

Purpose

Prior work has focused largely on predictors of residency performance, but little is known about whether residency performance extends beyond training to predict long-term productivity as an attending physician. Attending radiologists are evaluated using measures such as relative value units (RVUs), case volume, and peer review discrepancy rates, which are crucial for workforce planning and quality improvement.¹⁻² However, the connection between residency performance and these attending outcomes has not yet been established. Addressing this gap is essential to determine whether the metrics used to evaluate residents are not only meaningful in training but also predictive of career productivity. The objective of this study was to evaluate whether residency performance metrics could be used to predict attending productivity, as defined by whether an attending radiologist met their annual institutional RVU goal.

Methods

This is a retrospective cohort study of those having completed residency at a single academic institution between 1992 and 2023 and subsequently remained on faculty, allowing for direct comparison of performance across training and independent practice. The metrics measured were the residents' status as Chief Resident, In-Service examination scores, staff evaluations, and case volumes across 11 different imaging modalities and procedures, as well as overall volume. A logistic regression model was used to analyze the predictive factor of a subject's residency performance metrics to the binary outcome of reaching their RVU goal.

Results

Metric	Odds Ratio (95% CI)	P-value	Sample size
Total volume (125%)	4.05 (1.00 to 14.85)	0.0063	15
Total volume (100%)	2.23 (0.82 to 6.68)	0.058	15

Figure 1: Analysis of Resident Performance Metrics for 100% RVU Target
*Chest X-Ray Volume scaled (per 1000 cases)

	Met 100% Goal (n=17)	Did Not Meet 100% (n=12)	Met 125% Goal (n=11)	Did Not Meet 125% (n=18)
Total volume	10,950	9,347	11,303	9,347
Chest X-Ray	5,179	3,749	5,308	4,222
CT Abd/Pel	1,627	1,174	1,723	1,174
MRI Body	239	364	154	361

Figure 2: Analysis of Total Case Volume for 100% and 125% RVU Target
*Total volume (125%) and Total volume (100%) scaled (per 1000 cases)

Metric	Odds Ratio (95% CI)	P-value	Sample size
Chief Status	3.50 (0.69 to 17.71)	0.12	29
R1 In-Service Exam	0.97 (0.90 to 1.05)	0.48	7
R4 In-Service Exam	1.01 (0.94 to 1.07)	0.85	12
Faculty Evaluations	0.00 (2.39E-016 to 16341.27)	0.091	11
Chest X-Ray Volume	5.46 (0.82 to 36.43)	0.019	16

Figure 3: Median Residency Case Volumes by Attending Productivity Status

When comparing median case volumes between those who successfully reached the 100% RVU goal and those who did not, those who met the goal demonstrated higher median volumes across the majority of modalities. A statistically significant association was found between the volume of chest radiographs read in residency and reaching 100% of the RVU target as an attending radiologist ($p=0.019$). Another significant association was found between total case volume in residency and reaching 125% of the RVU goal as an attending radiologist ($p=0.0063$). The remaining metrics of chief status, R1 and R4 in-service exams, and faculty evaluations yielded no statistically significant correlation for the 100% RVU target.

Discussion

Our findings suggest that both volume of radiographs and total case volume over the course of the four year radiology residency may serve as significant longitudinal predictors of future professional productivity, as defined by the achievement of individualized RVU targets. The correlation of total case volume with only the higher RVU target suggests that exceptional productivity is a function of overall clinical stamina rather than a mastery of any single modality. By reframing metrics not just as markers of short-term competence but as predictors of career productivity, programs can look to train more productive radiologists with better allocation of time and resources.

References

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2. Moorefield JM, MacEwan DW, Sunshine JH. The radiology relative value scale: its development and implications. Radiology. 1993 May;187(2):317-26. doi: 10.1148/radiology.187.2.8475267. PMID: 8475267.