ONLINE APPENDIXES 3

Measuring quality of care in Medicare

ONLINE APPENDIX 3-A

Feasibility of measuring population-based outcomes: Potentially preventable admissions and emergency department visits

TABLE 3–A1

Examples of conditions used by AHRQ and 3M™ to be indicative of potentially preventable admissions

Condition	AHRQ Prevention Quality Indicators	3M Potentially Preventable Admissions
Diabetes	Diabetes short-term complication	Included
	Uncontrolled diabetes without complications	Included
	Rate of lower extremity amputation among patients with diabetes	Not included
	Long-term diabetes complications	Not included
Circulatory diseases	Hypertension	Included
	Congestive heart failure	Included
	Angina without procedure	Included
Respiratory diseases	Adult asthma	Included
	COPD	Included
Acute conditions	Dehydration	Included
	Bacterial pneumonia	Included
	Kidney and urinary tract infection	Included
	Perforated appendix	Not included
Additional conditions included in 3M's clinical logic for defining potentially preventable admissions	Not included	Migraines
	Not included	Seizures
	Not included	Cellulitis and other bacterial skin infections
	Not included	Infections of upper respiratory tract

Note: AHRQ (Agency for Healthcare Research and Quality), COPD (chronic obstructive pulmonary disease).

Source: Agency for Healthcare Research and Quality 2013, Averill et al. 2012.

To explore the feasibility of calculating population-based outcome measures for fee-for-service (FFS) Medicare in local areas across the United States, the Commission contracted with 3M™ Health Information Systems to calculate rates for two of the outcome measures listed in Table 3-3 in the chapter: potentially preventable admissions (PPAs) to a hospital and potentially preventable visits (PPVs) to the emergency department (ED). Other developers of quality measures have defined alternative approaches to measuring these potentially preventable events, and the Commission does not endorse any particular measurement technology. While both measures use hospital utilization data, they are not hospital quality measures; rather, they are designed to assess the effectiveness of the ambulatory care delivery systems within a geographic area. The premise underlying these measures is that, while every potentially preventable event might not be prevented, comparatively high rates of these potentially preventable events, when risk adjusted for variation and severity in the existing clinical conditions in the population, can identify opportunities for improvement in an area's ambulatory care systems.

Definition of potentially preventable admissions

The use of PPAs as a population-based measure of the quality of an area's ambulatory care delivery system is well established. The Agency for Healthcare Research and Quality (AHRQ) has developed several PPA measures that are based on a set of ambulatory care–sensitive conditions, namely, conditions for which admission to the hospital often can be avoided with appropriate ambulatory care (Table 3-A1).

The definition of PPA developed by 3M Health Information Systems is also based on ambulatory care–sensitive conditions, but it differs from AHRQ's

approach in two ways (Table 3-A1, p. 3). First, the 3M methodology includes admissions for short-term complications of chronic conditions, but excludes longer-term complications that are preventable only with years of prior preventive care (e.g., lower extremity amputations of diabetes patients). Second, 3M includes admissions for more conditions that might have been prevented by coordinated care (e.g., migraines) and admissions for procedures that clinical experts have questioned in terms of appropriateness or that may be avoided with less-intensive medical treatment (e.g., back procedures or spinal fusion). Examples of hospital admissions that 3M's definition does not consider potentially preventable include renal failure and cardiac arrhythmia. 3M has developed and refined its definition of PPAs with input from clinicians nationwide. Based on 3M's definition of PPAs, the five most frequently occurring PPA conditions for Medicare beneficiaries in 2011 are heart failure, pneumonia, chronic obstructive pulmonary disease, kidney and urinary tract infections, and cellulitis and other bacterial skin infections.

Definition of potentially preventable visits to the emergency department

The design and use of PPVs as a population-based measure of ambulatory care quality are not as well developed as they are for PPAs. AHRQ has not finalized indicators that measure potentially preventable ED use. Some researchers have defined potentially preventable ED visits based on ambulatory care–sensitive conditions, including asthma, diabetes, congestive heart failure (CHF), and bacterial pneumonia (McDonald 2009, Steiner 2010, Tang et al. 2010). Another approach, developed by researchers at New York University, is based on the ED visit's urgency or level of need (Billings 2003).

3M's PPV measure, like its PPA measure, includes ambulatory care–sensitive conditions and acute conditions that might have been prevented through care coordination. 3M's approach considers the medical conditions treated, procedures performed, and resources used during the ED visit.[1] 3M has developed and refined its PPV definitions with input from clinicians nationwide. The 3M PPVs also include nursing home care–sensitive conditions—conditions for which ED visits are not necessarily preventable if a patient lives in a community setting (such as at home), but may be preventable if the patient lives in an institutional setting (such as in a nursing home). An example of this kind of condition is an acute major eye infection. The PPV measure also includes conditions for which the patient could have received appropriate care in a community setting (e.g., upper respiratory tract infections).

The five most frequently occurring PPV conditions for Medicare beneficiaries in 2011 were abdominal pain; signs, symptoms, and other factors influencing health; infections of the upper respiratory tract; lumbar disc disease; and acute lower urinary tract infections.

Analysis of rates of PPAs and PPVs

3M Health Information Systems calculated national rates of PPAs and PPVs for 2011 based on 100 percent of FFS Medicare claims under Part A and Part B. This analysis excludes hospital readmissions within 30 days of the index admission (an index admission is one that meets certain criteria, such as clinical diagnosis, for inclusion in the rate calculation). 3M focused only on index admissions in this analysis to distinguish potentially preventable events that were more likely to have stemmed from the quality of a market's ambulatory care infrastructure from those that may have been more directly related to the quality of care in the hospital during the index admission. The analysis included inpatient acute care hospitals that are paid under the Medicare inpatient prospective payment system and critical access hospitals.

The findings showed that PPAs and PPVs nationally account for a significant proportion of all hospital admissions and ambulatory ED visits for the FFS Medicare population. In 2011, PPAs accounted for 28 percent of all FFS Medicare hospital admissions (with a national average rate of approximately 78 PPAs per 1,000 beneficiaries), while PPVs accounted for 55 percent of all ambulatory (treat-and-release) ED visits among FFS Medicare beneficiaries in 2011 (with a national rate of 227 events per 1,000 beneficiaries). These findings suggest there are ample opportunities to improve the quality of ambulatory care for Medicare beneficiaries to potentially prevent a significant percentage of hospital admissions and ED visits. ■

Endnotes

1 3M's definition excludes ED visits in which the patient (1) was admitted to the hospital (since these visits would be counted under its PPA measure) or (2) underwent a surgical procedure or therapy. Examples of ED visits that 3M's definition does not consider potentially preventable include chest pain and fractures.

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ONLINE APPENDIX 3-B

Feasibility of measuring potentially inappropriate use: Overuse

Because of the potential for harm to beneficiaries and the wasteful program spending that results from overuse of services, the Commission conducted and contracted for two types of analyses to examine the feasibility of measuring overuse in fee-for-service (FFS) Medicare. The first analysis adapts three measures currently used by CMS for public reporting of imaging use in hospital outpatient departments and applies them to national FFS Medicare claims data. The second analysis examines rates of repeat testing among FFS Medicare beneficiaries.

Measuring overuse of diagnostic imaging

To explore the feasibility of measuring potentially inappropriate use of diagnostic services, we examined claims-based indicators developed by CMS to measure the use of imaging in hospital outpatient departments (OPDs) (Centers for Medicare & Medicaid Services 2014b). These measures indicate how often a hospital provides imaging studies for FFS Medicare beneficiaries when they may not be medically appropriate (Centers for Medicare & Medicaid Services 2014a). The purpose of these measures is to reduce patients' exposure to unnecessary radiation and contrast materials, improve adherence to evidence-based guidelines, reduce unnecessary spending by the Medicare program and beneficiaries, and ensure that patients get the right service the first time (National Quality Forum 2012).

CMS applies its measures only to beneficiaries treated in OPDs rather than to those treated in other settings such as physicians' offices or independent diagnostic testing facilities (IDTFs), which are freestanding imaging centers. CMS publicly reports the scores for these measures at the hospital level, state level, and national level on the Hospital Compare website and through the Hospital Outpatient Quality Reporting (OQR) program. In general, a higher rate on one of these measures indicates that the hospital is more likely to perform an unnecessary imaging service. CMS intends for these measures to serve as benchmarking tools for identifying outlier providers (Centers for Medicare & Medicaid Services 2008, National Quality Forum 2014a, National Quality Forum 2014b). Although hospitals are not subject to financial penalties or rewards based on their performance on these measures, their annual outpatient payment update is reduced by 2 percentage points if they fail to report these and other measures to CMS through the Hospital OQR program.

We selected three of CMS's imaging measures for our analysis, representing three different types of imaging: MRI, computed tomography (CT), and cardiac stress tests (which include stress echocardiography, cardiac nuclear imaging, and stress MRI).[1] The three selected measures are as follows:

- patients with low back pain who had an MRI without trying conservative treatments first, such as physical therapy;
- patients who received CT scans of the chest that were combination (double) scans; and
- patients who received cardiac imaging stress tests before low-risk outpatient surgery.

Each of these measures has been endorsed by the National Quality Forum and each is described in the text box, pp. 11–12.

Although CMS calculates these measures only for imaging provided in OPDs, we included imaging provided in all ambulatory settings (physicians' offices, OPDs, and IDTFs) because many imaging studies are delivered in offices and IDTFs. We calculated national rates for 2010 through 2012 and the rate for each setting in 2012. The setting was based on where the imaging service was provided rather than where it was ordered. For example, a study that was ordered in a physician's office but provided in an OPD was counted as an OPD service. We used 100 percent Medicare claims data to include all beneficiaries who received these services.

The Commission's analysis shows that, during the study period, the national rate for MRI scans for low back pain without prior conservative treatment was fairly high: 36 percent in 2012, the same rate as in 2010 (Table 3B-1). This score means that, nationally, over one-third of MRI scans for low back pain were not preceded by conservative treatment, such as physical therapy. The national rate for CT scans of the chest that were combination scans declined from 5.1 percent in 2010 to 3.6 percent in 2012, suggesting that providers had altered their practice patterns to use CT scans more judiciously. The rate for cardiac imaging before low-risk outpatient surgery was stable at 5 percent from 2010 through 2012.

There is no consistent pattern for which setting performed the best on these measures. In 2012, the rate for MRI scans for low back pain was higher in OPDs than in IDTFs or physicians' offices, which suggests that those scans were more likely to be used inappropriately

TABLE 3–B1 **National rates for CMS's imaging measures, all ambulatory care settings, 2010–2012**

Measure	2010	2011	2012
MRI for low back pain without prior conservative treatment	36.0%	36.2%	36.0%
CT scans of the chest that were combination scans (with and without contrast)	5.1	4.3	3.6
Cardiac imaging before low-risk outpatient surgery	5.0	5.0	5.0

Note: CT (computed tomography).

Source: MedPAC analysis of 100 percent Medicare claims.

in OPDs (Table 3B-2).[2] By contrast, the rate for CT scans of the chest was higher in IDTFs and physicians' offices than in OPDs.[3] The rate for cardiac imaging before low-risk outpatient surgery was slightly higher in OPDs than in IDTFs and physicians' offices.[4]

Overall, the results of our analysis suggest that it is feasible to use CMS's outpatient imaging measures to examine the potentially inappropriate use of imaging in all ambulatory settings. The relatively high rates of MRI scans for low back pain without prior conservative treatment, and their persistence over time, is especially concerning. There is also significant variation across geographic areas in the rates of each of these measures (data not shown). Other research finds that some individual hospitals have high rates for these measures, which suggests that there are opportunities for providers to use these services more appropriately (Lewin Group 2013).

There are two caveats about how Medicare might apply overuse measures, whether as population-based or provider-based measures. First, there are limitations to using claims-based measures of potentially inappropriate use. Because claims typically lack details about a patient's clinical history and current symptoms, it can be difficult to assess whether a particular service is appropriate. For certain measures, CMS attempts to address this issue by looking for diagnoses and procedures in claims across multiple months and multiple settings to determine whether a patient should be excluded from a measure. For example, for the measure of patients with low back pain who had an MRI without first trying conservative treatments, CMS examines claims for 12 months preceding the MRI to determine whether a patient has a history of cancer or neurologic impairment; such patients are excluded from the measure because an MRI may be appropriate in those circumstances. In addition, there may be variations across providers in how procedures and diagnoses are coded, which could affect scores at the provider level. However, CMS believes that its standard prepayment claims analysis and postpayment audits should prevent this issue from having a major impact on the measure calculations (National Quality Forum 2014b). In the future, measures that use data from electronic health records could incorporate more clinical information than claims-based measures.

Another important issue is whether hospitals, physicians, or both parties should be held accountable for the inappropriate use of imaging studies performed in OPDs (Centers for Medicare & Medicaid Services 2008). On the one hand, hospitals provide the facility, imaging equipment, and staff, and may employ the radiologists

TABLE 3–B2 **National rates for CMS's imaging measures, by ambulatory setting, 2012**

Measure	Outpatient department	Physician office	IDTF
MRI for low back pain without prior conservative treatment	38.2%	33.4%	34.6%
CT scans of the chest that were combination scans (with and without contrast)	3.0	5.1	8.0
Cardiac imaging before low-risk outpatient surgery	5.3	4.9	4.7

Note: IDTF (independent diagnostic testing facility), CT (computed tomography).

Source: MedPAC analysis of 100 percent Medicare claims.

who interpret the studies. Hospitals may require that the ordering physician comply with clinical guidelines to ensure that the imaging studies are appropriate and may promote consultation between the ordering physician and radiologist (Appleby and Rau 2011, Graham 2010). On the other hand, physicians determine whether to order an imaging study and what type of study to order. In addition, hospitals may be unwilling to restrict the ability of nonemployed physicians to order imaging at their facilities. CMS reports its measures at the hospital level, not at the level of ordering physicians or their practices.

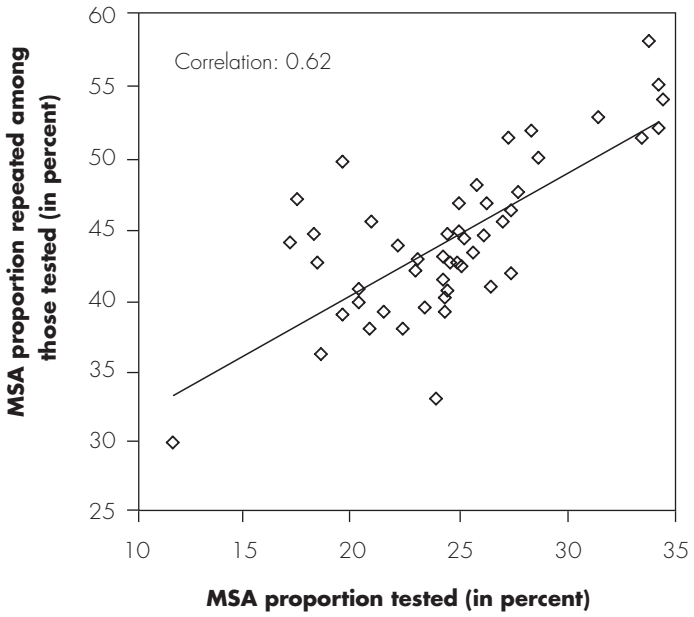
Measuring repeat testing

Overuse of services can take two forms. First, a service can be furnished to too many patients. Second, too many services can be furnished to the same patient. While most research on overuse has focused on the first category, two studies for the Commission have considered overuse in the second category: repeats of diagnostic tests furnished to Medicare beneficiaries. Both studies were led by a physician. The results were published in the *Archives of Internal Medicine* (now *JAMA Internal Medicine)* and the *Annals of Internal Medicine*. Commentaries accompanying the articles expressed the view that the repeat testing found represented "unjustified testing" or "overuse" (Kassirer and Milstein 2012, Shaheen 2014). Taken together, the two studies show that analyzing Medicare data to identify repeat testing is a viable option for quantifying overuse of diagnostic testing services. Available indicators—when relevant to a given test type—include length of interval between an index test and a repeat test, geographic variation in repeat testing, and patient diagnosis reported with tests.

Study of the extent of repeat testing

The first study addressed the extent to which certain tests are repeated (Welch et al. 2012). The list of services included three imaging services (echocardiography, nuclear medicine and echocardiography stress tests, and chest CT), pulmonary function tests, and two diagnostic procedures (cystoscopy and upper endoscopy). All are services for which uncertainty exists about whether to repeat them and how often. Medicare claims data for 2004 through 2009 were analyzed to determine rates at which beneficiaries received repeats of these tests and the intervals between an index test and a repeat test.

FIGURE 3–B1 **Proportion of beneficiaries with a repeat imaging stress test is positively correlated with proportion receiving at least one of these tests, 2004–2009**



Note: MSA (metropolitan statistical area).

Source: Welch et al. 2012.

The analysis found that repeat testing is more common than expected: depending on the test, one-third to one-half were repeated within three years of an index test. This finding raises the question of whether some physicians are routinely repeating tests even though little is known about appropriate thresholds and intervals for doing so. For example, in the case of echocardiography, 55 percent of these services were repeated within three years. The most common repeat interval was one year, suggesting that some beneficiaries are undergoing routine annual echocardiography despite the specific recommendation by the American College of Cardiology Foundation Appropriate Use Criteria Task Force against routine surveillance echocardiography.

An additional finding was that, across geographic areas, the proportion of beneficiaries receiving a repeat test was positively correlated with the proportion who received any test. For example, the correlation coefficient for the statistical relationship between the proportion of beneficiaries receiving imaging stress tests and the proportion receiving a repeat test (within three years) was 0.62 (Figure 3B-1). This finding indicates that in areas

Selected CMS imaging measures

MRI for low back pain

According to the American College of Radiology, uncomplicated acute low back pain is a benign condition that does not warrant imaging studies (Centers for Medicare & Medicaid Services 2013b, National Quality Forum 2014a). The cause of low back pain can usually be identified through a thorough medical history and physical examination. As part of the Choosing Wisely campaign, the American College of Physicians recommends against obtaining imaging studies in patients with nonspecific low back pain (back pain that cannot be attributed to a specific disease or spinal abnormality) (ABIM Foundation 2014).[5] Similarly, the American Academy of Family Physicians recommends against performing imaging for low back pain within the first six weeks of presenting symptoms, unless red flags (such as neurological deficits) are present (ABIM Foundation 2014). Partners Healthcare recommends that emergency physicians do not order MRIs of the lumbar spine for patients with low back pain unless the patients have high-risk features (Schuur et al. 2014). A meta-analysis of six randomized trials found that imaging for low back pain offered no advantages over usual care without imaging in terms of pain, functional ability, quality of life, or overall improvement (Chou et al. 2011).

Overuse of MRI scans for low back pain carries the risk of false-positive findings, increased costs for the Medicare program and beneficiaries, and the potential to induce a cascade of additional procedures, such as surgery (Baras and Baker 2009, Centers for Medicare & Medicaid Services 2011, Chou et al. 2011). Despite consensus that there is little value in imaging for low back pain, there is significant use of imaging (X-rays, MRI, and computed tomography (CT)) for this condition. One study found that nearly 30 percent of Medicare beneficiaries with uncomplicated low back pain received an imaging study within 28 days, even though imaging is rarely indicated in the absence of specific complications or comorbidities (Pham et al. 2009). Another study used data from the National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey on visits by adults to physicians for acute back pain (Kale et al. 2013).[6] The authors found that between 1999 and 2009, the share of these visits that involved diagnostic imaging increased from 19 percent to 23 percent. To observe rates of imaging for this condition, the National Committee for Quality Assurance developed a Healthcare Effectiveness Data and Information Set® (HEDIS®) measure that assesses the share of patients with low back pain who did not receive an imaging study within 28 days of the diagnosis (National Committee for Quality Assurance 2013). The score for commercial HMO plans on this measure in 2012 was 75 percent, which means that 25 percent of patients received imaging for low back pain within 28 days.

CMS's measure calculates the share of patients in hospital outpatient departments (OPDs) who received an MRI of the lumbar spine for low back pain before trying more conservative treatment (Centers for Medicare & Medicaid Services 2013d). The use of MRI for back pain is not typically indicated unless the patient has received a period of conservative therapy and serious symptoms persist (Centers for Medicare & Medicaid Services 2011). CMS examines claims data for evidence of conservative treatment, which includes physical therapy in the 60 days preceding the MRI, chiropractic treatment in the 60 days preceding the MRI, or an evaluation and management service between 28 days and 60 days before the MRI.[7] The measure excludes patients with serious conditions that may warrant an MRI without prior conservative treatment, such as cancer, trauma, neurologic impairment, or spine surgery. A higher score may indicate that a hospital is performing unnecessary MRI scans of the lumbar spine for low back pain (Centers for Medicare & Medicaid Services 2014b).

CT scans of the chest that were combination scans

A combination CT scan means that the patient received two scans: one without contrast (a substance put into the patient before the scan to highlight certain parts of the body), followed by a second scan with contrast. A combination CT scan doubles the patient's radiation dose and also exposes the patient to potentially harmful side effects of the contrast agent (Centers for Medicare

(continued next page)

Selected CMS imaging measures (cont.)

& Medicaid Services 2011). Combination CT scans are also more costly to beneficiaries and the Medicare program. According to a review of the literature and clinical guidelines, the use of CT combination scans of the chest may be appropriate for only one condition (solitary pulmonary nodule); it is not recommended for other conditions (Centers for Medicare & Medicaid Services 2013a). CMS's measure calculates the share of CT scans of the chest (those with contrast, those without contrast, and those with both) performed in OPDs that were combination scans (Centers for Medicare & Medicaid Services 2013e). A higher score may indicate that a hospital has a protocol that calls for routinely giving combination CT scans of the chest to patients when they only need a single scan (Centers for Medicare & Medicaid Services 2014b).

Cardiac imaging stress tests before low-risk outpatient surgery

Cardiac imaging is one of the most common imaging services in Medicare (Medicare Payment Advisory Commission 2014). Cardiac nuclear imaging is a major contributor to the growth in radiation exposure among Medicare beneficiaries (National Quality Forum 2014b). Two types of imaging frequently performed by cardiologists—nuclear stress tests and resting echocardiography—experienced rapid growth from 1999 through 2008 (Andrus and Welch 2012). From 2010 through 2012, the total number of cardiac nuclear tests per beneficiary performed in ambulatory settings fell by 13 percent, while the number of echocardiography studies fell by 3 percent. However, these declines were preceded by strong growth during the prior decade.

Clinical guidelines and appropriateness criteria recommend against using stress echocardiography and cardiac nuclear stress tests in the preoperative evaluation of patients who are going to have low-risk, noncardiac procedures (Centers for Medicare & Medicaid Services 2013c, National Quality Forum 2014b). As part of the Choosing Wisely campaign, for example, the American College of Cardiology (ACC) recommends against performing stress cardiac imaging as a preoperative assessment in patients scheduled to undergo low-risk, noncardiac surgery (ABIM Foundation 2014). The American Society of Nuclear Cardiology (ASNC) and the Society for Vascular Medicine have similar recommendations (ABIM Foundation 2014). The ACC states that these types of tests do not change the patient's clinical management or outcomes and lead to higher costs. In addition, inappropriate use of cardiac nuclear stress tests exposes patients to unnecessary radiation.

CMS's measure calculates the share of all cardiac stress tests performed in OPDs that were received by patients during the 30 days before they had certain low-risk, noncardiac outpatient surgical procedures (e.g., endoscopy, breast biopsy, and cataract surgery) (Centers for Medicare & Medicaid Services 2013f).[8] A higher score on this measure suggests that a hospital is using cardiac stress tests less appropriately.

Although CMS's measure targets one type of inappropriate use of cardiac imaging, appropriateness criteria developed by specialty societies designate several uses as inappropriate. For example, criteria produced by the American College of Cardiology Foundation (ACCF) and the ASNC classify nuclear cardiology studies that are performed to detect coronary artery disease in low-risk, asymptomatic patients as inappropriate (Brindis et al. 2005). Researchers examined nuclear cardiology procedures performed at six nonhospital sites and found that 14 percent were inappropriate based on the criteria developed by the ACCF and ASNC in 2005 (Hendel et al. 2010). Four percent of the inappropriate procedures were for preoperative assessment of patients before low-risk surgery. Using the 2009 ACCF and ASNC criteria, another study found that 24 percent of nuclear cardiology procedures performed at the Mayo Clinic were inappropriate (Carryer et al. 2010). Ten percent of the inappropriate procedures were for preoperative assessment of patients before low- or intermediate-risk noncardiac surgery. Both of these studies involved the collection of clinical data from patients' medical records rather than from claims. Because CMS's cardiac imaging measure uses claims data, it can be applied to all Medicare providers without requiring them to submit additional information. ■

where beneficiaries receive more initial imaging tests, they are also more likely to have more repeat tests. This finding is contrary to what might be expected, since in an area with a high rate of initial testing, a higher proportion of beneficiaries should be found to have no disease and therefore should be less likely to receive a repeat test. In any case, the finding of a positive relationship suggests that physician testing thresholds—for both initial tests and repeat tests—vary and not necessarily in a manner consistent with disease burden.

Study using diagnosis to identify potential overuse

The second study—of upper endoscopy use—considered another indicator of overuse: patient diagnosis (Pohl et al. 2014). Diagnoses reported with index and repeated upper endoscopies were classified—based on a formal process through which the authors obtained clinical input—as suggesting that a repeated upper endoscopy for a given beneficiary was expected, uncertain, or not expected. Medicare claims data for 2004 through 2009 were analyzed to determine rates of repeated upper endoscopy for beneficiaries in each of the three categories.

The findings were, first, that 12 percent of Medicare beneficiaries receive an upper endoscopy within a three-year period and, of those, a third of beneficiaries had their endoscopy repeated within three years. Second, 43 percent of the beneficiaries with repeated upper endoscopies did not appear to have a diagnosis at the index or repeated procedure that justified the repeated procedure. Based on these findings, the physicians conducting the study concluded that upper endoscopy may be substantially overused. ■

Endnotes

1 CMS's other imaging measures, which were not included in our analysis, are as follows: outpatients who had a follow-up mammogram, ultrasound, or MRI of the breast within 45 days after a screening mammogram; outpatient CT scans of the abdomen that were combination (double) scans; and outpatients with brain CT scans who got a sinus CT scan at the same time.

2 The differences in the mean rate for each setting are statistically significant ($p < 0.05$).

3 The differences in the mean rate for each setting are statistically significant ($p < 0.05$).

4 The differences in the mean rate between OPD and physician office and between OPD and IDTF are statistically significant ($p < 0.05$). However, the difference between physician office and IDTF is not statistically significant.

5 The Choosing Wisely campaign is an initiative of the ABIM Foundation to help physicians and patients engage in conversations about the overuse of tests and procedures. As part of this initiative, many physician specialty organizations have identified tests or procedures commonly used in their field whose necessity should be questioned and discussed.

6 The study excluded patients for whom imaging could be considered appropriate, such as patients with a diagnosis of malignancy, weight loss, fever, or neurological signs.

7 According to CMS, an evaluation and management (E&M) service that occurred between 28 days and 60 days before the MRI indicates that the patient had prior conservative treatment. However, an E&M service provided within 28 days of the MRI could have been the visit at which the MRI was ordered. Therefore, CMS does not consider an E&M service provided within 28 days of the MRI to be evidence of conservative treatment.

8 The denominator for this measure is the number of cardiac stress tests performed in an OPD. CMS developed a similar measure that used the number of low-risk, noncardiac outpatient surgeries as an alternative denominator (in both measures, the numerator was the number of cardiac stress tests performed 30 days before a low-risk outpatient surgery). However, this alternative denominator was large because hospitals perform many outpatient surgeries (Lewin Group 2010). In addition, the scores on this alternative measure were very low (the national average score was 0.5 percent). Because of the large denominators and very low scores, CMS would have needed to set a minimum case count of 2,000 outpatient surgeries per hospital to distinguish hospitals with low scores from hospitals with high scores. Only 200 hospitals would have met this minimum case count. Therefore, this measure would not have been useful for publicly reporting scores at the hospital level, and CMS did not adopt it.

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