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Background and Objectives: In 1992, with the approval of the American Board of Family Medicine (ABFM) (formerly known as the American Board of Family Practice), we established an accelerated residency program (ARP) involving five residency programs at the University of Tennessee (UT). An accredited resident can complete medical school and residency in a combined total of 6 years. This paper is a report of our experience with the ARP. Our objective was to determine if accelerated residents performed as well as or better than non-accelerated residents. Methods: Students are selected for the ARP on the basis of academic achievement, life experience, interviews, and commitment to family medicine. For the accelerated residents, we tracked outcomes measures, including medical school grade point average (GPA), US Medical Licensing Examination (USMLE) scores, ABFM In-training Examination scores, and board certification status. Results: From 1992 to 2002, 47 students entered the ARP at five UT residency programs. Five students did not complete the program. The average entering GPA was 3.17, and the average USMLE Step 1 score was 207. The accelerated residents, on average, performed better on ABFM In-training Examinations in the first and third years of residency than the non-accelerated residents did. Accelerated residents have a 100% ABFM certification rate. A total of 76% practice in Tennessee, and 65% began practice in a rural county. Conclusions: The UT ARP has been an effective means for allowing medical students to complete their family medicine training in 6 years. Accelerated residents have performed as well as or better than non-accelerated residents on standardized testing.

In 1989, the American Board of Family Medicine (ABFM) (formerly known as the American Board of Family Practice) approved the first accelerated residency program (ARP) at the University of Kentucky. As a result of the pilot project’s success, the ABFM approved 11 other programs throughout the United States to participate in this innovative experiment in medical education. The ARP at the University of Tennessee (UT) was among those approved in 1991, with the first six accelerated residents accepted in 1992. These students graduated with their medical school class in 1993 and simultaneously finished their first year of residency while still in medical school.

The UT program was designed to evaluate how accelerated residents progressed through residency and into practice. This article describes the UT ARP selection process, presents results from 1992 to 2002, and assesses the strengths and limitations of the program. This descriptive study tabulated characteristics and outcomes of the medical students who entered and their progress, thereby providing objective information about ARPs. Data sources include US Medical Licensing Examination (USMLE) Step I scores, medical school grade point average (GPA), year-to-year promotion, and the ability to pass the ABFM board certification examination. Scores on sequential ABFM In-training Examinations allowed comparison of accelerated and non-accelerated residents.

Background

An ARP allows qualified fourth-year medical students to function as first-year residents while simultaneously fulfilling their fourth-year medical school requirements. These students graduate with their medi-
tional school class and thus complete medical school and residency training in 6 years instead of 7 years. The ARP is a comprehensive process involving selection, education, training, and evaluation of medical students. It is similar to accelerated programs established in other specialties and other health professions.4,10

Our colleagues at the University of Nebraska11 have recently published a report on their accelerated rural training program, which includes a postgraduate year-4 fellowship training for rural practice. There is some evidence that rural physicians desire increased training prior to beginning rural practice.12,13 A recent article by Petrany and Crespo14 described the ARP at Marshall University. In contrast to the single residency program at Marshall University, the UT ARP has five residency programs for students to choose from. The UT experience includes 47 accelerated residents (compared to 16 at Marshall).

The overall purpose of the ARP is to provide an accelerated pathway for exceptional students to obtain residency training. This has allowed graduates to enter into underserved practice15,16 and to develop advanced skills in obstetrics, sports medicine, and emergency medicine.11,17 Additionally, the ARP has provided an opportunity to showcase the specialty of family medicine within the academic medical center through an innovative educational curriculum.18 The Future of Family Medicine project’s Task Force on Medical Education recommended that 3- and 4-year training programs be evaluated and compared. While not specifically referencing accelerated programs, this recommendation is an indication that innovative educational programs are being considered and evaluated by leadership within the specialty.19

**Methods**

*The Selection Process*

The UT ARP is unique in that it was implemented in multiple residency programs in five different locations. Two sites were in Memphis: one in a community hospital (Saint Francis), the other at the academic medical center (Healthplex), which closed its residency in 2002. The Tipton site, originally a rural satellite of the Healthplex, became an independently accredited program. The family medicine training program in Jackson was located in a community hospital 80 miles northeast of Memphis. The Knoxville Family Practice Program was located at the academic medical center in Knoxville.

UT students received information describing the ARP through the predoctoral division of the Department of Family Medicine. Students were contacted and informed about the program by faculty members, academic advisors, the Family Practice Student Association (FPSA), medical student clerkships, and medical school lectures. Third-year students received information at the beginning of the academic year on the purpose, application requirements, and deadline dates. Students were encouraged to talk directly to faculty in the residency programs and to current accelerated residents.

Students completed an application, indicating the sites in which they were interested. As part of the process, each applicant provided USMLE Step I scores, medical school transcript, a personal statement, and letters of recommendation. Interviews were determined by the individual program directors, and acceptance was based on academic strength, commitment to family medicine, ability to articulate professional goals, maturity, and potential to excel in the ARP.

**Overview of the Curriculum**

The first year was the most complex and difficult year for the accelerated residents because of their dual roles as an intern and a fourth-year student. To assist in making the transition from student to resident, the program attempted to schedule the required fourth-year student rotations during the first 6 months of the year. This necessitated coordination between the accelerated resident, the residency program, and the dean’s office in the medical school. The accelerated residents started at the beginning of July with the non-accelerated PGY-1 residents.

Table 1 shows an example of a PGY-1 accelerated resident’s training schedule. The curriculum was similar in all of the residency sites with only minor variations. The fourth-year medical school curriculum required that the accelerated resident complete the following medical school rotations: (1) internal medicine, junior internship, (2) surgical subspecialties, (3) ambulatory medicine, (4) primary care, junior internship, (5) neurology, and (6) three electives.

Accelerated residents received a salary and benefits that were the same as the other PGY-1 residents, but they were also required to pay their medical school tuition. During the year, they had outpatient continuity clinic and call responsibilities that were similar to the other PGY-1 residents. Residents in Tennessee do not require licensure, so this was not an issue for the accelerated residents. They were required to complete their graduate medical training at UT to receive dual credit for this year.

**Data Collection**

Forty-seven medical students were accepted into the UT ARP from 1992 to the present. Demographics data were collected on each entering medical student, including medical school GPA, class rank, and USMLE Step I scores. After entry into the program, information about the accelerated resident’s performance was collected, including USMLE Step II and III scores, ABFM In-training Examination scores, ABFM certification status, and academic performance on clini-
cal rotations. Exit interviews and annual interviews were conducted with all participants. Resident data were collected by the individual residency programs and coordinated by the authors.

Data Analysis

Demographic data were collected and analyzed using descriptive statistics. A paired t test was used to compare non-accelerated and accelerated In-training Examination scores. SPSS for Windows (version 10.0) was used for data analysis.

Results

The yearly number of applicants has varied between two and nine. The accelerated residency positions were included in the total number of residency positions that are offered each year and accounted for approximately 15% of the total. From 1992 to 2002, a total of 47 accelerated residents entered the program (Table 2).

Table 3 displays the GPA, medical school class rank, and USMLE Step I Board scores of successful applicants. Using the ABFM In-training Examination scores, administered to all residents in November of each year of training, the accelerated residents have done as well as their peers in the traditional residency programs. The average PGY-1 In-training Examination scores (composite/percentile) were 472/53 (range 340/7 to 630/99), with an increase to 506/47 as a PGY-2 and 533/51 as a PGY-3.

A closer evaluation of the In-training Examination data from three of the residency sites (Saint Francis, Tipton, and Healthplex) demonstrated that the accelerated residents were no more likely to score below the 20th percentile in any of the subcategories than were non-accelerated residents. In fact, in the first and third year, the proportion of scores below the 20th percentile in the accelerated group was significantly less than in the non-accelerated group. Data from the Jackson and Knoxville sites

Table 1

Typical Accelerated Residency Curriculum*

<table>
<thead>
<tr>
<th>Rotation**</th>
<th>Fulfills M-4 Requirement***</th>
<th>Fulfills Residency Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Medicine Inpatient Service—1 block</td>
<td>Yes (Junior internship)</td>
<td>Yes</td>
</tr>
<tr>
<td>Family Medicine Inpatient Service—1 block</td>
<td>Yes (M-4 elective)</td>
<td>Yes</td>
</tr>
<tr>
<td>Family Medicine Inpatient Service—1 block</td>
<td>Yes (M-4 elective)</td>
<td>Yes</td>
</tr>
<tr>
<td>Family Medicine Obstetrics—1 block</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Family Medicine Obstetrics—1 block</td>
<td>No</td>
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</tr>
<tr>
<td>Family Medicine Obstetrics—1 block</td>
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<td>Yes</td>
</tr>
<tr>
<td>Ambulatory Medicine—1 block</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Surgical Subspecialties—1 block</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Neurology—1 block</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Inpatient Pediatrics—1 block</td>
<td>Yes (M-4 elective)</td>
<td>Yes</td>
</tr>
<tr>
<td>Inpatient Pediatrics—1 block</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Dermatology—1 block</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Internal Medicine—1 block</td>
<td>(Yes) Junior internship</td>
<td>Yes</td>
</tr>
</tbody>
</table>

M-4—fourth-year medical student

* This is an example curriculum from one site (Saint Francis) with minor variations between sites.

** Each accelerated resident has Outpatient Continuity Clinic one to two times per week.

*** Only 8 months are required to complete the M-4 year.

Table 2

Number of Accelerated Residents at Each Family Medicine Residency Program by Year of Entry

<table>
<thead>
<tr>
<th>Entry Year</th>
<th>Healthplex*</th>
<th>Tipton</th>
<th>Saint Francis</th>
<th>Jackson</th>
<th>Knoxville</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>1993</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>1994</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>1995</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>1996</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1997</td>
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<td>3</td>
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</tr>
<tr>
<td>1998</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>1999</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2000</td>
<td>—</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2001</td>
<td>—</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2002</td>
<td>—</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>11</td>
<td>14</td>
<td>4</td>
<td>7</td>
<td>47</td>
</tr>
</tbody>
</table>

* The Healthplex residency program closed in 2002 and did not take any new residents after 2000.
The 47 accelerated residents have been outstanding in aggregate. Of particular note, the group included 15 chief residents. One accelerated resident was selected by the National Aeronautics and Space Administration (NASA) to participate in astronaut training. One graduate is deployed overseas in the US Army Special Forces. A graduate’s paper was published in the *Journal of the American Medical Association*. Only one accelerated resident was ever placed on academic probation.

As of June 2003, 37 residents have graduated from the accelerated program. Five residents dropped out of the program (three to pursue residency training in another specialty, and two transferred to another family medicine program), and five residents are in training. Among those who have taken the test, 100% (37/37) of the graduates have passed the ABFM board certification examination. The accelerated residents have been followed from medical school, through residency, and on into practice. Sixty-five percent began practice in a rural county, 76% practice in Tennessee, and 14% entered academic practice.

**Discussion**

The key finding of this study is that, when compared to the traditional curriculum of 4 years of medical school and 3 years of residency (4+3), residents in the accelerated curriculum (3+3) demonstrated performance scores equal to or better than their non-accelerated counterparts. Using annual In-training Examination scores beneath the 20th percentile as one indicator, accelerated residents scored better than their peers. Further, these accelerated residents frequently distinguished themselves as chief residents and with other honors. These Tennessee students were, on average, in the middle of their classes academically, and these data suggest that students need not be at the very top of their class academically to succeed in an accelerated program. With multiple sites and one of the largest sample sizes in the literature, these data add validity to previous studies.

Beneficial outcomes of accelerated residencies include a savings to society and taxpayers since there is a decrease in time and educational financing for the production of a well-trained physician.20 These educational costs are significant, and many family medicine programs face funding challenges.20,21 All students achieved the objective milestones of licensure and passage of the ABFM certification examination, despite the shorter and less-costly training.
A weakness of the study and an area for future research is the development of methods that might better quantify the experience of accelerated residents. Another limitation of this study is the retrospective nature of the data. We were unable to make some comparisons of accelerated to non-accelerated residents, since these data were not available at all of the programs.

Similar to other ARPs, our program attracted highly qualified medical students into family medicine. Although others have commented that there may have been a negative effect on those not chosen, a study on this campus observed that more students were “de-recruited” from family medicine in the fourth year than were driven away from family medicine for lack of selection into the AR program. These students simultaneously completed overlapping medical school and residency requirements and may have been kept away from this “de-recruitment.”

The program complemented departmental effort for the training and retention of family physicians into rural and academic practice. This was seen at the rural site and the other sites, particularly when this program served as a portal into the 1-year advanced women’s health fellowship program. Others have validated this rural linkage.

Similar to the University of Nebraska experience, our program has been successful in keeping graduates in the state of Tennessee as well as placing them in rural areas. This accelerated residency program allowed earlier entry to residency while simultaneously opening the option of an additional OB-intense year at the end. Graduates of the ARP may feel that finishing a year earlier gives them the flexibility to complete a fellowship. Interestingly, family medicine educators are beginning to consider optional training tracks and selective pathways as a means of increasing student interest in the specialty. It would seem that the availability of options would strengthen the case for family medicine training.

The accelerated program required energy and political capital within the university. At its inception in 1992, there was a national sense that managed care would require more and better-trained generalist physicians. The departmental chair was successful in convincing the dean that this program added value. This sense of value was heightened by the fact that more than 60 departments applied for the program, but only 11 were selected. In that sense, the department was viewed as having distinguished itself with the award of the program.

Petrany and Crespo at Marshall University called for a “... larger pool of evidence needed to fully assess the benefits and limitations of the accelerated residency.” In contrast to the 16 accelerated residents from Marshall University, UT, with 47 participants, is much larger. Our experience confirms that of Marshall University: accelerated residents performed well on ABFM In-training Examinations, were likely to be chief residents, and were more likely to choose an academic career than non-accelerated residents. External validity is provided by the congruence of our data on resident performance. Both papers document the increased likelihood of accelerated residents taking positions as faculty members. The UT experience is slightly different in the dimension of rural recruitment. This may be secondary to having a well-developed rural site nearby.

Eleven medical schools have accelerated residency programs in family medicine, and there are similar programs in internal medicine, pediatrics, and psychiatry. A broad review of outcomes of the accelerated programs in other specialties has not been published. The programs have been most successful in places where they were accepted by the faculty, hospital medical staff, and residency leadership. Even though planning, developing, and administering the accelerated program has not been simple, it should be noted that this process is similar to the day-to-day administrative complexity of all residencies. An area for future study is an analysis of the added administrative cost of an accelerated residency program compared to programs without the ARP.

Conclusions

The University of Tennessee’s 11-year experience with an accelerated family medicine curriculum has been positive. It has been successful in meeting national and state standards for the production of qualified family physicians. At the state level, it has recruited and retained family physicians for the state of Tennessee while placing a substantial percentage into rural and underserved areas. The program has allowed qualified medical students the opportunity to excel in an accelerated educational curriculum while providing savings in time and cost needed to support medical education. These data support continuation of this and other similar programs and further study of the educational outcomes associated with these programs.

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