

Advanced Imaging Utilization Trends in Privately Insured Patients From 2007 to 2013

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Abstract

Objective: The aim of the study was to investigate whether the increase in utilization of advanced diagnostic imaging for privately insured patients in 2011 was the beginning of a new trend in imaging utilization growth, or an isolated deviation from the declining trend that began in 2008.

Methods: We extracted outpatient and inpatient CT, diagnostic ultrasound, MRI, and PET procedures from databases, for the years 2007 to 2013. This study extended previous work, covering 2012 to 2013, using the same methodology. For every year of the study period, we calculated the following: number of procedures per person-year covered by private health insurance; proportion of office and emergency visits that resulted in an imaging session; average payments per procedure; and total payments per person-year covered by private health insurance.

Results: Outpatient utilization of CT and PET decreased in both 2012 and 2013; outpatient utilization of MRI mildly increased in 2012, but then decreased in 2013. Outpatient utilization of diagnostic ultrasound showed a very different pattern, increasing throughout the study period. Inpatient utilization of all imaging modalities except PET decreased in both 2012 and 2013. Adjusted payments for all imaging modalities increased in 2012, and then dropped substantially in 2013, except the adjusted payments for diagnostic ultrasound that increased in 2013 again.

Conclusions: The trend of increasing utilization of advanced diagnostic imaging seems to be over for some, but not all, imaging modalities. A combination of policy (eg, breast density notification laws), technologic advancement, and wider access seems to be responsible for at least part of an increasing utilization of diagnostic ultrasound.

Key Words: Diagnostic imaging utilization, payments, private insurance

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INTRODUCTION

Advanced diagnostic imaging is considered one of the key drivers of the increasing cost of health care in the United States [1]. Attempts to reduce the cost of diagnostic imaging procedures in the past decade have taken the form of either reducing payments per procedure (eg, via the Deficit Reduction Act of 2005 [2]) or imposing more-thoughtful decisions about health care delivery

(eg, the Choosing Wisely[®] initiative [3]). Analyzing trends in utilization of and payments for these procedures helps us understand whether these attempts were successful and identify gaps that should be addressed.

Several studies have documented a slowdown in utilization of advanced diagnostic imaging between 2008 and 2011 in the Medicare Part B fee-for-service population [4-8]. In 2014, we published a study [9] examining trends in utilization of and payments for advanced diagnostic imaging for the 2007 to 2011 period in a population of commercially insured individuals. As found in the Medicare Part B population studies, we observed declining patterns in both utilization and payments until 2010, but another increase occurred in 2011. The current article describes a follow-up study, using the most recent data from 2012 and 2013 to investigate whether the increased utilization of advanced diagnostic imaging in privately insured patients in 2011 was the beginning of a new growth trend or an isolated

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deviation from the declining trend that began around 2008. As in our previous study [9], we explored trends in utilization of and payments for four diagnostic imaging modalities—CT, diagnostic ultrasound, MRI, and PET—in a commercially insured population in the United States.

METHODS

We derived data for the analysis from Truven Health MarketScan[®] (Truven Health Analytics, Ann Arbor, Michigan) for 2007 to 2013, which represent health services for more than 35 million US employees and dependents with primary or Medicare supplemental coverage through commercial health insurance. Each annual issue of the database contains health care claims submitted throughout the calendar year. We identified CT, diagnostic ultrasound, MRI, and PET procedures within the Current Procedural Terminology[®] (CPT) codes for category I (70000 series) and category III, which were valid during the study period. We have not included CPT codes for radiologic guidance, mammography, bone/joint studies, radiation oncology, CT angiography, or MR angiography. All codes used in the analysis are listed in [Appendix 1](#). Services with add-on codes (see [Appendix 2](#)) were considered as a single procedure.

Because the imaging procedures were identified in the claims databases by the corresponding CPT codes, we had to ensure that coding standards were consistent across the study period. Even though multiple changes were made in the CPT coding (see [Appendix 3](#) for the full list), only the coding change for combined CT of the abdomen and pelvis, in 2011, could have affected our utilization measures significantly. Therefore, we identified instances in which both CT of the abdomen and CT of the pelvis were performed on a single patient on the same day, before 2011, and applied the appropriate code for the combined procedure taken from the new coding scheme, which became effective January 1, 2011.

We analyzed utilization trends in the inpatient setting separately from the outpatient setting. However, we analyzed payment trends in the outpatient setting only, because health plans typically bundle charges for an inpatient stay, which we could not disentangle from the information available. Payments per procedure included both professional and technical components, as well as patient cost-sharing (copayments, coinsurance, and deductibles). Payments were adjusted for inflation by the gross domestic product deflator [10] obtained from the US Department of Commerce, Bureau of Economic Analysis [11]. All payments were expressed in fourth-quarter 2013 dollars (the most recent period of our study).

Our sample included some managed care plans that process payments in the form of capitated fees. However, these plans provide approximate fee-for-service—equivalent amounts for the patient-encounter records. After we computed the adjusted total payment for each procedure, we explored the distribution of the adjusted payments, using CPT codes, to check for any unreasonably low or high payments in the database. Extremely low payments were “bottom-coded” to the point at which the payments distribution begins to noticeably increase. Extremely high payments were “top-coded” at the value of the second-highest payment. Finally, we assessed the impact of the bottom- and top-coded payments, to ensure that our measures of payment trends were not distorted.

We measured utilization of diagnostic imaging using two metrics. First, we reported the number of procedures per person-year that were covered by private health insurance. Second, we identified the proportion of office and emergency visits that resulted in an imaging session. To establish the trends in payments, we calculated the average payments per procedure as well as the total payments per person-year covered by private health insurance. Given that the levels of utilization and payments differed by modality, we compared changes in utilization and payments across modalities by reporting the relative changes that had occurred since the baseline year of 2007. After establishing the trends of utilization and payments on the modality level, we explored which CPT codes accounted for most of the observed changes.

The data analysis was performed using SAS software, Version 9.4 for Windows (SAS Institute, Inc, Cary, North Carolina). Final tabulation of the data was carried out using Excel 2013 (Microsoft Corporation, Redmond, Washington).

RESULTS

Our sample size ranged from 35 million to 53 million distinct health insurance beneficiaries. Because not everyone remained insured by a health plan contained in the MarketScan for the entire year, the above range was equivalent to 29.4 million and 44.7 million person-years. Age and gender distributions of beneficiaries were relatively stable throughout the study period. The MarketScan collects data from a different set of health plans each year; therefore, the regional distribution and that of health plan types both change from year to year. The preferred provider organization (PPO) health plans were the most common type, comprising 61% to 68% of the sample, followed by health maintenance organizations (HMOs), which made up 10% to 16% of the sample. The share of consumer-directed health plans and high-deductible health plans increased, from 2.4% in 2007 to 12.4% in 2013. The

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