

# Generic Contrast Agents

Our portfolio is growing to serve you better. Now you have a *choice*.



[VIEW CATALOG](#)

# AJNR

## Effect of Direct Neuroradiologist Participation in Physician Marketing on Imaging Volumes in Outpatient Radiology

L. Grignon, M. Keiper, J. Vavricek, W. Horsley, R. Murphy,  
A. Grignon and F. Yu

This information is current as  
of May 9, 2025.

*AJNR Am J Neuroradiol* 2014, 35 (8) 1481-1484

doi: <https://doi.org/10.3174/ajnr.A3924>

<http://www.ajnr.org/content/35/8/1481>

# Effect of Direct Neuroradiologist Participation in Physician Marketing on Imaging Volumes in Outpatient Radiology

L. Grignon, M. Keiper, J. Vavricek, W. Horsley, R. Murphy, A. Grignon, and F. Yu



## ABSTRACT

**BACKGROUND AND PURPOSE:** Over the past several years, decreased demand for and increased supply of imaging services has increased competition among outpatient imaging centers in the United States. This study hypothesizes that using a radiology sales representative and neuroradiologist as a team in marketing and sales will increase imaging referrals in outpatient imaging.

**MATERIALS AND METHODS:** From January to December 2009, baseline monthly physician referral data of CT and MR scans of 19 referring clinicians (neurologists, neurosurgeons, and anesthesiologists) to an outpatient radiology group were collected. During that time, a nonphysician radiology sales representative visited the referring clinicians' offices every 2 weeks. From January to June 2010, the same radiology sales representative visited the referring clinicians' offices every 2 weeks but was accompanied by a neuroradiologist once a month. From July 2010 to June 2011, the same radiology sales representative visited the referring clinicians' offices twice a month without a neuroradiologist.

**RESULTS:** Cross-sectional imaging referral volumes were approximately 2.5 times greater during the 6-month period using the neuroradiologist for direct physician-to-physician marketing when compared with the volumes achieved with the sales representative alone, and continued neuroradiologist involvement in marketing and sales is required to maintain referral volumes over time.

**CONCLUSIONS:** The impact on imaging referral volumes during the 6-month use of the neuroradiologist for direct physician-to-physician marketing in this study supports the assertion that neuroradiologist visits are an important element in establishing and maintaining a relationship with the referring clinician's office and thereby maximizing imaging referrals.

The imaging growth rate in outpatient radiology has slowed significantly during the past several years. Medicare data show that the annual growth rate for CT scans fell to just 1.4% in 2006–2009 from 14.3% annual growth in 2000–2005, and the annual growth rate for MR imaging fell to 2.6% in 2006–2009 from 14% annual growth in 2000–2005.<sup>1</sup> Similarly, data from private insurers found that the annual growth rate for CT scans fell to 3.1% in 2006–2009 from 20.4% annual growth in 2002–2006, and the annual growth rate for MR imaging fell to 1.1% in 2006–2009 from 16.6% annual growth in 2002–2006.<sup>1</sup> Compounding the

decrease in growth rate and demand, the number of imaging centers and supply of imaging services in the United States has progressively increased. The number of imaging centers has grown nationally from 6383 in 2011 to 6514 sites in 2012, increasing the percentage of single-site operations from 29% to 34% in 1 year.<sup>2</sup> The evolution of radiology supply and demand has created increased competition among outpatient imaging centers in the United States.

Radiology services have also increasingly become a commodity during the past decade. This may, in large part, be due to the previously described rapid increase in the supply of imaging services, the advancement and ubiquity of teleradiology, and the progressive lack of direct interaction between radiologists and referring clinicians in modern outpatient medicine. Radiologists are becoming increasingly removed from direct interaction with referring clinicians due to teleradiology, advances in PACS access for referring clinicians, and the increasing use of hospitalists, among other factors. In addition, the prevailing use of hospitalists has removed most referring clinicians from the hospital setting, eliminating substantive interactions with radiologists in outpatient imaging.

Received December 20, 2013; accepted after revision February 1, 2014.

From the Departments of Radiology (L.G., M.K., J.V.), Pediatrics (A.G.), and Biostatistics (F.Y.), University of Nebraska Medical Center, Omaha, Nebraska; and Scottsdale Medical Imaging (M.K., W.H., R.M.), Scottsdale, Arizona.

Paper previously presented at: Annual Meeting of the American Society of Neuroradiology, May 18–23, 2013; San Diego, California; and Annual Meeting of the Radiological Society of North America, December 1–6, 2013; Chicago, Illinois.

Please address correspondence to Mark Keiper, MD, Department of Radiology, University of Nebraska Medical Center, 981045 Nebraska Medical Center, Omaha, Nebraska, 68198-1045; e-mail: mark.keiper@unmc.edu

<http://dx.doi.org/10.3174/ajnr.A3924>

To combat commoditization and to distinguish itself from the vast array of competitors, an imaging provider can use innovative marketing and sales efforts that target the primary customer and re-establish the relationships with referring clinicians. This study hypothesizes that the use of the radiology sales representative and neuroradiologist as a team in marketing and sales visits to referring providers is an effective method by which to increase imaging referrals in outpatient radiology.

## MATERIALS AND METHODS

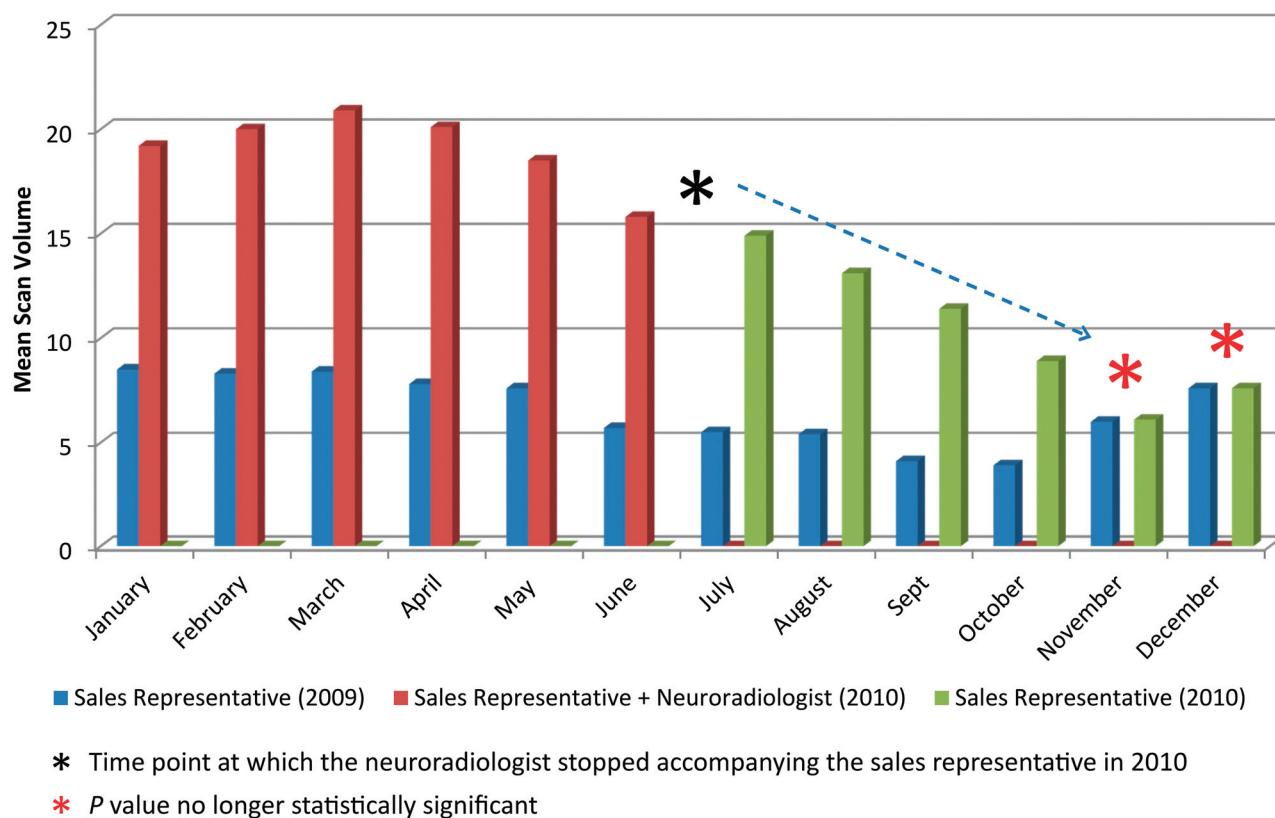
All potential referring clinicians to a busy outpatient imaging provider located in a single geographic locale were chosen on the basis of their referral volumes. Referring providers were categorized into A, B, C, and D categories. These categories were established

through evaluation of Medicare and private insurer radiology referral data for individual referring providers and through personal knowledge of referring clinicians' practices. Category A clinicians referred most of their patients to the imaging provider for radiologic examinations. Category B and C clinicians referred approximately 25%–75% of their patients to the imaging provider. The B and C providers were categorized as opportunity accounts. Category D clinicians referred few or no patients to the imaging provider due to geographic constraints or self-referral barriers. Nineteen category B and C referring clinicians (neurologists, neurosurgeons, and anesthesiologists) in both solo and group practices were selected, and baseline monthly referral data of CT and MR scans to an outpatient radiology practice were collected during a 12-month period from January to December 2009.

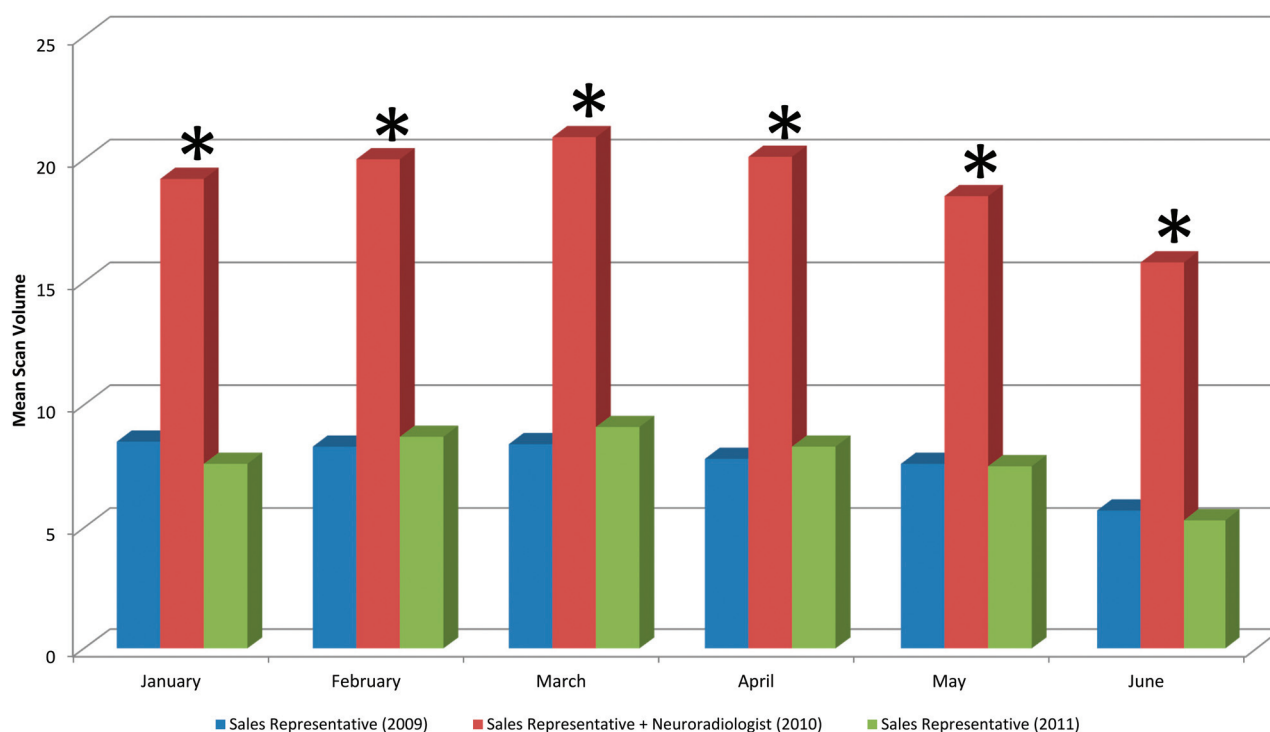
During that time, a senior and experienced nonphysician radiology sales representative with a successful track record in radiology sales and marketing made personal visits to the referring physicians' offices every two weeks, providing office staff and clinicians with technical support, substantive educational material, collateral marketing material from the radiology practice, and personal encounters to gather feedback regarding the imaging provider's service to the referring clinician's office. The representative did not provide meals or any other material that may be considered an inducement. From

**Mean scan volumes for an outpatient radiology group during control and test periods**

	Sales Representative (2009)	Sales Representative + Neuroradiologist (2010)	Sales Representative (2010)	P Value (Compared with 2009)
January	8.5	19.2	—	<.0001
February	8.3	20.0	—	<.0001
March	8.4	20.9	—	<.0001
April	7.8	20.1	—	<.0001
May	7.6	18.5	—	<.0001
June	5.7	15.8	—	<.0001
July	5.5	—	14.9	<.0001
August	5.4	—	13.1	<.0001
September	4.1	—	11.4	<.0001
October	3.9	—	8.9	<.0001
November	6	—	6.1	.49
December	7.6	—	7.6	1



**FIG 1.** Duration of effect of the neuroradiologist's participation in outpatient radiology marketing.



\* Mean scan volume with sales representative + neuroradiologist (2010) is significantly greater than with the sales representative alone in 2009 or 2011 ( $p < 0.0001$ )

**FIG 2.** Effect of joint sales representative and neuroradiologist participation in outpatient radiology marketing.

January to June 2010, the same radiology sales representative visited the same referring clinician offices every 2 weeks but was accompanied by a neuroradiologist once a month. The neuroradiologist provided educational lectures, imaging advice, and additional substantive personal interaction with referring clinicians during the visits. In July 2010, the neuroradiologist stopped accompanying the sales representative. From July 2010 to June 2011, the same radiology sales representative visited the referring clinicians' offices twice a month without the neuroradiologist.

Monthly CT and MR imaging referral volumes were collected during the same time periods as well. The time periods were separated by a year to control for typical seasonal variations of referral patterns due to marked increases in patient population during the winter months in this market. Comparisons were made between identical months of successive years because inherent variations of patient population and imaging volumes occurred not only on a seasonal basis, but also varied monthly during any given season due to the rapid flux in the patient population. No notable changes or improvements occurred in the service parameters of the radiology group, such as in the telecommunications equipment, scheduling or authorization personnel, or quantity of scanners or imaging centers available for scheduling. In addition, no change in the individual referring clinicians' practices occurred between the time periods.

The generalized estimating equation model for negative binomial data with a log link was used to fit the scan data to adjust for correlation among the repeated interventions on a single referring clinician. The monthly referral volumes of CT and MR imaging examinations collected for both time periods were compared for

the years 2009–2011 on a month-by-month basis to control for additional potential monthly variations in referral volume.

## RESULTS

The results demonstrate the relatively dramatic effect of the use of a neuroradiologist in garnering increases in imaging referral volumes. Cross-sectional imaging volumes were approximately 2.25–2.75 times ( $P < .0001$ ) greater during the 6-month period using the neuroradiologist for direct physician-to-physician marketing when compared with the volumes achieved for the identical month of the corresponding time period with the sales representative alone. Additionally, the referral volumes began to decrease for all providers approximately 1.5 months after the neuroradiologist stopped visiting the clinicians. The referral volumes returned to baseline levels approximately 5 months after the neuroradiologist terminated visits ( $P > .05$ ) (Table and Fig 1). Moreover, the referral volumes remained at baseline values for the entire following 6-month period when the sales representative continued to visit the referring clinicians' offices alone (Fig 2).

## DISCUSSION

Radiology sales representatives and neuroradiologists are both important in maximizing clinician referrals and subsequent imaging growth. However, they face individual limitations in developing a relationship with the referring provider's office. Maximizing the unique positive attributes and skills of both the sales representative and the neuroradiologist is crucial to achieving the most successful outcomes.

Radiology sales representatives are an important link between outpatient radiology centers and referring providers by serving as a vital source of information through educational and service visits and by providing a support structure for the referring provider's office. A survey of physicians in private practice found that they were more likely than those in university hospitals to interact with, value, and rely on sales representatives, with 76% perceiving sales representatives as valuable.<sup>3</sup> Therefore, the sales professional is an established, respected source for the referring clinician, particularly in the outpatient setting.

However, radiologists are perhaps the most important element in establishing and maintaining a relationship with the referring clinician's office. Radiologists are perceived as the leaders of the radiology entity and provide instant credibility as experts in the field. Because they have an extensive fund of radiologic and medical expertise, they can more precisely educate clinicians on the advantages of referring to their outpatient center. A study of factors affecting the choice of specialist by primary care physicians found that 59.2% of respondents chose "previous experience with specialist" and 53% chose "quality of specialist communication to the primary care physician" as major factors in choosing a specialist.<sup>4</sup> An effective direct interaction with the referring clinician, therefore, likely creates a bond through which a meaningful referral source may develop.

A team consisting of both the sales representative and neuroradiologist ideally incorporates both the medical expertise and clout of the neuroradiologist and the sales expertise and greater availability of the sales representative. Radiology sales representatives are limited in their medical knowledge and also lack radiologic expertise, thereby potentially encountering a lack of appreciation and respect because they are not considered medical peers. However, neuroradiologists are limited in their marketing and sales abilities and are not traditionally sales-oriented, so they may be unwilling to make a sales visit to a referring clinician's office or may be less effective during the visit. By combining the marketing and sales ability of the radiology sales representative with the medical expertise and leadership of the neuroradiologist, the outpatient center may overcome the practical limitations each may individually face and achieve the most successful outcomes.

The results of this study support the hypothesis that using the neuroradiologist and sales representative as a team during sales visits provides added value to the referring clinicians and consequently increases imaging center referral volumes. The data suggest that a sales team approach for developing a relationship with referring providers garners a statistically significant increase in referral scan volumes over traditional strategies that use a sales representative alone, even when the neuroradiologist has previously established a relationship with the provider. The sales team approach may justify the opportunity cost in lost clinical revenue value units incurred by the neuroradiologist on sales visits be-

cause the decrease in clinical productivity may be outweighed by the marked increase in referral volumes engendered during the sales visits. The use of the neuroradiologist during sales visits also improves the effectiveness of a sales representative working alone because the representative's credibility and value as a team member is enhanced by joint office visits.

Further study is needed to more precisely determine the optimal frequency and duration of sales visits and to determine the long-term effect of neuroradiologist involvement in sales. In addition, further study is warranted to determine the long-term outcomes for the sales representative working alone because the agent may ultimately be seen as an extension or valuable substitute for the neuroradiologist after repeated joint visits. This may increase the representative's value and allow for more substantive interactions with referring clinicians' offices without the need for frequent involvement in marketing and sales by the neuroradiologist.

## CONCLUSIONS

The dramatic impact on imaging referral volumes during the time of neuroradiologist involvement in marketing and sales supports the hypothesis that neuroradiologists are an important element in establishing and maintaining a relationship with the referring clinician's office. The change in imaging volumes also supports the hypothesis that a neuroradiologist's direct interaction with the referring clinician through personal visits re-establishes a bond through which a meaningful referral source may develop. By combining the marketing and sales ability of the radiology sales representative with the medical expertise and leadership of the neuroradiologist, the outpatient center may be able to achieve improved market share.

Disclosures: Laurent Grignon—UNRELATED: Employment: Executive Health Resources, Comments: I work part-time as a physician advisor for Executive Health Resources, which is owned by UnitedHealth Group. They did not provide any compensation in relation to the project.

## REFERENCES

1. Lee DW, Levy F. **The sharp slowdown in growth of medical imaging: an early analysis suggests combination of policies was the cause.** *Health Aff (Millwood)* 2012;31:1876–84
2. Proval C. **2012's Top 20 imaging-center chains: third annual report.** *Radiology Business Journal*. September 4, 2012. <http://www.radiologybusiness.com/topics/business/2012%E2%80%99s-top-20-imaging-center-chains-third-annual-report>. Accessed March 8, 2014
3. Anderson B, Silverman G, Loewenstein G, et al. **Factors associated with physicians' reliance on pharmaceutical sales representatives.** *Acad Med* 2009;84:994–1002
4. Kinchen KS, Cooper LA, Levine D, et al. **Referral of patients to specialists: factors affecting choice of specialist by primary care physician.** *Ann Fam Med* 2004;2:245–52