ORIGINAL ARTICLE

# Volume and Coverage of Secondary Imaging Interpretation Under Medicare, 2003 to 2016

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## Abstract

**Purpose:** The aim of this study was to assess changing Medicare volumes of, and coverage for, secondary interpretations of diagnostic imaging examinations stratified by modality and body region service families.

**Methods:** Medicare Physician/Supplier Procedure Summary Master Files for 2003 to 2016 were obtained. Aggregate Part B fee-for-service claims frequency and payment data were isolated for noninvasive diagnostic imaging and stratified by service family. Using published Medicare payment rules, secondary interpretations were identified as studies billed using both modifiers 26 and 77. Billed and denied services volumes were calculated and compared across modality and body region service families.

**Results:** Seven service families showed a compound annual growth rate from 2003 to 2016 of >20% (an additional 12 service families, >10% growth). For select high-volume service families (chest radiography and fluoroscopy [R&F], brain MRI, and abdominal and pelvic CT), relative growth in billed secondary interpretation services exceeded that for primary interpretations. In 2016, body region and modality service families with the most billed secondary interpretations were chest R&F (674,124), abdominal and pelvic R&F (65,566), brain CT (45,642), extremity R&F (34,560), abdominal and pelvic CT (14,269), and chest CT (10,914). All service families had secondary interpretation denial rates <25% in 2016 (15 service families, <10%).

**Conclusions:** Among Medicare beneficiaries, the frequency of billed secondary interpretation services for diagnostic imaging services increased from 2003 to 2016 across a broad range of modalities and body regions, often dramatically. Payment denial rates were consistently low across service families. As CMS continues to seek input on appropriate coverage for these services, these findings suggest increasing clinical demand for and payer acceptance of these value-added radiologist services.

**Key Words:** Secondary interpretation, Medicare, health policy, chest radiography

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## INTRODUCTION

Numerous studies have documented incremental clinical value when secondary interpretations are rendered for imaging examinations initially performed and interpreted at other institutions. Such investigations have occurred largely in the context of CT and MRI examinations (and particularly for oncology patients) referred to tertiary care centers for more subspecialized interpretations [1-5].

Historically, Medicare and private payers were believed to frequently deny payment for such secondary

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interpretations, contending that such work was unnecessarily duplicative [6]. Over time, however, formal secondary interpretations of outside imaging studies have become common practice within many academic and other large medical centers, leading to considerations of how those centers might best integrate this new professional service volume into their routine workflow [7,8]. One recent study, focusing exclusively on CT examinations, demonstrated substantial growth nationally in both the performance of, and coverage for, these studies in the Medicare population [9], suggesting that provider demand for, and payer acceptance of, these services may be increasing. However, it remains unclear whether trends in payment coverage for secondary interpretations of CT examinations are generalizable to other imaging modalities and body regions. In light of a recent specific solicitation from CMS for more information on the extent to which physicians are seeking payment for secondary interpretation services [10], such data could help guide ongoing future policy development. We therefore conducted this study to better understand the changing volume of, and coverage for, secondary imaging interpretations in the Medicare population, stratified by modality- and body region–defined imaging service families.

## METHODS

Our HIPAA-compliant use of CMS-designated Public Use Files was performed under a formal exemption from the Institutional Review Board of ACR. Medicare Physician/Supplier Procedure Summary Master Files were obtained from CMS for 2003 through 2016 (the most recent year for which such data are available) [11]. These files contain aggregate Medicare Part B fee-for-service claims data, stratified by individual service as well as other service characteristics, including associated billing modifiers. Data fields include separate information on the frequency of billed and denied services. Billed and denied service count information was extracted for all services defined as noninvasive diagnostic imaging by the Neiman Imaging Types of Service classification system [12], which identifies Healthcare Common Procedure Coding System codes representing noninvasive diagnostic imaging and further stratifies such codes into distinct imaging service families defined by imaging modality and body region.

Using previously described methodology [9], services were deemed to represent secondary interpretations when billed using both modifier 26, to indicate provision of only the professional component, and modifier 77, to indicate a repeat service ordered by a different physician, as CMS has previously directed [6]. All services billed without that unique modifier combination were deemed to represent primary interpretations. For both primary and secondary interpretations for each distinct imaging service family, denial rates were calculated in a manner previously described [6,13,14] as the fraction of claims for billed services denied by CMS.

The total number of billed secondary interpretations across the entire study period was computed by modality and by body region. Billed secondary interpretation volumes, the compound annual growth rate in billed secondary interpretations since 2003, and secondary interpretation denial rates were computed for all imaging service families in 2016. Annual trends in the number of billed primary interpretations, billed secondary interpretations, and secondary interpretation denial rates, were computed for three selected imaging service families demonstrating particularly relative high secondary interpretation volumes. Analysis was performed using SAS version 9.4 (SAS Institute, Cary, North Carolina) and Excel for Windows 2010 (Microsoft, Redmond, Washington).

## RESULTS

Between 2003 and 2016, the total number of billed secondary interpretations by modality was 9,738,758 for radiography and fluoroscopy (R&F), 568,088 for CT, 105,607 for ultrasound, 84,412 for MRI, and 23,120 for nuclear medicine (Fig. 1A). By body region, the total number of billed secondary interpretations was 8,516,072 for chest, 852,214 for abdomen and pelvis, 485,652 for extremity, 356,864 for brain, 157,700 for spine, and fewer than 100,000 for each of the remaining body regions (Fig. 1B).

In 2016, the imaging service families with the largest number of billed secondary interpretations were chest R&F (674,124, representing 75.5% of all billed secondary interpretations in 2016), abdominal and pelvic R&F (65,566 [7.3%]), brain CT (45,642 [5.1%]), extremity R&F (34,560 [3.9%]), abdominal and pelvic CT (14,269 [1.6%]), and chest CT (10,914 [1.2%]) (Table 1). The imaging service families with the greatest growth in billed secondary interpretations from 2003 to 2016 were cardiac MRI (compound annual growth rate +35.7%), breast MRI (+33.1%), abdominal and pelvic MRI (+30.3%), unspecified nuclear medicine