Work and Retirement Preferences of Practicing Radiologists as a Predictor of Workforce Needs

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Rationale and Objectives: The radiology job market has been described as highly variable, and recent practice hiring surveys predict that the number of available jobs will remain flat. Radiologists may be working more hours and retiring later than desired, activities that influence overall job availability. A national survey was performed to determine the desired work rate and retirement preferences of practicing radiologists, and the responses are used to estimate current and potential future work output and future workforce needs.

Materials and Methods: Practicing radiologists were surveyed regarding current and preferred work level and desired and expected retirement age. A model incorporating these preferences and stratified by age was developed using survey responses and American Medical Association full-time equivalent (FTE) estimates. Available FTE radiologists are estimated under four scenarios from 2016 to 2031 in 5-year intervals.

Results: The model predicts a total of 26,362 FTE radiologists available in 2011, which corresponds to previous estimates. Participants reported working more hours and expecting to retire later than desired, with younger radiologists and women reporting the greatest desired decrease in FTE hours worked. Under each scenario, there is an initial FTE availability in 2016 ranging from 21,156 to 24,537, which increases to between 27,753 and 31,435 FTE by 2031 depending on work rate and retirement patterns.

Conclusions: Practicing radiologists report that they currently work more hours than desired and expect to retire later than they would prefer. If radiologists changed current personal work rate and expected retirement age to meet these preferences, there would be an immediate shortage of FTE radiologists continuing until at least 2020 assuming no other workforce needs changes.

Key Words: Workforce; retirement; full-time equivalent; human resources; radiologists; employment.

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There is currently significant uncertainty regarding the appropriate size of the radiology workforce and the impact of numerous internal and external factors on the availability of jobs (1). The overall job market has been highly variable over the previous 20 years with extremes of both surplus and shortage (2–7), and responses to these imbalances often take several years (8). Two consecutive yearly practice leader hiring surveys estimate that current demand for radiologists is essentially flat and almost precisely matches the number of new trainees entering the workforce each year (9).

The exact workforce needs remain difficult to determine but can be useful for practice managers and administrators when estimating staffing requirements. National survey data are used to estimate the full–time equivalent (FTE) hours worked and retirement preferences of currently practicing radiologists. Current and future work output and workforce are modeled under several different possible scenarios using radiologists' self-reported preferences for part-time employment and early retirement.

MATERIALS AND METHODS

After institutional review board approval, electronic invitations to an online multiple-choice survey (SurveyMonkey, Palo Alto, CA™) were sent to all members of the American College of Radiology (ACR), the Association of University Radiologists (AUR), and the Society of Chairs of Academic Radiology Departments (SCARD) in March 2011 with a follow-up reminder 4 weeks later (10). Participants were allowed to forward the invitation to other radiologists. The ACR membership list contained ∼18,900 email addresses at the time of the survey (Brad Short, Senior Director of Membership Services for the American College of Radiology, personal communication). The AUR and SCARD membership lists were considered to be overlapping, and therefore, sample size was estimated at 19,000 survey invitations. A total of 2163 surveys were completed for an estimated response rate of 11%. Duplicate responses were possible because the survey was anonymous and distributed by multiple organizations; however, it is unlikely that participants would complete the survey more than once.

All demographic information, including "period born," "current full-time work level," "desired work rate," "expected

TABLE 1. Full-time Equivalent (FTE) Weighting for Survey Participant Self-reported Current Work Rates

Response to "Current Time Worked"	Weight for Calculated Percent Effort (FTE)
Full time	1.0
>80%	0.9
60%–80%	0.7
40%–60%	0.5
<40%	0.2

TABLE 2. Comparing Calculated Current and Desired Percent Full-time Equivalent (FTE) Effort for Gender and Generation

Gender	Period Born	Current Percent Effort FTE	Desired Percent Effort FTE
Female	1925–1945	77.65	74.38
	1946–1963	91.01	77.48
	1964–1980	91.30	77.76
Male	1925–1945	77.24	69.15
	1946–1963	95.54	83.09
	1964–1980	99.48	94.00

retirement age," and "desired retirement age," was self–reported and responses missing any of these items were excluded. Responses from retired and in-training radiologists were excluded to limit the sample to radiologists in active practice.

The average percent effort of current work rate was computed for each age cohort using a sliding scale (Table 1) and applied to the practicing numbers for radiologists from the American Medical Association (AMA) physician master file to obtain 2011 FTE estimates (Table 2; personal communication, Bridget Westley, Direct Medical Data). FTE estimates are used in employment analyses to compare workloads across workers; an FTE of 1.0 indicates full-time employment, whereas an FTE of 0.5 indicates a work rate of 50%. The AMA FTE estimates were summed over gender and generation to represent 2011 FTE values. The difference between expected and desired retirement age was in continuous form of 5-year intervals and compared using a two-sided Wilcoxon rank sum test. The FTE estimates were weighted using the response rates for both "expected" and "desired" retirement age at each 5-year interval from 2016 to 2031.

There were ~1200 graduating radiology residents in 2011 (9), nearly all of whom are expected to be part of the youngest cohort in the survey (born between 1981 and 2000) because 95% of all medical school graduates in 2009 were born after 1981 (11) and radiology residency requires a minimum of 5 years. Medicare caps and financing for graduate medical education, the primary source of residency funding, are expected to remain unchanged or decrease during the projection period (12), which makes significant program expansion unlikely. As each graduate is believed to seek active

employment regardless of any delays into the workforce, an average of 1200 new radiologists were added to the model each subsequent year and their FTE contribution was weighted by the average percent effort of the group born from 1964 to 1980. The total weighted incoming FTE for graduates was added to the workforce FTE at each 5-year interval.

To reduce variability, the model assumes that, on average, current and new radiologists will work at the same percent effort for the next 20 years. After retirement, their assigned percent effort was zero. FTE percent effort for each age cohort and gender was calculated under four different scenarios in which individuals 1) work at their currently reported work rate and retire when they expect to retire, the "status quo," 2) work at their desired work rate and retire when they expect to retire, 3) work at their current work rate and retire when they would like to retire, or 4) work at their desired work rate and retire when they would like to retire. Analysis of variance methods were used to assess the effects of gender and period born on current and desired percent effort.

RESULTS

After exclusions, 1840 radiologists in active practice completed the survey. The gender distribution of participants was 76% male and 24% female. The age cohorts were roughly divided into commonly accepted generations: the Veteran generation (VG, born 1925–1945), the Boomer generation (BG, born 1946–1963), Generation X (GX, born 1964–1980), and Generation Y (born 1980–2000) with a distribution of 12%, 45%, 40%, and 3%, respectively. This survey population is reflective of the current radiology workforce, which is ~70% male with 47% and 44% of practicing members born between 1946 and 1963 and between 1964 and 1980, respectively (Brad Short, Senior Director of Membership Services for the American College of Radiology, personal communication).

After applying the percent effort sliding scale to calculate FTE effort (Table 1), BG and GX radiologists had FTE work rates similar to each other and these were significantly higher than VG radiologists (Table 2). There was no difference in the current FTE levels between genders when controlling for period born (Table 2). Differences were significant for desired percent effort by gender and for actual percent effort by period born ($P < .001$ for each; Table 2).

The model estimates the 2011 radiology FTE workforce at 26,362 which is similar to a previously predicted 2010 radiology FTE availability of 28,012 under stable residency conditions (4). There is a predicted initial shortage of radiologists with a nadir in 2016 followed by a rising supply over the next 15 years under each of the four scenarios (Fig. 1). Based only on current and desired work rates and retirement ages, we predict there will be 21,156–24,537 available FTE radiologists in 2016.

Under the baseline scenario of no change or "status quo," where radiologists continue working at current FTE rates for the next 20 years and do not retire until their expected