged to examine more closely the working conditions, financial aid, and educational programs in adequately supplied states. How do states with adequate (i.e., higher than the national average) practitioner-to-population ratios differ from states with low ratios? Do they differ in educational supply? In salary scales? In educational recruitment efforts? In professional image or job recognition? Is one educational program in the country’s 11th most populous state (i.e., Georgia) enough?

In summary, although much publicity has focused on the severe nursing shortages across the nation, in Georgia and apparently in other states, the proportional shortage of occupational therapists is equally severe and the shortage will not be remedied in the near future. Public awareness of this problem must be increased to allow for successful solutions. Over the next decade, increased and creative efforts will be needed in the provision of occupational therapy services, in educational programming, and in financial aid to students and programs to meet the demands of the future.

Acknowledgments

I gratefully acknowledge the research assistance provided by Dr. Kathy Harris, former research assistant at the Institute of Higher Education, University of Georgia, Athens, Georgia.

This study was funded in part by a grant from the Georgia Student Finance Authority, Tucker, Georgia.

References


