

Predictors of Academic Radiology Subspecialization

An Analysis of Medicare Claims Data

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Purpose

Healthcare is moving away from a fee-for-service to a performance-based model.

- CMS has worked with radiology subspecialty societies to expand their performance metrics, but this is limited by metrics that are meaningful and relevant to radiology.

A promising area is the degree of specialization of radiology practices.

- Radiologists receive subspecialty fellowship training and develop specialty practice patterns, presumably because such specialization results in higher quality reads.

We used publicly available Medicare claims data to ascertain a radiologist's field of expertise and the appropriateness of their specialty reads.

Materials & Methods

- Using the 2015 Medicare Provider Utilization and Payment Data and the ACR's Neiman Imaging Types of Service (NITOS) system, we classified the work RVUs each radiologist interpreted within different subspecialties.
- Additionally, we designated certain CPT codes as advanced imaging, which consisted of the most complex subspecialty examinations.
- We determined radiologist subspecializations of the top 20 NIH-funded radiology departments (Rosenkrantz, 2017).
- Using python's sklearn library, we then identified features that could determine subspecialty classification.

Results

- We predict radiology specialization both by RVU proportion for advanced specialty imaging relative to overall specialty imaging and RVU fraction for specialty imaging relative to overall imaging.

Results: Figure 1

- Figure 1 shows advanced specialty imaging RVUs proportion in a respective radiologist's specialty and associated radiologist specialization.

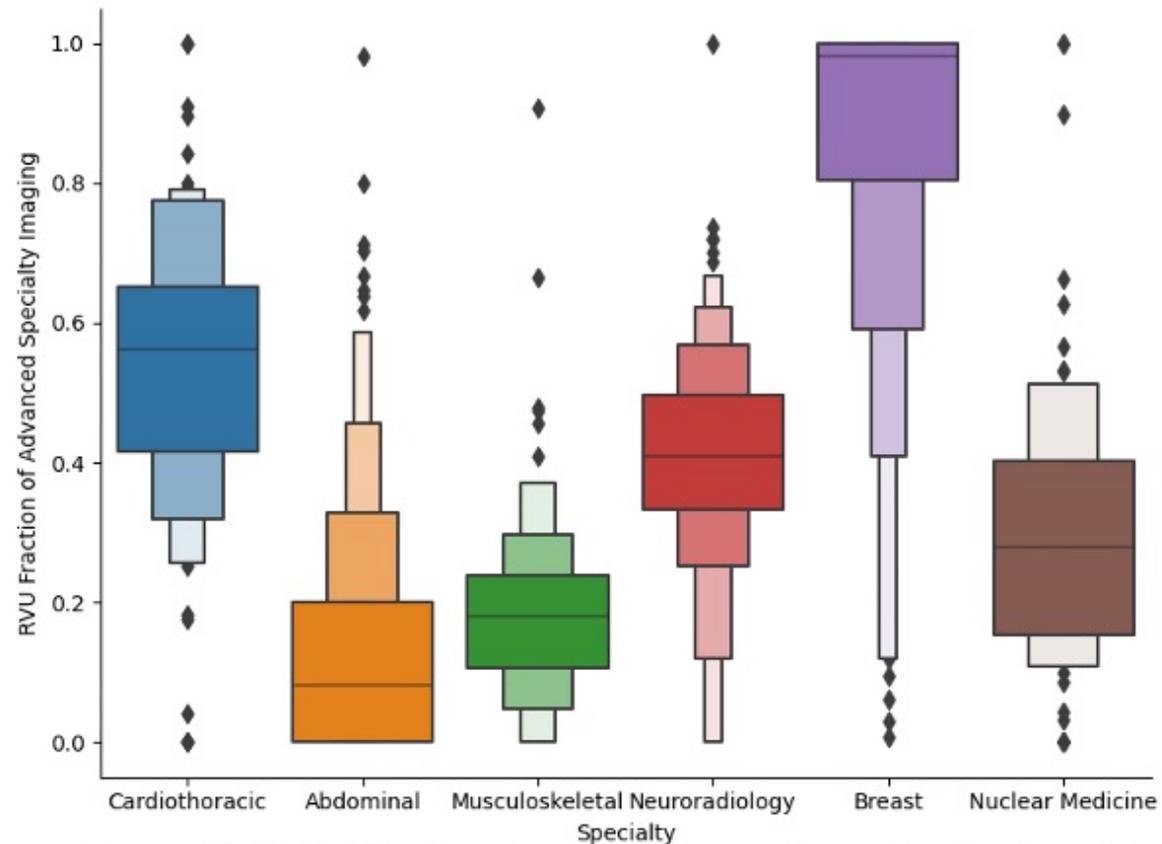


Figure 1: RVU Distribution of Advanced Imaging by Specialty.

For each specialized radiologist, determined from recording top 20 NIH-funded radiology departments, we determined the extent of fraction of advanced specialty imaging RVUs to overall specialty imaging RVUs for each specialized radiologist.

Results: Figure 2

- Figure 2 shows a subset analysis, in which the fraction of musculoskeletal imaging reads relative to overall reads by every radiologist was highest amongst musculoskeletal-specialized radiologists (F-score of 231.0, p-value < 0.01).

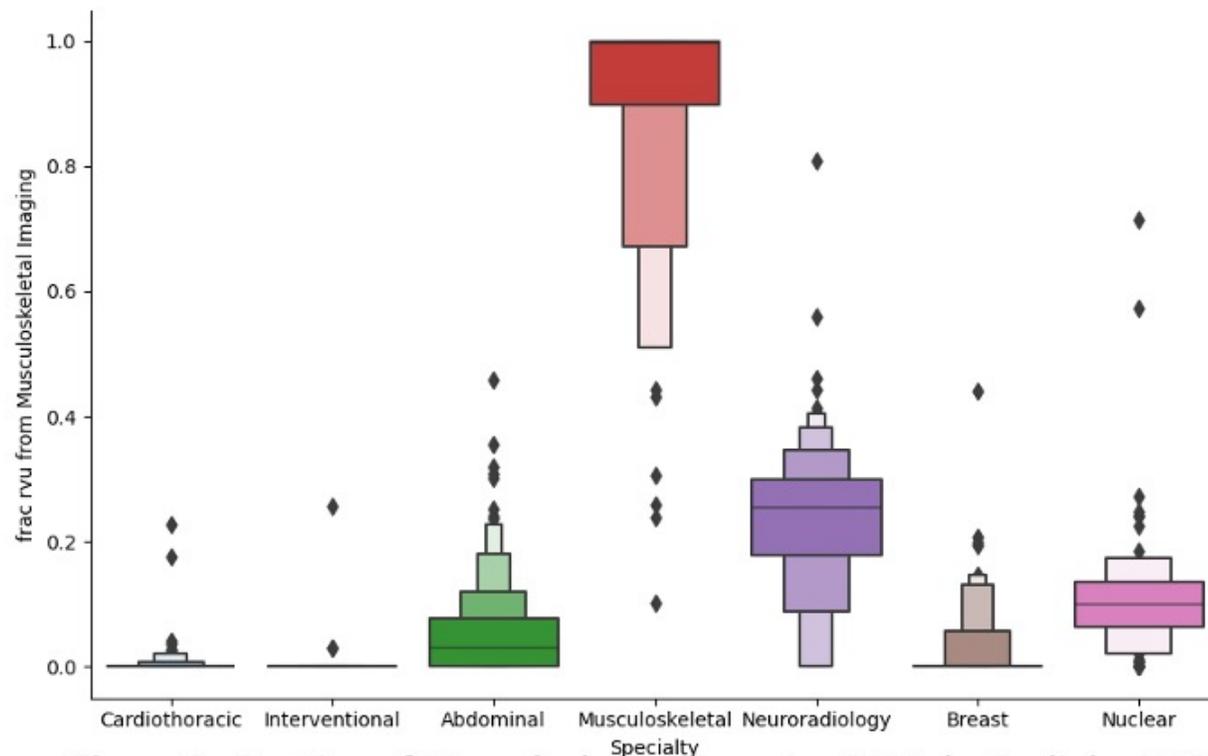


Figure 2: Fraction of Musculoskeletal Imaging RVUs by Radiologist Specialty. This is a sample feature that was detected in our machine learning analysis: The fraction of RVUs derived from musculoskeletal imaging compared to overall imaging reads was classified by radiologist specialty, derived from the top 20 NIH-funded radiology department data. The extent of musculoskeletal imaging reads was statistically significant in detecting musculoskeletal-specialized radiologists, with an F-statistic was 231.0 and p-value < 0.01.

Conclusions

- We detected differences in the proportion of advanced specialty imaging read by specialized radiologists and could predict a radiologist's specialization based on the proportion of specialty imaging read.
- This categorization method can be used to classify non-academic radiology specialties for further analysis into Medicare claims data, including differences in geography, practice size, and scope of practice.