

# Medicare Utilization of CT Angiography from 2001 through 2014: Continued Growth by Radiologists

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## ABSTRACT

**Purpose:** To examine changes in utilization of computed tomography (CT) angiography nationally and changing relative specialty roles in examination interpretation.

**Materials and Methods:** Service-specific claims data for region-specific CT angiography examinations were identified using Medicare Physician Supplier Procedure Summary Master Files from 2001 through 2014. Longitudinal national utilization rates were calculated using annual Medicare enrollment data for 2001–2013. Procedure volumes by specialty group and site of service were analyzed.

**Results:** Total annual claims for CT angiography for Medicare fee for service beneficiaries increased from 64,846 to 1,709,088 (compound annual growth rate [CAGR] 29%) between 2001 and 2014. Per 1,000 beneficiaries, overall CT angiography utilization increased annually from 2.1 in 2001 to 47.6 in 2013. Overall interpretation market share increased 4% (91%–95%) for radiology. Cardiology increased from 1% in 2001 to 6% in 2007 but decreased annually to 2% in 2014. Vascular surgery market share remained < 1% throughout the study period. Growth of CT angiography in the emergency department (ED) outpaced all other sites of service, increasing from 11% to 28% (CAGR 38%). The chest was the dominant body region imaged with CT angiography, increasing from 36,984 to 914,086 (CAGR 28%).

**Conclusions:** Utilization of CT angiography in the Medicare population increased markedly for 2001–2014, particularly in the ED, with radiologists remaining dominant providers. The chest is the most common body region imaged with CT angiography.

## ABBREVIATIONS

CAGR = compound annual growth rate, CPT = Current Procedural Terminology, ED = emergency department, FFS = fee for service, PPS = Physician Supplier Procedure Summary

Diseases of the blood vessels result in conditions such as stroke, aneurysm, and lower extremity ischemia and are a significant cause of morbidity and mortality in the

United States (1). Stroke and aortic aneurysms are estimated to kill approximately 130,000 and 17,000 Americans, respectively, each year (2,3). Imaging, including ultrasound, computed tomography (CT), and magnetic resonance (MR) imaging, plays a vital role in the diagnosis and management of vascular diseases. CT angiography has emerged as one of the most common and useful tests to assess for aneurysms, dissections, or thrombotic/embolic disease. These dedicated vascular examinations take advantage of rapid CT acquisition technique to image arteries using an intravenous contrast agent. Given its noninvasive nature, CT angiography has replaced traditional catheter angiography as the test of choice for much diagnostic arterial imaging. Recognizing the value of these dedicated vascular examinations, the American Medical Association Current Procedural Terminology

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(CPT) Editorial Panel created dedicated codes for CT angiography in 2001 (4).

The balance of direct catheter angiography and non-invasive angiography is changing across the United States. Patel et al (5) reported that lower extremity CT angiography and MR angiography increased 272% from 2002 to 2013 with a concurrent 18% reduction in traditional invasive lower extremity angiography. That study also described that the reduction in direct catheter angiography was isolated to radiology providers; for cardiologists and surgeons, the use of catheter-based angiography increased 35%. Meanwhile, there is evidence that nonradiologists are increasingly providing coronary CT angiography services, but it is unknown whether this increase extends into other body parts (6). The aims of this study were (a) to quantify changing utilization of CT angiography throughout the body in the Medicare population during the period 2001–2014, (b) to uncover trends in changing specialist involvement, and (c) to identify changes in sites of service.

## MATERIALS AND METHODS

This study using aggregated Medicare claims data from Centers for Medicare and Medicaid Services designated Public Use Files was granted exempt status from our institutional review board. National Medicare claims

tracking methodology for imaging utilization was based on methodology used previously (6,7). Annual Medicare Physician Supplier Procedure Summary (PSPS) Master Files were obtained from the Centers for Medicare and Medicaid Services for years 2001–2014. These files contain aggregated Part B Medicare billing data for all claims submitted by physicians and other providers nationally. Fields include information on procedures by CPT code, billing provider specialty, and patient location at the time of service.

PSPS Master Files include summary information of all claims for all beneficiaries in the traditional Medicare fee for service (FFS) program, which currently represents approximately 70% of all Medicare supplementary medical insurance enrollees. Between 2001 and 2013, enrollment ranged from 31.5 million to 33.7 million (8) (as this report goes to print, 2014 enrollment figures have not yet been released). These files contain aggregated 100% Part B Medicare billing data for all claims submitted by physicians and other providers nationally.

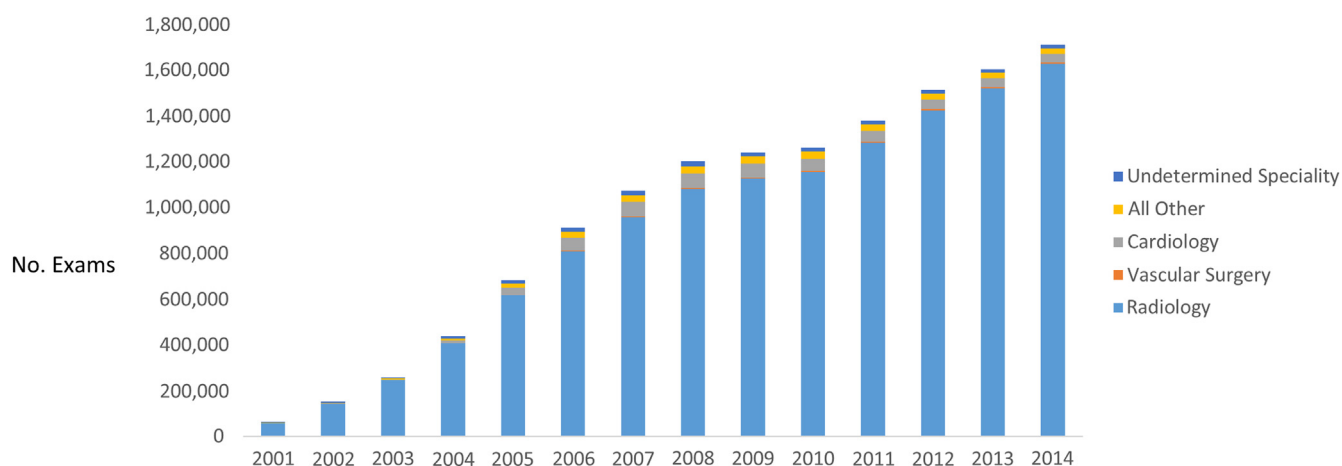
Health care providers are identified within PSPS Master Files with self-reported specialty and profession codes. For this study, we grouped services by those with specialty codes for diagnostic radiology (#30), nuclear medicine (#36), and interventional radiology (#94) together in a radiologist category. Vascular surgery (#77) and cardiology (#6) were each categorized

**Table 1.** CT Angiography Examination CPT Codes

Anatomy	CPT Codes	Description
Head	70496	CT angiography head
Neck	70498	CT angiography neck
Chest	71275	CT angiography chest (includes PE studies)
Abdomen	74175, 74174	CT angiography abdomen, CT angiography abdomen and pelvis*
Aorta with runoffs	75635	CT angiography, abdominal aorta and bilateral iliofemoral lower extremity runoff
Extremity	73206, 73706	CT angiography upper extremity, CT angiography lower extremity

CPT = Current Procedural Terminology; PE = pulmonary embolism.

\*New code in 2012.



**Figure 1.** Medicare FFS CT angiography examinations by provider type (2001–2014).

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