





Examining topics affecting the recruitment and retention of physicians and advanced practice professionals





Radiology Supply, Demand and Locum Tenens Staffing Trends

Introduction

Staff Care is one the nation's leading locum tenens staffing firms and is a company of a AMN Healthcare (NYSE: AMN), the largest healthcare staffing organization in the United States and the innovator of workforce solutions.

Staff Care specializes in the locum tenens staffing of physicians in all specialties and also provides nationwide locum tenens staffing of advanced practice and dental professionals.

As the thought leader in its field, Staff Care produces a series of surveys, white papers, books, peaking presentations and other resources intended to provide insight into physician staffing, locum tenens, and related trends.

This white paper examines supply, demand and locum tenens staffing trends pertaining to radiologists and begins with a history of the specialty and information on training and licensure of radiologists.

Radiology: Definition and History

A radiologist is defined as a physician who uses various image-taking methodologies to diagnose and manage patients and provide therapeutic options. Physicians practicing in the field of radiology specialize in diagnostic radiology, interventional radiology, or radiation oncology. They also may certify in a number of subspecialties. The radiology specialty board also certifies in medical physics and issues specific certificates within this discipline.

Among the imaging technologies that comprise radiology are x-rays ("plain film"), computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), ultrasound, bone density scans and digital mammography.

The practice of using technology to take diagnostic images began with the detection and development of x-rays by Wilhelm Roentgen, a German mechanical engineer and physicist, in 1895. Roentgen was able to take the first x-ray, which was of his wife, and subsequently became the first person to win the Nobel Prize in physics in 1901. He had experimented with passing electric currents through a tube and by doing so, was able to turn this experiment into an X-ray.

The first person to receive an X-ray for medical purposes was a young American, Eddie McCarthy, who fell while skating on the Connecticut River in 1896 and fractured his left wrist. Originally, x-rays were captured on photographic plates but eventually images were transitioned to film. Today, many x-ray images are stored digitally.



Ultrasound started to be used in the 1950s, with "real-time" ultrasound machines coming online in the late 1970s. CT scanning, invented by Godfrey Hounsfield, came into use in the 1970s. Like many forms of diagnostic imaging, the use of CT scans has greatly increased, with approximately 80 million such scans taken in the U.S. each year, up from about three million in 1980.

The ability to use x-rays was transformational in medicine. It allowed for the diagnosis of fractures, bone cancer, tumors, emphysema, cystic fibrosis and other maladies. It quickly became a key diagnostic tool and has been one for well over 100 years, with several hundred million x-rays taken in the U.S. annually. Other forms of diagnostic imaging allow for pictures of soft tissue to be taken and for the viewing of 3-D images of the body. These techniques have become so important that few procedures or treatments for chronic, acute or emergent problems take place today without a diagnostic image being taken and interpreted.



Radiology Training

Radiologists follow the standard path of medical training by completing a bachelor's degree at a four-year college and subsequently obtaining a medical degree.

According to Study.com, "After graduating from medical school, an aspiring radiologist must complete four years of a radiology residency, which is a combination of specialty medical education and paid on-thejob training. Residents complete clinical rotations in different subspecialties of radiology, attend lectures, and conduct research. Some radiologists then go on to complete additional training so they can further specialize. For example, interventional radiology, which requires doctors to use catheters, wires and other probes during certain imaging procedures, involves 1-2 years of fellowship training following completion of a residency".

In addition, the continuing emergence of new technologies requires extra training so that equipment can be used safely and accurately. It's common for even advanced radiologists with many years of practice to take part in specialized training programs.





Licensure and Certification

A radiologist must be licensed to practice medicine, and licenses must be renewed periodically. Licensure can be earned by passing the United States Medical Licensing Exam (USMLE) or the Comprehensive Osteopathic Medical Licensing Exam (COMLEX), and meeting any other state requirements. In addition, many radiologists are certified through the American Board of Radiology (ABR) or the American Osteopathic Board of Radiology (AOBR). Board certification is optional, but requires continuing education to be maintained.

Career Information

A radiologist's day-to-day job duties might include interpreting information gathered through imaging techniques, communicating results with doctors and patients, writing medical reports, and explaining treatment risks, benefits, and alternatives to patients. Typically, a radiologist oversees a team of imaging technicians and assistants. Radiologists can stay current on the latest developments in radiology through online classes and other forms of continuing education.

Areas of Focus and Specialization

Radiologists have a variety of areas of focus and specialization, including:

Diagnostic Radiology

According to the American Board of Radiology (ABR), "A diagnostic radiologist uses x-rays, radionuclides, ultrasound, and electromagnetic radiation to diagnose and treat disease. Training required is five years: one year of clinical training, followed by four years of radiology training. The majority of trainees complete an additional year of training during a fellowship. **A diagnostic radiologist who wishes to specialize in one of the five areas listed below must first certify in diagnostic radiology.**"

- Neuroradiology
- Nuclear Radiology
- Pain Medicine
- Pediatric Radiology
- Vascular and Interventional Radiology









Subspecialty Descriptions

Below is a description of various radiology subspecialties as defined by the ABR. Certification in one of the following subspecialties requires additional training and examination.

Neuroradiology

A specialist in neuroradiology diagnoses and treats disorders of the brain, sinuses, spine, spinal cord, neck, and the central nervous system, such as aging and degenerative diseases, seizure disorders, cancer, stroke, cerebrovascular diseases, and trauma. Imaging commonly used in neuroradiology includes angiography, myelography, interventional techniques, and magnetic resonance imaging (MRI). Two additional years – one year of a fellowship and one year of practice or additional approved training – are required.

Nuclear Radiology

A specialist in nuclear radiology uses the administration of trace amounts of radioactive substances (radionuclides) to provide images and information for making a diagnosis. Imaging that can involve nuclear radiology includes positron emission tomography (PET) and single photon emission computed tomography (SPECT) scans. One additional year of fellowship training is required.

Pain Medicine

A specialist in pain medicine provides care for patients with acute, chronic, and/or cancer pain in both inpatient and outpatient settings while coordinating patient care needs with other specialists. One additional year of fellowship training is required.

Pediatric Radiology

A specialist in pediatric radiology uses imaging and interventional procedures related to the diagnosis, care, and management of congenital abnormalities (those present at birth) and diseases particular to infants and children. A pediatric radiologist also treats diseases that begin in childhood and can cause impairments in adulthood. Two additional years – one year of a fellowship and one year of practice or additional approved training – are required.





Vascular and Interventional Radiology

A specialist in vascular and interventional radiology diagnoses and treats diseases with the use of various radiologic imaging technologies, including fluoroscopy, digital radiography, computed tomography (CT), sonography, and magnetic resonance imaging (MRI). Therapies include angioplasty, stent placement, thrombolysis, embolization, biliary and genitourinary drainages, abscess drainages, and others. Two additional years – one year of a fellowship and one year of practice or additional approved training – are required."

Work Settings for Radiologists

There are various work settings in which radiologists can practice. These include:

- 1. Public and Private Hospitals: Although radiologists may or may not be hospital employees, they often work within the hospital confines using the hospital's radiology equipment as well working with the radiology technologists on the hospital's staff.
- 2. Medical Groups: Radiologists can enter into partnerships with other physicians to form a medical group/clinic/private practice by way of a corporation, partnership or some form of a limited liability company.
- **3. Private Solo Practice:** The private practice option with one physician remains an option but is increasingly rare.
- **4. Teleradiology:** Beginning in around 2000, radiologists began to work from home or from other remote locations as Teleradiologists. These doctors work within a group, individually, or for an agency and conduct business apart from facilities at which the imaging occurs.
- 5. Locum tenens: Radiologists may choose to work temporary (locum tenens) assignments, usually through a staffing firm, though they also may schedule temporary assignments on their own.

Work Settings for Radiologists

Supply and demand for physicians in various specialties is subject to cyclical trends, and that is certainly the case in radiology, a specialty in which demand saw a significant spike some years ago, a subsequent sharp decline, and is now experiencing a demand acceleration.

Following is a demographic breakdown of the current diagnostic radiology workforce, using statistics from the AMA's Physician Master File.







Diagnostic Radiology Demographics

Total Physicians	28,348
Total Physicians in Active Patient Care	20,970
International Medical School Graduates	2,179 (10% of active patient care)
Board Certified	19,941
Research	94
Administrative / Teaching	416
Last Year Residents	1,058
Female	5,334 (25% of active patient care)
Male	15,636 (75% of active patient care)
Age 45 and over	17,165 (82% of total physicians)
Age 55 and over	11,129 (53% of total physicians)

Source: AMA Physician Master File. 2018

As these numbers indicate, over half of all diagnostic radiologists (53%) are 55 years old or older, compared to 42% of all physicians. Radiologists are relatively older, on average, than physicians generally and a significant wave of retirements in the specialty can be anticipated. One quarter of diagnostic radiologists (25%) are female, compared to approximately 35% of all physicians, while 10% are international medical graduates (IMGs) compared to approximately 25% of all physicians.





A Significant Increase in Locum Tenens Radiology "Days Requested"

Regarding the cyclical nature of physician supply and demand trends referenced above, it is interesting to note that approximately 15 years ago radiology was considered to be the most in-demand specialty in the United States.

Emerging technologies and favorable reimbursement structures drove what was then a strong buyer's market in radiology in which radiologists were in high demand and had many practice opportunities from which to choose.

Demand for radiology diminished over subsequent years due to a robust supply of residents entering the specialty, payment cuts for imaging services, and utilization suppression linked to both the 2007 recession and to managed care, as well as the growing use of both domestic and offshore teleradiology services.

In the last five years, however, demand for radiologists has resurfaced and gained momentum. Staff Care tracks demand for various medical specialties through the number of temporary "days requested" we receive from clients and potential clients. The number of open days we have been asked to fill with locum tenens radiologists has grown significantly, as the numbers below demonstrate.

Locum Tenens "Days Requested"/Radiology

2015	2017	2019	Five Year	235%
11,498	18,378	38,640	Growth rate:	233/0

Merritt Hawkins, firm specializing in the recruitment of physicians into permanent positions (and also a company of AMN Healthcare) has observed a similar trend. In 2012, radiology dropped out of Merritt Hawkins' top 20 most requested search assignments altogether.

It returned for the first time since then in Merritt Hawkins' 2016 Incentive Review and built on its momentum in 2017, with a 100% increase in search assignments year-over-year. In the 2018 Incentive Review, radiology placed in the top four of Merritt Hawkins' most requested physician search assignments, following only family medicine, psychiatry and internal medicine, with number of search assignments increasing 65% year-over-year. It also was number four among physician specialties in the firm's 2019 Incentive Review.







A Growing Shortage of Specialists

Renewed demand for radiologists was inevitable because imaging remains central to diagnostic and procedural work in today's healthcare system, in which very little transpires without a picture. The importance of radiology is enhanced with each technological advance (including artificial intelligence) that makes imaging techniques more varied and effective.

Combine this with improvements in the economy allowing for more elective procedures and the effect of population aging on utilization, and demand for radiologists was inevitably going to rise at some point. In addition, as referenced above, over 50% of radiologists are 55 or older and attrition is beginning to reduce the candidate pool.

Increased demand for radiologists is a symptom of the larger shortage of medical specialists in the overall physician workforce. In its 2019 study, the Association of American Medical Colleges (AAMC) projects a shortage of up to 121,900 physicians by 2032. This will include a shortage of up to 55,000 primary care physicians but an even greater deficit of up to 67,000 specialists, among whom are radiologists (*The Complexities of Physician Supply and Demand. AAMC. April, 2019*).

The shortage of specialists will be driven in large part by population aging at a time when over 10,000 Baby Boomers turn 65 every day. According to the Centers for Disease Control and Prevention (CDC), people 65 years old and older account for 37% of diagnostic tests and procedures (including radiologic procedures) while comprising only 14% of the population.

A 2013 Health Affairs study projected that as the U.S. population ages, demand for radiology services will grow approximately 18% between 2013 and 2025 (*Health Affairs. November, 2013*).

Rising demand for radiology also is notable as it suggests that even with the widespread use of teleradiology, which allows for the distribution of imaging studies to radiologists nationally and even internationally, healthcare facilities are again seeking the assistance of recruiting firms such as Merritt Hawkins to help them find radiologists. Demand now is at the level where facilities are seeking both more traditional, on-site radiologists and those working as teleradiologists. Teleradiology has gained momentum recently due to technological advancements that improve quality and the ability of radiologists to work remotely.





Radiologist Practice Patterns and Perspectives

Every other year, Merritt Hawkins conducts a nationwide survey of physicians on behalf of The Physicians Foundation (www.physiciansfoundation.org), a not-for-profit grant-making organization dedicated to advancing the work of practicing physicians. The Survey of America's Physicians examines the practice the patterns, career plans and perspectives of today's doctors. Based on data from close to 9,000 physicians, it is one of the most comprehensive physician surveys undertaken in the U.S. Below are responses from 296 radiologists who completed the survey with comparisons to all physicians who responded.

	All	Rad
Practice owner/partner/associate	31.4%	39.3%
Employed by a hospital	19.1%	19.7%
Employed by a hospital-owned medical group	17.4%	7.5%
Employed by a physician-owned medical group	12.6%	18.9%
Other	19.5%	14.6%

1. What is your current professional status?

2. Which best describes your professional morale and your feelings about the current state of the medical profession?

	All	Rad
Very positive	7.0%	6.5%
Somewhat positive	37.7%	39.1%
Somewhat negative	37.4%	41.8%
Very negative	17.9%	12.6%







	All	Rad
0-20	4.9%	5.1%
21-30	5.0%	3.4%
31-40	11.7%	8.5%
41-50	24.1%	26.5%
51-60	26.1%	36.1%
61-70	15.7%	11.9%
71-80	7.8%	6.1%
81 or more	4.7%	2.4%
OVERALL AVERAGE	51.4%	50.8 hours

3. On average, how many hours do you work per week (include all clinical and non-clinical duties)?

4. Of these, how many hours do you work each week on NON-CLINICAL (paperwork) duties only?

	All	Rad
0-5	25%	56.6%
6-10	28.6%	28.1%
11-15	18.8%	7.5%
16-20	12.3%	4.1%
21-25	6.1%	1.7%
26 or more	9.2%	2.0%
OVERALL AVERAGE	11.37 hours	6.3 hours





5. Which of the following best describes your current practice?

	All	Rad
I am overextended and overworked	23.9%	26.2%
l am at full capacity	55.6%	62.2%
I have time to see more patients and assume more duties	20.5%	11.6%

6. To what extent do you have feelings of professional burnout in your medical career?

	All	Rad
No such feelings	5.7%	5.1%
Rarely have these feelings	16.6%	15.7%
Sometimes have these feelings	37.7%	39.1%
Often have these feelings	31.0%	31.6%
Always have these feelings	9.1%	8.5%

7. Is any of your compensation tied to quality metrics such as patient satisfaction, following treatment guidelines, compliance, "citizenship", error rates, etc.?

	All	Rad
Yes	47.1%	35.8%
No	39.5%	48.7%
Unsure	13.4%	15.5%



	All	Rad
0-10	41.9%	44.3%
11-20	22.4%	22.6%
21-30	8.4%	4.7%
31-40	2.5%	2.8%
41-50	1.8%	1.9%
51 or more	4.2%	3.8%
OVERALL AVERAGE	14.2%	13.4%

8. What percent of your TOTAL compensation is tied to such metrics?

9. On the whole, how would you describe the current state of relations between physicians and hospitals, many of which now would employ physicians?

	All	Rad
Mostly positive and cooperative	6.1%	3.1%
Somewhat positive and cooperative	25.6%	22.6%
Neither positive nor negative	21.8%	23.7%
Somewhat negative and adversarial	34.4%	37.7%
Mostly negative and adversarial	12.0%	12.7%

Source: A Survey of America's Physicians. The Physicians Foundation/Merritt Hawkins. September, 2018

Survey responses above indicate several characteristics of note regarding radiologists today. One is that they are more likely to practice in independent owner status than physicians generally. Over 39% of radiologists indicate they are private practice owners or partners compared to less than one-third of all physicians (31.4%).

About one-fifth (18.9%) of radiologists indicate they are employed by a physician-owned group, compared to 12.6% of all physicians. Over 58% of radiologists, therefore, are either practice owners/partners or they are employed directly by physicians, compared to 44.0% of all physicians.





Over one-fourth of all radiologists (27.2%) indicate they are employed directly by a hospital or by a hospital-owned medical group, compared to 36.5% of all physicians.

The fact that a relatively high number of radiologists are independent practice owners or are employed by physicians can affect how radiologists are recruited today, a topic discussed in more detail below.



Overwork and Burnout

The Survey of America's Physicians indicates that the state of physician morale is a problematic one. The majority of all physicians responding to the survey (55.3%), indicate their morale is either somewhat negative or very negative, as do the majority of radiologists (54.4%).

Part of these feelings of low morale may be traced to overwork and burnout. The great majority of all physicians who responded to the survey (79.5%) indicate they are either at capacity in their practices or they are overworked and overextended. An even higher number of radiologists (88.4%) indicate they are either at capacity or are overworked and overextended. This is the case even though radiologists work an average of 50.8 hours a week, according to the survey, less than the average of 51.4 hours per week for all physicians.

The survey indicates that feelings of professional burnout are common among physicians, with 77.8% of all doctors reporting they sometimes, often or always have feelings of burnout. Among radiologists, the number is slightly higher at 79.2%. This is the case even though radiologists report spending considerably less time on non-clinical paperwork per week (6.3 hours) than all physicians, who report spending an average of 11.37 hours on non-clinical paperwork per week.

Non-clinical paperwork duties are identified as a significant source of physician dissatisfaction in the survey and are considered a contributor to physician burnout. Though radiologist experience less of this paperwork than most physicians, long shifts, the absence of call, increasing volumes, heavy emphasis on reducing turnaround times, reimbursement changes/reductions and the amount of focus required to interpret images (often without the direct patient interaction that sustains other types of physicians) may be contributors to the often poor morale and high rates of burnout among radiologists.

For these reasons, **a** growing number of radiologists are working on a locum tenens basis, as locum tenens allows physicians to focus more on clinical duties and less on administrative duties, and allows them to choose when and where they will work.





Compensation in Radiology

Each year Merritt Hawkins releases a report tracking the salaries and other incentives our clients offer to recruit physicians in a variety of specialties. Merritt Hawkins' annual Review of Physician and Advanced Practitioner Recruiting Incentives is entering its 26th year and includes data that now serves as a benchmark for healthcare facilities nationwide seeking to structure competitive physician recruiting packages.

Below are low, average and high radiology salary offers as listed in Merritt Hawkins' 2019 Incentive Review.

This data reflects starting salaries for radiologists not inclusive of signing bonuses, production bonuses or other forms of compensation. Merritt Hawkins' data therefore is distinct from other physician compensation sources, which typically track the overall compensation physicians earn and indicate as gross income on their tax returns. Numbers from several of these surveys are indicated below.

Average Compensation for Radiologists/Various Sources

Sullivan Cotter	\$508,225
American Medical Group Assn.	\$482.599
Integrated Healthcare Strategies	\$466,884
Merritt Hawkins	\$387,000

When costs such as malpractice insurance, health insurance and other benefits are factored into the equation, the total compensation hospitals and other healthcare facilities pay to radiologists often is comparable to what they might pay as a daily rate for locum tenens coverage.









Locum Tenens Staffing Recommendations for Radiology

As was noted above, over the last five years Staff Care experienced a 235% growth rate in the number of locum tenens days requested for radiology we received from clients, including hospitals, medical groups and other healthcare facilities.

In 2018, the greatest area of need Staff Care saw in radiology was for locum tenens diagnostic radiologists who also performed minor interventional procedures.

By contrast, in 2019 need in the specialty was primarily reflected by requests for locum tenens radiologists who provide subspecialty services, including mammography, neuroradiology and musculo-skeletal. These needs were for the most part a result of patient aging, which is driving demand for medical specialists across the board, a trend alluded to earlier in this white paper.

Healthcare facilities should consider that finding radiologists to provide subspecialty services, whether on a locum tenens or a permanent basis, is likely to become more difficult and staffing requirements should be planned for as far in advance as possible.

The use of teleradiology is becoming more widespread and also is creating more demand for locum tenens radiologists who read remotely. Though hospitals may want "boots on the ground" they use locum tenens radiologists to maintain services while they seek permanent physicians, or they may simply rely on tele-radiologists as a substitute for permanent physicians. Healthcare facilities therefore should consider adding tele-radiology to their service lines.

In 2019, Staff Care also observed that academic medical centers became more active in incorporating locum tenens radiologists into their staffing plans, underscoring the growing staffing requirements in academic settings.





Credentialing

A growing number of Staff Care clients require locum tenens radiologists to be credentialed at multiple facilities. With the ongoing surge of merger and acquisition activity in healthcare, it is increasingly important to understand the various locum tenens provider credentialing processes for management groups.

Due to the expansion of these management groups, the credentialing process can be lengthier in nature, adding an additional steps. Most groups have their own process, in addition to the individual hospitals for which the radiology locum tenens will read. For teleradiology, there can be many hospitals involved and each will require a separate privileging process.

To expedite credentialing, we encourage locums providers to have certifications, references and copies of their case logs at hand. It is also important that they have any documentation pertaining to their previous 10 years of malpractice history.

Billing for Locum Tenens Radiology

Staff Care encourages our clients to be proactive when billing for the services of locum tenens radiologists and other providers, initiating the payer application process prior to the arrival of the locum tenens physician. This should be done while working concurrently through the credentialing process. As a large, national locum tenens staffing company, Staff Care can assist clients in this regard through our Billing Department.

Clients also are asking for productivity requirements to be built into locum tenens contracts. A growing number of healthcare facilities are interested in paying providers based on of a productivity model, in contrast to the traditional model which has been based on hours worked.









Pay and Planning for Locum Tenens

Given current supply and demand dynamics, healthcare facilities should plan for a highly competitive market for locum tenens radiologists. Pay rates are rising and physicians now are being offered greater flexibility in pay, location, setting and schedule.

Though many healthcare facilities today are attempting to do more with less, investing upfront in the locum tenens process, including provider orientation and PACs training, reduces costs in the long-term. All physicians require a ramp up period, whether they are working as locum tenens or are in permanent positions. It is a mistake to require radiologists to read at the maximum within the first few days of their assignment. Some acclimation may be necessary before they reach peak productivity.

It is also important to vet a locum tenens' volume capabilities and modality skills on a case-by-case basis, being clear about volume expectations and modalities needed. A full-service staffing company will assist in creating a profile of the opportunity and ensure the locum tenens radiologist is a match for the facility.

Conclusion

Current demographic trends, including population aging, are significantly increasing the demand for medical specialists, including radiologists. Growing demand for radiology services is reflected in the increasing number of radiology "days requested" Staff Care is receiving from its clients. Staff Care anticipates that this demand will continue and that locum tenens radiologists will be widely used to fill staffing gaps for the foreseeable future.





About Staff Care

Staff Care is the leading provider of locum tenens staffing services in the United States and is a company of AMN Healthcare (NYSE: AMN), the largest healthcare workforce solutions organization in the nation. As part of our role as industry leaders, Staff Care generates original survey data regarding trends in locum tenens staffing, presents educational seminars on physician staffing and related topics, and develops a series of white papers examining physician and advanced practitioner staffing issues.

Staff Care executives authored the book on locum tenens staffing. Entitled, *Have Stethoscope, Will Travel: Staff Care's Guide to Locum Tenens*, the book outlines locum tenens staffing principles, uses and procedures for both healthcare facilities and physicians. Staff Care is proud to sponsor the Country Doctor of the Year Award, a national honor that recognizes the spirit, skill and dedication of America's rural medical practitioners.

This white paper is one is a series that Staff Care has produced. Others in the series include:

- Nurse Practitioners and Physician Assistants: Supply, Distribution, and Scope of Practice Considerations
- Women in Medicine: A Review of Changing Physician Demographics, Female Physicians by Specialty, State and Related Data
- Physician Supply Comparisons: Physicians by Select Specialties Practicing in Each State and Licensed in Each State but Practicing Elsewhere
- The Physician Shortage: Data Points and State Rankings
- Population Health Management
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