Pediatric Cardiology in the 1990s

ROBERTA G. WILLIAMS, MD, FACC, TIMOTHY L. KENNEDY, MA, JAMES H. MOLLER, MD, FACC
Los Angeles, California

Objectives. In 1991, all active board-certified pediatric cardiologists were polled by questionnaire to examine the relation of subspecialty training and motivational and satisfaction issues to practice characteristics.

Background. Previous questionnaires with regard to manpower status and practice characteristics were published in 1967 and 1980. These indicated a field predominantly centered in academic medicine with growth in manpower close to predicted need.

Methods. The questionnaire was mailed to 844 of 884 active board-certified pediatric cardiologists and was returned anonymously by 570, a 68% response rate.

Results. Among respondents, the mean year in which fellowship training was completed was 1974. The average length of subspecialty training was 31 months for all respondents and 34 months among those completing training since 1981. Seventy-seven percent of subspecialty training centered on clinical training.

Conclusions. The field of pediatric cardiology is a subspecialty centered on patient care and performance of diagnostic and interventional techniques. Professional activities varied according to practice setting. Pediatric cardiologists with basic research training and professional activities remain a minority. Satisfaction is high, with greatest satisfaction in professional interactions and least satisfaction with income and free time.

In 1991, the Manpower Advisory and Pediatric Cardiology Committees of the American College of Cardiology, in cooperation with the American Board of Pediatrics, undertook a survey of board-certified pediatric cardiologists. The major goals of the study were to 1) examine subspecialty training, 2) assess current professional activities, 3) investigate work settings and 4) explore the amount and sources of income.

The study collected data on practice characteristics and training, including length and nature of training, professional activities and practice settings, amount and source of income and career choice. This report presents an overview of these findings compared with previously reported data (1,2) and discusses the implications of the data for the training and utilization of pediatric cardiologists.

From the Department of Pediatrics, University of California, Los Angeles Medical Center, Los Angeles, California. This study was funded by the American College of Cardiology.

The views expressed herein are solely those of the authors and do not represent the official policy of the American College of Cardiology or the American Board of Pediatrics.

Manuscript received July 20, 1993; revised manuscript received November 1, 1993; accepted November 9, 1993.

Address for correspondence: Dr. Roberta G. Williams, Department of Pediatrics, MDCC-B2-427, University of California, Los Angeles Medical Center, Los Angeles, California 90024-1743.

©1994 by the American College of Cardiology

0735-1097/94/$7.00
The average length of subspecialty training was 31 months (range 12 to 72). A trend toward a longer training period among recent trainees was noted. Among board-certified pediatric cardiology training before 1971, 202 (37%) between 1971 and 1980 and 175 (32%) after 1980.

The average length of subspecialty training was 31 months (range 12 to 72). A trend toward a longer training period among recent trainees was noted. Among board-certified pediatric cardiologists completing training between 1947 and 1970, the average number of subspecialty training months was 28, whereas 31 was the average among those completing training between 1971 and 1980 and 34 among those completing training since 1981 (Fig. 1).

On average, 77% of subspecialty training time was focused on clinical care, with the remainder focused on research. For those completing training before 1971, the average research training period was 6.4 months, whereas for those completing training between 1971 and 1980, the average research training was slightly less, 6.2 months. For recent trainees, the average number of research training months was 9.4. Thus, although the minimal subspecialty training period increased from 12 to 36 months during the past 30 years, research training as a proportion of total training has lagged. Only 18 respondents (3%) completed ≥22 months of research training.

Professional setting and activities. On average, board-certified pediatric cardiologists reported working 54 h/week. In 1991, subspecialty care consumed the majority of their time (89% of all clinical hours).

Respondents reported that an average of 19 h/week (34% of professional time) were devoted to providing outpatient care, whereas 16 h (29%) were devoted to inpatient care. Research and teaching activities entail ~6 h each on average and, when combined, comprise 21% of professional activities. Comparisons of professional activities by work setting are shown in Table 1.

Board-certified pediatric cardiologists in group practice reported the highest total weekly number of professional and patient care hours (58 and 47 h/week, respectively, compared with 54 and 35 h/week for the group as a whole). Compared with those in other work settings, board-certified pediatric cardiologists employed by contract organizations had the smallest total weekly number of professional hours.

A total of 397 respondents (71%) performed diagnostic cardiac catheterization, 313 (56%) performed interventional catheterization and 415 (75%) performed echocardiography. Both diagnostic catheterization and echocardiography were performed by 330 of respondents (58%).

Diagnostic electrophysiology was performed by 137 of respondents (25%); 45 (8%) performed interventional electrophysiologic procedures and 39 (7%) performed permanent pacemaker implantations.

Income. Income ranges are shown in Table 2. Differences are partially accounted for by the character of the work. Categorized by primary work setting, respondents in private group practices earned the most ($173,800), and those in medical schools/universities earned the least ($123,000). Categorized by principal professional activity, respondents engaged in "other" activities earned the most ($167,900 on average), and those engaged in research earned the least ($109,600). Categorized by procedures, respondents performing only invasive procedures earned the most ($157,300 on average) and those performing only noninvasive procedures the least ($121,300).

Career satisfaction. Career satisfaction for the entire group was high, with only 15% of respondents indicating that they would not reselect their present position. Professional satisfaction was high in the factors considered more important, as shown in Figures 2 and 3, respectively.

Professional challenge, interaction with colleagues, clinical resources, career security and clinical autonomy were
Table 2. Number of Respondents by Professional Income and Primary Source of Income

<table>
<thead>
<tr>
<th>Primary Source</th>
<th>&lt;$100,000</th>
<th>$100,000 to $149,999</th>
<th>≥$150,000</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract service</td>
<td>4</td>
<td>11</td>
<td>12</td>
<td>27</td>
</tr>
<tr>
<td>Private practice</td>
<td>20</td>
<td>41</td>
<td>84</td>
<td>145</td>
</tr>
<tr>
<td>Medical school</td>
<td>99</td>
<td>97</td>
<td>44</td>
<td>240</td>
</tr>
<tr>
<td>Hospital</td>
<td>11</td>
<td>24</td>
<td>14</td>
<td>49</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
<td>32</td>
<td>25</td>
<td>69</td>
</tr>
<tr>
<td>Total</td>
<td>146</td>
<td>205</td>
<td>179</td>
<td>530</td>
</tr>
</tbody>
</table>

ranked as the factors most important to career satisfaction. Only 3% to 9% of respondents indicated dissatisfaction with these factors. Free time, predictable work schedule, income and income potential were listed in an intermediate range of importance but were the cause of dissatisfaction in 19% to 37% of respondents. Opportunity to do work in basic science, community involvement and travel were ranked lowest in importance.

Discussion

Manpower in pediatric cardiology. In 1967 there were 207 board-certified pediatric cardiologists (1). In 1980 there were 519 (2), and in 1991 there were 884 (including those who had died or were retired or missing). In 1991 the number of board-certified pediatric cardiologists approached the projected demand of 900, as calculated by Moller and Adams (2) in 1986, but it was less than the 1,150 projected demand for 1990, as calculated by the Graduate Medical Education National Advisory Committee in 1980 (3). The total number of pediatric cardiologist trainees (all years) was 130 in 1980, 140 in 1985 and 176 in 1990 (4). However, these numbers do not reflect a significant increase in total trainees in recent years (in 1988 a 3-year training program became mandatory for those beginning subspecialty training in pediatric cardiology).

Pediatric cardiology services are also delivered by adult cardiologists or pediatricians with special training or interest in cardiology. McCrindle et al. (5) reported that 2% of pediatricians who provide patient care in an office setting provided some cardiovascular services to their patients. The contribution of adult cardiologists to care in the pediatric age group is unknown.

Ninety-seven percent of pediatric cardiologists practice in urban or suburban settings (6). The need for concentrated resources for the diagnosis, management and correction of pediatric heart disease warrants this distribution (7). Thus, the current manpower in pediatric cardiology appears to be roughly equal to the needs of the nation. The slow increase in numbers seems to be proportional to the increased work loads created by the prolonged survival of patients with severe or complex forms of heart disease and the growth of new and time-consuming areas of special expertise, such as advanced diagnostic procedures, interventional catheterizations, transplantation, electrophysiology and fetal cardiology.

Research training and activity. There has been an increase in clinical and research training, with a strong emphasis on clinical experience, a trend that might be expected in a field characterized by complex, high risk management and technically demanding procedures. Only 3% of respondents had at least 22 months of research training, a total that may underestimate the number of research-trained physicians in the field because a few received an advanced degree in basic sciences or other research training before entering a fellowship program. Nevertheless, the relatively short research training time is mirrored by the small percent of respondents who devote ≥50% of their time to research after completion of training. The growth of basic science within the field is limited by the paucity of adequately trained researchers, the need for highly specialized clinical skills and the competition with more "time-protected" noncardiologists for research support. This trend is likely to continue unless resources can be found to attract trainees with basic science training and interest and to provide protected research time for young faculty members.
General professional characteristics. This report presents an overview from a 1991 census of pediatric cardiologists. Seventy-five percent of them devoted ≥95% of their clinical activity to delivering subspecialty care. The total weekly number of working hours—53—did not change between 1981 and 1991, although a reduction in hours worked was noted between 1967 and 1981 (1,2). The income of board-certified pediatric cardiologists is roughly equal to 55% of that of adult cardiologists and is only 12% greater than that of those practicing general pediatrics (7). This discrepancy is most likely due to a heavy indigent care burden and to an unfavorable work load compensation balance. These difficulties, coupled with the increasing debt burden of pediatric residents and the threatened reduction in the availability of training stipends for subspecialists, may decrease the number of persons entering the field, despite a high degree of satisfaction among those now in the field. Eventually, this decrease will probably have an adverse effect on access for children with heart disease.

Several issues need further exploration to adequately understand and predict the future of pediatric cardiology: the effect of changing health care reimbursement on referral to pediatric cardiologists; the effect of factors such as drug use, human immunodeficiency virus (HIV) infection and prenatal care on the incidence of pediatric cardiovascular disease; the changing gender balance in pediatric training programs and its impact on choice of a pediatric subspecialty career track; and the effect of proposed alterations of funding for subspecialty graduate medical education.

The following persons contributed their thoughts to the organization and conduct of the research: members of the American College of Cardiology Manpower Advisory Committee—Sidney Goldstein, MD, FACC; Joseph S. Alpert, MD, FACC, John J. Gregory, MD, FACC, Barry D. Rutherford, MD, FACC, Sidney C. Smith, Jr., MD, FACC, George W. Vetrovec, MD, FACC, Bonnie H. Weiner, MD, FACC; members of the American College of Cardiology Pediatric Cardiology Committee—Norman S. Talner, MD, FACC, Ruth L. Collins-Nakai, MD, FACC, Arthur Garson, Jr., MD, FACC, Welton M. Gersony, MD, FACC, William W. Pinsky, MD, FACC, David J. Sahn, MD, FACC. The American Board of Pediatrics supplied the mailing list of board-certified pediatric cardiologists.

References