

● *Editorial***TOO MANY RADIATION ONCOLOGISTS? AN EMPIRICAL REPORT**

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The American College of Radiology (ACR) has a long history of addressing the professional concerns of radiation oncologists. The growing concern of radiation oncologists about the employment situation in their profession prompted the College to undertake an intensive research effort to study this situation and its likely future. Many of the College's findings on this subject have been published (2, 3, 8, 9, 11) and presented at important gatherings of the profession, such as the Intersociety Commission meeting each summer. As well, the College's research department has been working intensively with the ASTRO Human Resources Committee in the last year. In order to provide more information on the employment situation to the profession, and to make information more readily available, this research report presents many previously unpublished findings and assembles in one place data from multiple earlier reports.

UNEMPLOYMENT IN 1994

The 1994 unemployment rate averaged 0.2% [standard error (SE) = 0.1%] for radiation oncologists. This compares favorably with the 0.4% rate (SE = 0.2%) for all physicians for 1994 (12). Approximately 2% of radiation oncologists (SE = 1%) experienced unemployment at some point during the year, with the average duration of unemployment being approximately 1 month. These findings are from the ACR's 1995 Survey of Radiologists, a stratified random sample survey of radiation oncologists, diagnostic radiologists, and nuclear medicine specialists, which had a 75% overall response rate and obtained responses from approximately 250 radiation oncologists.

EMPLOYMENT OF 1994 AND 1995

Graduates, views of training program directors, and program's plans were studied through a small 1994 sample survey of training program directors (9, 11) and a

1995 survey of *all* directors (8). Response rates were 85 and 94%, respectively.

In 1995, none of the graduates of responding programs (who totaled 149 residents and 26 fellows) were reported unemployed as of December, although 11% of residents and 27% of fellows had not had commitments for positions as of April–May, and a survey we conducted for ASTRO (4) showed that 6% (SE = 3%) of residency graduates experienced some unemployment shortly after graduating. The same pattern characterized the relatively small sample (24 residents) in the 1994 survey. (Note that we used the standard definition of “unemployed”—namely, not having work when one is seeking it. In 1995, there were two residency graduates not in the labor force—that is, not working because they had not wanted to be working. This situation typically involves a woman with very young children.) In 1995, program directors said that 90% of residents and 85% of fellows had jobs that reasonably matched the individual graduate's training and employment goals. The percentage of graduating residents who had a position of this type did not differ (by the usual test of statistical significance— $p \leq 0.05$) between 1994 and 1995. However, the percentage of residency program directors who reported the difficulty of finding jobs was greater than typical of recent years increased from 29% in 1994 to 63% in 1995.

We were astonished to find no unemployed graduates, particularly given common perceptions that “there are no jobs out there” and the growing pessimism of training program directors. Hypothetically, program directors might be responding to weakening of “soft” indicators, which may deteriorate before literal unemployment becomes substantial. However, we found no deterioration between 1994 and 1995 in the two “soft” indicators we studied—(a) the percentage of graduates who wound up with positions not in keeping with their training and individual goals, and (b) the percentage who had not secured positions late in the hiring season (that is, as of April–May).

Whatever its cause, program directors' growing pessimism is not leading to a reduction in residency program size. In 1995, while nearly half of programs anticipated a change in size, increases and decreases almost exactly offset each other. However, there may be some decrease in the annual number of *graduates* as 3-year programs change to a 4-year format with no increase in the number of residents. In contrast, a major decrease was, on average, planned among the one-third of fellowship programs that anticipated a change in size.

In 1995, neither reported unemployment (which was zero) nor the "soft" indicators we studied differed between graduates of 3-year and 4-year residency programs. The logical implication is that either (a) graduates of higher-quality programs do not fare better in the employment market or (b) 4-year programs do not produce higher quality graduates although, as I understand it, the logic of the new ABR requirement for a fourth year is to upgrade quality.

We also did not find differences in unemployment or in the two "soft" indicators among different regions of the country or among programs located in different sized cities. Thus, it appears that graduates are effectively reaching beyond the locality where they trained in their employment search.

In contrast, when program faculty told us of an unemployed radiation oncologist, the story often involved someone who could look for work only where he or she trained, due to a spouse. Straightforward probability calculations show that if a physician has only a 10% chance of finding work in any one locality, he or she, nonetheless, has a 99.5% probability of finding work if he or she is willing to consider any of 50 localities. And there are literally hundreds of localities in the United States.

These contrasting figures may explain how individual instances of severe distress coexist with very low overall unemployment.

Hiring of Radiation Oncologists, which constitutes the "demand side" of the employment market, was studied through ACR's 1991, 1994, and 1995 surveys of the hiring done by a stratified random sample of radiation oncology, diagnostic radiology, and mixed groups, including multispecialty, academic, private, and government groups (2, 3). The 1994 survey went to 400 groups; the 1995 survey, to 600. Response rates were 92 and 84%, respectively.

These surveys indicate that the (combined) total number of radiation oncologists and diagnostic radiologists that groups were seeking to hire declined by approximately 37% between 1991 and 1995. Groups were recruiting 204 (SE = 53) radiation oncologists in 1994, but only 144 (SE = 36) in 1995. In both years, approximately 90–95 positions (SE = approximately 25–35) were expansion positions. The other positions were replacements for radiation oncologists leaving the field (principally through retirement or death) or moving to another group. The radiation oncologist workforce expands by

approximately 120 physicians annually (see below). With expansion positions apparently substantially fewer than the growth of the workforce, significant problems of unemployment seem likely to emerge in the near future.

Curiously, in both 1994 and 1995, groups managed to fill only approximately 75% of the radiation oncology positions for which they were recruiting, despite the apparent softness of the market. Thus, there were a substantial number of vacancies—a number equal to 1–2% of the workforce—that remained even after the hiring season was over.

Long term projections (10) point to a future surplus of radiation oncologists, primarily because the radiation oncologist workforce is growing by at least 4% annually while the number of cancer patients treated by radiation oncology is likely to increase by at most 3% annually. Thus, a surplus of radiation oncologists of at least 1% a year, or at least 10% in a decade, seems likely to emerge.

The projection that the workforce will increase by approximately 120 radiation oncologists, or 4%, annually is based on a detailed model that incorporates: (a) the number (approximately 160) and age distribution of those entering the workforce each year; (b) the age distribution of the present workforce; (c) the percentage in each age category—for example, the percentage of those aged 65 to 69—who are active rather than retired (we assume this will remain constant in the future for each age group); (d) average work hours in each age group (also assumed to remain constant); and (e) mortality rates. This detailed projection is confirmed by two much simpler sources—the American Medical Association's annual count of physicians in the U.S. in each specialty (1), and the latest, preliminary data from the ACR's Patterns of Care Study (PCS) (6), which show a 23% increase in the number of radiation oncologists between 1990 and 1994. Both of these sources, indeed, show workforce growth of slightly over 120 annually during the most recent 4 years for which data are available. Future growth will be less rapid in percentage terms than the 23% in 4 years shown by the PCS data not because the annual expansion is smaller in *number* but because the same increase of approximately 120 annually is applied to a larger base, making the *percentage* growth rate slower.

Comparison of the 1995 Survey of Radiologists with the previous 1990–91 survey shows that the percentage of radiation oncologists age 55 and over who were professionally active rather than retired was, if anything, higher in 1995, at 92% (SE = 4%), than at the beginning of the decade. The difference from 1990–91, however, was not statistically significant. The comparison takes into account changes in the age mix of those 55 and over. Conceivably, the growth of managed care and other changes in the work environment—such as increased "hassle factor" and Medicare payment constraints—might have led to a wave of early retirements, thereby

somewhat slowing the increase in the physician workforce. However, this has not happened.

The projected annual growth rate of at most 3% in patients is derived from: (a) the growth of the U.S. population, approximately 1% annually; (b) the effect of population aging, approximately $\frac{3}{4}$ % annually, given U.S. age-specific cancer incidence and the U.S. population age structure; (c) an increasing age-specific incidence of cancer, assumed to be approximately $\frac{3}{4}$ % annually, as it has been over the last 2 decades; and (d) an increasing share of cancer patients receiving radiation treatment, assumed to add approximately $\frac{1}{2}$ % annually to the number of radiation oncology patients, which is in keeping with the long-term trend shown by a comparison between total cancer cases in the United States and long-term PCS data (7) on the number of new patients seen by radiation oncologists. The latest preliminary PCS data (6), showing an approximate 13% increase in new patients between 1989 and 1993, confirm the estimate of a 3% annual increase in patients.

If the growth of managed care reduces the percentage of cancer patients receiving radiation treatment—or even merely stabilizes this percentage—the number of patients will grow at less than 3% annually. The same will be true if the decline in smoking in the U.S. over the past 2–3 decades eventually reduces the incidence of lung cancer, as it should. Thus, 3% should be viewed as a generous estimate of the annual increase in patients, and 10% seems a conservative estimate of the amount by which workforce growth will exceed growth in the number of patients over the next decade.

PCS data illustrate the problem likely in the future as the workforce grows more rapidly than the number of patients. In the decade and a half preceding 1990, the number of new patients per radiation oncologist was fairly constant (7). However, over the next 4 years, preliminary data (6) indicate that the number of radiation oncologists increased by 23% while the number of new patients increased by 13%, so that the number of new patients per radiation oncologist decreased by approximately 10%. Presumably, this decrease of 10% was accommodated through a combination of more extensive treatment of the average patient and shorter work hours for radiation oncologists since, as noted above, unemployment at the end of the 4-year period was only a small fraction of 1%. However, the opportunities for further increases in treatment intensity or shortening of hours would seem

necessarily limited. Thus, a substantial unemployment problem seems likely to emerge in the not-too-distant future.

Data from the National Match (5) and the ACR's Professional Bureau placement service are of very limited value for understanding the employment situation because the fraction of available positions that are offered through these mechanism varies erratically from year to year, as does their use by those seeking positions. For example, the number of positions offered in the Match decreased by 18% between 1995 and 1996, while the best estimate (see above) is that the number of beginning residency positions remained essentially constant. Similarly, the number of job seekers using the Professional Bureau at the ASTRO annual meeting decreased by 40% between 1992 and 1993, although there is no reason to believe there was any similar decline in the number of radiation oncologists seeking positions. Despite their major weaknesses, some observers have paid these data substantial attention, probably because they have been readily available. For the record, the relevant recent statistics are: approximately 80% of National Match-offered positions filled in the Match in 1993 and 1994, approximately 90% did so in 1995, and approximately 70% did so in 1996. The ratio of applicants to positions offered through ACR's Professional Bureau at the annual ASTRO meeting increased from 1.9 in 1993 to 3.0 in 1994 and 3.3 in 1995.

In summary, unemployment of radiation oncologists has been very low—a fraction of 1%—and through 1995, training program directors report that essentially all graduates of training programs have found jobs. Moreover, the directors report that the percentage of graduates with jobs reasonably matching the individual graduate's training and employment goals has been high (approximately 90%) and steady. However, there are strong indications that the situation is likely to deteriorate in the future. These signs are found (a) in the shortfall of expansion positions relative to the annual expansion in the radiation oncologist workforce, and (b) in long-term projections, which show the growth of the workforce outstripping the growth in the number of patients by at least 1% annually. On the other hand, the early 1990s saw a decline of approximately 10% in the ratio of new patients to radiation oncologists without substantial unemployment emerging, and the mechanisms that permitted the accommodation (presumably more intensive treatment of patients and/or shorter work hours) may permit a similar adjustment to a further decline in the future.

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