RADIOLOGY RETROSPECTIVE

a decade of change

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INTRODUCTION

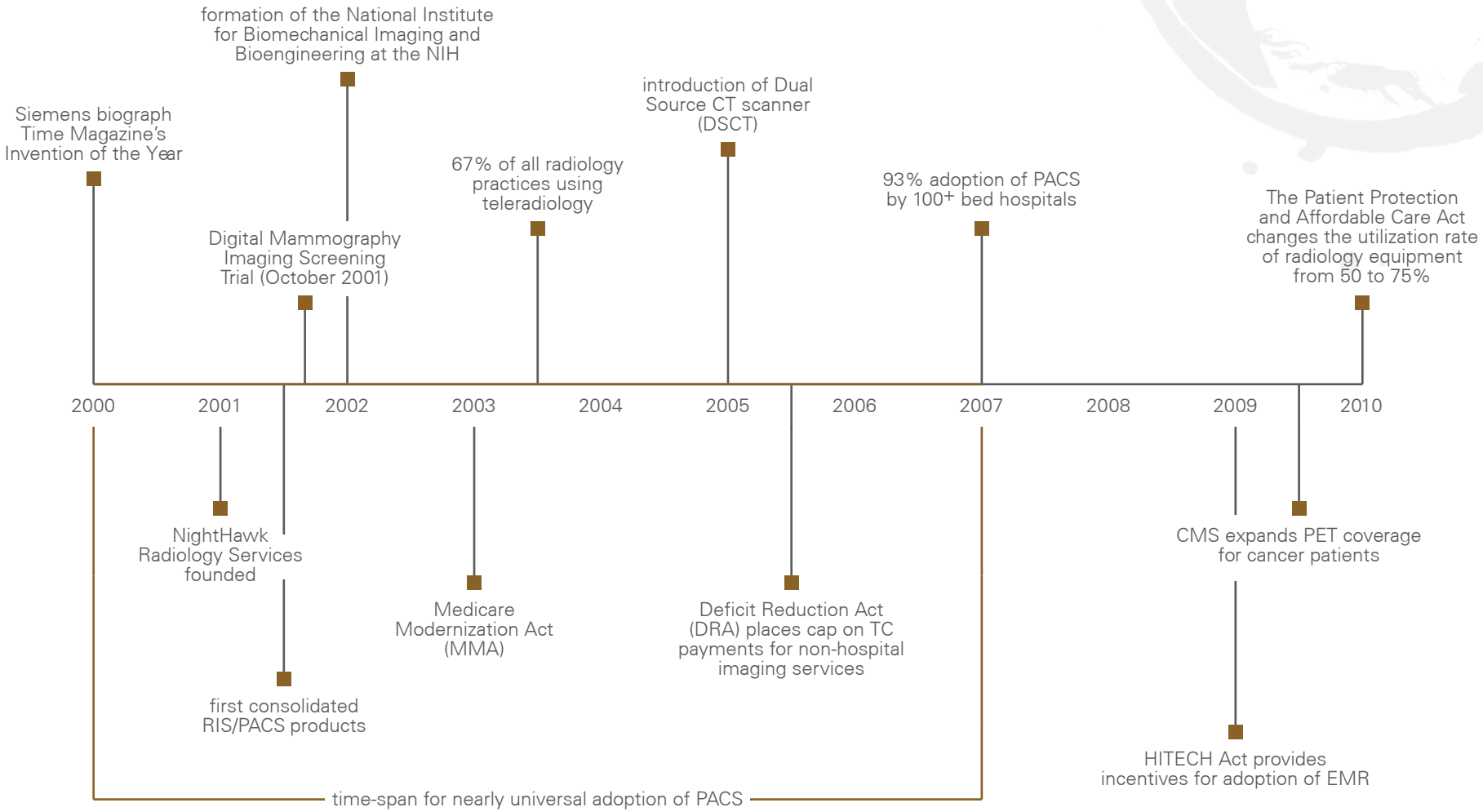
The first decade of the 21st century has brought a tremendous amount of change to radiology. The beginning of the decade marked the peak of surging demand for radiologists, demand that simply could not be satisfied by residency graduates. As a result, salaries sky-rocketed and vacation offerings got richer and richer. Thanks to the wide-spread adoption of teleradiology, which was driven by the meteoric rise of the Internet, radiologists were offered positions with zero call. Over time, the shortage eased, supply increased, and the economy took its toll. Currently demand and supply appear to be more or less in balance, with a soft over-supply of radiologists.

This decade has also seen tremendous technological advances in radiology. And the impact on productivity has been substantial. Annual procedures per radiologist have increased 16% and that in spite of the increase in vacation time. Another consequence of the changing technological landscape has been a surge in demand for radiologists with increasingly more specialized training. Whereas at the beginning of the decade, employers were predominantly looking for generalists, now specialists in digital mammography or MSK are routinely being recruited.

But the cost of this new technology disproportionately raised radiology's contribution to the cost of health care. The Deficit Reduction Act (DRA) sought to "correct" this problem by levying cuts to Medicare payments for radiology which averaged to 20% across modalities. More pressure is being brought to bear on radiology with the Patient Protection and Affordable Care Act, which increases utilization rate assumptions from 50% to 75%.

Some believe that mounting frustration over health care reform and the aging of the radiologist population will create the perfect storm for a mass exodus from the field. This, they say, will create an even more severe shortage of radiologists in the next 10 years. What we *can* expect is greater use of teleradiology, improvements in productivity rates beyond their current levels, and compensation packages that will continue to attract medical students to radiology residencies. As the past decade has shown, the more likely scenario is that necessity, opportunity and innovation will meet to satisfy demand.

A DECADE OF CHANGE



SUPPLY & DEMAND

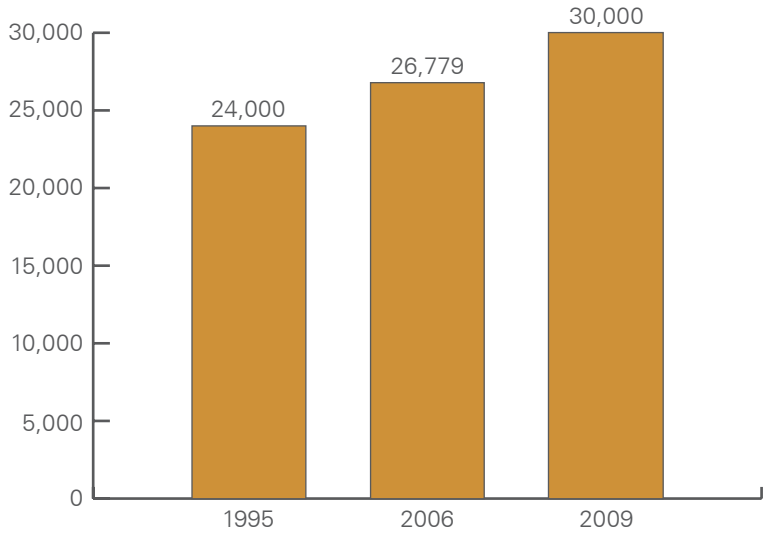
The radiology workforce increased by approximately 25% over the past 15 years. Previously an unpopular specialty, with relatively low earnings and unattractive hours, radiology grew in popularity over the last decade. Increased demand that pushed wages up at an astronomical rate and exciting technological advances have driven medical school graduates to radiology residencies in greater and greater numbers. In fact, the number of radiologists transitioning into practice nearly doubled over the past 20 years, with a steep run-up in the late 1990s.

Whereas the 1990s experienced positive growth in residency transitions for nine out of 10 years, the last decade has been more volatile than the 1990s. Overall, the trend has been positive, however, with residency transitions increasing by approximately one sixth. 2000 and 2005 were peak years followed by significant dips in 2001 and 2006 respectively.

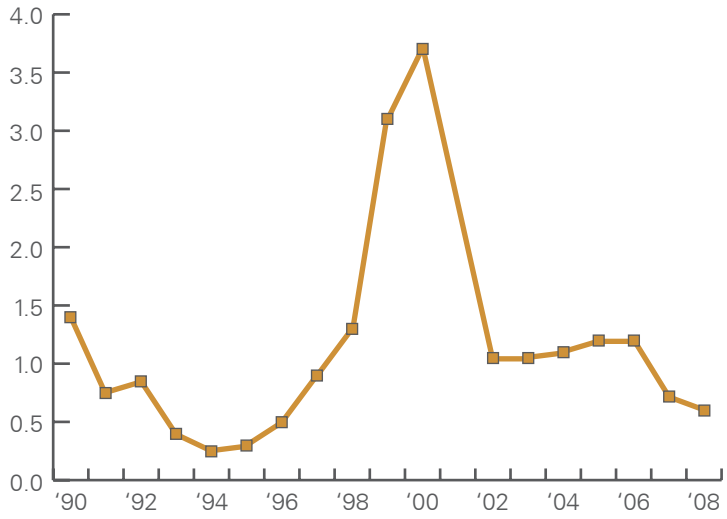
The peak of the demand for radiologists took place in 2000, with the number of open jobs per job seeker reaching nearly 4:1, then dropping down to balanced supply-demand in 2002. After a slight uptick in 2005 and 2006, there have been slightly more jobs than candidates in recent years. A study published in the AJR credits productivity increases with the easing of the radiologist shortage in the early part of the decade.

A 2008 LocumTenens.com survey of physicians showed that 29% of radiologists, if they had to do it all over again, would not choose a career in medicine. This was the highest percentage among nine specialties surveyed.

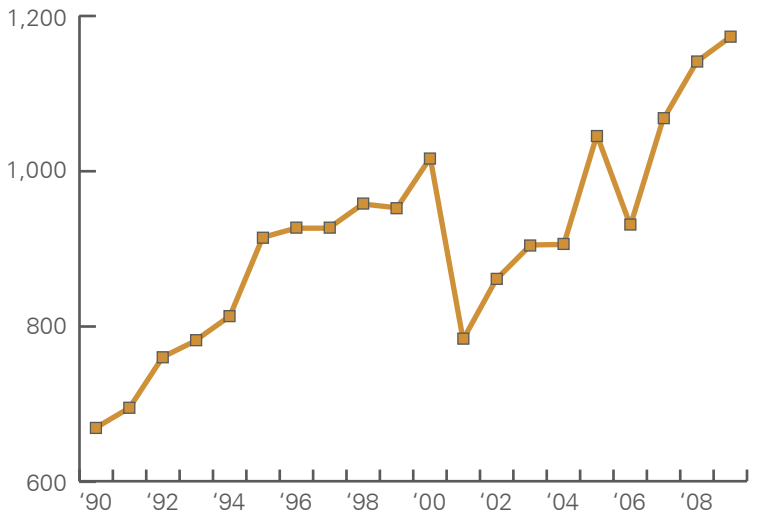
growth of radiology workforce, 1995–2009 (active radiologists)



number of job listings per job seeker, 1990–2008



annual residency transitions, 1990–2008



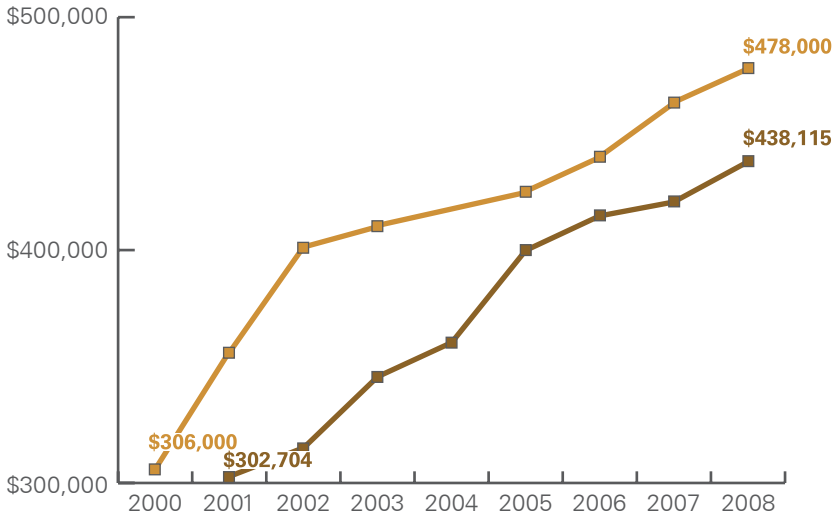
Quick Comparable
percent increase in compensation 2000–2008 (inflation adjusted)
non-interventional radiologists: ***35.0%***
all specialist physicians: ***6.95%***

WORK PRODUCTIVITY & COMPENSATION

One driving factor in the increase in radiologist supply has been steeply-rising compensation. A large portion of that increase happened between 2000 and 2001. The timing of the spike in salaries is consistent with the dramatic shortage experienced around the beginning of the decade. In unadjusted dollars, interventional radiologists' earnings went up nearly $180,000 in less than 10 years. At the same time, non-interventional radiologists' salaries went up nearly $140,000.

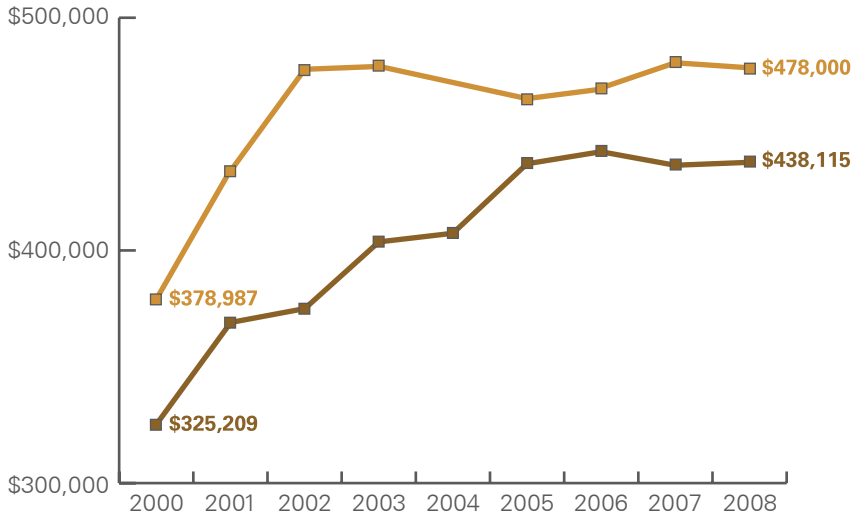
Even in inflation-adjusted terms, compensation went up significantly, but non-interventionalist compensation grew at a faster rate than interventionalist compensation. Non-interventional radiologists' salaries increased 35% while interventionalists' saw a 26% increase. At the beginning of the decade, interventional radiologists made on average 16% more than non-interventional radiologists. In 2008, the gap between the two groups was less than 10%.

unadjusted compensation, 2000–2008



diagnostic radiology–interventional
diagnostic radiology–non-interventional

inflation-adjusted compensation, 2000–2008



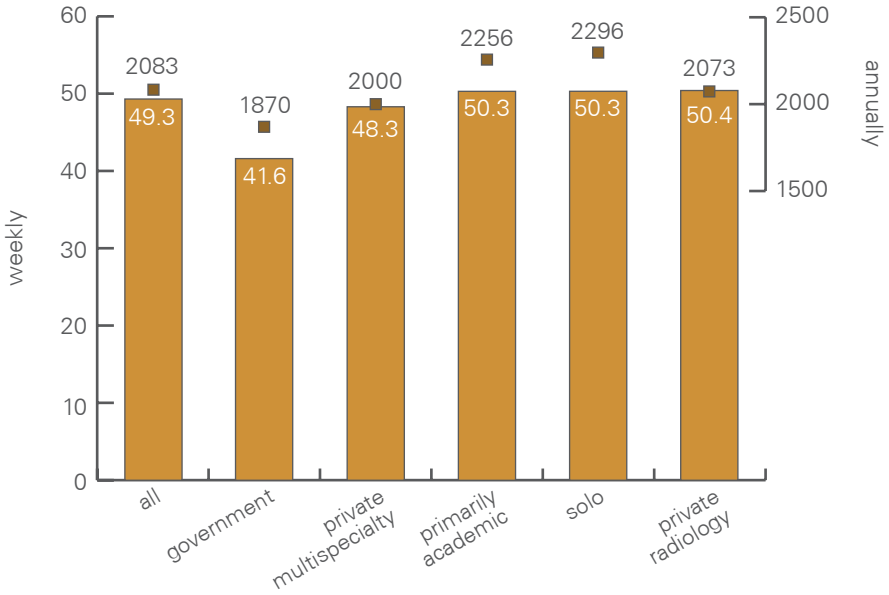
diagnostic radiology–interventional
diagnostic radiology–non-interventional

03 03 WORK PRODUCTIVITY & COMPENSATION

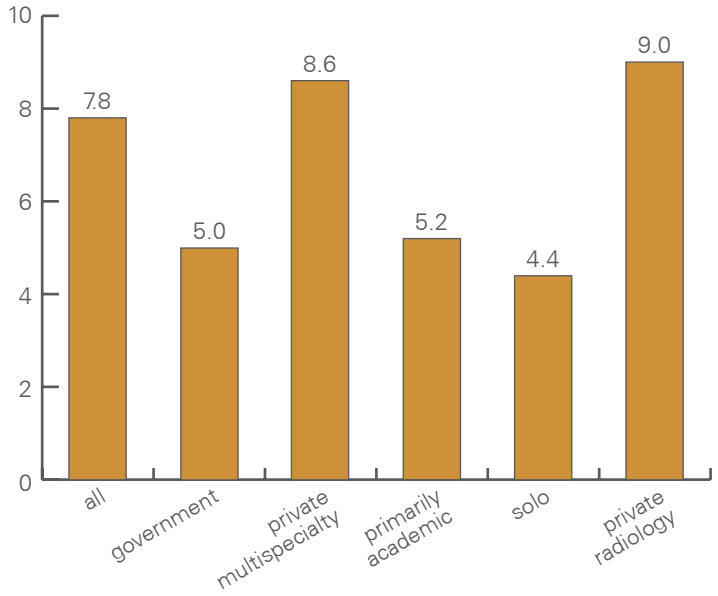
While different sources give different accounts of the change in work hours of radiologists over the past 10 years, it appears that the general consensus is that weekly hours worked currently stand at about 50 hours per week. It is unclear, however, whether this has remained flat over the decade or decreased since the late 1990s, when, the U.S. Department of Health and Human Services reports, general and diagnostic radiologists worked between 56 and 57 hours per week. Given anecdotal evidence that suggests that high-demand for radiologists drove them to more lifestyle-oriented positions with less or no call, which in turn drove the demand for off-hours teleradiology services, it seems likely that weekly hours have decreased.

While hours worked were decreasing, vacation days were increasing, from an average of 27 days in 1995 to 39 days in 2007, a 45% increase. At the peak of demand for radiologists, however, it was not unheard of for some to command 12–17 weeks of vacation and, in some cases, even one week on, one week off for a total of 26 weeks a year. Anecdotal evidence suggests that vacation days are decreasing in recent years as a result of the recession while some radiologists are choosing to "sell" their vacation time, working locum tenens for part of their time off in order to earn extra income. In spite of increasing vacation time, productivity went up significantly in the 10 years ending in 2007, from 12,800 procedures per radiologist to 14,900, a 16% increase. This change is a testament to the advances in PACS and imaging technology that have occurred in that time frame.

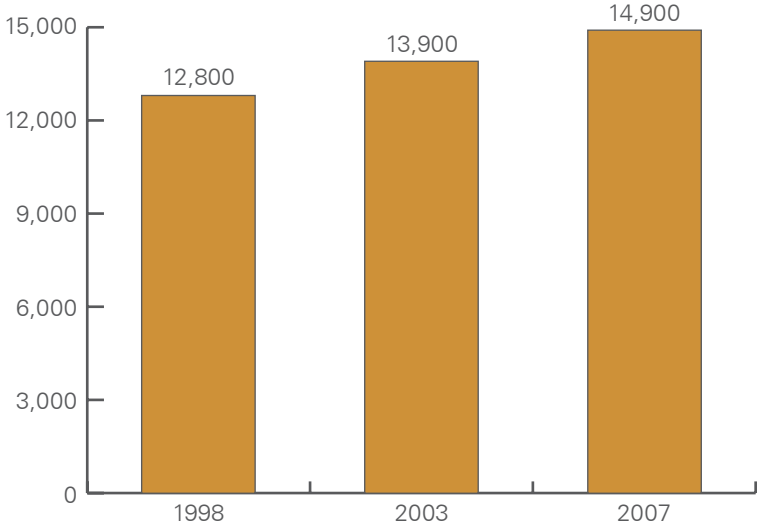
average hours worked, 2007



vacation time, 2007



annual procedures per radiologist



PROFILE OF A RADIOLOGIST

rate of sub-specialization

According to the American College of Radiology (ACR) about three quarters of radiologists sub-specialize. On average, radiologists spend between 40 and 60% of their time working in their specialty area. The four most popular sub-specialties account for between 40 and 65% of all radiologists.

There appears to be a trend toward more specialization in radiology. According to the Association of American Medical Colleges (AAMC), in the five years ending in 2007, the number of radiologists who sub-specialize increased by a third.

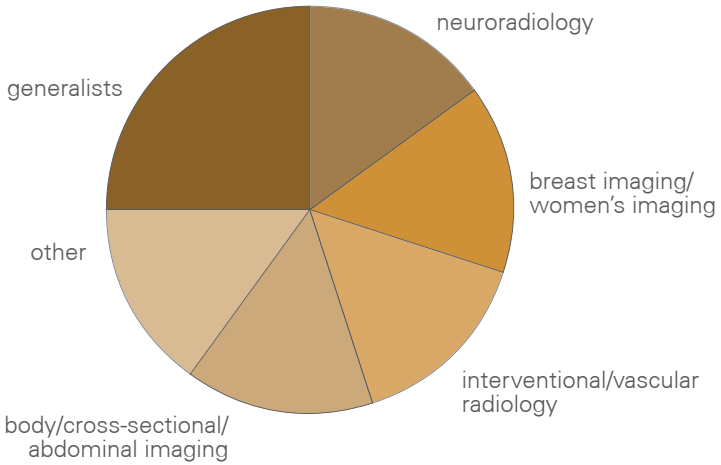
women in radiology

Despite the fact that medical schools have been graduating relatively equal percentages of women and men in recent years, women continue to represent a small proportion of radiologists. Currently the ACR estimates that 20% of radiologists are women whereas they represent about a third of doctors overall. The reason for this disparity? A study by the Radiologic Society of North America (RSNA) in 2005 revealed that 95% of female respondents did not choose radiology because of the "lack of direct patient contact."

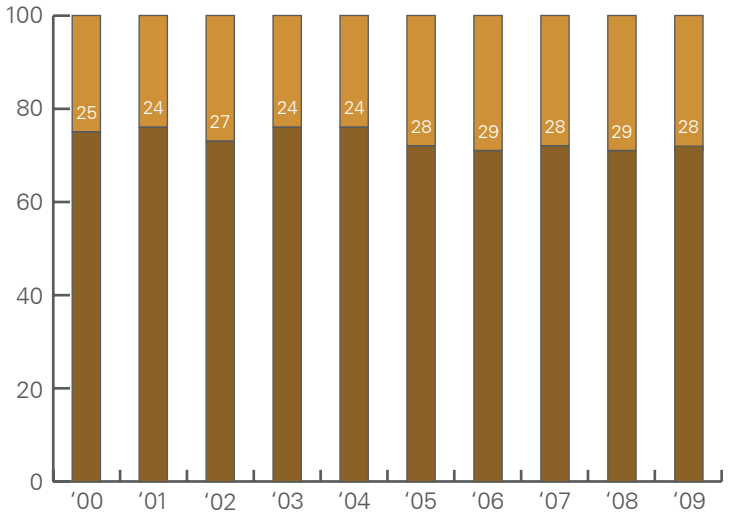
Given that female doctors are more likely to work reduced hours or take time off early in their careers for maternity leave, a career in teleradiology ought to be attractive to female doctors wanting a lifestyle more conducive to caring for children. The trend in residency transitions over the past decade implies that this may be the case. The percentage of women transitioning to practice in the second half of the decade was, on average, 15% higher than at the beginning of the decade.

The secondary reasons that women cited for not choosing to specialize in radiology in the RSNA study were a "lack of exposure to radiology" and a "lack of role models." These issues may self-correct if more women continue to be attracted to the specialty.

composition of radiology workforce by sub-specialty



residency transitions by gender (percentages)



percentage of females
percentage of males

05 01 TELERADIOLOGY

Average internet connectivity speed at the beginning of the decade was less than 56Kbps compared to the current 3.8Mbps.

TELERADIOLOGY

The rise of teleradiology is regarded as the defining event in the field of radiology in the past decade. Given the growth of the Internet in the last 10 years, teleradiology's quick adoption is no surprise. By 2003, 67% of radiology practices were using teleradiology.

The use of teleradiology assuaged a multitude of woes. As a recruiting tool it was handy—radiologists were attracted by the benefit of not having to take call. Teleradiology also made specialists available in rural areas where only a generalist might normally be hired. However, teleradiology has also caused the commoditization of radiology, making it more vulnerable than other specialties to competition from cheaper off-shore labor.

Nighthawk Radiology Services, founded in 2001, pioneered the call-coverage application of teleradiology, also referred to as external off-hours teleradiology services. EOTS has had a tremendous adoption rate from 15% in 2003 to 44% of all radiology practices in 2007. The use of EOTS in suburbs of small cities reaches up to 90%. EOTS coverage has been provided in three different ways: by U.S.-trained and licensed, domestically based physicians; by American physicians located in places like Australia and New Zealand; and by foreign physicians in countries like India and China. But certain obstacles, like language barriers and restrictions on final reads on Medicare/Medicaid cases, ensure that radiology services will continue to be, at least for the meantime, a predominantly domestic industry.

Whereas in years past, teleradiology may have been used to help mitigate the shortage of radiologists, it is now a fixture of the radiology landscape, with hospitals relying on a mix of on-site and off-site radiologists as a permanent solution. But a recent study shows that teleradiology and EOTS growth may be slowing, perhaps as a result of the softening of the radiology labor market and the fact that radiology practices are starting to take back their call coverage. However, this trend could very well reverse itself if the labor market tightens back up and shortages return.

By 2003, 67% of radiology practices were using teleradiology.

charges for teleradiology preliminary reads
2003 – $20 to $80
2010 – $15 to $65

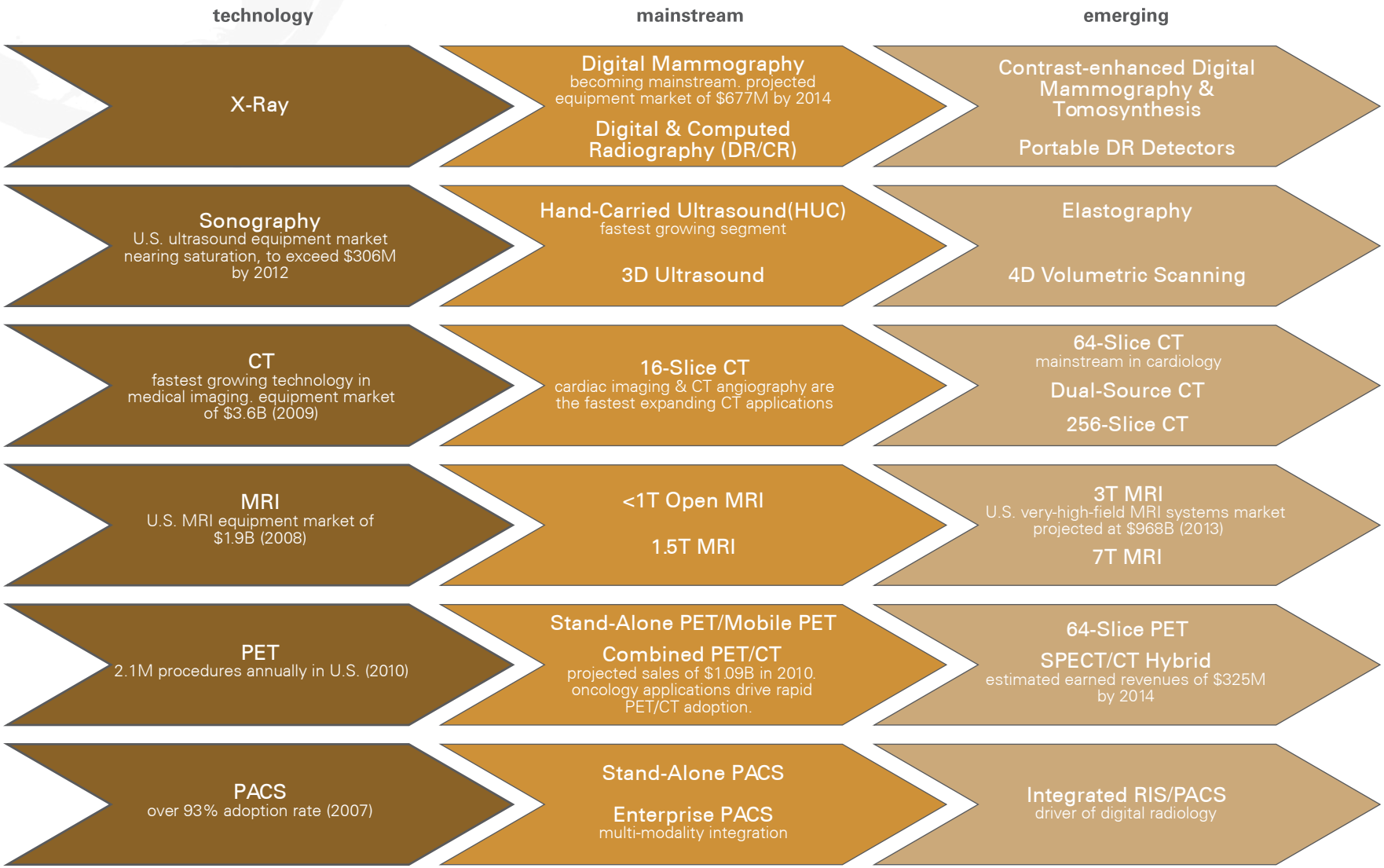
PRACTICE MANAGEMENT COMPANIES

One offshoot of the teleradiology industry are practice management companies (PMCs). The evolution of teleradiology progressed from night-time call coverage providing preliminary reads and later final reads, to daytime overflow and/or specialty reads. Some teleradiology services companies, realizing that there was a market for daytime final reads, transformed into full-service companies and began competing directly with radiology practices for hospital contracts. In other cases, PMCs evolved from traditional radiology practices, and now companies are being founded on the PMC business model from the beginning. In some instances PMCs displaced longstanding relationships between radiology practices and hospitals, promising to improve turnaround times and increase revenue organically.

A complicated scramble is underway in which radiology practices, PMCs, and teleradiology firms are competing for the same business. Teleradiology firms, whose customer base has historically been radiology practices, are also expanding their sites to include PMCs, in the process displeasing their radiology practice clients. As a result, many radiology groups have begun to take back their nighttime reads.

Even though teleradiology has contributed to the commoditization of radiology, it remains a relationship-based specialty, which gives an edge to radiology groups over sprawling PMCs. Referring doctors, especially emergency medicine specialists, want to know the radiologists to whom they send their studies; what's more, they prefer them to actually be on-site. While radiology groups are concerned about the corporatization of their specialty, the jury is still out as to whether the PMC model has lived up to its promise.

RADIOLOGY TECHNOLOGY ADOPTION



LEGISLATIVE LANDSCAPE

The technological advances that radiology has experienced in recent decades have made available new and often expensive diagnostic studies that have caused radiology to contribute significantly to the rising cost of healthcare. Legislation has been passed to try to reduce the Medicare/ Medicaid payments for the technical component (TC) of radiology studies. The Deficit Reduction Act put limits on non-hospital imaging services, which some argue put undue pressure on independent imaging centers. The 75% utilization rate assumption imposed by the Patient Protection and Affordable Care Act, in fact, scaled back a planned jump to 90% that would have taken effect in 2010, but even 75% seems unattainable based on current practices.

legislation / regulations	year	summary	impact on radiology
Deficit Reduction Act (DRA)	2005	DRA placed a cap on the technical component of Medicare payments for non-hospital imaging services. The DRA impact translates to an average 18.5% reduction in Medicare payments due to the technical component caps.	Impact varied by modality with MRI most impacted: - MRI: 34.3% reduction - Interventional radiology: 16.6% reduction - Ultrasound: 15.5% reduction - Radiation oncology: 13.1% reduction - X-ray: 12.5% reduction - Nuclear medicine: 12.2% - CT: 10.9% reduction - The caps do not apply to diagnostic or screening mammography.
Centers for Medicare & Medicaid Services (CMS) Expands Coverage for PET	2009	Triples the number of cancer types covered by CMS' guidelines for initial treatment using FDG PET.	CMS will now provide reimbursement for PET scans used in the initial treatment-strategy evaluation of patients with most types of solid tumors and will allow for use of PET in subsequent treatment-strategy evaluations for an expanded number of cancer types.
Health Information Technology for Economic and Clinical Health Act (HITECH Act)	2009	Provides $21 billion to fund a financial incentive program for physicians and hospitals to adopt health information technology. The program will be in place by 2011.	Radiology is already a very technology-oriented specialty. The adoption of EMRs will further improve the speed and efficiency of radiology studies.
Patient Protection and Affordable Care Act (PPAC)	2010	- Increases the utilization rate assumption for CT and MRI from 50 to 75% effective 2011. Nuclear medicine and PET services appear to have avoided a payment cut. - Also increases the TC discount for additional imaging studies performed on the same Medicare patient, on the same day, from 25% to 50%.	The utilization rate assumption seems to be out of synch with actual practice. Rural facilities on average have a 48% utilization rate and non-rural facilities a 54% utilization rate. This requirement will most likely increase the rate of imaging center closings across the country. The ACR strenuously opposed this change saying, "Medicare imaging expenditures, which often trend with private insurance, are down since 2007. Imaging is not an escalating medical expense and should not have been cut in this fashion."

retirement fast facts
number of retired radiologists: ***6,500***
percent of radiologists above age 55: ***44***
number of hospitals with only one radiologist aged 65 or older: ***600***

THE FUTURE OF RADIOLOGY

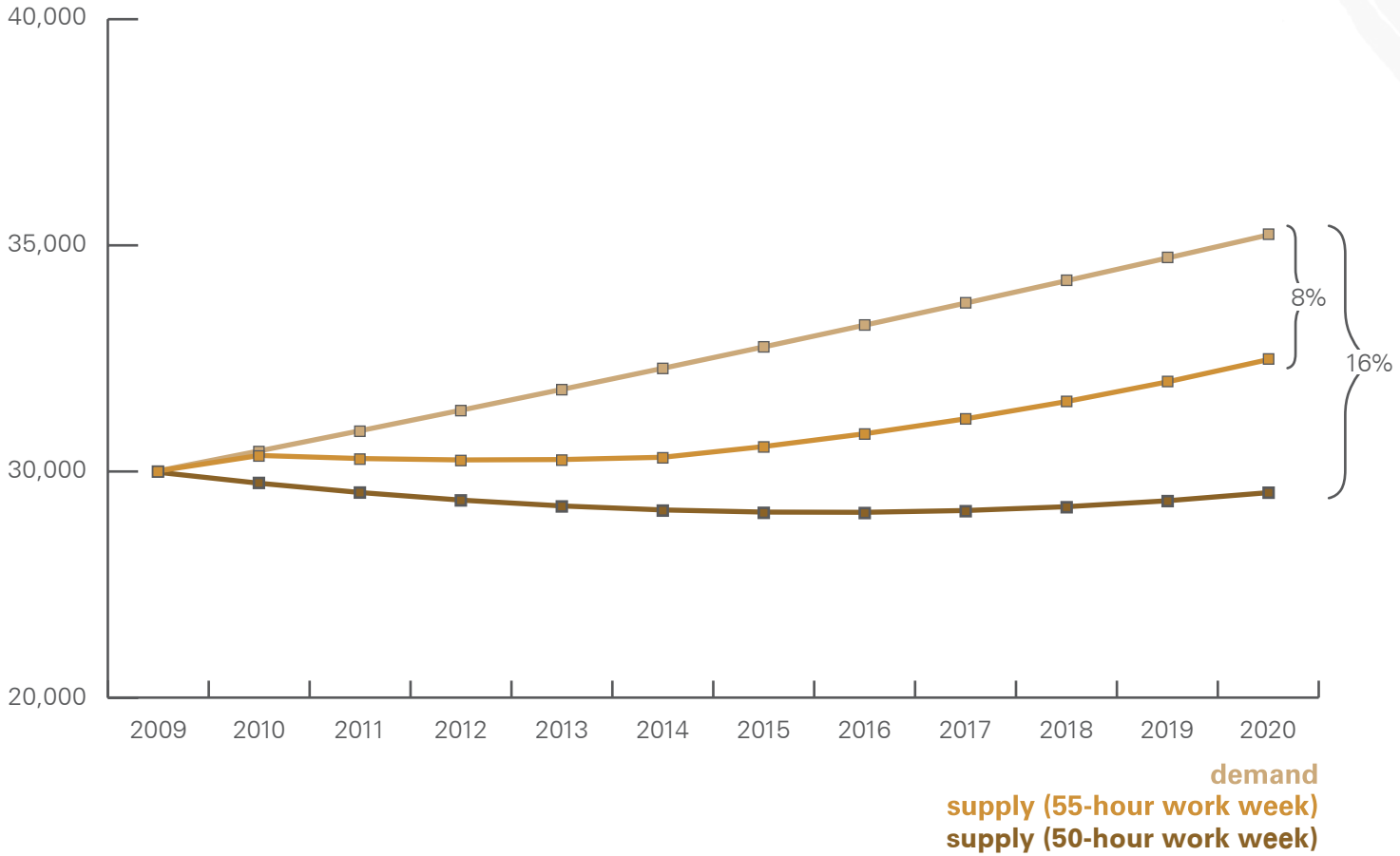
As healthcare legislation becomes fully implemented, especially the HITECH Act and PPAC, more pressure will come to bear on healthcare providers to become more efficient, implement new technologies, and generally do more with less. Radiology will feel the squeeze from reduced technical component payments when PPAC's 75% assumption goes into effect. We should expect to see an increase in imaging center closings as facilities with low volume perish and only the fittest survive. But doctors almost universally assert that healthcare reform must include some sort of reform to medical malpractice litigation, which currently encourages the ordering of unnecessary tests and procedures to protect doctors from lawsuits and costs taxpayers and consumers billions of dollars every year.

Teleradiology will continue to be an important aspect of how radiology is practiced, helping to cover call and supplement radiology deficits in rural settings. It is unclear, however, to what extent off-shoring will be part of the teleradiology landscape. Protectionist policies from the CMS may very well clash with World Trade Organization rules. Whether globalization of medical care will win out is as yet unknown.

Supply will continue to be an issue in the coming decade. A shortage similar to the one at the beginning of the century is possible by the end of the next decade. Retiring radiologists will exacerbate the problem with 44% of them reaching age 65 within the next 10 years. Mounting frustrations with Medicare/Medicaid policy and an improving stock market could be the final impetus that drives still-active retirement age radiologists to hang up their lab coats for good.

Based on current supply and demand trends (and accounting for 32 million newly insured patients), by 2020, there could be a 16% gap in supply versus demand. But there are a lot of x-factors: the newly insured could have disproportionately high demand for services; aging baby boomers could tax the system more than expected; the full impact of Medicare cuts is unknown. There are several ways that demand can be met: residency slots can be increased at a faster rate; radiologists could work longer hours or delay retirement by a year or two; productivity could increase exponentially; or a combination of all of the above. There is good reason to believe that, as with the last shortage, market forces will intervene to solve the problem.

radiologist workforce supply & demand scenarios, 2009-2020



Assumptions:
Supply and demand were calculated using current trends. Growth of residency transitions is projected at 3.11% per year (the average over the last 18 years). The number of retiring radiologists (retirement age set at 64 based on the current average retirement age for radiologists) is spread out evenly at 1,467 per year. Demand growth has averaged 3.18% over the past nine years, and starting in, 2014, it is adjusted to 3.51% to accommodate 32 million newly insured patients (this assumes that increasing the pool of insured people by 10% will cause a 10% increase in rate of demand). Productivity increased 16% over the 10 years ending in 2007, or a compounded average of 1.7% per year.

09 01 APPENDIX: DEFENSIVE MEDICINE

a radiologist's perspective

"ER physicians are on the 'front lines' and are in many ways, totally unprotected from liability, and I would imagine that the percent of defensive medicine is upwards of 75% of their ordering, and with good reason. If the government really wants to make a sincere attempt at healthcare cost containment, they need to include tort reform with healthcare reform. If tort reform is not taken seriously, I don't know how physicians, healthcare workers, and the general public receiving healthcare can believe healthcare reform to make a difference, as we all will suffer while lawyers continue to profit."

—Radiologist in California

DEFENSIVE MEDICINE

In a survey of 3,070 physicians, of which six percent were radiologists, Jackson Healthcare discovered that defensive medicine is very widely practiced. Overall, 92.3% of physicians acknowledged practicing defensive medicine. While radiology was second to last among all specialties in terms of percentage of physicians answering "yes" to the question "Do you practice defensive medicine?," at 88.7%, the vast majority of radiologists clearly practice defensive medicine. The range among all specialties was 96.3% of emergency medicine specialists, on the high end, to 80% of pediatricians, on the low end. The role of emergency medicine in the practice of defensive medicine was highlighted in the open-ended comments, where 27% of radiologists stated (unprompted) that the majority of defensive medicine imaging studies are ordered through the emergency room.

Emergency medicine specialists estimate that on average just under 40% of their practice is defensive in nature. In contrast, radiologists attribute 30% of their practice to defensive medicine. While the number of radiologists who claim to practice defensive medicine is lower than other specialties, the proportion of their practice associated with defensive medicine is in the top four.

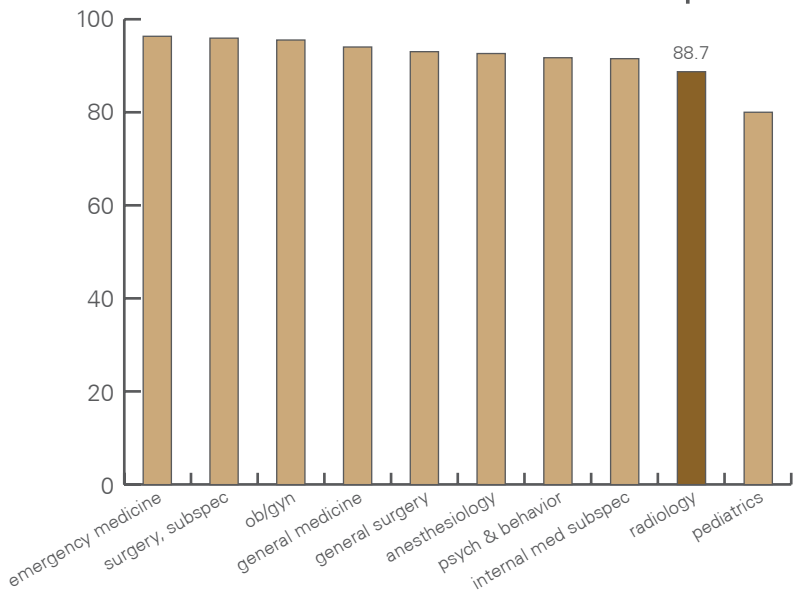
Although the emergency room may generate the greatest percentage of defensive medicine studies, it is OB/GYN surgery that has the majority of paid malpractice claims. According to Physicians Insurers Association of America (PIAA), radiology is in the top 10 with just under 4,000 paid claims between 1985 and 2008. While radiologists are named often in malpractice suits in connection with suits against other doctors, the cases against them are very frequently dropped.

A third of radiologists responding to Jackson Healthcare's defensive medicine study cited unnecessary exposure to radiation as an example of how defensive medicine impacts patient care.

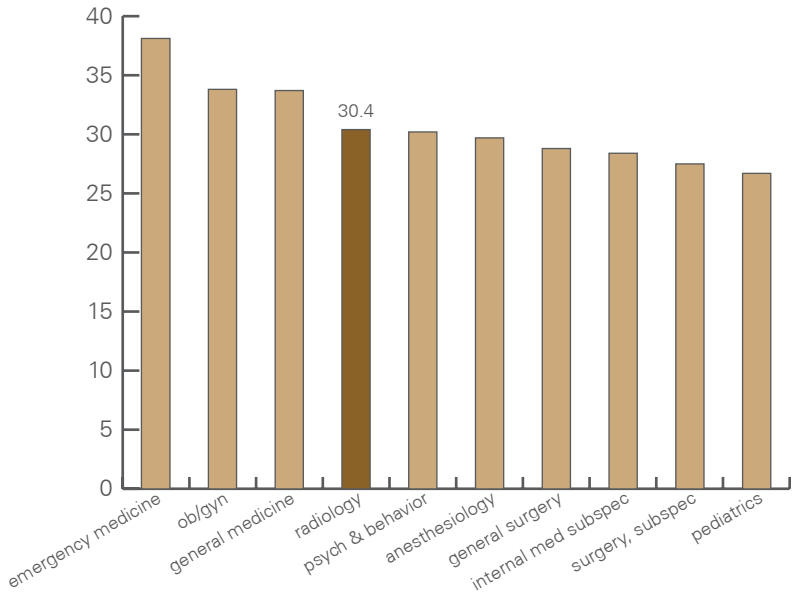
"I personally believe that the idea of a medical 'mistake' fund should be created which should benefit patients who are the unfortunate victim of a medical error, and that the funds should come from the current malpractice insurance physicians pay (i.e. instead of paying malpractice, pay into this fund). The state medical boards should be the ones to police physicians who consistently make 'mistakes' and suspend or revoke licenses."

—Radiologist in California

percentage of radiologists who practice defensive medicine vs. other specialties



percentage of practice that is defensive in nature, 2010



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ABOUT THE AUTHOR

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The first employee hired by the start-up that became LocumTenens.com, Ms. Thill joined the agency in 1996 and became partner in 1998. Since those early years she has been instrumental in the firm's growth and success, facilitating its entry into new specialty markets and adding structure and accountability to newly formed teams. After taking over LocumTenens.com's radiology team as its vice president in 2002, Ms. Thill has taken the team from a negative position to producing roughly 20 percent of the firm's revenue annually. Since then she has also taken over direct management of the anesthesia team, and her role has expanded into operations and CVO, giving her a broad view of the locum tenens industry.

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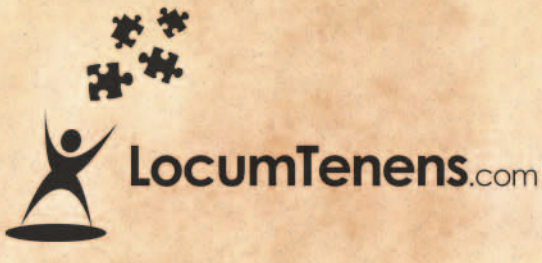

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