



BCBSM Physician Group Incentive Program 2012 Program Year

**Radiology Management Initiative: Appropriate Use of
Diagnostic Imaging Services**

Initiative Plan



I. Initiative Overview

The Blue Cross Blue Shield of Michigan (BCBSM) Radiology Management Initiative is one of many initiatives of the Physician Group Incentive Program (PGIP). Since its inception in 2005, PGIP has supported and facilitated practice transformation using a wide variety of initiatives to reward physician organizations (POs) for improved performance in health care delivery. As of September 2011, PGIP includes 40 POs from across the state of Michigan, representing nearly 15,000 primary care and specialty physicians who are members of the BCBSM TRUST PPO and/or Traditional Networks. These physicians provide care to nearly two million BCBSM members.

BCBSM's Physician Group Incentive Program encourages all payer collaboration, catalyzing all payer system development, rather than payer-specific system development. Through PGIP, BCBSM is helping to improve the quality of care for all Michigan residents. Patients throughout the state, regardless of payer, benefit from the improved care processes developed through the PGIP provider community. Developing systems of care which are used for all patients helps assure that providers don't have to alter care processes based on whether patients have insurance, or which insurance they have. This is an important factor in ensuring that the best practices and care processes are reliably provided to all patients, all of the time. This all-payer approach to practice transformation is good for patients with coverage from BCBSM and BCN and helps further BCBSM's social mission of cultivating a healthier future for all Michigan residents.

Goals and Objectives

The Radiology Management Initiative (RM) was created within PGIP to identify opportunities to improve appropriate imaging practices for members attributed to primary care physicians (PCPs), regardless of the ordering physician specialty. These opportunities are reflected in variations observed between PCPs, practice units (PUs) and POs and are expressed to the POs through comparative reports and claim-level datasets. This form of communicating ordering practices is used to reduce the potential lack of knowledge of physician-level ordering practice patterns and variation between practices.

The objectives of the RMI are to:

1. Reduce variation in cost and use rates of imaging services among physicians and POs in PGIP by decreasing inappropriate imaging utilization
2. Support POs' development and implementation of radiology management intervention plans to increase PO performance toward the benchmark
3. Support POs' development and implementation of intervention plans to address self-referral rates

Summary of Results

PO participation in the RMI has increased since its inception. Overall costs per member per month (PMPM) continue to increase, but at a slower rate since the inception of the RMI. The following RMI results were observed during program year 2010:

- 32 (89%) of PGIP POs participated in the RMI, representing over 90% of PGIP primary care physicians (PCPs)
- High-tech imaging accounted for the greatest proportion of radiology costs
- Total high-tech standard cost PMPM was \$16.01, an 8% decrease from 2009
- Total low-tech standard cost PMPM was \$9.05, a 5% decrease from 2009

- Total imaging PMPM standard costs dropped by 3.5%, attributed to a drop in PMPM for nuclear medicine and PET scans
- High-tech imaging services per 1,000 dropped by over 11%, attributed to a drop in services per 1,000 for nuclear medicine and PET scans
- Low-tech imaging services per 1,000 increased by 4.6%,
- Total imaging services per 1,000 increased by less than 1%

Starting in 2009, the Centers for Medicare & Medicaid Services (CMS) consolidated several secondary codes into primary codes for several high tech procedures, including several nuclear medicine codes, when performed at the same time. The CMS changes were made to avoid duplicate payments for practice expenses (e.g., supplies, staff time) and work (e.g., patient gowning and positioning) for diagnostic imaging services done on contiguous areas (e.g., abdominal CTs and pelvis CTs) at the same time. As a result, the new codes, covering more than one area, encompass many of the duplicative functions and expenses.

The impact of this is there appears to be a decrease in services/use per 1,000 attributed members. This is reflected in the BCBSM data as an 11% decrease in risk adjusted high tech procedures per 1,000 members between 2009 and 2010, and an almost 59% decrease in risk adjusted nuclear medicine procedures per 1,000 attributed members. However, decreases in PMPM were much less dramatic, therefore, a better indicator for trend in high tech imaging use.

Savings for the most recent 18 month period, 4Q09 through 2Q11, is \$27.8million, with the greatest savings concentrated among high-tech radiology services.

II. Background

Health Problem and Significance

Skyrocketing use of diagnostic imaging over the past decade has contributed to a surge in related medical costs.¹ The Blue Cross Blue Shield Association (BCBSA) reported a 42% growth (281 million to 401 million) in the number of advanced imaging procedures from 2000 to 2005.² Magnetic Resonance Imaging (MRI) and Computerized Topography (CT) scan use increased by more than 50% among persons with private insurance within a similar time period.³ An additional study measuring imaging use from 1997 through 2006 reported an increase for nearly every imaging modality including MRI, CT scans, nuclear medicine, ultrasound and conventional radiography.

This surge in imaging use is positively correlated with a steep increase in the annual cost per enrollee of diagnostic imaging.⁴ From 2000 to 2005, Medicare reported a 108% spending increase in diagnostic imaging from \$6.6 to \$13.7 billion⁵ and for the first time, the increase in imaging costs surpassed the increase in pharmaceutical costs.⁶ Currently, outpatient diagnostic imaging spending exceeds \$100 billion and is growing at a rate in excess of 20%.⁷ Blue Cross Blue Shield of Tennessee reported an annual increase in costs PMPM of 26% from 2001 to 2004, which directly resulted from advanced imaging utilization expenses.⁸

While diagnostic imaging often provides medical benefits, it also contributes to a substantial amount of radiation exposure, equivalent to approximately 14% of total exposure worldwide.⁹ Studies suggest that 1.5-2% of cancers are caused by exposure to radiation from CT scans.¹⁰ Doctors at the National Institutes of Health, concerned that Americans may be accumulating too much lifetime radiation exposure from medical tests, will begin recording how much radiation patients receive from CT scans and other procedures in their electronic medical records.¹¹ In February 2010, the Food and Drug Administration (FDA) announced a campaign to reduce

unnecessary radiation exposure from CTs, nuclear medicine studies and fluoroscopy procedures. The FDA's plan is to promote the safe use of these modalities, help physicians make more informed decisions about ordering these modalities, and increase patient awareness of their radiation exposure.¹²

In addition to radiation exposure, excess imaging use can lead to an increase in false positive test results.¹³ False positives can generate significant cost increases due to downstream diagnostic and therapeutic procedures, ultimately resulting in unnecessary health care utilization and associated cost.

Research has demonstrated a clear relationship between the availability of new technology and the increase in imaging use and cost within the past decade.^{14,15} The number of CT scans grew by more than 50% from 1995 to 2004 with the number of MRI machines doubling within the same time period. Additionally, the number of outpatient diagnostic imaging centers increased by 38% from 2001 to 2005.¹⁶

Some contend that the increase in use of new medical technology is the result of the replacement of older technology, but the contrary has been found when looking at advanced diagnostic imaging. The availability of MRI machines as a new technology has not been reported to replace the use of CT scans; rather, this is additive as both imaging services have increased over the years. Between 1997 and 2006, MRI use increased from 22 to 72 images per 1,000 enrollees; CT scan use also increased from 81 to 181 images per 1,000. A recent study of the continued use of double chest CT scans, one without dye and one with dye, rendered consecutively, contributes to the observed rise in CT cost and use trends.¹⁷ Additionally, the rates of conventional radiography use remained much higher than overall advanced imaging and accounted for the highest number of images during each year.¹⁸

The availability of advanced imaging technology alone does not solely drive the increased use - the acceptance of new technology by physicians has shown to be a major determinant of the rate of diffusion. Patient demand is also a powerful determinant of increased use of advanced imaging technology, with the marketing of this technology playing a significant role. Similar to the pharmaceutical industry, marketing of advanced diagnostic imaging has resulted in increased requests for the new technology as people in the United States (U.S.) and Canada have been reported to have greater knowledge and expectations of these new technologies than people in Western European countries.¹⁹

U.S. physician practices expand the number of patients deemed eligible for new procedures more rapidly than do physicians in other nations. This is partly due to the fee-for-service payments made to physicians and hospitals when patients receive new technological services.²⁰ Self-referral of imaging by non-radiologists is a strong predictor of increased imaging use and cost. Hillman's landmark study found that physicians who referred images to themselves ordered 4.0 to 4.5 times more imaging than physicians who referred to a radiologist.²¹ Nearly twenty years later, physicians who refer to themselves or to the same specialty continue to order more imaging (between 1.2 to 3.2 times) than those who refer to a radiologist.²² This type of self-referral, defined as imaging directed and performed in a non-radiologist's own office is one of two forms of self-referral. The other results from imaging referred to a facility, in which the ordering physician has some form of ownership or financial interest. This conflict of interest is associated with a 54% increase in imaging use, with utilizing patients receiving 65% more imaging procedures than their counterparts. Self-referral overall has been estimated to produce physician profits of approximately \$8 billion annually.²³ This type of incentive can create a conflict of interest between providing appropriate and efficient care. A study by Hemenway et al. looked at the impact of financial incentives distributed through bonuses at an ambulatory

care center that operated its own imaging equipment. They found that this potential for incentives increased imaging use by 16% in the first year (1990).

Self-referral has been discouraged by the expansion of the Stark laws to include interest in any entity that derives a substantial portion of revenue from physicians of designated health services. Imaging modalities held under the Stark laws include MRI, CT scans, and ultrasound, in addition to diagnostic and therapeutic nuclear medicine.²⁴

While advances in imaging technology and increases in rates of self-referral are associated with increased imaging use and cost through physician gain, the practice of defensive medicine is also associated with the rise in imaging use and associated costs, but does not provide a financial incentive for physicians. Defensive medicine is defined as a deviation from appropriate medicine induced primarily as a result of potential threats from a lawsuit.^{25,26} In the case of imaging use, defensive medicine includes ordering of additional testing that has little to no medical value to reduce the potential for adverse outcomes, deterring patients from filing malpractice claims, or persuading the legal system that the standard of care was met. A survey of specialty physicians found that nearly all reported instances of practicing defensive medicine with many of the additional tests being MRI or CT scans.²⁷ A survey among Massachusetts physicians showed that 28% of diagnostic imaging referrals represented defensive medicine.²⁸

All previously described factors have been associated with increased motivation to order diagnostic imaging in response to a financial incentive. A different type of explanation of increased imaging use is the lack of knowledge of clinical indications for ordering advanced diagnostic imaging. Those PCPs who do not order advanced diagnostic imaging on a regular basis may not be as aware of evidence-based guidelines for specific conditions as their specialist peers. Additionally, physicians may not be aware of their own ordering practice patterns and how they may vary from the practice patterns of their peers, due to either the lack of geographic proximity to other physicians or the inability to record and track ordering behaviors.

BCBSM Experience

BCBSM reports outpatient diagnostic radiology spend totaling \$842M (a decrease of 8% from 2009) in its Radiology Key Metric Report 2010. This report also showed a favorable cost PMPM trend of -1%, driven almost exclusively by the high tech cost PMPM trend of -4%.^{29,30}

Possible Solutions

Programs that apply regulations aimed at reducing inappropriate imaging have shown success. Implementing guidelines to limit privileging of non-radiologists resulted in imaging quality improvements and decreased radiation dosage with no decline in quality of care.³¹ Additionally, many health insurers have initiated pre-certification programs through radiology benefit management companies to ensure clinical necessity for advanced imaging such as CT and MRI by educating ordering physicians. Process elements with these programs may include prior-authorization, physician education, consultation, physician profiling, retrospective claims analysis, and privileging by non-radiologists.

In addition, some plans require all freestanding imaging facilities and physician offices performing outpatient imaging studies to obtain accreditation as a condition for reimbursement. Imaging modalities that may be subject to this requirement are CT/computed tomography angiogram (CTA), MRI/magnetic resonance angiogram (MRA), positron emission tomography (PET), nuclear medicine, nuclear cardiology, and echocardiography.³²

To control diagnostic imaging utilization, some plans have imposed higher co-payments for high cost diagnostic imaging services. In July 2004, Anthem BCBS introduced \$100 co-payments for HMO members. Other plans have introduced steerage to venues where extensive accreditation was obtained. Highmark only pays for images taken at locations that offer five or more modalities and are open Saturdays.³³ Other strategies to control the ever-increasing costs of diagnostic imaging include, imposing physician self-referral restrictions, developing and disseminating nationally recognized evidence-based guidelines, patient education campaigns, and using electronic medical records to provide test results for physicians at the point of service so duplicate tests are not ordered.³⁴

Appendix I contains a cause and effect diagram to graphically display the issues and interventions relevant to the use of radiology services. These issues were outlined in the **Background** section of this document.

BCBSM Experience

BCBSM currently has an active prior authorization program designed to address the increasing use of diagnostic imaging services. In 1995, BCBSM contracted with American Imaging Management (AIM) to establish the Radiology Management Program (RMP) for its PPO products consisting of two major components: a prior authorization program for MRI, CT scans, nuclear imaging and PET scans and an in-office privileging program for low tech radiology services. The purpose of these two programs is to ensure appropriate ordering of imaging services. The physician specialty privileging program allows non-radiology physicians to perform and interpret in the office those plain film and ultrasound exams for which they are appropriately trained. The program is based on specialty training rather than a physician's individual credentials. The in-office privileging portion of the RMP is not factored into the PO's performance or evaluation component of this initiative. However, low-tech imaging procedures performed in the office are a factor in the POs' performance and evaluation metrics.

In 2008, PGIP was expanded to include the RMI aimed at identifying opportunities to improve appropriate imaging practices for members attributed to PCPs, regardless of the referring physician specialty. These opportunities were to be identified by comparing PCP imaging PMPM costs and utilization rates across POs and observing cost and use variations between PCPs, POs or physician groups. The hypothesis underlying the Initiative is that POs participating in the RMI will decrease their diagnostic imaging utilization and trend by a greater amount than would have been achieved without the RMI.

III. Initiative Description

Specific Area of Focus

The RMI is designed to moderate the increase in diagnostic imaging costs by reducing inappropriate use of diagnostic radiology, both high-tech and low-tech. The provision of performance data to POs enables them to develop strategies based on their own radiology use and cost patterns.

Target Population

All PCPs are eligible to participate in the RMI if they are a member of a PGIP PO. The Initiative evaluation population is defined as those BCBSM members, ages 0-64, attributed to a PCP who is part of a PGIP PO participating in the RMI.

Criteria for Participation

Primary Care Physicians (PCP) are eligible to participate in this initiative. PCPs are defined as those physicians practicing within Michigan with a primary specialty of General Practice, Family Practice, Internal Medicine, Pediatrics, or Geriatric Medicine.

BCBSM Deliverables

Through the regular delivery of data, POs can identify and investigate variation in imaging practices among physicians, and encourage goal-setting and development of interventions. The three types of data provided to the POs include:

1) Radiology Dashboard Report

The dashboard is distributed to POs on a semi-annual basis. Information in the dashboard report includes both unadjusted and risk-adjusted utilization rates per 1,000 and standard cost PMPM by PO. Additional break-down analysis is available by imaging modality (MRI, CT Scan, Nuclear Medicine, PET Scan, Ultrasound, Plain Film and Other Imaging), by location of service (office/free-standing imaging facility or outpatient hospital), by clinically relevant bundles of imaging (brain, spine, cardiac and chest x-ray), and by referral patterns. The dashboard report also includes rates of compliance and the use of the web for pre-authorization of high-tech imaging.

2) Claims dataset

The dataset is distributed to the POs on a quarterly basis. Claims-level data allows POs to perform analyses for their attributed members at the PO, PU, and individual physician levels. The dataset includes claim-level detail for each imaging procedure rendered for the attributed membership. The dataset contains specific dates of service, an indicator of the location of service (office/free-standing imaging facility, outpatient hospital, or emergency room), the procedure code with a description, the primary ICD-9 diagnosis code, and description and the first name, last name, and specialty of the ordering physician. The dataset also include rates of compliance and the use of the web for pre-authorization of high-tech imaging.

3) Claims data feeds

Claims data feeds are distributed to the POs on a monthly basis and include all claims processed by BCBSM in the previous month including facility, professional and pharmacy claims. The claims data feeds include a variety of data elements, including member (or patient) information and PGIP physician information. Facility and professional claims include procedure codes, types of services, places of services, diagnosis codes plus other details. Pharmacy claims include both prescribing and attributed physicians (they may be the same, drug and generic indicator codes, specialty drug indicator codes and therapeutic classifications. Medical pharmaceutical benefit drugs (such as chemotherapeutic drugs) may be, and often times are submitted in the Facility and Professional claims feeds information.

(See Appendix II for the data delivery schedule.)

Webinars regarding the use of data will be offered when a need is expressed by POs. These will be conducted during regularly scheduled Data Users Workgroup (DUWG) meetings or independently, depending on the DUWG's request.

BCBSM reserves the right to modify its evaluative and administrative processes related to the Initiative.

PO Expectations/Deliverables

POs that choose to participate in the RMI are required to conduct the following activities:

1) Identify a clinical lead and analytical lead for the RMI

A clinical lead and analytical lead at each PO is responsible for receiving data (dashboard reports and datasets) distributed by BCBSM, reviewing each data source, and identifying trends in cost and use where opportunities for physician education on imaging best practices can be encouraged.

2) Identify a radiologist as a consultant to enhance appropriate use of imaging services

Lack of reliable information on imaging effectiveness and what modality works best may raise health care costs while potentially lowering the quality of health care. It can also result in “add-on” testing if the physician orders multiple imaging tests when one would suffice.¹⁰ Previous progress reports have described the value of collaborating with and engaging the professional guidance of radiologists and technicians to ensure quality of imaging services and to educate physicians on best practices. The treating physician may also consult with radiology professional to discuss alternate, more appropriate imaging services to ensure that the patient gets the right test the first time.

3) Utilize AIM’s prior authorization program for high-tech imaging services via the AIM website (<http://www.americanimaging.net/services/WebApplications.html>)

Before ordering high-tech diagnostic imaging in outpatient settings, providers must contact AIM to verify the use of the most appropriate diagnostic imaging exam for the diagnosis in question. While authorization can be obtained via telephone or fax, use of the AIM website for pre-authorization is the most time-effective and preferred way of seeking the required authorizations.

4) Utilize the semi-annual dashboard reports, quarterly datasets and monthly claims data feeds (provided by PGIP) to identify variation in imaging practices and develop and implement strategies and programs to manage the use of radiology services among sub-POs, practice units, and individual physicians

Understanding variations in imaging use between physicians will support the development of education programs that promote best practices and nationally accepted imaging guidelines.

5) Complete semi-annual progress reports

Progress reports must be completed semi-annually by all POs participating in the PGIP RMI. The progress reports are an opportunity for POs to describe barriers to and strategies for success in managing the use of imaging procedures.

6) Attend monthly PGIP Data Users Workgroup (DUW) meetings and periodic webinars

POs should designate a representative to attend the monthly PGIP DUW meetings and periodic webinars offered throughout the year. The DUW meetings are planned and facilitated by PGIP POs for PGIP POs and provide a forum for collaboration among POs. Throughout the year, webinars are provided to discuss radiology data at the PO, PU, and physician levels. Attendance at these is strongly encouraged to get acquainted with data content and its practical uses by a PO.

7) Develop and implement intervention plans to promote the appropriate use of both high-tech and low-tech radiology services

POs should actively review data received regarding their physicians’ radiology use and develop intervention plans to address appropriateness of use. Information is provided on physician self-referral rates, use by high-tech procedure by type and by procedure, etc.

Quality Improvement Model

It is expected that participating PGIP POs will exhibit a similar or greater downward trend in overall cost PMPM as was reported for 2010 (i.e., -1%). In order to realize this improvement in overall radiology services use, PGIP POs are expected to commit to practices and implement processes that will reduce unnecessary radiology services use while improving the quality of patient care.

AIM, the BCBSM radiology benefits management vendor, began sending letters to the Michigan provider community (ordering physicians based on a list provided to AIM by BCBSM) in July, 2011 regarding its Patient Safety Program that it launched in 2008. The purpose of this program is to disseminate relevant information to healthcare providers and consumers regarding radiation exposure in imaging to support informed decisions regarding the risks and value of imaging procedures. Details on AIM's safety program can be found at <http://www.americanimaging.net/safety>.

To heighten provider awareness of patient radiation exposure, BCBSM is in the planning phases of developing its own PGIP provider education.

Several areas where improvements at the PO and PU level can occur to reduce cost and improve quality are:

1. Improve adherence to clinical guidelines for performing radiology services
2. Reduce overall cost PMPM of PGIP POs
3. Be cognizant of the level of radiation exposure, particularly for high-tech imaging services

Benchmarks

Based on BCBSM's preliminary reported downward trend in cost PMPM of 1% for 2010, it is reasonable to expect a similar downward trend in the PGIP radiology cost PMPM.

A benchmark for the reduction in the overall PGIP initiative cost PMPM for program year 2012 is 2%.

A benchmark for the PGIP provider education program regarding radiation exposure resulting from imaging services is a communication to all POs in 2012.

Incentive Model and Payment Methodology

POs earn financial incentives based on overall performance and improvement realized based on cost PMPM. Overall performance is evaluated by assessing the PO's utilization, measured as the total combined high- and low-tech imaging standard cost PMPM, against an established PGIP-specific benchmark and the PGIP average. The benchmark is calculated based on the average utilization performance (combined standard cost PMPM) of all the PGIP POs that have the lowest utilization and account for 20% of attributed population.

Improvement is evaluated by comparing a current 12 month combined standard cost PMPM with a prior 12 month combined standard cost PMPM and against the PGIP average improvement. For POs participating for the first time in this initiative, the first two payments will

be based on overall performance. Improvement for new POs will default to the PGIP average for the payment period.

In this initiative, incentive payments are based on PO performance, PO improvement over a prior measurement period, and the number of PO-attributed members. The payment methodology generates a single summary score for each PO that represents the weighted sum of the PO's normalized performance score and normalized improvement score. The normalized performance score is represented along a scale from 0-1, where 1 represents the best performance and 0 represents the worst performance. The normalized improvement score – the ratio of current improvement to the theoretical optimal improvement – is similarly represented along a scale from 0-1, where 1 represents the most improvement over the previous measurement period and 0 represents the least improvement over the previous period.

Each PO with a summary score above a certain percentile will receive an initiative incentive payment. The PO will receive a percentage of the initiative-specific incentive pool based on the PO's summary score, weighted by the PO's number of attributed members. POs with summary scores in the lowest percentiles will receive either no incentive payment or a negative incentive payment. The negative payment is based on the PO's summary score and the number of attributed members, factored by a negative 10% payment percentage.

The negative incentive payment is designed to a) encourage POs to become actively engaged in pursuing improvement in those initiatives in which they are enrolled, and b) encourage POs to carefully make their initiative selections and discourage them from enrolling in initiatives without engaging in activities to improve performance. A PO's poor performance on a specific initiative can result in a negative incentive payment that reduces the PO's overall reward payment for the scoring period. However, a PO's overall incentive payment (for all PGIP initiatives) for a scoring period will never be lower than zero.

BCBSM reserves the right to use discretion in making incentive payments based on the data and relative PO performance.

IV. Evaluation

Evaluation Overview

Evaluation of the PGIP RMI will address the intervention design and delivery, and will focus on the effects theorized to result from the intervention. These effects include short-term behavioral and knowledge-based changes, and long-term effects that include reducing inappropriate imaging utilization, which subsequently may reduce cost or slow the cost trend. The evaluation is intended to provide insight into the effectiveness of the designed RMI.

See Appendix III for a description of the evaluation metrics.

Process (Short-term) Measures

Evaluation of the resources required to deliver an intervention may provide insight into opportunities to make an intervention more efficient, address staffing needs, and improve data quality. Appendix III presents the process outcomes associated with the resource requirements and processes for delivering the RMI.

Intermediate Measures

While long-term outcomes include reduced imaging costs and heightening providers' awareness of their patients' radiation exposure are goals associated with the RMI, the intervention itself is directed at short-term intermediate problem areas that when resolved may reduce the member's likelihood of receiving less effective and/or inappropriate care. Without demonstrated improvement in these intermediate steps, the RMI theoretically cannot attribute identified reductions in services per 1,000 and costs to the intervention itself. Appendix III provides measures for evaluating the intermediate steps of the causal pathway for the RMI.

Long-term Measures

The impacts of the RMI are conceptualized and calculated as the difference between where cost and use would have been for participants absent the Initiative and where it actually is now for the participants.

Progress Reporting

Progress reports must be completed semi-annually by all POs participating in the RMI. The progress reports are an opportunity for each PO to describe barriers to and strategies for success in managing the use of imaging procedures.

V. Results

PO participation in the RMI has increased since its inception with 90% of PGIP POs participating in 2010, representing over 90% of PGIP primary care physicians (PCPs). Overall costs PMPM continue to increase, but at a slower rate since the inception of the RMI.

The following RMI results were observed when comparing 2010 results with 2009 results:

- High-tech imaging still accounted for the greatest proportion of radiology costs
- Total high-tech cost PMPM was \$16.01, an 8% decrease from 2009
- Total low-tech cost PMPM was \$9.05, a 5% decrease from 2009
- Total imaging PMPM costs dropped by 3.5%, attributed to a drop in PMPM for nuclear medicine and PET scans
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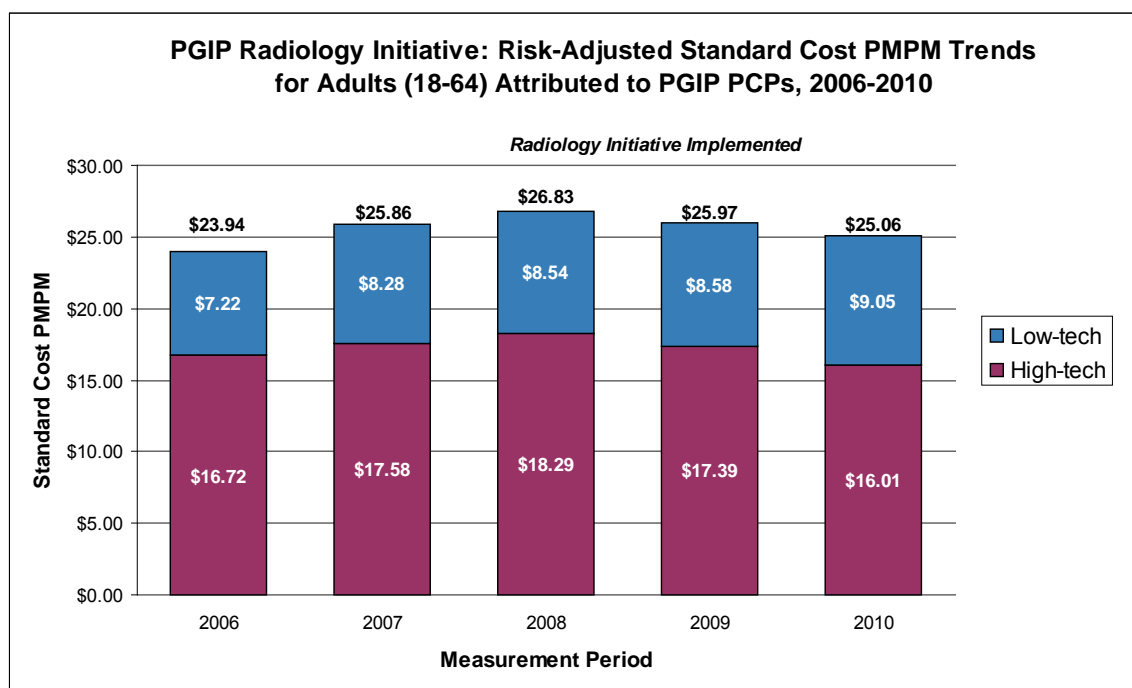
Starting in 2009, the CMS consolidated several secondary codes into primary codes for several high tech procedures, including several nuclear medicine codes, when performed at the same time. The CMS changes are to avoid duplicate payments for practice expenses (e.g., supplies, staff time) and work (e.g., patient gowning and positioning) for diagnostic imaging services done on contiguous areas (e.g., abdominal CTs and pelvis CTs) at the same time. As a result, the

new codes, covering more than one area, encompass many of the duplicative functions and expenses.

The impact of this is there appears to be a decrease in services/use per 1,000 attributed members. This is reflected in the BCBSM data as an 11% decrease in risk adjusted high tech procedures per 1,000 members between 2009 and 2010, and an almost 59% decrease in risk adjusted nuclear medicine procedures per 1,000 attributed members.

The RMI began in 2008, and it has reversed the upward trend in the costs of both low- and high-tech radiology among the PGIP population. Figure 2 below shows the trend in low-tech, high-tech and total PMPMs from 2006 through 2010.

Figure 2. PMPM trends in low-tech, high-tech and total radiology costs, 2006-2010



There has been recent professional and public attention focused on the amount of radiation exposure involved in medical imaging. For the past three years, AIM has used data from their ten years of experience in prior authorization of high tech imaging for BCBSM to identify members with elevated cumulative radiation exposure. When imaging studies involving exposure to ionizing radiation are ordered and the BCBSM member's cumulative exposure has exceeded 50 millisieverts (mSv), the case is automatically elevated to clinical review. AIM states that doses over 100 mSv may have a statistical impact on lifetime cancer risk. The risks are multiplied in children.

By utilizing comprehensive claims data and AIM's proprietary protocol for estimating radiation exposure by CPT code, BCBSM is able to expand this analysis to estimate each BCBSM member's radiation exposure. This data reflects all outpatient imaging services, including office based, hospital outpatient and emergency department imaging (which cannot be captured in the AIM data); this data excludes radiation from imaging done in the hospital inpatient setting or from procedures not paid by BCBSM (e.g. lapse in member enrollment, coordination of benefits,

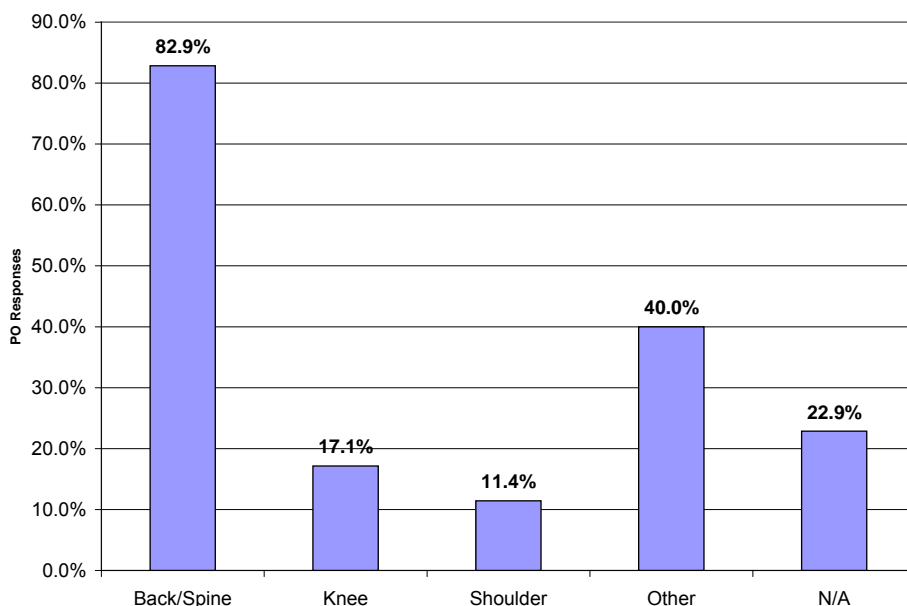
etc.). PGIP will examine the results of this analysis to develop a provider education strategy regarding imaging services and radiation exposure.

To gather information on what POs are doing to specifically address the use of imaging services among their patient populations, the 2011 Progress Report completed by PGIP POs contained the following RMI-specific questions that were completed by POs participating in the RMI:

1. What is your PO's imaging area of focus? Select all that apply.
 - Back/spine
 - Knee
 - Shoulder
 - Other area of focus
2. What imaging services is your PO focusing on? Select all that apply.
 - MRI
 - CT
 - X-ray
 - Ultrasound
 - Nuclear Medicine
 - PET
 - Low Tech
3. Why did your PO choose this imaging focus area (s)? Select all that apply.
 - High Volume
 - High Cost
 - High Risk
 - Other
4. Has your PO developed a practice guide for appropriate radiology use? Yes/No
5. If yes to #4, for what use was your PO's practice guide developed? Describe.

For question #1, most participating POs (29 out of 35 or 83%) stated that back/spine imaging was an imaging area of focus; knee was a focus area for 17% (6 out of 35), and shoulder was a focus area for 11% (4 out of 35), while 40% (14 out of 35) focused on other areas, and 23% (8 out of 35) did not provide feedback. Figure 3 displays imaging areas on which POs are focused.

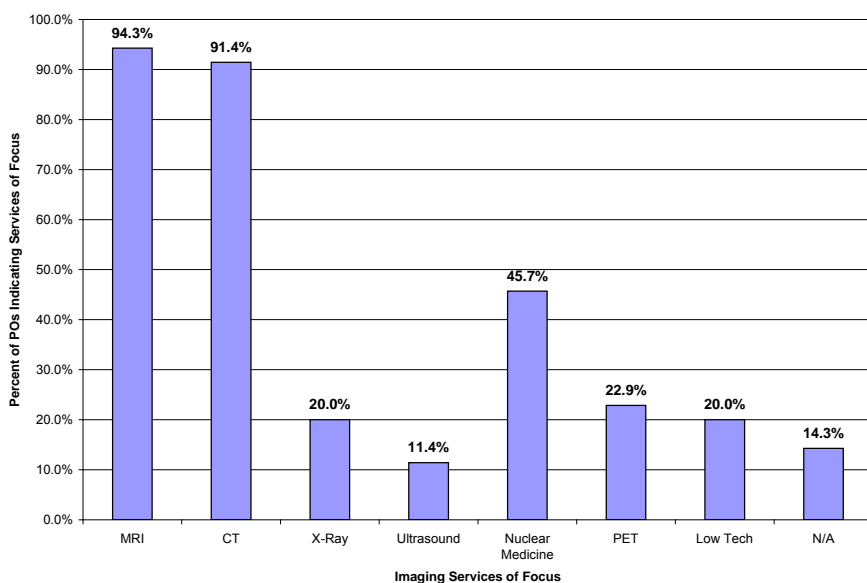
Figure 3. Imaging areas identified by POs on which they are focused, spring 2011 Progress Report



For question #2, participating POs reported focusing on the use of specific imaging services: 94% (33 out of 35) of POs focus on MRI use, 91% (32 out of 35) focus on CT scan use, 20% (7 out of 35) focus on x-ray use, 11% (4 out of 35) focus on ultrasound use, 46% (16 out of 35) focus on nuclear medicine imaging use, 23% (8 out of 35) focus on PET scan use, while 20%

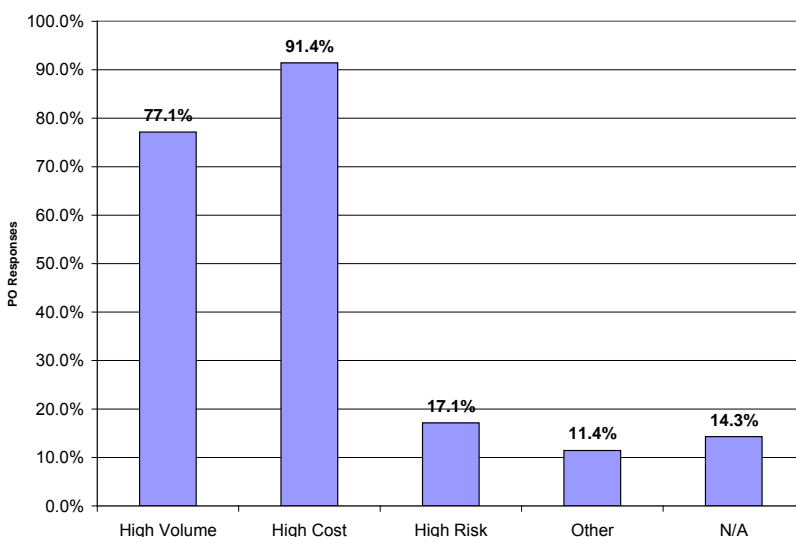
(7 out of 35) focus on low tech services use, and 14% (5 out of 35) did not provide feedback. Figure 4 displays the types of imaging services on which POs are focused.

Figure 4. Imaging technology identified by POs on which they are focused, spring 2011 Progress Report



For question #3, participating POs reported their reasons for choosing the imaging areas of focus. 77% (27 out of 35) chose these focus areas because of the high volume of patients, 91% (32 out of 35) chose these areas because of high costs, 17% (6 out of 35) chose their focus area because of high risk, while 11% (4 out of 35) chose these areas for other reasons, and 14% (5 out of 35) did not provide feedback. Figure 5 summarizes PO responses for why they chose the type of imaging for their focus.

Figure 5. Reason for imaging area of focus reported by POs, spring 2011 Progress Report

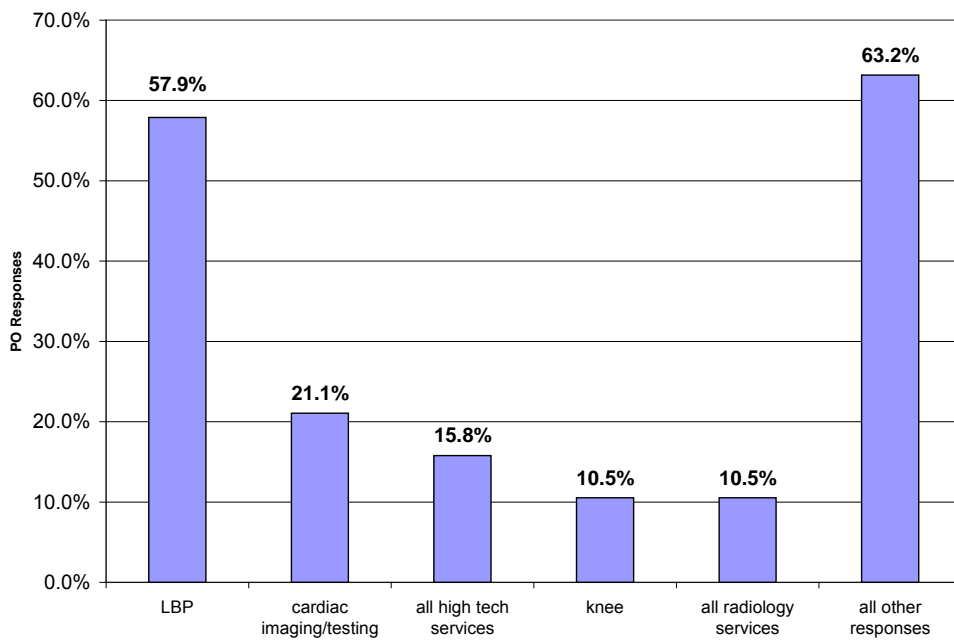


For question #4, “Has your PO developed a practice guide for appropriate radiology use?” 54% of POs (19 out of 35) reported a practice guide for appropriate radiology use was developed,

while 46% of POs (16 out of 35) reported no development of a practice guide for appropriate radiology use.

Those who have developed a practice guide reported having done so to use the guide for various reasons: 11% (2 out of 19) of POs reported using their guide for all radiology services, 21% (4 out of 19) of POs reported using their guide for various focus areas, and 5% (1 out of 19) POs reporting using their guide for general quality and safety. A practice guide is used by 58% (11 out of 19) of POs for low back pain, 21% (4 out of 19) for cardiac imaging/testing, and 21% (4 out of 19) for MRIs. Additionally, 21% (4 out of 19) of POs reported using their practice guide for high tech and low tech testing, while 5% (1 out of 19) of POs reported using their guide for PU utilization patterns, specifically high cost referring physicians. Figure 6 summarizes PO responses regarding practice guide development.

Figure 6. PO responses regarding development of practice guides for imaging use by topic, spring 2011 Progress Report



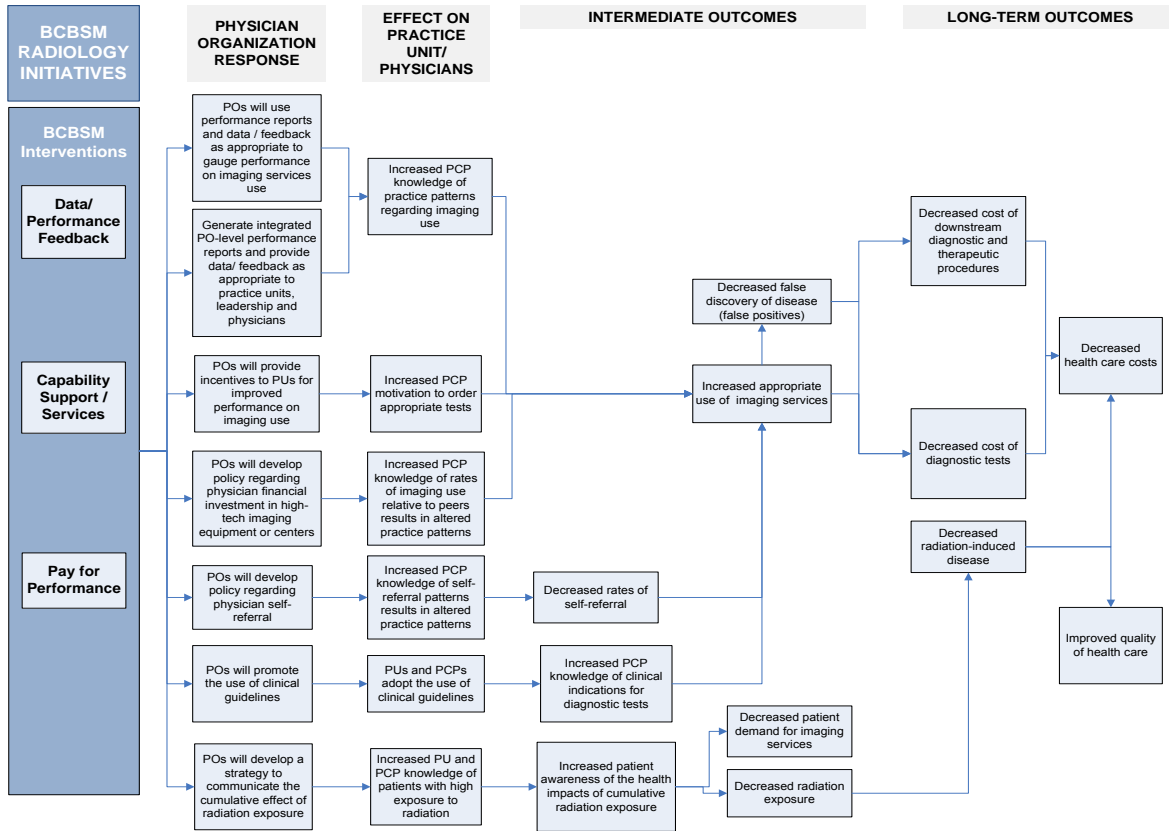
POs reported a wide variety of topics for which they developed practice guides. Table 1 provides a table of responses regarding practice guidelines developed by POs to address radiology use.

Table 1. Practice guidelines developed by POs for appropriate radiology use, 2011 Progress Report

PO Practice Guide Developed	% of POs	# of PO
LBP	57.9%	11
cardiac imaging/testing	21.1%	4
all high tech services	15.8%	3
knee	10.5%	2
all radiology services	10.5%	2
high cost referring physicians	5.3%	1
nuclear stress	5.3%	1
ER high tech	5.3%	1
abdomen	5.3%	1
pelvis	5.3%	1
ankle	5.3%	1
sinusitis	5.3%	1
breast	5.3%	1
osteoporosis	5.3%	1
venous	5.3%	1
headache	5.3%	1
MRIs	5.3%	1

Savings for the most recent 18 month, period 4Q09 through 2Q11, is \$27.8 million, with the greatest savings concentrated among high-tech radiology services.

Appendix I. PGIP Radiology Initiative Cause and Effect Diagram (Intervention Model)



Appendix II. Data Delivery Schedule for the Radiology Management Initiative

Data Type	Release Date	Time Period of Claims	Run out	Attribution Period	Physician List
Quarterly Dataset	03/14/2012	10/1/2010 - 09/30/2011	3 months	07/1/2009 - 06/30/2011	July 2011
Quarterly Dataset	06/13/2012	01/1/2011 - 12/31/2011	3 months	01/1/2010 - 12/31/2011	Jan 2012
Biannual Dashboard	06/13/2012	01/1/2011 - 12/31/2011	3 months	01/1/2010 - 12/31/2011	Jan 2012
Quarterly Dataset	09/12/2012	04/1/2011 - 03/31/2012	3 months	01/1/2010 - 12/31/2011	Jan 2012
Quarterly Dataset	12/12/2012	07/1/2011 - 06/30/2012	3 months	01/1/2010 - 12/31/2011	July 2012
Biannual Dashboard	12/12/2012	07/1/2011 - 06/30/2012	3 months	07/1/2010 - 06/30/2012	July 2012

Appendix III. Evaluation Metrics: Radiology Management Initiative

Table 1: Evaluation of Process Outcomes

Category	Process Metric	Data Source	Measurement	Metric
Initiative Team	Identification of the Clinical Lead	Progress Report	A) Please identify the name of the Clinical Lead for the RMI.	% of participating PGIP POs that identified a Clinical Lead
			B) What percentage of time does the Clinical Lead dedicate to the RMI (FTE)?	% of participating PGIP POs with a Clinical Lead and the percentage of time (in terms of FTE) spent on the RMI
	Identification of the Analytic Lead	Progress Report	A) Please identify the name of the Analytic Lead for the RMI	% of participating PGIP POs that identified an Analytic Lead
			B) What percentage of time does the Analytic Lead dedicate to the RMI (FTE)?	% of participating PGIP POs with an Analytic Lead and the percentage of time (in terms of FTE) spent on the RMI
	Identification of the Radiologist Consultant	Progress Report	A) Please identify the name of the Radiologist Consultant for the RMI.	% of participating PGIP POs that identified a Radiologist Consultant
			B) What percentage of time does the Radiologist Consultant dedicate to the RMI (FTE)?	% of participating PGIP POs with a Radiologist Consultant and the percentage of time (in terms of FTE) spent on the RMI
	PGIP Data Users Workgroup (DUWG) Representative	A) Progress Report	A) Please identify the name of the DUWG representative for the RMI.	% of participating PGIP POs that identified a representative to attend the DUWG
		B) DUWG Meeting Minutes	B) What percentage of the DUWG meetings does the representative attend?	% of DUWG meetings attended by each PO
Participation in the Initiative	Clinical Team	Progress Report	NA	% of participating PGIP POs that met the minimum necessary requirements for an initiative team
	PO Participation	PGIP Physician List	NA	Total number of non-Oncology POs participating in PGIP as of January 2010
		PGIP Physician List	NA	Number and % of eligible POs who participate in the RMI

Category	Process Metric	Data Source	Measurement	Metric
	PCP Participation	PGIP Physician List	Total number and % of PCPs participating in PGIP as of January 2010 that selected the RMI	Number and % of PGIP PCPs participating in the RMI
	Member participation	PGIP Physician List and PCP care relationships table	Total number and % of BCBSM adult members (18-64) assigned a PCP relationship to a PCP participating in the RMI	Number and % of PGIP members assigned a PCP relationship to a PCP participating in the RMI
Dataset Use	Datasets Opened	Progress Report and Quarterly Dataset (Radiology – PO level)	Question. Please list the number of members with 5 or more high-tech services as reported in your quarterly PGIP initiative dataset (Radiology – PO level) distributed in May 2012	Number and % of participating PGIP POs that accurately reported the number of their members with 5 or more high-tech services

Intermediate Outcomes: While long-term outcomes such as a reduction of inappropriate imaging utilization rates and trend are a goal of the RMI, the intervention itself is directed at short-term intermediate problem areas that when resolved may reduce the member’s likelihood of receiving imaging services for inappropriate use. Without demonstrated improvement in these intermediate steps, the RMI theoretically cannot attribute identified reductions in inappropriate imaging utilization to the intervention itself. Table 2 provides measures for evaluating the intermediate steps of the causal pathway for the RMI.

Table 2: Evaluation of Intermediate Outcomes

Overall Objective	Specific Objective	Data Source	Measurement	Metric
Intermediate Objective 1: POs exhibit progress in building an infrastructure for moderating the increase in standard cost PMPM for imaging services.	Communicate initiative and imaging focus area(s) to Practice Units (PUs)	Progress Report	Question: What is your PO’s imaging area of focus? (check list): 1. Back/spine 2. Knee 3. Shoulder 4. Other	Number and % of responses by focus area
			Question: What imaging services is your PO focusing on? 1. MRI 2. CT 3. X-Ray 4. Ultrasound 5. Nuclear Medicine 6. PET 7. Low tech	Number and % of responses by imaging service
			Question: Why did you choose this focus area? (check list) 1. High volume 2. High risk 3. High cost 4. Other	Number and % or responses by reason
Intermediate Objective 2: Promote practice standardization in the use of radiology services	Develop a practice guide to standardize radiology use	Progress Report	Question #: Has your PO developed a practice guide for appropriate radiology use? Y or N	Number and % of POs that indicated they developed a practice guide for appropriate radiology use
			Question #: If so, for what use was your practice guide developed (e.g., MRIs with low back pain)?	Number and % of POs that developed practice guides by type

Long-term Outcomes: Through implementation of the RMI, the intermediate steps in the causal pathway addressed by the intervention will lead to a change in long-term distal outcomes. These outcomes include reductions in inappropriate imaging utilization rates and trend for both high-tech and low-tech imaging modalities and reductions in costs associated with inappropriate imaging use. Table 3 provides a summary of the methods used for evaluating long-term outcomes. BCBSM’s Clinical Epidemiology and Biostatistics Department is responsible for the long-term evaluation of the RMI.

Study population: Data will be included for all members, ages 18 to 64 years, who are assigned a primary care relationship with a PCP from the PGIP physician list. Physician panels established by the claims-based assignment of primary care relationships will be aggregated by PO based upon semi-annually updated PGIP physician lists.

Data Source: The primary care relationships that form the denominators of the indicators of interest will come from the claims-based primary care relationship assignment process, currently implemented semi-annually (March, September). Membership files will be linked to the primary care relationships file to provide demographic information and prospective risk information used for risk adjustment. The PGIP physician files contain information on relationships between physicians, PUs, and POs. A physician may only be associated with a single PU and single PO. The PGIP physician file is updated semi-annually (January, July) with self-reported information from the respective POs. The radiology data mart will serve as the source of truth for radiology claims used in the analysis. To control for differential reimbursement, standard cost will be used for analysis rather than actual cost. Standard cost for imaging procedures was based upon the full service trust fee schedule and reflects the allowed amount for technical and global components. Standard cost also reflects the resource intensity of a procedure and thus is frequently a measure of utilization in addition to cost. Radiology claims will be linked to the standard cost table to retrieve information on standard cost.

Main outcome: Radiology utilization will be defined as the total standard cost per member per month (PMPM) spent on radiology services by members assigned a primary care relationship to a PCP within a PO. Radiology utilization will be estimated monthly using the most current physician list and most current panel of assigned primary care relationships.

Study Design: Evaluation of the PGIP radiology initiative will incorporate a longitudinal cohort design consisting of a series of repeated measures of radiology utilization aggregated at the PO level. Data will be analyzed using generalized linear mixed models in SAS version 9.1.3. These models will be assessed as both random intercept (where the POs can have their own start point) and random intercept with random slope (where the POs can have their own trend in addition to the PO-specific starting point). Autoregressive correlation between repeated measures of utilization will be incorporated to account for the correlation between data observations of the same PO. The repeated measures design will control for variation observed within each PO. Data from 2006 and 2007 will be used to form the basis of an existing secular trend in radiology utilization prior to implementation of the PGIP RMI (January 2008) in both participating and nonparticipating groups. Follow-up will be ongoing for the duration of the Initiative.

POs that participated in the RMI will be compared to other PGIP physician organizations that did not participate in the RMI. In this model, the utilization rate and trend observed during the RMI reflect the secular trend established by both participating and nonparticipating groups prior to the RMI and the secular trend of the nonparticipating groups after implementation of the Initiative.

Covariates:

A. Potential confounding variables in the relationship between participating in the PGIP RMI and overall radiology services, cost, and trend in cost:

- Age distribution of members assigned care relationships with physicians
- Gender distribution of members assigned care relationships with physicians
- Risk score distribution (as a proxy for general health) of members assigned care relationships with physicians

- Pre-existing knowledge of best practices related to radiology utilization
- Level of defensive medicine practiced by physicians
- Level of patient demand for radiology services
- Supply of radiology equipment to which physicians have direct access
- Availability and supply of free-standing radiology facilities in the vicinity of physicians
- Member benefit structure for co-payment of radiology services

B. Potential moderating variables in the relationship between participating in the PGIP initiative and overall radiology services, cost, and trend in cost include the level of privileging physicians have for performing radiology services.

Table 3: Evaluation of Long-Term Outcomes

Long Term Objective 1: Reduce inappropriate imaging utilization	Objective 1.1: POs that participate in the RMI will decrease their high-tech radiology utilization by a greater amount than would have been achieved without the RMI
	Objective 1.2: POs that participate in the RMI will decrease their low-tech radiology utilization by a greater amount than would have been achieved without the RMI
Study Population	Exposed to the RMI: POs that participated in the RMI
	Unexposed to the RMI: POs that participated in PGIP but did not participate in the RMI
Data Source	Enterprise Data Warehouse (EDW)/CHCQES (Radiology Data Mart): Claims data to identify diagnostic imaging services
Outcome Measurement	High-tech Utilization Rate: The high-tech imaging utilization is defined as the total standard cost PMPM spent on high-tech imaging (e.g., MRI, CT scans, nuclear medicine and PET scans)
	Low-tech Utilization Rate: The low-tech imaging utilization is defined as the total standard cost PMPM spent on low-tech imaging (e.g., diagnostic radiography, ultrasound, plain film and other low-technology imaging)
Study Design	Evaluation will use a longitudinal cohort design consisting of a series of repeated measures of radiology utilization (separate high-tech, low-tech and combined high-tech and low-tech utilization) aggregated at the PO level.

Appendix IV. PGIP Initiative Contact Information: Radiology Management Initiative

For additional information on the Radiology Management Initiative, contact the following Initiative leads:

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Endnotes

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