Career Opportunities for Infectious Diseases Subspecialists

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Few data are available regarding trends in career opportunities for subspecialty physicians. A review of advertisements for infectious diseases physicians in the 1990, 1993, and 1995 issues of the New England Journal of Medicine revealed a significant decline in the number of openings between 1990 and 1995. In each year the number of private practice advertisements exceeded those in all other categories combined, and this ratio increased over time. Both private practice and academic advertisements commonly listed opportunities or requirements for teaching or research. Expertise in internal medicine, rarely mentioned in advertisements for academic infectious diseases physicians, became the most frequently cited private practice subclassification in 1995. Both private practice and academic settings offered numerous positions related to the care of patients with human immunodeficiency virus infection. The demand for expertise in epidemiology, intravenous therapy, travel medicine, transplantation, or sexually transmitted diseases remained low. Most positions were in heavily populated states or geographic areas.

Recent changes in health care systems in the United States have spurred debate over the future roles of medical specialists and subspecialists. Predicting the need or demand for physicians or their services is much more difficult than estimating the numbers and types of physicians who will comprise the workforce in the future. As a consequence, no single approach to forecasting physician requirements is universally accepted [1]. Yet, with use of various methods including adjusted need-based [2] or demand-based [3] estimates, extrapolation [4], and population-based benchmarking [5], an excess of subspecialists has been predicted. Authoritative bodies such as the Federated Council of Internal Medicine and the American Board of Internal Medicine have reached a consensus that too many subspecialists are being trained [6, 7]. Medical subspecialty societies are now debating what type of training their fellowship programs in the subspecialty of infectious diseases. The current study involved an analogous approach to assess recent trends in market demands for infectious diseases physicians in the United States.

There have been few objective studies, and thus few reliable data are available on career opportunities for physicians [1]. The Conference Board’s Help Wanted Index [8] is used by labor economists to track national changes in job availability. This quantifiable, objective, historically documented method is based on counts of the numbers of help-wanted advertisements that appear in the classified sections of United States newspapers [8, 9]. Seifer and co-workers [10] modified this approach and used medical journal recruitment advertisements as a measure of marketplace demand. They found a steep decline since 1990 in the number of advertised positions for physicians with internal medicine subspecialty training, while the number of advertisements for family medicine physicians rose [10]. No similar published studies have focused on career opportunities in the subspecialty of infectious diseases. The current study involved an analogous approach to assess recent trends in market demands for infectious diseases physicians in the United States.

Methods and Materials

The author counted and reviewed all classified advertisements in the categories of Infectious Diseases, Internal Medicine, and Other (Chiefs, Directors, Department Heads, Faculty, and Research) listed in the New England Journal of Medicine during the years 1990, 1993, and 1995. Each advertisement was evaluated individually. All advertisements specifically seeking infectious diseases physicians were further analyzed for content. Advertisements for nonphysicians, infectious diseases fellowship positions, and pediatric infectious diseases specialists and those seeking an internist for work related to HIV or AIDS...
were excluded. Any information specifying the geographic location of the employment opportunity was noted.

Infectious diseases employment openings were classified as private practice, faculty, industry, National Institutes of Health (NIH), or Centers for Disease Control and Prevention (CDC). Private practice employment advertisements were further subclassified whenever specified opportunities or requirements were given for academic affiliation, research, teaching, epidemiology (including infection control), HIV/AIDS, travel medicine, transplantation, sexually transmitted disease (STD), iv therapy, or internal medicine. Whenever possible, faculty employment advertisements were similarly further subclassified with respect to specified clinical, research (clinical, basic, or unspecified), teaching, epidemiology (including infection control), HIV/AIDS, travel medicine, transplantation, STD, iv therapy, or internal medicine requirements or opportunities. If more than one position was listed in a given advertisement (e.g., “Seeking two physicians”), each position was considered separately.

Many private practice and faculty advertisements listed one or more subclassification requirements or opportunities for each position. Each subclassification was considered separately within each advertisement. For example, an advertisement stating “the position involves patient care, teaching, infection control, and research” would be considered to have four separate subclassifications: clinical, teaching, epidemiology, and research (unspecified).

Statistical analysis was performed by using the $\chi^2$ test.

**Results**

A total of 16,576 advertisements were reviewed. The number of all types of positions listed under the internal medicine heading of classified advertisements in the *New England Journal of Medicine* declined from 4,133 in 1990 to 3,448 in 1993 and rose to 3,694 in 1995. In contrast, the number of positions advertised under the infectious diseases heading declined significantly from 542 in 1990 to 458 in 1993 and again to 340 in 1995 (P < .01). The number of Other positions listed in 1990, 1993, and 1995 declined as well (1,704, 1,272, and 985 respectively; $P < .01$).

Advertised positions for infectious diseases physicians were gleaned from all of the above heading categories and were classified into five types of employment opportunities: private practice, faculty, industry, NIH, or CDC (figure 1). In each of the three years surveyed, the majority of all infectious diseases employment advertisements were for private practice opportunities. The number of advertisements for both private practice and faculty positions declined significantly from 1990 to 1995 ($P < .05$). Little change was evident over time in the small number of advertisements in 1990, 1993, and 1995 for positions in industry (15, 15, and 23, respectively), the NIH (5, 0, and 0, respectively), or the CDC (1, 1, and 0, respectively).

Several trends emerged when private practice infectious diseases advertisements were subclassified (table 1). Absolute and relative numbers of advertisements for positions offering an academic affiliation declined between 1990 and 1995. Although absolute numbers decreased, the percentage of advertisements citing teaching or research opportunities remained stable. Advertisements for positions related to HIV/AIDS care increased from 5% to 11%.

Marked declines were noted in the numbers of advertisements that called for expertise in hospital epidemiology or infection control. In 1990, <10% of private practice infectious diseases advertisements called for expertise in iv therapy, travel medicine, or transplantation. The demand for these subclassifications continued to decrease through 1995. No advertisements for STD expertise were found in any of the years surveyed. In contrast, the number of advertised positions describing combined infectious diseases and internal medicine practice rose significantly. Internal medicine, cited in 29% of private practice infectious diseases advertisements in 1995, became the leading subclassification for this group.

Subclassification of advertised faculty positions revealed slightly different trends (table 2). Teaching or clinical requirements were listed most frequently each year. Declines were noted in absolute and relative numbers of positions calling for clinical or basic research, whereas the percentage with unspecified research requirements remained stable. The relative proportion of advertisements for positions related to HIV/AIDS care remained stable, and this subclassification ranked third behind clinical and teaching positions in 1995.

Although the absolute number of advertised epidemiology/infection control positions declined, the relative proportion of this subclassification remained fairly constant. The numbers and percentage of advertised positions in the fields of travel medicine, transplantation, and STD remained low. The percentage of advertised faculty infectious diseases positions that specified internal medicine responsibilities rose to 4% in 1993 but returned to <1% in 1995.
Table 1. Distribution of advertisements for infectious diseases private practice positions by subclassification and year.

<table>
<thead>
<tr>
<th>Subclassification</th>
<th>1990 (%)</th>
<th>1993 (%)</th>
<th>1995 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic affiliation</td>
<td>87 (20)</td>
<td>47 (16)</td>
<td>27 (10)</td>
</tr>
<tr>
<td>Teaching</td>
<td>80 (19)</td>
<td>46 (16)</td>
<td>56 (21)</td>
</tr>
<tr>
<td>Research</td>
<td>83 (19)</td>
<td>63 (22)</td>
<td>55 (21)</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>22 (5)</td>
<td>27 (9)</td>
<td>29 (11)</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>57 (13)</td>
<td>45 (16)</td>
<td>15 (6)</td>
</tr>
<tr>
<td>Intravenous therapy</td>
<td>29 (7)</td>
<td>11 (4)</td>
<td>2 (&lt;1)</td>
</tr>
<tr>
<td>Travel medicine</td>
<td>17 (4)</td>
<td>9 (3)</td>
<td>6 (2)</td>
</tr>
<tr>
<td>Transplantation</td>
<td>5 (1)</td>
<td>5 (2)</td>
<td>0</td>
</tr>
<tr>
<td>Sexually transmitted</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Internal medicine</td>
<td>50 (12)</td>
<td>36 (12)</td>
<td>78 (29)</td>
</tr>
<tr>
<td>Total</td>
<td>430 (100)</td>
<td>289 (100)</td>
<td>268 (100)</td>
</tr>
</tbody>
</table>

All advertised positions with specified locations were grouped by state or geographic area. Those states or areas with ≥10 advertisements for positions in 1990, 1993, or 1995 are listed in Table 3. New York had the largest number of advertisements for infectious diseases physicians in 1990. By 1995, the total number of advertised positions for New York had declined by >50%, and Florida moved from second to first place in the total number of advertised positions. In each of the 3 years surveyed, the combined totals for eastern states, southern states, and California accounted for the majority of advertised positions that were associated with a specified location.

Discussion

It might be assumed that the demand for relevant medical subspecialty expertise would increase in an era of new and reemerging infectious diseases. However, the growing emphasis on containment of health care costs is threatening the traditional roles of infectious diseases physicians in both academic and private practice settings. The results of the present study indicated a steady decline between 1990 and 1995 in the number of positions for infectious diseases subspecialists that were advertised in a prominent medical journal. The changes were particularly evident with respect to professional openings in academia. Although the relative demand for clinical and teaching faculty remained stable, the percentage of advertisements calling for clinical or basic researchers decreased.

Advertisements for private practice positions exceeded those for faculty members in each year surveyed, and the ratio increased from 2.7:1 in 1993 to 4.5:1 in 1995. While the demand for expertise in the field of AIDS rose significantly in the community and remained steady in academia, the call for infectious diseases physicians skilled in iv therapy, transplantation, travel medicine, and STD remained low. This finding was particularly surprising in view of recent shifts toward outpatient iv therapy, the burgeoning bone marrow and solid organ transplantation programs nationwide, and a growing population of immigrants and international travelers. The observed decline in the number of advertised epidemiology positions in the private sector may reflect decreased demand due to downsizing or intrahospital as well as interhospital consolidations of quality improvement–related services.

Table 2. Distribution of advertisements for infectious diseases faculty positions by subclassification and year.

<table>
<thead>
<tr>
<th>Subclassification</th>
<th>1990 (%)</th>
<th>1993 (%)</th>
<th>1995 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical</td>
<td>86 (22)</td>
<td>100 (25)</td>
<td>43 (23)</td>
</tr>
<tr>
<td>Teaching</td>
<td>73 (19)</td>
<td>81 (20)</td>
<td>40 (21)</td>
</tr>
<tr>
<td>Research</td>
<td>65 (18)</td>
<td>47 (12)</td>
<td>19 (10)</td>
</tr>
<tr>
<td>Clinical</td>
<td>46 (12)</td>
<td>22 (5)</td>
<td>16 (8)</td>
</tr>
<tr>
<td>Basic</td>
<td>37 (10)</td>
<td>60 (15)</td>
<td>25 (13)</td>
</tr>
<tr>
<td>UNSPECIFIED</td>
<td>50 (13)</td>
<td>49 (12)</td>
<td>27 (14)</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>27 (7)</td>
<td>15 (4)</td>
<td>10 (5)</td>
</tr>
<tr>
<td>Travel medicine</td>
<td>0</td>
<td>1 (&lt;1)</td>
<td>6 (3)</td>
</tr>
<tr>
<td>Transplantation</td>
<td>0</td>
<td>3 (1)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Sexually transmitted</td>
<td>0</td>
<td>8 (2)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Internal medicine</td>
<td>0</td>
<td>17 (4)</td>
<td>3 (1)</td>
</tr>
<tr>
<td>Total</td>
<td>384 (100)</td>
<td>403 (100)</td>
<td>189 (100)</td>
</tr>
</tbody>
</table>

Table 3. Geographic distribution of advertised infectious diseases positions by year.

<table>
<thead>
<tr>
<th>State or area*</th>
<th>1990</th>
<th>1993</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>104</td>
<td>79</td>
<td>48</td>
</tr>
<tr>
<td>Florida</td>
<td>54</td>
<td>78</td>
<td>50</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>36</td>
<td>33</td>
<td>19</td>
</tr>
<tr>
<td>Georgia</td>
<td>32</td>
<td>14</td>
<td>22</td>
</tr>
<tr>
<td>Illinois</td>
<td>28</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>California</td>
<td>27</td>
<td>27</td>
<td>17</td>
</tr>
<tr>
<td>New Jersey</td>
<td>24</td>
<td>19</td>
<td>25</td>
</tr>
<tr>
<td>Midwest</td>
<td>24</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>23</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td>North Carolina</td>
<td>23</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>Texas</td>
<td>19</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>East coast</td>
<td>18</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Connecticut</td>
<td>16</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Maryland</td>
<td>14</td>
<td>28</td>
<td>3</td>
</tr>
<tr>
<td>Virginia</td>
<td>13</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Washington</td>
<td>13</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Southeast</td>
<td>13</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Ohio</td>
<td>9</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>Louisiana</td>
<td>8</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>Maine</td>
<td>3</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Southwest</td>
<td>2</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Iowa</td>
<td>0</td>
<td>16</td>
<td>4</td>
</tr>
</tbody>
</table>

* States or geographic areas listed for ≥10 advertised positions in 1990, 1993, or 1995.
How do these findings correlate with actual job availability? The strengths and limitations of using recruitment advertisements for job market analysis have been discussed elsewhere [9, 10]. The present study focused on one prominent medical journal, thereby minimizing the effects of confounding variables [9]. Employment marketing strategies may differ among prospective employers in academia, private practice, and industry. An increase in the use of professional recruitment agencies and placement services could potentially affect the use of job advertisements in journals. However, classified advertisements continue to play an important role for job-seeking physicians as well as for those who seek their services. This type of study does not provide absolute numbers of available positions because most advertisements ran more than once. Relative comparisons can be made, however, between the apparent availability of a variety of subclassified infectious diseases positions, both within and between academic and private practice settings.

How can current and future infectious diseases physicians deal with market forces that impact upon their careers? A panel of experts [11] has appropriately recommended that infectious diseases physicians seize opportunities to develop and expand services for the care of patients infected with HIV and the areas of infection control, epidemiology, outcomes research, outpatient iv therapy, and resource management. This panel further advised that success in dealing with these market forces was linked to knowledge of managed care principles, practice guidelines, physician profiling, outcomes monitoring, computerized information management, risk sharing, networking, and marketing [11]. In addition, multidisciplinary antimicrobial management programs can save health care institutions hundreds of thousands of dollars annually [12]. By developing and coordinating such programs, infectious diseases physicians can establish their economic value to hospitals while reducing the risk of infections caused by resistant microbial pathogens.

Outcomes research may provide data that support the role of subspecialists. Infectious diseases consultation has been found to reduce the risk of hospitalization for patients with AIDS [13]. Classen and co-workers [14] used a case-control study to measure the impact of infectious diseases consultation on outcomes for patients hospitalized in a tertiary care medical center [14]. Their results indicated that infectious diseases consultation was associated with longer hospital stays, longer intensive care unit stays, and higher antibiotic costs. However, these investigators found that patients seen in consultation during the last one-third of hospitalization had shorter hospital stays and lower antibiotic costs [14].

How can infectious diseases fellowship programs optimally prepare trainees for future career opportunities? There is general agreement among most training program directors and section chiefs that the numbers of fellowship positions should decrease or at least remain stable. Prospective infectious diseases fellows are aware of changes in the market-place, and the numbers of unfilled training positions are increasing annually. There is less agreement on how best to train physicians who are intent on a career in infectious diseases. Ideally, fellows should receive excellent training in areas and in numbers appropriate for the perceived future market demands [15].

In the current study, although the numbers of all advertised positions for infectious diseases physicians decreased, the ratio of employment opportunities continued to favor individuals with clinical skills. In each year surveyed the majority of advertised positions were in private practice. Prospective employers increasingly indicated expectations of accompanying skills in internal medicine. Although relatively few faculty positions specified internal medicine duties, more current academic infectious diseases physicians are being asked to shoulder more internal medicine teaching and/or attending duties (author’s unpublished observations). For this reason all fellows should be encouraged to maintain their internal medicine skills, regardless of their career aspirations. Those who wish to become clinical investigators or basic scientists will require additional, unique training to learn the specialized skills required for a successful career [16].

Acknowledgment

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References

9. Abraham KG, Wachter M. Help-wanted advertising, job vacancies, and