

Supply/Demand in Radiology: A Historical Perspective and Comparison to other Labor Markets

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Rationale and Objectives: There has been attention on the job market recently and on radiology's supply/demand calculus. Supply is influenced by the number of trained radiologists, while demand is driven by demographics and technological innovation. We analyze the supply of radiologists historically and compare to other labor markets—medical and non-medical, domestic and foreign.

Materials and Methods: We review National Resident Matching Program data in radiology and several other specialties from 1991 to 2015. We also review surveys, physician recruitment data, and peer-reviewed commentaries on medical specialty job markets. Trends are compared across specialties. The regulation of American medical training is compared to that in the United Kingdom and to a non-medical labor market, unionized theatrical stage employees.

Results: Radiology residency positions have increased since 1998 despite a downturn in the job market. This expansion coincides with a decreasing percentage of positions filled by domestic graduates. A similar trend has been seen in pathology, a notoriously oversupplied specialty. Conversely, other specialties have maintained their proportion of domestic graduates by way of limited supply or implicit demand.

Conclusions: The radiology job market is currently oversupplied, primarily a result of increasing residency positions despite indicators of decreasing demand. The percentage of residency positions filled by domestic graduates has decreased during the same period, suggesting that medical student interest is responsive to the market. Other specialties, particularly pathology, demonstrate the dangers of chronic oversupply. We advocate a reduction of radiology residency positions such that supply closely approximates demand without exceeding it. Additional measures may be taken, if necessary, to restore market equilibrium in the event of a mild undersupply.

Key Words: ACGME; economics; employment; job market; Match; NRMP; oversupply; residency; trainees.

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THE RADIOLOGY JOB MARKET—A HISTORICAL OVERVIEW

Radiology training numbers have been influenced by technology, policy-driven reimbursements, and the economy in general.

Diagnostic radiology residency was extended from 3 to 4 years in 1982 (1). This corresponded with the introduction of magnetic resonance imaging, which emerged amid progress in computed tomography, ultrasound, nuclear medicine, and digital subtraction angiography.

Technology enabled the detection and the characterization of a greater breadth of disease. Imaging induced its own demand by increasing diagnostic confidence and de-

tecting early or unsuspected pathology. Utilization increased in the late 1990s and early 2000s, particularly among Medicare recipients. From 1998 to 2001, annual increases in utilization per Medicare enrollee ranged from 1% (radiography) to 16% (magnetic resonance imaging) (2,3). Reimbursement followed a similar trajectory, making radiology a key revenue generator.

The demand affected the job market, and residency positions were increased in the 2000s. These events were out of sync, however, as residency expansion trailed the market. The American College of Radiology's Professional Bureau reported a ratio of 3.8 jobs per job seeker in 2000, a dramatic improvement from a nadir of 0.2 in the mid-1990s (4). This ratio is generated using data collected on-site at the annual meeting of the Radiological Society of North America. Individuals submitting a resume for consideration are defined as job seekers and vacancies listed by employers are defined as jobs. Published yearly since 1990, this figure has been validated as a useful measure of the combined academic and community radiology employment market (4). Residency positions remained static as the market strengthened between 1998 (843) and 2000 (841), but increased by 35 per year from 2000 (841) to 2005 (1018) (5,6).

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TABLE 1. Positions Offered in the NRMP, by Year and Specialty

	1991	1996	1998	2001	2004	2007	2010	2013	2014	2015
Radiology	822	1154	843	875	981	1043	1090	1143	1176	1156
Pathology	513	426	355	363	477	513	503	583	597	605
Dermatology	17	20	246	262	294	320	360	407	414	427
Rad. onc.	5	113	94	93	128	142	159	183	186	200
Plastic surg.	9	49	49	59	79	94	106	127	136	148
Internal med.	4704	4654	4697	4727	4751	4798	4999	6227	6524	6770
General surg.	1116	1004	1024	1041	1044	1057	1077	1180	1205	1224

NRMP, National Residency Match Program.

After varying degrees of reduction during the mid-1990s, the number of available positions has subsequently increased in all specialties. Apparent dramatic increases in radiation oncology (1996), plastic surgery (1996), and dermatology (1998) are the result of training pathway modification (i.e. subspecialty/fellowship changing to categorical residency).

TABLE 2. Year-by-year NRMP Data for Radiology

A													
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	
Total positions	822	794	828	873	1026	1154	890	843	852	841	875	920	
Total applicants	1105	1118	1205	1125	1078	874	902	1080	1244	1405	1503	1380	
App:Pos	1.3	1.4	1.5	1.3	1.1	0.8	1.0	1.3	1.5	1.7	1.7	1.5	
%USMG	79	75	80	74	63	43	51	67	77	86	84	83	
B													
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total positions	979	981	1018	1011	1035	1085	1095	1090	1124	1111	1143	1176	1156
Total applicants	1428	1463	1204	1301	1331	1364	1543	1431	1299	1219	1307	1288	1141
App:Pos	1.5	1.5	1.2	1.3	1.3	1.3	1.4	1.3	1.2	1.1	1.1	1.1	1.0
%USMG	83	85	78	80	82	83	87	84	79	75	72	66	56

App:Pos, ratio of total applicants to total positions; NRMP, National Residency Match Program; Total applicants, USMGs + FMGs; Total positions, available PGY-1 + PGY-2 positions; USMG, United States medical graduate; %USMG, percentage of total positions filled by USMGs.

This dyssynchrony, which continues today, originated with the contraction of residency positions and diminished interest in radiology due to dismal predictions of its long-term prospects during the preceding Clinton era (Table 1). More specifically, the Balanced Budget Act of 1997 prompted a 27% reduction in residency positions between 1996 (1154) and 1998 (843) that directly preceded the aforementioned expansion (Table 2; Fig 1) (7).

As noted, the radiology residency class of 2000 was greeted with 3.8 job listings per job seeker (4). Demand for imaging slowed by 2006, coinciding with the Deficit Reduction Act, reimbursement cuts, rising deductibles, and concerns about radiation and overutilization (8,9). This was reflected in the job market, as the ratio of listings to seekers ranged from 1.1 to 1.2 between 2003 and 2006 (10). In 2007, the ratio fell to 0.72—that is, fewer listed jobs than seekers (10).

By 2010, outside agencies had taken notice of the lukewarm demand for new radiologists. Merritt Hawkins, the United States' leading physician recruitment firm, stated the following in their 2010 review: "Medicare reimbursement, decreased utilization, and continued interest in radiology among

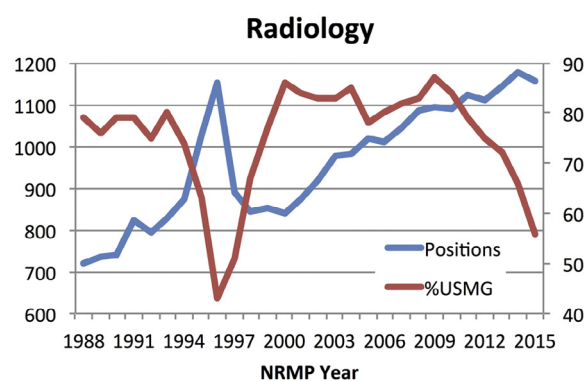


Figure 1. NRMP radiology residency match data. Graphical representation of radiology residency positions offered and percentage of positions filled by United States medical graduates (USMGs), by year. Large fluctuations in the percentage of positions filled by USMGs reflect the inherent lability of radiology's supply-demand calculus.

medical graduates have helped to balance out the demand for radiologists and available supply" (11).

Demand for new radiologists continued downward over the next 2 years, as confirmed by Merritt Hawkins' 2012 report:

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