



Trends in Potential Overuse of Three Services Among Individuals with Employer- Sponsored Health Insurance

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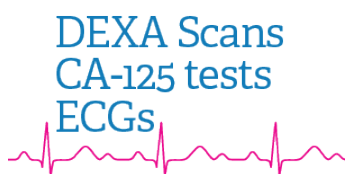
KEY TAKEAWAYS

Our analysis showed that potential overuse of bone density scans (DEXA scans), cancer antigen 125 blood tests (CA-125), and electrocardiography (ECG) among individuals with employer-sponsored insurance remained high but declined consistently between 2008 and 2013:



The national rate of potential overuse for medical services in the study exhibited a

sustained downward trend between 2008 and 2013: from 21.2 to 13.7 per 1,000 women for DEXA scans, from 4.7 to 3.3 per 1,000 women for CA-125 tests, and from 87.5 per 1,000 individuals in 2009 to 84.6 per 1,000 in 2013 for ECGs.



The proportion of these three services that represented potential overuse

remained high but also decreased between 2008 and 2013: from 39 percent to 35 percent for DEXA scans, from 41 percent to 33 percent for CA-125 tests and from 44 percent in 2009 to 42 percent in 2013 for ECGs.



The total national spending associated with potential overuse of DEXA scans, CA-

125 tests and ECGs in the population with employer-sponsored insurance was \$154 million in 2013.



Clinicians may be more cognizant of test appropriateness criteria through

such efforts as the Choosing Wisely campaign and ACP's High Value Care Initiative, as well as health plans' efforts to promote evidence-based medicine.



The adoption of clinical guidelines and decision support tools at the point of care may

help in reducing the overuse of medical services.

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Summary

Reducing the occurrence of low-value health care services can improve quality and safety while reducing wasteful spending. In 2010 the American College of Physicians (ACP) launched its High Value Care Initiative focused on training clinicians to reduce low-value care while improving outcomes, and in 2012 the ABIM Foundation launched the Choosing Wisely® campaign to initiate conversations between physicians and patients on the overuse of health care services.

This study jointly conducted by the ACP and AHIP aims to describe the magnitude and trends in potential overuse of three high volume medical services among individuals with employer-sponsored insurance (ESI): dual-energy X-ray absorptiometry (DEXA) scans, cancer antigen 125 (CA-125) blood tests, and electrocardiography (ECG). The analysis used health insurance claims data for 44 million - 53 million individuals (depending on the year) from the Truven Health MarketScan® Commercial Claims and Encounters Database (2008 - 2013).

The study found that the national rate of potential overuse for these tests exhibited a sustained downward trend between 2008 and 2013, decreasing from 21.2 to 13.7 per 1,000 women for DEXA scans, from 4.7 to 3.3 per 1,000 women for CA-125 tests and from 87.5 per 1,000 individuals in 2009 to 84.6 per 1,000 in 2013 for ECGs.

The proportion of these three services that represented potential overuse remained high between 2008 and 2013, although this proportion decreased between 2008 and 2013: from 39 percent to 35 percent for DEXA scans, from 41 percent to 33 percent for CA-125 tests and from 44 percent in 2009 to 42 percent in 2013 for ECGs. As a result, in 2013, the total national spending associated with potential overuse for all three services in the population with employer-sponsored insurance was \$154 million in 2013. To reduce the overuse of services, clinical guidelines should clearly delineate the appropriateness of health care tests and procedures, including recommended frequency and guidance about when to start and stop testing. Using decision-support tools at the point of care may be effective in assisting clinicians with delivering appropriate care.

Background

The amount of wasteful spending in the United States health care system has been well-documented. One estimate suggests that overtreatment, failures of care coordination, poor execution of care processes, administrative complexity, pricing failures, and fraud and abuse account for at least 20 percent of all health care expenditures¹. The Institute of Medicine estimated that in 2009 30% of all national health care spending was wasted and that 27 percent of this wasteful spending could be attributed to the provision of unnecessary services².

Reducing the occurrence of low-value or unnecessary services can improve quality and patient safety while also reducing costs. For example, fewer low-value services would reduce unnecessary radiation exposure³ and follow-up tests, procedures, and/or treatments including surgeries⁴; and would also reduce patient anxiety.

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Efforts are currently underway to address the use of such low-value services. In 2010, the American College of Physicians (ACP) launched its High Value Care Initiative focused on training clinicians to reduce low-value care while improving outcomes⁵. This initiative has integrated a definition of, and framework for, delivering high-value care in all ACP's educational programs, products, and services. In 2012 the ABIM Foundation launched the Choosing Wisely® campaign to initiate conversations between physicians and patients on the overuse and misuse of health care services⁶.

Since the launch of these campaigns, a limited number of recent studies, primarily focused on the Medicare population, has estimated the magnitude of overuse of specific health care services. Researchers estimated rates at which low-value services are provided in the Medicare population and found these rates to be quite high⁷⁻⁹. The Institute for Clinical and Economic Review has estimated New England's regional utilization trends and costs associated with five services for women deemed unnecessary by the American College of Obstetricians and Gynecologists with employer-sponsored health insurance (ESI) and estimated the unnecessary costs to range between \$54 million - \$141 million, annually¹⁰. To date we are unaware of studies focused on estimating national rates of overuse of specific services in the under 65 population with ESI.

The objective of our pilot study is to describe the magnitude and trends in potential overuse of three services that could be measured utilizing administrative data: dual-energy X-ray absorptiometry (DEXA) scans, cancer antigen 125 (CA-125) blood tests, and electrocardiography (ECG), and to identify factors associated with overuse among individuals under age 65 with ESI.

We believe that our study, combined with existing research on measuring rates of overuse among Medicare beneficiaries, can be useful to clinicians, patients, policymakers and other health care stakeholders. Measurement can help better focus resources available to design and implement quality improvement efforts, educate providers and patients, and evaluate quality gains over time.

Methodology

We convened a clinical expert panel consisting of ACP staff physicians and health plans' national medical directors to identify the set of medical services that might be subject to overuse. The list of services that was deemed by the ACP workgroup as being frequently used in a manner that does not reflect high-value care served as our starting point^{11, 12}. The panel used the following criteria to select a subset of services for initial analysis:

- relative facility to measure overuse using administrative data;
 - individual health plan data showing high rates of use or spending on the service; and
 - low unit cost but high volume services that could potentially impact a large population.
- Based on these criteria, the panel identified three services from the ACP list for the pilot study analysis: DEXA scans and CA-125 tests among women, and ECGs among men and women.

A DEXA scan measures bone mineral density and is commonly used to screen for or diagnose osteopenia or osteoporosis in women at risk and

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older women. Although a DEXA scan is recommended as routine screening for women when they reach the age of 65 and for those under 65 with high fracture risk, it is not a recommended procedure for younger women who are at low risk for having a fracture^{11, 13-15}. Many of the women included in our study are younger and likely premenopausal, and are therefore at very low risk for bone loss and subsequent fractures. Mild bone loss detected by a DEXA scan may lead to a diagnosis of osteopenia, resulting in potentially unnecessary treatment with medications. Use of these medications includes several associated risks such as increased risk of esophagitis, osteonecrosis of the jaw, and severe bone, muscle and joint pain with bisphosphonates; and vasomotor symptoms and thrombotic events with selective estrogen receptor modulators; and the unknown risks of long-term use of anti-osteoporosis medications^{4,16-18}. In addition, the United States Preventive Services Task Force (USPSTF) and the American College of Rheumatology also recommend against repeating a DEXA scan within a two-year period of an initial scan due to the limited precision of the test and the time necessary to see clinically significant change^{14,19,20}.

A CA-125 test detects the amount of protein CA 125 in blood and is used as a tumor marker during treatment of some cancers such as ovarian cancer. The USPSTF, ACOG and ACP recommend against using a CA-125 test to screen for ovarian cancer in asymptomatic women^{10,11,21,22}. In addition to the unnecessary spending, this screening test may produce false positive results which can lead to additional testing, significant patient anxiety and in some cases major surgical procedures such as an oophorectomy with potential for severe complications^{23,24}. Although the rate of unnecessary CA-125 testing is not known, a

survey of physicians found that 6 percent of physicians routinely offer ovarian cancer screening tests to women at low risk^{10,25}.

An ECG is used to diagnose and monitor cardiovascular disease and often as part of preoperative care to determine patient fitness for anesthesia and risk for perioperative complications. Currently, the USPSTF, the American College of Cardiology Foundation/American Heart Association, and the American Academy of Family Physicians recommend against performing ECGs to screen for coronary heart disease in asymptomatic adults at low risk for heart disease^{26,27}. In addition to the unnecessary expense, this screening test may produce false-positive results, which can lead to follow-up testing and procedures. For example, an abnormal ECG can lead to angiography, which carries the risk of serious adverse events, such as death, stroke, and myocardial infarction²⁶.

Data Source

This study utilized the Truven Health MarketScan® Commercial Claims and Encounters Database, which contains de-identified administrative data from large employers and health plans across the US who provide private health care coverage for 44 million - 53 million individuals with ESI in 2008-2013. In our analysis, we used the following datasets for the period of 2008 to 2013: annual enrollment file, enrollment detail file, outpatient drug claims file, and outpatient services file. The data include information on coverage dates, service dates, age, state, total dollars paid to providers, procedure codes, diagnostic codes, and national drug codes.

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Measure Definitions

Since our study is based on administrative data that do not contain all relevant clinical data (e.g., family history and patient risk), we use the term “potential overuse” because for some patients a DEXA scan, CA-125 test, or ECG may have been classified as appropriate had the clinical data been available. We defined four measures of potential overuse: initial DEXA scans, short-interval repeat DEXA scans following an initial scan, CA-125 tests, and ECGs. The panel developed inclusion and exclusion criteria for each measure based on age, enrollment status, diagnoses, and procedures that may indicate appropriate versus potential overuse.

A potentially unnecessary DEXA scan was defined as receipt of a scan among continuously enrolled women ages 18-64 without a diagnosis of osteoporosis, osteopenia, or prescription history of glucocorticoids (identified using National Drug Codes) during the measurement year. For women receiving a potentially unnecessary DEXA scan, we calculated the rate of short-interval repeat scanning defined as an additional DEXA scan within the following 23 months of an index scan.

We calculated this repeat scanning rate separately for the members of four cohorts based

on calendar years 2008, 2009, 2010, and 2011. The cohorts were constructed by including all women who met the denominator statement requirements for the cohort year, remained continuously enrolled in the two subsequent years, and who received a DEXA scan in the cohort year.

A potentially unnecessary CA-125 test was defined as receipt of a test among continuously enrolled women ages 18-64 who did not have a diagnosis of ovarian cancer or other relevant clinical indicators.

Finally, a potentially unnecessary ECG was defined as receipt of an ECG among continuously enrolled individuals ages 18-64 during an annual preventive visit in the absence of any cardiac diagnosis or other relevant clinical indicators on the claims associated with this visit or within a six-month look-back period prior to the visit and where the primary diagnosis for the visit was either a routine medical or gynecological exam. The exact definitions of the measures are presented in Table 1. The Appendix includes the diagnosis and procedure codes used in the analysis.

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Table 1: Measure Definitions

	Denominator Inclusion	Denominator Exclusion	Numerator
DEXA Scan	<ul style="list-style-type: none"> Continuously enrolled (no more than one break in health plan enrollment of less than 30 days, no break in enrollment exceeding 30 days) Women between the ages of 18 and 64 Prescription drug records available 	<ul style="list-style-type: none"> Diagnosis of osteoporosis or osteopenia at any point during the measurement year (International Classification of Diseases diagnosis codes: 733.00, 733.01, 733.02, 733.03, 733.09, or 733.90) Record of filling a prescription of at least one 30-day or greater supply of steroids during the measurement year 	<ul style="list-style-type: none"> All DEXA scans (Current Procedural Terminology (CPT®) codes of 77080, 77081, or 77082 (performed in the population described in the denominator statement in the measurement year
CA-125 Tests	<ul style="list-style-type: none"> Continuously enrolled (no more than one break in health plan enrollment of less than 30 days, no break in enrollment exceeding 30 days) Women between the ages of 18 and 64 	<ul style="list-style-type: none"> Diagnosis of ovarian cancer or other related clinical indications during the measurement year (for the list of codes see the Appendix) 	<ul style="list-style-type: none"> CA-125 screening tests performed in the population described in the denominator statement in the measurement year (CPT® code 86304)
ECGs	<ul style="list-style-type: none"> Continuously enrolled (no more than one break in health plan enrollment of less than 30 days, no break in enrollment exceeding 30 days) Individuals between the ages of 18 and 64 Individuals with a preventive service visit <p>Preventive service visits were identified through the occurrence on the claims of CPT® codes 99385, 99386, 99395, 99396, or through the presence of any of the CPT® codes 99211, 99212, 99213, 99214, or 99215 in conjunction with the ICD-9 V-codes for preventive services V70.0, V70.8, V70.9, V72.31, or V72.32</p>	<ul style="list-style-type: none"> The presence of any cardiac diagnosis (primary or secondary) or other relevant clinical indicators on the claim for a preventive service visit or during the six-month period preceding the date of visit 	<ul style="list-style-type: none"> ECGs (CPT codes 93000, 93005, or 93010) performed during a preventive service visit in the population described in the denominator statement in the measurement year For the measure numerator, only ECGs with ICD-9 primary diagnosis codes V 70.0 (“Routine general medical examination at a health care facility”) and V72.31 (“Routine gynecological examination” were selected

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Statistical Analysis

We calculated the following statistics:

- the number of individuals meeting the denominator criteria described in Table 1 for the three tests (four measures),
- the overall and age group-specific rates of tests per 1,000 individuals in each measure denominator,
- the frequency of repeated DEXA scans,
- the proportion of potentially unnecessary tests among all DEXA scans, CA-125 tests, or ECGs performed in a given year, and
- the mean payment for each of the three tests based on claims paid on a fee-for-service (FFS) basis (which is reported in the current dollars and adjusted for inflation by using the Consumer Price Index).

A small proportion of claims in our data set (the number ranged between 0.04 percent and 0.05 percent for different years) were missing the enrollee identification number and thus could not be assigned to a particular enrollee and were excluded. Since the share of these claims was very small it is unlikely that the inability to include them significantly affected our results.

To address potential bias due to the use of a non-random sample of the administrative data source, we transformed the statistics derived from the Truven Health MarketScan data into national estimates of rates of potential overuse of DEXA scans, short-interval repeat scans, CA-125 tests, and ECGs for the ESI population by using the national weights derived from the Household Component of the Medical Expenditure Panel Survey and provided by Truven

Health Analytics. We used these same weights to calculate national spending estimates for the ESI population. The weights were constructed from demographic information such as age, geographic region, sex, and metropolitan statistical area.

All analyses were performed using the statistical software package SAS 9.4 (SAS Institute Inc., Cary, NC).

Results

Table 2 presents the national rates of potential overuse of DEXA scans, CA-125 testing, and ECGs over the time period 2008-2013 among individuals with ESI.

Table 2 also shows a downward time trend for potential overuse rates of DEXA scans, CA-125 testing, and ECGs between 2008 and 2013. Potential overuse rates for DEXA scans decreased from 21.2 in 2008 to 13.7 in 2013 representing a relative decrease of 35 percent. Similarly, potential overuse rates for CA-125 tests also decreased during the same time period from 4.7 to 3.3 representing a 30 percent relative decrease. Unlike for the other two tests, the potential overuse rate for ECGs decreased only slightly – by 3 percent over the same time period, from 87.5 in 2009 to 84.6 in 2013.

In addition to the decrease in the rate of potential overuse, the proportion of unnecessary DEXA scans out of all scans performed declined from 39 percent in 2008 to 35 percent in 2013. Similarly, the proportion of unnecessary CA-125 tests out of all tests decreased from 41 percent in 2008 to 33 percent in 2013. The proportion of potentially unnecessary ECGs out of all ECGs performed remained roughly constant at the 42 percent - 44 percent level between 2009 and 2013.

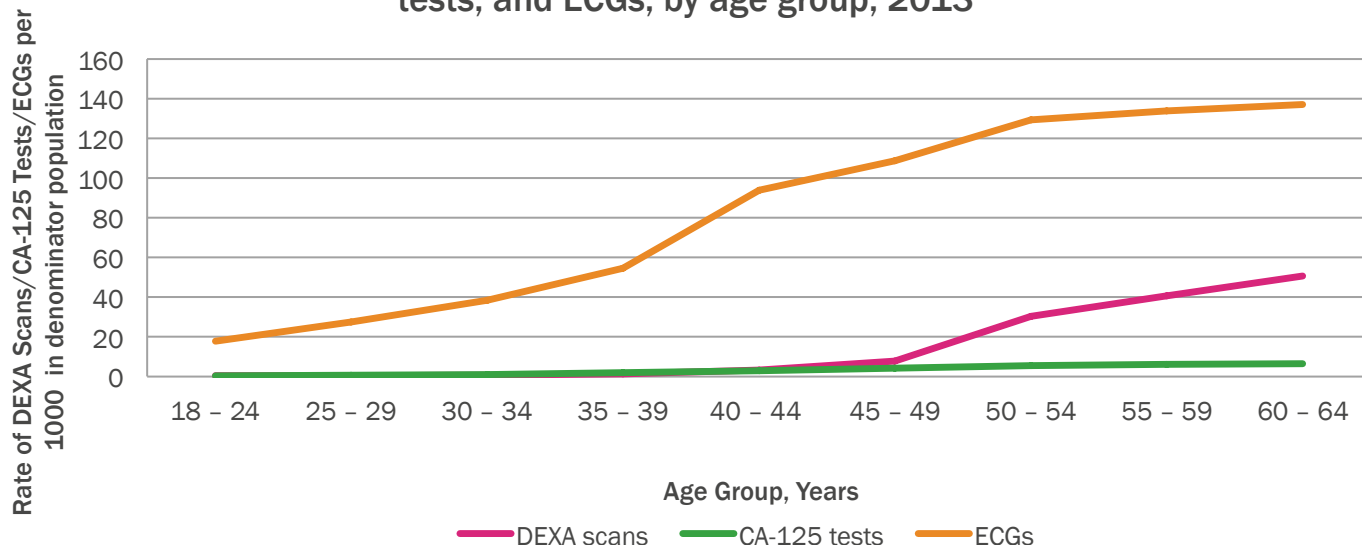
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**Table 2: National Estimates of Potential Overuse and Payment Statistics
Among Individuals with ESI**

	2008	2009	2010	2011	2012	2013
Total number of individuals with employer-sponsored insurance	163,018,002	162,202,238	160,095,313	154,273,037	154,273,037	158,285,567
DEXA Scans						
Number of women meeting the denominator criteria described in Table 1	43,709,764	44,119,685	43,638,389	42,493,149	42,547,978	45,375,493
Rate of DEXA scans per 1,000 among women with an absence of osteopenia/osteoporosis and/or other clinical indicators	21.2	21.0	19.4	18.0	15.3	13.7
Proportion of potentially unnecessary DEXA scans of all DEXA scans	39%	37%	37%	36%	36%	35%
Mean payment per DEXA Scan, in 2013 dollars	\$158	\$155	\$145	\$147	\$150	\$142
CA-125						
Number of women meeting the denominator criteria described in Table 1	60,085,633	59,519,211	58,816,271	57,231,806	57,073,795	58,711,806
Rate of CA-125 screenings per 1,000 among women with an absence of an ovarian cancer diagnosis or other clinical indicators	4.7	4.5	4.2	3.9	3.5	3.3
Proportion of potentially unnecessary CA-125 tests of all CA-125 tests	41%	38%	37%	36%	34%	33%
Mean payment per CA-125 Test, in 2013 dollars	\$42	\$43	\$41	\$42	\$42	\$39
ECGs						
Number of individuals meeting the denominator criteria described in Table 1	N/A	22,072,257	22,293,598	21,987,560	23,266,425	25,751,864
Rate of ECGs per 1,000 individuals in denominator	N/A	87.5	93.1	91.4	84.9	84.6
Proportion of potentially unnecessary ECGs	N/A	44%	44%	44%	42%	42%
Mean payment per ECG, in 2013 dollars	N/A	\$36	\$35	\$34	\$32	\$31

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Figure 1. National Rates of Potential Overuse: DEXA scans, CA-125 tests, and ECGs, by age group, 2013



We also found that a considerable number of potentially unnecessary DEXA scans was followed by a short-interval repeat DEXA scan within the next 23 months. In the 2008 cohort, 8.7 percent of women received a repeat DEXA scan within 23 months, and this rate decreased slightly in the subsequent years: 7.4 percent for the 2009 cohort, 6.8 percent for the 2010 cohort, and 6.3 percent for the 2011 cohort (data not shown).

Figure 1 shows the national rate of DEXA scans, CA-125 tests, and ECGs by age band for the measurement year 2013 for people with ESI. For all three services, the rates of potential overuse rise with age. The rate of potentially unnecessary DEXA scans is 15 times higher in the 60-64 age group compared to the 40-44 age group, two times higher for potentially unnecessary CA-125 tests, and 1.5 times higher for ECGs. The results were similar for other measurement years (data not shown).

In addition to calculating average spending per test (Table 2) we also estimated the amount of potentially wasteful spending at the national level

for these three tests. In 2013, the total national spending for the ESI population for all three services was \$154 million, with DEXA scans and ECGs accounting for 96 percent of this spending.

Discussion

Prior research has shown that the amount of wasteful spending in the Medicare population is substantial, though the amount of waste greatly varied in terms of how the measure was defined (i.e., sensitive vs. specific measure definitions)^{7-9,28}. This is the first study to our knowledge to explore overuse trends of DEXA scans, CA-125 tests, and ECGs in the population with ESI. Our study showed that increasing age and earlier study year were associated with greater overuse (although the magnitude of the effect varies for ECG compared with DEXA scan and CA-125 testing for study year).

It is evident that the prevalence of potentially unnecessary DEXA scans, CA-125 tests, and ECGs is decreasing over time. Some of our findings coincide with previous research on use

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of imaging services. For example, another study found that overuse of thoracic CT scans done both with and without contrast has decreased over time, which could be a result of physicians becoming more aware of American College of Radiology's Appropriate Use Criteria²⁹, risks of cumulative radiation exposure, and the increasing utilization of radiology benefit managers³⁰. Increased awareness of guidelines from respected organizations like the USPSTF, ACC/AHA, ACP and ACOG may help explain the downward trend in DEXA scans and CA-125 testing. Clinicians may also be more cognizant of test appropriateness criteria through such efforts as the Choosing Wisely campaign and ACP's High Value Care Initiative^{5,6,11} as well as health plans' efforts to promote evidence-based medicine.

A survey of 600 practicing physicians recently performed by the American Board of Internal Medicine Foundation (ABIMF) identified several factors that contribute to unnecessary services. The top three reasons physicians said they ordered unnecessary tests and procedures were concern about malpractice issues, "just to be safe," and "wanting more information to reassure myself"³¹. Since cardiovascular disease is common and associated with high morbidity and mortality, it is not surprising that physicians would perform unnecessary electrocardiography despite existing guidelines that recommend against screening low-risk, asymptomatic patients^{26,32,33}. In addition, guideline inconsistency may lead to provider confusion as the ACCF/AHA guideline recommends that an individual physician decide whether or not a screening electrocardiogram is warranted in the asymptomatic, intermediate-risk population³⁴. It is clear, however, that with all three tests, it is important to monitor the current extent of overuse for these tests, as there is still substantial room for improvement.

Increasing age was associated with greater potential overuse of DEXA scans, CA-125 tests, and ECGs. This may be related to women approaching menopausal age and associated bone loss and/or women approaching the recommended screening age of 65 for DEXA scans combined with patient requests to receive these tests or the physician's lack of awareness regarding the ovarian cancer and osteoporosis screening guidelines^{14,25,35}. Increasing age was also associated with greater potential overuse of ECGs, which could be related to the fact that the incidence rate for many cardiovascular diseases increases with age,^{36,37} possibly creating greater willingness to order a diagnostic test even in the absence of clinical indications.

The rates of potentially unnecessary services in our study could also have been affected by a variety of factors that were outside of the study's scope, such as growth in patient cost sharing, or possible increase in low-tech testing (such as ECGs) as a substitute for high-tech imaging (such as stress echocardiography or nuclear perfusion imaging), often a focus of utilization management programs. The rates of potentially unnecessary ECGs may have also been affected by the observed increase in the share of people with preventive visits (25 percent of continuously enrolled members age 18-64 had a preventive service visit in 2009 and 29 percent in 2013). To reduce the prevalence of unnecessary medical services, clinical guidelines should clearly identify the appropriate use of frequently overused tests and procedures, including recommended frequency and clear guidance about when to start and stop testing. In areas where guidelines already exist, efforts to improve dissemination and timely adoption should be enhanced through concise communication of key recommendations to providers and ideas on how to incorporate them into the clinical workflow. A decision-support tool at the point of care may be an

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effective approach to assisting clinicians in delivering appropriate care as well as avoiding inappropriate care. An example of such an approach that has been implemented successfully by the Institute for Clinical Systems Improvement involved a support tool to ensure the appropriate use of high-tech diagnostic imaging scans³⁸.

Next, based on the established guidelines, a set of provider-level "inappropriate testing" measures should be developed to encourage ongoing quality improvement. It is important that overuse and underuse be measured together in order to ensure the highest quality of care is being delivered. Future research should focus on validating claims-based measures against clinical data so that provider-level measures can be established and monitored over time.

Study Limitations

The administrative claims data used for our study represent a large albeit non-random population of individuals with employer sponsored insurance with a broad geographic representation. We applied national weights derived from a non-random data source to correct for potential biases in our estimates. We therefore conclude that our results can be generalized to the national population of individuals with employer-sponsored insurance with certain limitations.

First, this study was conducted using administrative data, which may not capture complete patient risks or symptoms. For example, women who are less than 65 with 10-year fracture risk greater than or equal to that of a 65-year-old white woman would meet the

recommendations of the USPSTF for osteoporosis screening¹⁴. Similarly other reasons to order a DEXA scan might reasonably include premature ovarian failure, and hyperthyroidism. The absence of complete patient risks and symptoms may have misclassified potential overuse among some individuals. Second, the amount of measured overuse is driven by measure definition. For example, a sensitive measure definition may capture a greater extent of overuse whereas a more specific measure may miss some instances of overuse but would provide a more conservative estimate of overuse, which could be more appropriate given the data limitations. In an effort to avoid over-estimating overuse we defined our measures to be as specific as possible. Finally, the composition of Truven MarketScan data contributors may vary from year to year. However, this was unlikely to influence our results since the underlying population distribution by gender, age and state remained stable during the study period.

Finally, a collaborative approach among specialty societies, physicians, payers, and patients is needed to reduce overuse and ensure that patients are getting the right care at the right time.

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Related Topic



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