Over the past 40 years, technological advances in the field of medical imaging have provided an avenue for physicians to use noninvasive means to diagnose disease. Medical imaging procedures that use x-rays, magnetic fields, and sound waves allow physicians to evaluate the human body, often saving patients from undergoing costly surgical procedures. Legislators recently have turned their health care cost-cutting focus to diagnostic imaging. This shift in focus could be a result of reports of dramatic increases in the use of diagnostic imaging procedures and increased health care expenditures.

Medical imaging departments always have been one of the most profitable departments within hospitals. Many health care facilities rely on medical imaging services to subsidize other functions that generate little or no revenue. Between 2000 and 2005, medical imaging service expenditures for Medicare patients billed under the physician fee schedule grew more than all other types of services provided by physicians. This increase was due, in part, to technological advances and the ability of medical imaging to replace surgery as a diagnostic tool. From 2001 to 2006, there was a significant increase in medical imaging procedures, with a 3.6% increase in volume for imaging services provided to Medicare patients compared with an increase of 4.1% for all other services combined.

The Deficit Reduction Act of 2006 and other more recent cuts in Medicare reimbursement have resulted in dramatic decreases in the use of and payment for medical imaging and radiation oncology services. The growth rate of noninvasive diagnostic imaging services provided to Medicare patients slowed to 1.4% between 2005 and 2008 and flattened for most of the advanced imaging services such as magnetic resonance (MR) imaging, computed...
tomography (CT), nuclear medicine, and ultrasonography. The amount Medicare paid for all services grew 31% from 2000 to 2005, but imaging service costs grew 61%, with CT, MR, and nuclear medicine growing the fastest. This growth resulted in an increase in dollars spent by Medicare for imaging services from $6.4 billion in 2000 to $12.3 billion in 2006. Changes in payment systems after 2006 have resulted in decreased expenditures for imaging services as evidenced by total expenditures of $10.9 billion in 2010.

Medicare reimbursement for medical imaging procedures was cut 8 times between 2005 and 2011. Beneficiary claims for imaging services declined in the years 2009 to 2011, with CT, MR, and nuclear medicine showing an approximately 27.6% decrease compared to a 21.3% overall increase in Medicare spending for nonimaging services in the same period. Even with the decline in use and reimbursement rates in recent years, imaging services still account for a significant amount of health care expenditures for Medicare patients. In 2011, Medicare expenditures for imaging services were estimated at $557.8 billion and accounted for 22% of the $2.7 trillion total expenditure for health care services provided to Medicare patients.

Considering the country’s attention toward cutting the cost of Medicare, medical imaging continues to be an area that legislators have focused on for reducing expenditures, which ultimately affects the amount of money available in health care facilities to provide these services and to pay the personnel who perform them. These cuts mean radiologic science professionals need to understand how the Medicare program works, the provisions health care facilities must abide by to obtain payment for services provided to Medicare beneficiaries, and how recent changes in Medicare reimbursement rates affect a medical imaging or radiation therapy department’s bottom line.

**History of Medicaid and Medicare**

Medicaid and Medicare were enacted by Congress in 1965 and implemented on July 1, 1966, through amendments to the Social Security Act. Both Medicaid and Medicare are governmental health insurance programs that provide health insurance at a level equal to that offered by employers. It was estimated that in 2010, 95 million people in the United States, or 31% of the population, were covered by government health insurance. Approximately 44.3 million Americans received Medicare coverage in 2010, and 48.6 million received Medicaid coverage that year.

**Medicaid**

Title XIX of the Social Security Act established Medicaid, which was enacted in 1965 as a state program to help low-income or low-resource individuals and families pay for medical care. Medicaid was not available in all 50 states until 1982. Medicaid funding comes from both federal and state governmental sources. The Centers for Medicare & Medicaid Services (CMS) monitor each state’s program and determine the state’s eligibility for funding. States that abide by federal statutes, regulations, and guidelines are eligible to receive federal funding for the state’s Medicaid program. Each state determines the financial and employment eligibility requirements for participation, the amount and type of assistance provided, and the services covered, so these aspects vary from state to state. The federal government requires states to offer minimum basic services in order to receive matching federal funds. Benefits the state must offer include:

- Inpatient and outpatient hospital services.
- Physician services.
- Laboratory and x-ray services.
- Family planning services.
- Care by midlevel providers.
- Transportation to services.
- Tobacco cessation services.
- Nursing facility services.
- Screening, diagnostic, and treatment services for health, vision, dental, and hearing for individuals younger than 21 years of age.

Federal statutes require states to offer Medicaid to specific groups such as pregnant women, children, and individuals with disabilities. Many states offer services above the level mandated by the federal government, especially services for children. Low-income people who are elderly also access Medicaid for help in paying for premiums, copays, prescriptions, and long-term care. Beneficiaries are required to pay a deductible for Part A services and a premium and deductible and copays for Parts B, C, and D coverage and services. No dental, vision, or long-term care options are available.
with Medicare. Medicaid will pay all or part of the Part B premium for those who qualify, who then also can apply for additional prescription drug and long-term care assistance. Most elderly people obtain secondary insurance or use Medicaid for assistance with coverage for these services.\(^\text{12}\)

The Patient Protection and Affordable Care Act (ACA), which is scheduled to go into effect January 1, 2014, requires states to establish a minimum income eligibility level for individuals aged younger than 65 years and those who earn below 133% of the federal poverty level.\(^\text{13}\) See Box 1 for a list of common acronyms.

**How Medicaid Is Funded**

The amount of federal funding provided to state Medicaid programs is based on the Federal Medical Assistance Percentages rates. These percentages are reviewed and revised annually by the Social Security Administration.\(^\text{14,15}\) The federal government contributes between 50% and 75% of a state’s program expenditures based on criteria such as per capita income.\(^\text{16}\) Each state determines how state funding is acquired, and funding may come from sources such as state payroll taxes and legislative appropriations. The CMS verifies that state funding meets federal requirements before authorizing federal funding.\(^\text{16}\)

Each state determines how services are paid. More than 70% of the states pay under a contract system in which payment rates are negotiated with networks and providers. Other states use a fee-for-service model, with rates based on cost-to-provide services, the rate that private insurance organizations pay for services, and the rate that Medicare pays for the services. Payment rates are based on factors such as the Medicare Economic Index, which is a calculation based on inflation; economic growth rate in the United States; growth in number of beneficiaries and changes in regulations; and other state-based factors that influence inflation rates within the state.\(^\text{16}\)

**Patient Protection and Affordable Care Act**

The primary purpose of the ACA is to decrease the number of Americans who do not have health insurance. The Medicaid program is expected to bear the biggest burden for the implementation of the ACA; its implementation is expected to add 21 million people to the Medicaid program by the year 2022. This increase translates into an estimated $76 billion increase in state Medicaid expenses and $952 billion increase in federal Medicaid expenses between 2013 and 2022.\(^\text{17}\)

**Medicare**

When Medicare was enacted, more than half of Americans older than 65 years of age had little or no health insurance coverage. Medicare was structured to provide no-cost health insurance equal to that of typical employer-provided health insurance for individuals who had reached retirement.\(^\text{1}\) More than 19 million Americans enrolled in Medicare when this component of the Social Security Act took effect on July 1, 1966. President Harry Truman was the first enrollee.\(^\text{18}\) In 1972, eligibility to participate in Medicare was extended to include individuals younger than 64 who have long-term disabilities.\(^\text{18}\)

In 1966, Medicare was set up as a 2-tiered system: Part A offered benefits for inpatient hospital services, and Part B offered supplemental insurance for other health care services. Services covered under Part A included inpatient hospital services, skilled-nursing facility services, and home health services; coverage for hospice care was added to Part A in 1983. Under Part A, the hospital was paid an amount that Medicare determined to be a reasonable cost for treating the patient, regardless of the actual charges issued by the hospital.

**Box 1**

**Common Acronyms Related to Medicare Reimbursement**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>Patient Protection and Affordable Care Act</td>
</tr>
<tr>
<td>ACO</td>
<td>Accountable Care Organizations</td>
</tr>
<tr>
<td>APC</td>
<td>Ambulatory Payment Classification</td>
</tr>
<tr>
<td>DRG</td>
<td>Diagnosis-Related Group</td>
</tr>
<tr>
<td>HOPPS</td>
<td>Hospital Outpatient Prospective Payment System</td>
</tr>
<tr>
<td>MACs</td>
<td>Medicare Administrative Contractors</td>
</tr>
<tr>
<td>MIPPA</td>
<td>Medicare Improvements for Patients and Providers Act</td>
</tr>
<tr>
<td>MMA</td>
<td>Medicare Modernization Act</td>
</tr>
<tr>
<td>MPFS</td>
<td>Medicare Physician Fee Schedule</td>
</tr>
<tr>
<td>MPPR</td>
<td>Multiple Procedure Payment Reduction</td>
</tr>
<tr>
<td>OPPS</td>
<td>Outpatient Prospective Payment System</td>
</tr>
<tr>
<td>PQRS</td>
<td>Physician Quality Reporting System</td>
</tr>
<tr>
<td>RVU</td>
<td>Relative Value Unit</td>
</tr>
</tbody>
</table>
Individuals covered by Part A were responsible for paying only a deductible equivalent to the average cost of 1 day’s hospital stay for the first 60 days of hospital care. Between 61 and 91 days, the beneficiary was responsible for paying a daily fee of one-quarter of the average cost of 1 day’s hospital stay. After 90 days, the individual could choose to dip into his or her lifetime reserve—equal to 60 days’ coverage—and pay a daily fee of one-half of the average cost of 1 day’s hospital stay or pay the entire charge. In rare circumstances, Medicare requires an enrollee to pay a premium for Part A benefits. The annual deductible for Medicare in 1966 was $40 per year; in 2013 it was $1184 per year.

Under Part B, Medicare covered nonhospital charges such as:
- Physician office visits.
- Laboratory, radiology, and therapy services.
- Outpatient procedures.
- Home medical equipment.

These services were, and still are, paid based on Medicare’s reasonable-cost basis. Medicare Part B is a voluntary plan, and the individual is responsible for an annual deductible and coinsurance. In 2003, the Medicare Prescription Drug, Improvement, and Modernization Act, also known as the Medicare Modernization Act (MMA), authorized a tiered premium system based on income. Table 1 compares the monthly premium, annual deductible, and per-service copay for Medicare Part B in 1966 vs 2013.

Medicare Plan C, also known as Medicare Advantage, was enacted in 2003 to allow private insurance companies to cover the benefits offered by Medicare Plans A and B. Plan C allows eligible participants to choose the carrier for their health care benefits—either the federal government or a private insurance company.

Section 101 of the MMA of 2003 amended Title XVIII of the Social Security Act by implementing Medicare Part D as a voluntary prescription drug benefit program. Medicare Part D, implemented in 2006, is only available to people enrolled in Medicare Parts A or B and requires annual enrollment.

How Medicare Is Funded

With the original enactment of Medicare in 1966, a federal payroll tax—funded by employers, employees, and self-employed individuals—was authorized to fund Part A of the Medicare plan, and this plan was offered to all American citizens aged older than 65 years at no cost. The 1966 payroll tax was established as 0.35% on wages, up to a maximum of $6600 annually. For $3 a month, Medicare Part B was available to all U.S. citizens and to legal aliens who had lived in the United States for more than 5 years. At the time of enactment, the federal government estimated the actual cost to provide services under Plan B at approximately $72 per year, so the individual enrollee’s premium covered half of the actual cost to provide the services, and the federal government funded the other half.

In 2013, the Medicare payroll tax was 2.9%, with half being paid by the individual through payroll deductions and half by the employer. Self-employed individuals pay the full 2.9%. No wage limits are in place today. In addition, beginning in 2013, individuals were assessed an additional Medicare tax of approximately 3.8% on investment income if their modified adjusted gross income exceeded $250 000 for married couples filing jointly, $200 000 for single people or heads of household, or $125 000 for married couples filing separately.

Over the past 40 years, the services provided under Medicare have evolved to ensure that elderly people in America have the same access to and level of care provided by “standard” health insurance policies. Unfortunately, funding for Medicare has not kept up with costs to administer the program, and the system as originally envisioned is no longer sustainable.

How Providers Qualify to Receive Medicare Payments

Health care providers are required to meet certain conditions to maintain eligibility to submit and receive payment for services provided to Medicare beneficiaries.
These conditions for participation are met through an accreditation process or participation in a quality reporting program.

**Accreditation**

Accreditation is a process used to monitor and control health care facilities and providers and to ensure that these entities and individuals meet or exceed minimum standards and qualifications. Many accreditation programs are available in the health care arena, with most of them focused on specific services provided by health care facilities and providers. Federally mandated accreditation programs outline the qualifications health care facilities and providers must meet in order to bill for and receive payment for services to Medicare beneficiaries. These programs typically fall into 2 categories: hospital accreditation and outpatient or ambulatory care facility accreditation.

**Hospital Accreditation**

Hospital accreditation was part of the 1965 Medicare program. The original law recognized the authority of the Joint Commission, formerly known as the Joint Commission on Accreditation of Healthcare Organizations, to accredit hospitals and accepted this accreditation as compliance with certification standards for participation in the Medicare program. The Department of Health, Education, and Welfare administered Medicare but did not have access to Joint Commission accreditation actions or means for validating the program.

The law also prohibited the federal government from imposing additional requirements to Joint Commission–accredited facilities. Amendments to the Social Security Act passed in 1972 permitted the Department of Health, Education, and Welfare to impose standards more stringent than the Joint Commission’s on hospitals and allowed a mechanism for state agencies to validate Joint Commission accreditation actions. This action provided the gateway for the current relationship between the Joint Commission and Medicare.24

CMS contracts with the Joint Commission and some state accrediting agencies to administer hospital accreditation programs for assurance that the hospitals are in compliance with conditions of participation in the Medicare program. For hospitals to qualify to receive Medicare payments, they must be accredited either by the Joint Commission or by an authorized state accrediting agency.25

**Outpatient Facility Accreditation**

The Medicare Improvements for Patients and Providers Act of 2008 (MIPPA) amended the Social Security Act to require accreditation of physicians, nonphysician practitioners, and independent diagnostic testing facilities that provide the technical component of MR, CT, and positron emission tomography–computed tomography (PET-CT) procedures after January 1, 2012. The law also allows the Secretary of Health and Human Services to include imaging services other than radiography, ultrasonography, and fluoroscopy, which are excluded, and mammography, which requires accreditation through the Mammography Quality Standards Act. MIPPA regulations authorize the American College of Radiologists, the Intersocietal Accreditation Commission, and the Joint Commission to accredit practices and facilities that provide advanced imaging services.26 The recognized agencies each establish standards that an accredited facility must abide by to attain and maintain accreditation and to submit and receive payment for services provided to Medicare beneficiaries.

**Quality Reporting**

The CMS established 3 goals for quality initiatives: better health, better health care, and lower costs. The CMS takes the stance that quality measurement and reporting will improve the quality of the services consumers receive because it encourages providers and health care facilities to become more aware of the quality of the services they provide and to implement processes to improve the quality of the services measured.27

The quality reporting programs implemented by CMS align payment incentives to quality measures and include all levels of service covered by Medicare. In addition to the general quality reporting programs, CMS has additional programs for inpatient and ambulatory surgical centers that affect either a percent of payment or offer incentives for participation in the programs.28 All of the quality programs and measures are reviewed and updated annually.
Hospital Inpatient Quality Reporting Program

Included in the 2003 MMA, with additional requirements added as part of the 2005 Deficit Reduction Act, the Hospital Inpatient Quality Reporting Program provides consumers with information about the quality of care provided by hospitals. The program’s intent is to ensure quality through public disclosure and accountability. It requires hospitals to submit data on specific measures for common diseases or health care services such as acute myocardial infarction, heart failure, pneumonia, immunizations, emergency department services, mortality and readmission rates, and patient satisfaction. The information hospitals submit is available to the general public online (www.medicare.gov/hospitalcompare). Currently, CMS reduces payment rates by 2% for all Medicare services provided by hospitals that do not participate in the Hospital Inpatient Quality Reporting Program.

Hospital Outpatient Quality Reporting Program

The Hospital Outpatient Quality Reporting Program, implemented in 2011, affected payments for services provided to Medicare beneficiaries beginning in 2012. To determine eligibility for payment in 2014, hospitals were required to submit quality measure information for patients who were treated in 2012 for acute myocardial infarction, chest pain, emergency department throughput, pain management, stroke, outpatient surgery, imaging efficiency, and other facility measures. Hospitals must report prior-year standardized measures data to receive the full outpatient prospective payment system (OPPS) rate for the following fiscal year. The full payment is available to hospitals that submit accurate and complete data for all the outpatient measures. Currently, payment is tied only to reporting of quality data, not to performance or minimum standards of quality in these measures.

Box 2

**Hospital-Based Outpatient Radiology Department Quality Measures**

- MR imaging lumbar spine for low back pain – reports the percent of MR imaging of lumbar spine studies performed on Medicare beneficiaries with a diagnosis of low back pain and for which the patient has no evidence of conservative therapy prior to performance of the MR imaging.
- Mammography follow-up rates – reports the percent of Medicare patients with screening studies who also have a diagnostic ultrasonography or MR follow-up examination within 45 days of a screening mammogram.
- Abdomen CT use of intravenous contrast material – reports the ratio of CT abdominal scans performed on Medicare patients with and without intravenous contrast compared to all CT abdomen studies performed on Medicare patients.
- Thorax CT use of intravenous contrast material – reports the ratio of CT chest procedures performed on Medicare patients with and without contrast compared to all CT chest studies performed on Medicare patients.
- Cardiac imaging for preoperative risk assessment for noncardiac low-risk surgery – reports the percent of stress echo, single-photon emission CT myocardial perfusion imaging, or stress MR imaging studies performed on Medicare patients at a hospital outpatient facility 30 days prior to an outpatient, low-risk noncardiac surgery performed anywhere on the same Medicare patient.
- Simultaneous use of brain CT and sinus CT – reports the percent of brain CT and sinus CT performed on the same Medicare patient on the same day by the same facility.

Quality Reporting Initiative, MIPPA authorized incentive payments for providers who meet requirements through the PQRS through 2010, and the ACA authorized incentive payments for participants in the PQRS through 2014, with penalties beginning in 2015 for providers who do not report quality measures.

Physicians can participate in the program as individuals or as members of a group practice. Other allied health professionals required to participate in the PQRS include physical, occupational, and speech language therapists, audiologists, nurse practitioners, and physician assistants.
Quality measures for physicians include documentation of:

- Patient and family engagement, such as plan of care for falls or pain management.
- Patient safety, such as timely administration of antibiotics prior to surgical procedures, medication reconciliation, and documenting exposure time for procedures using fluoroscopy.
- Care coordination, such as a reminder system for screening mammography, surveillance of abdominal aortic aneurysm repair after surgery, and biopsy result follow-up.
- Clinical processes/effectiveness for disease management, such as effective control of high blood pressure and aspirin use by patients with ischemic vascular disease.
- Effective use of health care resources, such as overuse of bone scans for staging low-risk prostate cancer.
- Population and public health services, such as preventive screening for tobacco use and high blood pressure.

**How Bills for Services Are Processed**

Private insurers have processed Medicare claims since the program was enacted. This system for processing payments was established to alleviate concerns from health care organizations that the federal government could interfere with providers' abilities to practice medicine if a government agency were reviewing and processing claims. In response to these concerns, Congress included provisions for private insurance companies to contract with the federal government to review and process Medicare claims.

**Medicare Administrative Contractors**

The system for reviewing and processing Medicare claims was established with 2 types of contractors. Fiscal intermediaries process and pay Medicare Part A claims, and health insurance carriers process and pay Medicare Part B claims. Part B contracts were awarded by geographical region so the same carrier processed all the claims in a specific region. The role of contractors evolved from a bill payment service to more autonomous organizations that developed coverage policy and provided education to medical providers. Both Part A fiscal intermediaries and Part B authorized carriers were provided the authority to determine the appropriate payment amounts by applying Medicare coverage rules and setting controls to mitigate fraud and abuse. This structure remained in place until 2002 when the MMA was passed.

The MMA included provisions for reforming Medicare contracts to address issues that had evolved with the system since 1965. The statutes mandated that the 2 contractor systems merge, with carriers within the resulting system referred to as Medicare Administrative Contractors (MACs). The MMA also provided the federal government and contractors more options for the contracts and mandatory review for contract renewals at 5-year intervals. Prior to 2003, health care provider associations nominated organizations to be fiscal intermediaries, and CMS selected from the list of nominated carriers. With enactment of MMA, selection of MACs occurs through a competitive bidding process.

Currently, the United States is divided into 15 regions, with each region having 3 contracted MACs: 1 to process Part A and B payments, 1 to process durable medical equipment payments, and 1 to process home health care payments.

**How Services Are Billed**

The CMS uses 4 systems to pay for services provided to Medicare beneficiaries. The Inpatient Prospective Payment System is used by hospitals—other than critical access hospitals—to bill for inpatient (Part A) services provided to Medicare beneficiaries. Noncritical access hospitals bill for outpatient (Part B) services provided by the hospital. Providers use the physician fee schedule to bill for physician services provided to all Part A and B beneficiaries and services provided to Part B beneficiaries at ambulatory care facilities. Hospitals designated as critical access hospitals have a billing system that pays 101% of reasonable costs for services provided to Part A and B beneficiaries (see Box 3).

**Inpatient Services**

In 1983, the Health Care Finance Association implemented a new reimbursement system for Medicare claims for inpatient services. Prior to this, the payment system was a retrospective, cost-based payment system that allowed health care facilities to receive payment from
Medicare Reimbursement: What R.T.s Should Know

Box 3
Payment Scenario Examples

A Medicare patient wakes up one morning with shortness of breath and fever and decides to seek medical care. Depending on the type of facility the patient accesses for care and the final diagnosis, payment for diagnostic tests and treatment will differ. To compare the payment differences, we will assume the patient receives a chest radiograph regardless of facility and final diagnosis and has already met annual deductibles for Medicare Parts A and B.

If the patient accesses care at a physician’s office and this office has capabilities to perform a chest radiograph, the Medicare Physician Fee Schedule (MPFS) is used to bill for the radiographic procedure. The patient is responsible to pay the $6.63 copayment, and Medicare reimburses the physician’s practice $33.14 for performing and reading the radiograph, regardless of the amount the physician’s office actually bills for the imaging. If the physician’s office does not have capabilities to perform the examination and sends the patient to the hospital for an outpatient procedure, the Hospital Outpatient Prospective Payment System is used to bill for the radiograph. The patient is responsible to pay the copayment of $11.25, and Medicare reimburses the hospital $45.95 for performing the procedure and the radiologist $10.28 for interpreting the radiograph, regardless of the amount the hospital and the radiologist actually bill for the examination.

If the patient accesses care at the emergency department, receives a chest radiograph and subsequently is admitted as an inpatient for 5 days for treatment of pneumonia and pleurisy without complicating conditions, the Healthcare Common Procedure Coding System diagnosis-related groups (DRGs) are used to bill for treatment of the patient’s pneumonia, and MPFS is used to bill for the interpretation of the radiograph. The patient is responsible to pay the inpatient copayment of $0 (because the patient already met the deductible), and Medicare reimburses the hospital $3984.08 for treating the patient’s pneumonia, regardless of how much the hospital bills for diagnosis and treatment of the infection. Because this payment is for all services provided to diagnose and treat the patient’s condition, no separate payment is made to the hospital for the radiograph. The radiologist will be reimbursed $10.28 for interpreting the radiograph.

Medicare for all services rendered to patients covered by Medicare Part A. On September 30, 1983, the Health Care Finance Association implemented a prospective payment system based on diagnosis-related groups (DRGs). This system categorized a patient’s diagnosis into a DRG. Each DRG had a payment amount assigned based on the national average cost to treat that specific diagnosis or disease. With a diagnosis-based payment system, a health care facility is reimbursed according to a predetermined amount that is dependent upon the patient’s diagnosis and appropriateness of the services provided, which was determined prior to payment being made. Congress mandated the change from a retrospective cost-based system to the prospective payment system based on DRGs in an effort to contain health care expenditures and to use Medicare funds more efficiently. This system is still in use today.

Radiology services provided to inpatients are considered part of the treatment for the diagnosis, so the hospital does not bill or receive payment for these services in addition to the DRG payment. Inpatient services are billed under the Healthcare Common Procedure Coding System of Part A. Hospitals cannot bill separately for the technical component of radiology or radiation oncology services provided to inpatients, but physicians can be billed separately for the services they provide to inpatient Medicare beneficiaries.

Outpatient Services Provided by a Hospital

The Balanced Budget Act of 1997 authorized implementation of a Hospital Outpatient Prospective Payment System (HOPPS) and, after several years of refinement, HOPPS became effective for all outpatient services provided by a hospital on or after August 1, 2000. HOPPS reimbursement calculations are based on Ambulatory Payment Classification (APC) groups. The APC system uses the relative value unit (RVU) to determine a fair and equitable payment for the services provided by a health care facility. CMS determines how many resources are typically allocated to provide a specific treatment or test. It then weighs the resources allocated to provide the treatment against
a midlevel physician office visit in terms of the complexity of the test or treatment, the amount of resources consumed, and the time spent providing the service. Finally, CMS assigns a value to the test or treatment, which is termed the **RVU**. Procedures with similar relative values are bundled into APCs. The HOPPS resulted in evaluating more than 8000 diagnostic tests and treatments and assigning them approximately 450 APC categories.41,45

Each APC is assigned a reimbursement rate based on a weighted average of all APCs and is adjusted for local wage differences. Each hospital is classified based on size, services provided, and location within the United States, and the hospital is paid for outpatient procedures based on an adjusted APC schedule assignment. The geographic modification is applied to 60% of the base rate because Medicare assumes wages make up approximately 60% of the cost for services. Outpatient surgery, outpatient clinics, emergency department services, observation services, outpatient testing, and therapy all are covered under HOPPS.46 An advisory group reviews the APCs annually to determine whether procedures need to be moved to different APC groups and to determine the annual conversion factor to use for payment adjustments to the rate Medicare pays for each group.46 The CMS reviews the advisory group’s recommendations, proposes changes to the payment system, and determines which procedures qualify for reimbursement under HOPPS for the next calendar year.

In addition to grouping procedures into APCs, HOPPS has changed the method for determining how much of the APC charge a patient is responsible for paying. Medicare benefits for services provided under Part B are subject to an annual deductible. The beneficiary is responsible for paying the cost of most services provided until he or she has paid out the amount of the annual deductible. After the deductible has been met, the patient is responsible for a copay equal to or less than the copay for the same service provided under Medicare Part A, which is typically 20%.46

When HOPPS was implemented on August 1, 2000, health care facilities were allowed to bill for supplies and medical devices used during certain procedures using transitional pass-through codes. The use of transitional pass-through codes was eliminated and, today, the costs of supplies used during a typical outpatient procedure are not billed separate from the procedure. Common supplies used for radiology that are no longer paid outside of the APC system include\(^{43,45}\):
- Guidance services such as use of ultrasonography in interventional labs to locate arteries.
- Image processing.
- Diagnostic radiopharmaceuticals.
- Contrast agents.
- Observation time.
- Implantable medical devices.
- Routine supplies such as needles and syringes.

**Outpatient Services Not Provided by a Hospital**

Medicare Part B payment systems for services provided by physicians and nonhospital facilities have changed dramatically in the past 2 decades. Initially, the Part B payment rate was calculated based on the annual actual allowable charges in the prior year. This was changed in 1984 to limit the annual increase. In 1992, the resource-based relative value scale physician fee schedule was implemented. This system calculated payment rates based on the estimated physician time and other resources needed to provide a specific service.47 Outpatient radiology services not provided in or by a hospital are billed under Medicare Part B, and the rates are based on the Current Procedural Terminology–4 portion of Healthcare Common Procedure Coding System codes. This billing system is referred to as the **Medicare Physician Fee Schedule (MPFS)**.46

The MPFS for each procedure has 3 components: physician, technical, and global. The physician component is the payment for the independent licensed practitioner’s services. Payments for services provided by a midlevel provider are calculated as a percentage of the total physician component for the service. The technical component is the payment for all other resources used to provide the service, such as the medical equipment and nonprovider staff time. The global component includes a payment for both the physician and technical components and usually is for services provided by a private practice or independent diagnostic testing facility, or when the hospital employs the physicians.48 The MPFS rates are based on RVU, conversion factor, and geographic practice cost indices, and there are 3 types of RVUs\(^{46}\):
- Work RVU – estimates time and intensity to provide the services, accounts for about 50% of the payment rate, and is reviewed at least once every 5 years.
- Practice expense RVU – estimates the costs of maintaining a practice.
- Malpractice RVU – estimates the expense of carrying insurance for malpractice.

Until 1994, the practice and malpractice expense RVUs were calculated separately and based on average allowable charges. The practice expense RVU is based on estimated expenses for managing an office practice. These expenses include personnel wages, rent, and office furniture. The conversion factor is reviewed and updated annually based on comparison of actual expenditures to the sustainable growth rate. This annual adjustment is called the Medicare Economic Index. The sustainable growth rate calculation is derived from medical inflation, projected growth rate in the U.S. economy, projected growth in the number of Medicare beneficiaries, and changes in statutes and regulations. The geographic practice cost indices account for geographic variations in costs of practicing medicine in different parts of the country and are updated every 3 years.

**Effect of Recent Regulatory Changes**

**OPPS and MPFS Reimbursement Disparity**

The implementation of OPPS in the early 2000s resulted in a flattening of rate increases for outpatient services provided by hospitals (see Table 2). Unfortunately, these changes also resulted in disparity in reimbursement rates between OPPS and MPFS, with reimbursement rates much higher for procedures performed outside of a hospital setting (see Table 3). As a result of this disparity, hospitals and physicians began to open independent diagnostic testing centers to take advantage of the higher reimbursement rates for procedures billed through the MPFS. Between 2000 and 2005, medical imaging service expenditures for Medicare patients billed under MPFS grew more than all other types of services provided by physicians. There was a significant increase in use of and payment for medical imaging procedures, with a 3.6% increase in volume for imaging services provided to Medicare patients from 2001 to 2006, compared with an increase of 4.1% for all other services combined.

The CMS recognized these increases in volume and expenditures for diagnostic imaging services, and Congress addressed the issue. The Deficit Reduction Act of 2005 enacted a cap on the MPFS rates for the technical component of imaging procedures to be no more than the rate paid through OPPS. In 2007, the method CMS used to calculate the RVUs for services was revised to include direct and indirect practice expense RVUs, using the same calculation for determining rates for services that do and do not involve a physician, and using up-to-date practice cost data to estimate indirect physician expense RVUs. The phase-in for these changes to RVU rate calculations was completed in 2010. Table 2 shows the result of RVU rate calculation changes on MPFS.

**Use Rate Changes**

The CMS uses a cost-per-minute use over the life expectancy of imaging equipment, including capital and maintenance costs, as the basis for determining practice costs. The CMS also factors in the percentage of time the equipment is available to perform procedures in a 50-hour workweek. This factor is referred to as the utilization rate. In 2008, the utilization rate was 50%; in 2010, it was changed to 75% for the technical component of imaging equipment used by physicians, physician practices, and independent diagnostic testing facilities—those who use MPFS to bill for these services. Through 2013, the RVU was calculated assuming patients are

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**Table 2**

**Examples of Unadjusted Rate Changes in the Hospital Outpatient Prospective Payment System**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>2003 ($)</th>
<th>2008 ($)</th>
<th>2013 ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>70470 – CT head/brain w/o &amp; w/dye</td>
<td>295.93</td>
<td>325.64</td>
<td>329.34</td>
</tr>
<tr>
<td>71020 – Chest x-ray</td>
<td>42.13</td>
<td>44.29</td>
<td>45.95</td>
</tr>
<tr>
<td>73218 – MRI upper extremity w/o dye</td>
<td>364.58</td>
<td>343.52</td>
<td>338.49</td>
</tr>
<tr>
<td>76856 – US exam, pelvic, complete</td>
<td>88.42</td>
<td>96.14</td>
<td>99.32</td>
</tr>
<tr>
<td>78315 – Bone imaging, 3 phase</td>
<td>235.60</td>
<td>242.29</td>
<td>261.68</td>
</tr>
<tr>
<td>77418 – Radiation Tx delivery, IMRT</td>
<td>400.00</td>
<td>347.65</td>
<td>483.70</td>
</tr>
</tbody>
</table>

Abbreviations: CT, computed tomography; IMRT, intensity-modulated radiation therapy; MRI, magnetic resonance imaging; Tx, treatment; US, ultrasound; w/ with; w/o, without.

* Short descriptors as identified by the Centers for Medicare & Medicaid Services.
being imaged 37.5 hours in each 50-hour workweek. Part of the fiscal cliff deal made on January 1, 2013, increased the utilization rate to 90%, meaning for services billed after January 1, 2014, the RVU calculation now assumes that imaging equipment would be imaging patients 45 hours per 50-hour workweek. Higher utilization rates lower the technical component calculation because the cost of the equipment is allocated over a higher number of hours of use. The 90% utilization rate only affects equipment that cost more than $1 million. With a utilization rate of 90%, it is estimated that most CT and MR procedures will see a decrease in reimbursement rates of 10% to 20% beginning in 2014.34

Multiple Procedure Payment Reduction

Multiple Procedure Payment Reduction (MPPR) on the technical components of certain diagnostic imaging procedures was implemented as part of the ACA and became effective January 1, 2011. The change required a reduction in the technical component payment for certain imaging services, primarily CT, MR, and ultrasound provided on the same day to the same patient. MPPR applied only to the technical component for diagnostic imaging procedures; however, as of January 1, 2012, MPPR reduced payment for the physician component provided by the same physician, on the same patient, during the same session.
on the same day by 75% for lessor rate procedures. As of January 1, 2013, technical and physician component reduction applies to physicians in the same group practice who provide services to the same patient, in the same session, on the same day (see Table 5).

Accountable Care Organizations

Accountable Care Organizations (ACOs) are part of the Medicare Shared Savings Program created as part of the ACA. Data showed that areas in the United States with lower Medicare cost-per-beneficiary had higher quality care. The term ACO was developed on the assumption that excessive Medicare expenditures are due to discretionary services that include more frequent hospital stays, specialist referrals, and increased use of diagnostic testing. ACOs intend to provide high-quality care or to improve care while decreasing the cost of providing that care.

The ACO option allows groups of physicians, hospitals, and other health care providers to form partnerships and voluntarily agree to accept responsibility for caring for a defined group of Medicare beneficiaries for a specific amount of money. An ACO is expected to provide optimal care from a patient’s perspective, and the provision of this care has to be operationalized by clinicians, facilities, and patients into plans of care customized to each patient. The plans of care must be evidence-based and managed more efficiently than the care provided by the current health care system. The success of an ACO depends on the ability of the partnership to enable and sustain improved performance across the whole health care system and moves health care into the business-process-management world.

An ACO contracts with CMS to provide services to a defined group of Medicare beneficiaries. The ACO is required to meet certain quality standards, share data with CMS, and accept payments set by CMS for total care of the patient—not individual services provided to the patient. ACOs do not bill under any current Medicare payment plans, and the ACO receives the payment, not individual providers or facilities.

Medicare establishes spending targets for ACOs based on the past 3 years’ expenditures for a specific Medicare population and estimates them for the future based on anticipated increases in national Medicare spending. The established ACO spending targets do not include geographic factoring. The ACO benefits when the group provides high-quality care and improves beneficiary health at a cost lower than CMS expects. If the ACO provides care for a group of beneficiaries at a cost lower than the spending targets, it receives a percentage of the savings and distributes the savings among the partners of the ACO. However, if the cost to provide services to a group of beneficiaries is higher than expected, the ACO is expected to cover the difference. Specific items identified as potential cost savers include reduction in specialty and hospital expenditures; appropriate use of referrals; reducing emergency department visits, admissions, nosocomial infections, and adverse events; and shortened hospital stays.

Table 5

<table>
<thead>
<tr>
<th>Procedure Description</th>
<th>2008 ($)</th>
<th>2013 ($)</th>
<th>75%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>70470 – CT head/brain w/o &amp; w/dye</td>
<td>352.69</td>
<td>43.58</td>
<td>43.58(0.75) = 32.69</td>
<td>113.90(0.5) = 56.95</td>
</tr>
<tr>
<td>72127 – CT neck spine w/o &amp; w/dye</td>
<td>430.38</td>
<td>43.34</td>
<td>43.34(0.75) = 32.51</td>
<td></td>
</tr>
<tr>
<td>74177 – CT abd &amp; pelv w/contrast</td>
<td>62.36</td>
<td>178.46</td>
<td>178.46(0.5) = 89</td>
<td></td>
</tr>
<tr>
<td>72193 – CT pelvis w/dye</td>
<td>335.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>74160 – CT abdomen w/dye</td>
<td>365.25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Final Total Payment</strong></td>
<td><strong>1484.25</strong></td>
<td><strong>456.04</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: abd, abdomen; CT, computed tomography; GC, global component; PC, physician component; pelv, pelvis; TC, technical component; w/ with; w/o, without.

* Short descriptors as identified by the Centers for Medicare & Medicaid Services.
Conclusion

Technological advances in medical imaging have provided physicians with noninvasive means to diagnose disease. Because medical imaging departments always have been one of the most profitable departments operated within hospitals, many health care facilities rely on medical imaging services to subsidize other functions that generate little or no revenue. Between 2000 and 2005, medical imaging service expenditures for Medicare patients billed under the physician fee schedule grew more than all other types of services provided by physicians.

The Deficit Reduction Act of 2006 and other more recent cuts in Medicare reimbursement have resulted in dramatic decreases in the use of and payment for medical imaging and radiation oncology services. Medicare reimbursement for medical imaging procedures was cut 8 times between the years 2005 and 2011. Per-beneficiary claims for imaging services declined in the years 2009 to 2011, with CT, MR, and nuclear medicine showing an approximate 27.6% decrease compared to 21.3% overall increase in Medicare spending for nonimaging services in the same period. The reduction in Medicare reimbursement for medical imaging and radiation therapy procedures has decreased the amount of money available in health care facilities to provide these services and to pay the personnel who perform them.

Liana Watson, DM, R.T.(R)(M)(S)(BS), RDMS, RVT, FASRT, is the chief governance and development officer for the American Society of Radiologic Technologists. She has worked as a radiology administrator and published several articles in Radiologic Technology in the areas of breast imaging, professional development, leadership, and job satisfaction. She extensively researched Medicare reimbursement while in graduate school during the early 2000s. Watson is a former member of the ASRT Foundation Board of Trustees and a 2004 GE Healthcare Management Scholarship recipient.

Reprint requests may be mailed to the American Society of Radiologic Technologists, Communications Department, 15000 Central Ave SE, Albuquerque, NM 87123-3909, or e-mailed to communications@asrt.org.

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Read the preceding Directed Reading and choose the answer that is most correct based on the article.

1. Changes in payment systems after 2006 have resulted in decreased expenditures for imaging services as evidenced by total expenditures of ______ billion in 2010.
   a. $10.9
   b. $12.3
   c. $18.6
   d. $21.2

2. Between 2009 and 2011, beneficiary claims for computed tomography (CT), magnetic resonance (MR) imaging, and nuclear medicine services:
   a. remained the same.
   b. increased by 21.3%.
   c. increased by 31%.
   d. decreased by 27.6%.

3. In 2011 Medicare expenditures for imaging services were estimated to be:
   a. $557.8 billion.
   b. $660.4 billion.
   c. $800.3 billion.
   d. $2.7 trillion.

4. Medicaid and Medicare were enacted by Congress in:
   a. 1962.
   b. 1965.
   c. 1972.
   d. 1986.

5. It was estimated that in 2010, government health insurance covered ______% of the population in the United States.
   a. 31
   b. 44.3
   c. 48.6
   d. 50

continued on next page
6. For which of the following low-income or low-resource groups does Medicaid provide health care services?
   1. families
   2. individuals
   3. immigrants
   a. 1 and 2
   b. 1 and 3
   c. 2 and 3
   d. 1, 2, and 3

7. The minimum basic Medicaid services states are required to offer in order to receive matching federal funds include:
   1. inpatient and outpatient hospital services.
   2. laboratory and x-ray services.
   3. transportation to services.
   a. 1 and 2
   b. 1 and 3
   c. 2 and 3
   d. 1, 2, and 3

8. The Medicare program that covers inpatient hospital services is:
   a. Part A.
   b. Part B.
   c. Part C.
   d. Part D.

9. The Medicare program that covers nonhospital charges such as physician office visits and outpatient procedures is:
   a. Part A.
   b. Part B.
   c. Part C.
   d. Part D.

10. Medicare is funded by all of the following except:
    a. self-employed individuals.
    b. employees in the United States.
    c. employers in the United States.
    d. private insurance carriers.

11. For hospitals to qualify to receive Medicare payments, they must be accredited by the ______ or an authorized state accrediting agency.
    a. Intersocietal Accreditation Commission
    b. Joint Commission
    c. Centers for Medicare & Medicaid Services (CMS)
    d. National Committee for Quality Assurance

12. The Medicare Improvements for Patients and Providers Act of 2008 (MIPPA) requires accreditation of physicians, nonphysician practitioners, and independent diagnostic testing facilities that provide the technical component of which procedures?
    1. MR
    2. CT
    3. PET-CT
    a. 1 and 2
    b. 1 and 3
    c. 2 and 3
    d. 1, 2, and 3

13. The ______ provides consumers with information about the quality of care provided by hospitals.
    a. Patient Protection and Affordable Care Act (ACA)
    b. MIPPA
    c. Hospital Inpatient Quality Reporting Program
    d. CMS
14. Hospitals that do not participate in the Hospital Inpatient Quality Reporting Program have their Medicare payment rates:
   a. reduced by 4%.
   b. reduced by 2%.
   c. paid at full rate.
   d. increased by 1.5%.

15. The Hospital Outpatient Quality Reporting Program requires hospitals to report in 2013 all of the following quality measures except:
   a. mammography follow-up rates.
   b. use of intravenous contrast materials with thorax CT.
   c. CT head scans performed on emergency department patients presenting with headaches.
   d. MR imaging lumbar spine for low back pain.

16. The United States is divided into 15 regions, and each region has 3 Medicare Administrative Contractors (MACs). MACs process which types of Medicare claims payments?
   1. Part A and Part B
   2. home health care
   3. transportation to services

   a. 1 and 2
   b. 1 and 3
   c. 2 and 3
   d. 1, 2, and 3

17. Radiology services provided to inpatients are considered part of the treatment for the diagnosis, so the hospital does not bill or receive payment for these services in addition to the diagnosis-related group payment.
   a. true
   b. false

18. The Ambulatory Payment Classification (APC) system uses the relative value unit to determine:
   a. the number of physician visits allowed each patient.
   b. a fair and equitable payment for the services provided by a health care facility.
   c. who can be admitted to the hospital.
   d. the number of diagnostic tests allowed each patient.

19. The reimbursement rate geographic modification is applied to ______ % of the base rate.
   a. 60
   b. 50
   c. 40
   d. 30

20. Common supplies used for radiology that are no longer paid outside of the APC system include:
   1. image processing.
   2. contrast agents.
   3. routine supplies such as needles and syringes.

   a. 1 and 2
   b. 1 and 3
   c. 2 and 3
   d. 1, 2, and 3

21. The Medicare Physician Fee Schedule (MPFS) ______ component payment is for resources used to provide a service, such as the medical equipment and nonprovider staff time.
   a. professional
   b. global
   c. technical
   d. therapist

continued on next page
22. The ______ enacted a cap on the MPFS rates for the technical component of imaging procedures to be no more than the rate paid through the outpatient prospective payment system.
   a. ACA  
   b. MIPPA  
   c. Deficit Reduction Act  
   d. Balanced Budget Act

23. The ______ rate is the percentage of time a piece of imaging equipment is available to perform procedures in a 50-hour workweek.
   a. utilization  
   b. reimbursement  
   c. growth  
   d. availability

24. It is estimated that most CT and MR procedures will see a decrease in reimbursement rates of ______ % beginning in 2014.
   a. 0 to 10  
   b. 10 to 20  
   c. 20 to 30  
   d. 30 to 40

25. Accountable Care Organizations agree to do all of the following except:
   a. bill for individual services provided to Medicare beneficiaries in their group.  
   b. accept payment for total care of a patient.  
   c. share data with the CMS.  
   d. provide care to a defined group of Medicare beneficiaries for a specific amount of money.