RADIOLOGY MANAGEMENT

The Journal of AHRA: The Association for Medical Imaging Management

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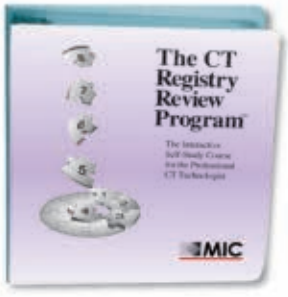

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A Day in the Life

By Debra L. Murphy

Recently, some of the AHRA staff took a field trip and spent the morning at 2016–2017 AHRA President Jason Newmark's hospital—Baystate Medical Center in Springfield, MA. It was an ideal way for us to get a better sense of what our members do every day—our own version of a site visit. We were flies on the wall at a monthly manager's meeting where they debriefed on satisfaction scores, budgets, and a large project implementation that was about to go live. AHRA member Mark Feeley then generously gave us his time with a behind the scenes tour and introduced us to their hard working staff. It was fascinating to look at a hospital through your lens. Being shown how and why a patient moves through the department was like walking through a live action value stream map.

AHRA staff don't do what you do, but we need to understand what you do to help you do what you do better. (Got that?) It's complementing the quantitative methods we traditionally use for understanding member needs with in-person observation. We certainly got a more complete picture (insert radiology joke here) of your professional lives and it helped us gain perspective on some of your pain points.

In other fun member news, every year at this time, the recipients of the Gary Boyd Editorial Awards for *Radiology Management* are named. These awards are voted on by AHRA members so the recipients should feel especially proud of this peer to peer recognition. Congratulations to the following individuals who will be honored at this year's Annual Meeting in Nashville!

Outstanding Column
"Regulatory Changes ahead for Medical Imaging"
Sheila M. Sferrella, CRA, FAHRA
September/October 2015

Outstanding Feature
"Effective Leadership in the 21st Century"
Jacqueline Jones, RT(R), CNMT
November/December 2015

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Give a Little, Get a Lot

By Paul Dubiel, MS, RT(R), CRA, FAHRA

I have always considered myself a man of few words; my mantra has always been actions speak louder than words. I am a bullet point kind of guy who likes short and concise everything. Terms like "at the elbow, glide path, band width, paradigm shift" (enter your site specific ones here—I know you all have them) all make my eyes roll into the back of my head. This, as you might imagine, might be a slight obstacle for the editor-in-chief of a journal and the author of a regular column.

I have never felt it a burden or a chore to fulfill my role as editor and columnist. Some months I have my column prepared way in advance, although I turn it in on the due date (don't want to spoil Deb Murphy, our managing editor). I even have columns lined up for a few editions ahead of time. Ideas circulate in my head months in advance and just when I think I'm set, I've realized it's too bad I didn't write them down before I went to sleep. Other times it takes a gentle reminder from the real editor to jolt me into action and get my column done. I can never really tell what is going to spark an idea. Could be a song I heard or a word from a book I am reading or just an idea that hits me on my walk around the neighborhood while out getting some much needed exercise. Either way, when it comes down to it, I'm doing something I really enjoy and hope some of my words help you and your staff realize we are all in this together.

I didn't start out as editor-in-chief I first wrote a story probably 13–14 years ago that was published in the *Link* newsletter. It was a three part story about converting to PACS from film based imaging. It was my first taste of the world of AHRA publishing and I really enjoyed seeing my thoughts in print. I soon started writing other articles, some co-written with other would be authors and some on my own. After a few years of writing I wanted to do more so I applied to be on the Editorial Review Board which was and still is a great experience. I get to work with a bunch of imaging leaders all committed to producing one of the finest professional journals available. We review every article and make recommendations to the author to help improve the message. I'm always in awe after reading the articles on how dedicated and knowledgeable our members are and how little I really need to do to make their work as good as you see it in the journal. We are a talented, well-educated bunch and it shows in every journal article and column that comes out and I am proud and humble to be a part of the process.

These articles don't get written themselves. We need members to continually put in submissions to the journal on any topic you have a strong passion or commitment around. Your time, effort, and expertise are what make the journal and AHRA great. Learning from each other, no matter how small or big the topic, is what makes AHRA the premier imaging leadership organization for our profession.

Writing isn't the only thing you can do to contribute to this great organization. Way before I was part of the journal, I joined numerous task forces and committees over the years, each with its own distinct goal and, in the end, reward. Volunteer opportunities abound. Opportunities range from the small (making a few calls to members for various reasons) to the large (running for office on the board of directors that helps guide AHRA and its members). You can host a local seminar or be a mentor to a new manager. You can help edit a text book or spend some time working with your local government trying to understand and influence some of the new regulations that will affect our profession. Sign up to present a session at a meeting or volunteer to be a proctor for one of them. All you need to do is go to the AHRA website and click on the volunteer tab and all the volunteer opportunities available are at your fingertips. And if you're not sure what you want to volunteer for there are a whole bunch of members and committee chairs who you can contact to ask about the opportunities and what they entail. I have never met a volunteer not willing to talk about what they have done for AHRA, but more importantly, what volunteering for AHRA has done for them. Besides achieving a sense of accomplishment, you get to meet a bunch of great

people also committed to making an already great organization greater. The members I have met through volunteering over the years have helped me grow, guided me through some tough decisions, and mostly made me laugh and ultimately volunteer more. Of course I would love for you to write an article for the journal or volunteer for the Editorial Review Board—after all, I can't be editor-in-chief forever and Deb can only put up with my metaphysical references for just so long.

Any organization is only as good and strong as the members who contribute to it. You are the reason we are what we are. Without you and your time and your talents we would not be as successful as we are. It's time to give a little to get a lot in return.

Paul A. Dubiel, MS, RT(R), CRA, FAHRA has been the senior director, imaging at Seton Family of Hospitals in Austin, TX since 2002. An AHRA member since 1993, he is currently editor-in-chief of Radiology Management *and has volunteered for numerous other task forces and committees. Paul can be contacted at pdubiel@seton.org.*

Medicare Payment Reform Focuses on Quantity of Imaging Services

By Bill Finerfrock, Nathan Baugh, and Alexander Ehat

Not many politicians in this election cycle are running on a platform of raising taxes and cutting benefits. Some might want to cut spending, others might want to increase taxes or revenue, but almost no one wants to do both. This political dichotomy drives much of the Medicare conversation in Washington. Everyone recognizes that Medicare revenues are no longer keeping up with Medicare expenditures, but the most obvious solutions (increasing taxes/revenue, or reducing expenditures/benefits) are very unpopular ideas on one side of the aisle or the other. As a result, Congress has sought to fix Medicare's revenue vs outlays problem not by raising taxes or cutting benefits, but rather by pushing Medicare to become more efficient.

As many AHRA members are probably already aware, one of the key ways the government hopes to achieve this increased efficiency is by identifying and eliminating "inappropriate" imaging orders. This is evidenced by Medicare's impending Clinical Decision Support/Appropriate Use Criteria requirements as well as the Proposed Rule released on May 9 implementing a piece of legislation known as "MACRA" (Medicare Access and CHIP Reauthorization Act).[1]

While this Proposed Rule only affects physician payments, and will not affect the technical component of Medicare payments, it will likely have a significant impact on the volume of imaging studies ordered. This is because eligible clinicians will be awarded points toward their "quality" score if they avoid ordering "inappropriate" imaging services.

In the May/Jun 2016 issue of *Radiology Management*, we discussed that CMS had yet to finalize their plans to combine the three existing quality initiatives (PQRS, VM, and EHR) into the Merit-Based Incentive Payment System (MIPS) which will significantly affect physician pay. Now, however, the Proposed Rule for MACRA has been released and the medical community has been digging into the details, and their significance. Of note is a significant change to the PQRS program whereby physicians are no longer going to be rewarded for simply reporting quality measures, but instead will be rewarded or penalized based on their performance on a measure relative to their peers.

Think of your child's Little League switching from awarding trophies to everyone for participation to only awarding trophies to the top half of performers. That is essentially what CMS is doing.

What does this mean for imaging? A number of quality measures, from which eligible clinicians can choose to report, either discourage or encourage the ordering of imaging studies. Because next year clinicians will actually have an incentive to ***perform*** well on the measure, we may see a considerable change in the volume of imaging services ordered. Table 1 is meant to give AHRA members an idea of some of the quality measures that may affect the volume of services ordered.

We should note that not all quality measures related to imaging promote or discourage the ordering of imaging services. There are a number of quality measures for radiologists that encourage reporting or recording of certain items which may involve collaboration with the imaging department. For instance, the government is going to reward radiologists who consistently document the radiation exposure indices for fluoroscopy procedures in their final reports.

The radiology focused measures that may affect imaging departments are shaded in blue in Table 1. Those interested in seeing the full list of quality measures should look at Table A or Table E in the Proposed Rule.

The MIPS design represents the first real push from the government to eliminate "inappropriate" imaging orders. Proponents of MACRA view the legislation as an excellent initiative to improve quality of care and lower Medicare costs. Some even hope that the efficiencies

TABLE 1. Quality Measures that May Affect Volume of Services Ordered

PQRS Number	Measure Name and Description	Specialty	Measure Steward	Does the Measure Encourage or Discourage Imaging
102	Prostate Cancer: Avoidance of Overuse of Bone *Scan for Staging Low Risk Prostate Cancer Patients*; Percentage of patients with prostate cancer with a low to very-low risk of recurrence who do not receive a bone scan. [Note: Physicians want to have a score as close to 100 as possible]	Uruology	American Medical Association—Physician Consortium for Performance Improvement	**Discourage**
145	*Radiology: Exposure Time Reported for Procedures Using Fluoroscopy*; Percentage of final reports for procedures using fluoroscopy that document radiation exposure indices.	Diagnostic Radiology	American College of Radiology/ AMA/ Association Physician Consortium for Performance Improvement	**Neither**
147	*Correlation with Existing Imaging Studies for All Patients Undergoing Bone Scintigraphy*; Percentage of final reports for all patients undergoing bone scintigraphy that include documentation of correlation with preexisting relevant imaging studies.	Nuclear Medicine	American Medical Association—Physician Consortium for Performance Improvement/ Society of Nuclear Medicine and Molecular Imaging	**Neither**
156	*Radiation Dose Limits to Normal Tissues*; Percentage of patients with certain types of cancer receiving 3D conformal radiation therapy who had documentation of radiation dose limits to normal tissues established before the radiation treatment began	Oncology	American Society for Radiation Oncology	**Neither**
224	*Overutilization of Imaging Studies in Melanoma*; Percentage of patients with a current diagnosis of Stage 0 through IIC melanoma or a history of melanoma at any stage, without signs or symptoms suggesting systemic spread, seen for an office visit during the one-year measurement period, for whom no diagnostic imaging studies were ordered. [Note: Physicians want to have a score as close to 100 as possible]	Dermatology	American Academy of Dermatology/ American Medical Association- Physician Consortium for Performance Improvement	**Discourage**
225	*Reminder System for Screening Mammograms*; Percentage of patients undergoing a mammogram whose information is entered into a reminder system with a target due date for when their next mammogram should be. [Note: Radiologists want to have a score as close to 100 as possible]	Diagnostic Radiology	American College of Radiology/ American Medical Association-Physician Consortium for Performance Improvement	**Encourage**
254	*Ultrasound Determination of Pregnancy Location for Pregnant Patients with Abdominal Pain*; Percent of pregnant females from age 14-50 who present to emergency department a chief complaint of abdominal pain or vaginal bleeding who receive an ultrasound to determine pregnancy location. [Note: Caregivers want to have a score as close to 100 as possible]	Emergency Medicine	American College of Emergency Physicians	**Encourage**
262	*Image Confirmation of Successful Excision of Image-Localized Breast Lesion*; Intraoperative image confirmation of lesion(s) targeted for image guided excisional biopsy or image guided partial masectomy in patients with image-detected breast lesions. [Note: Radiologists/Surgeons want to have a score as close to 100 as possible]	Unspecified	American Society of Breast Surgeons	**Encourage**

TABLE 1. Quality Measures that May Affect Volume of Services Ordered

PQRS Number	Measure Name and Description	Specialty	Measure Steward	Does the Measure Encourage or Discourage Imaging
312	*Use of Imaging Studies for Low Back Pain*; Percentage of patients from 18-50 with a diagnosis of low back pain who did not have an imaging study within 28 days of diagnosis.	General Practice/ Orthopedic Surgery	National Committee for Quality Assurance	**Discourage**
324	*Cardiac Stress Imaging Not Meeting Appropriate Use Criteria: Testing in Asymptomatic, Low-Risk Patients*; Percentage of all single-photon emission computed tomography (SPECT), myocardial pefusion imaging (MPI), stress echocardiogram (ECHO), cardiac computed tomography angiography (CCTA), and cardiovascular magnetic resonance (CMR) performed in asymptomatic, low coronary heart disease (CHD) risk patients 18 and older for initial detection and risk assessment. [Note: Cardiologists want to have a score as close to 0 as possible]	Cardiology	American College of Cardiology	**Discourage**
333	*Adult Sinusitis: Computerized Tomography (CT) for Acute Sinusitis (Overuse)*; Percentage of patients 18 and older with a diagnosis of acute sinusitis who had a computerized tomography (CT) scan of the paranasul sinuses ordered at time of or within 28 days of diagnosis. [Note physicians want to have a score as close to 0 as possible]	General Practice/ Internal Medicine/ Otolaryngology/	American Academy of Otolaryngology- Head and Neck Surgery	**Discourage**
359	Optimizing Patient Exposure to Ionizing Radiation: Utilization of a Standardized Nomenclature for Computed Tomography (CT) Imaging Description; Percentage of CT imaging reports for all patients with a name according to standardized nomenclature and standardized nomenclature used in the institution's computer records	Radiology	American College of Radiology	**Neither**
360	*Optimizing Patient Exposure to Ionizing Radiation: Count of Potential High Dose Radiation Imaging Studies (CT and Cardiac Nuclear Medicine)*; Percentage of CT and cardiac nuclear medicine imaging reports for all patients that document a count of previous imaging studies done on the patient in the last twelve months	Radiology	American College of Radiology	**Neither**
361	*Optimizing Patient Exposure to Ionizing Radiation: Reporting to a Radiation Dose Index Registry*; Percentage of total computed tomography studies reported to a radiation dose index registry AND include a minimum number of selected data elements	Radiology	American College of Radiology	**Neither**
401	*Hepatitis C: Screening for Hepatocellular Carcinoma (HCC) in Patients with Cirrhosis*; Percentage of patients over 18 with a diagnosis of chronic hepatitis C cirrhosis who underwent imaging with either ultrasound, contrast enhanced CT or MRI for hepatocellular carcinoma (HCC) at least once within the 12 month reporting period. [Physicians want to have a score as close to 100 as possible]	Gastroenterology/ General Practice/ Internal Medicine	American Medical Association—Physician Consortium for Performance Improvement/ American Gastroenterological Association	**Encourage**
405	*Appropriate Follow-Up Imaging for Incidental Abdominal Lesions*; Percentage of final reports for abdominal imaging studies that both note an abdominal lesion and subsequently recommend additional imaging. [Note: Radiologists want to have a score as close to 0 as possible]	Allergy/ Immunology/ Rheumatology	American College of Radiology	**Discourage**

(*continued*)

TABLE 1. Quality Measures that May Affect Volume of Services Ordered (*Continued*)

PQRS Number	Measure Name and Description	Specialty	Measure Steward	Does the Measure Encourage or Discourage Imaging
406	*Appropriate Follow-Up Imaging for Incidental Thyroid Nodules in Patients*; Percentage of final reports for computed tomography or MRI studies of the chest or neck that recommend follow-up imaging for individuals with no known thyroid disease and a thyroid nodule of <1 cm. [Note: Radiologists want to have a score as close to 0 as possible]	Radiology	American College of Radiology	**Discourage**
415	*Emergency Department Utilization of CT for Minor Blunt Head Trauma for Patients Aged 18 Years and Older*; Percentage of emergency department visits for patients over 18 presented within 24 hours of a minor blunt head trauma with a Glasgow Coma Scale (GCS) score of 15 and who had CT for trauma ordered by an emergency care provider who have an indication for a head CT. [Note: Physicians want to have a score as close to 100 as possible]	Emergency Medicine	American College of Emergency Physicians	**Discourage**
419	*Overuse Of Neuroimaging For Patients With Primary Headache And A Normal Neurological Examination*; Percentage of patients with a diagnosis of primary headache disorder whom advanced brain imaging was not ordered. [Note: Physicians want to have a score as close to 100 as possible]	Neurology	American Academy of Neurology	**Discourage**
436	*Radiation Consideration for Adult CT: Utilization of Dose Lowering Techniques*; Percentage of final reports for CT scans where one of three radiation dose reduction techniques was used	Radiology	American College of Radiology/ AMA/ Association Physician Consortium for Performance Improvement/ National Committee for Quality Assurance	**Neither**

gained under MACRA will fix Medicare's funding imbalance without having to do those politically unpopular things: cutting benefits or raising taxes.

MACRA skeptics, on the other hand, may argue that these changes will not drive improved quality or lower costs, but rather only result in further provider consolidation. We may come to learn that there isn't as much inappropriate imaging as we thought. Some might say that even if the law's many moving parts came together brilliantly, it is unlikely to fix the underlying actuarial problems in Medicare, or slow medical inflation.

In any case, AHRA members should review the quality measures of ordering professionals to see if they might affect the quantity of orders their imaging centers receive.

Reference

[1]Centers for Medicare & Medicaid Services. "Medicare Program; Merit-Based Incentive Payment System (MIPS) and Alternative Payment Model (APM) Incentive Under the Physician Fee Schedule, and Criteria for Physician-Focused Payment Models." Federal Register. May 9, 2016. Available at: https://www.federalregister.gov/articles/2016/05/09/2016-10032/medicare-program-merit-based-incentive-payment-system-mips-and-alternative-payment-model-apm. Accessed June 6, 2016.

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KidSTRONG

By Ronda Kruetzer, RT(R)(MR)

In the fall of 2015, thanks to the AHRA & Toshiba Putting Patients First grant, the radiology department at Ozarks Community Hospital (OCH) of Gravette in Gravette, Arkansas was able to launch KidSTRONG, a pediatric program designed to improve the safety, understanding, and comfort of pediatric radiology procedures conducted at the hospital. The program's purpose was to build confidence in young patients, ease procedure fears, and encourage healthy, strong lifestyles for the organization's youngest patients.

OCH is a health system serving patients throughout northwest Arkansas and southwest Missouri. The system includes two hospital facilities and 17 clinics throughout the region, headquartered between the two hospitals in Webb City, Missouri. Both hospitals are formerly closed facilities, reopened to serve the local need and provide care for the underserved population throughout their respective locations. The health system is a safety-net provider, ensuring access to care for the underserved population of governmental and self-pay patients. More than 80% of the total patient population is uninsured or on governmental insurance.

In 2008, community members in Gravette, Arkansas reached out to OCH administration regarding the closed Gravette Medical Center Hospital, which had served a large pediatric patient population prior to closing. Gravette is a rural community located in the far northwest corner of Benton County and due to the town's secluded location, access to healthcare was slim. To serve the need of Gravette citizens and those in the surrounding small communities, OCH of Gravette was reopened as a critical access hospital. OCH of Gravette is a 25-bed acute care hospital. Due to its location within the region, the hospital is a necessity for residents in need of emergent medical care. While there are several hospitals located in the larger communities of Bentonville, Rogers, Siloam Springs and Fayetteville, Arkansas, the closest hospital to Gravette is 20 miles away or more. Due to this fact, many small communities surrounding Gravette take advantage of healthcare within this rural community, and OCH of Gravette has a busy caseload of patients spanning a multi-state region including Arkansas, Oklahoma, Missouri, and Kansas.

Following the receipt of the Putting Patients First grant, OCH of Gravette administration determined that an all-encompassing department renovation in radiology would be the perfect complement to the KidSTRONG program. In addition to the purchase of pediatric lead, child-friendly décor and supplies, and pediatric radiology safety education, OCH of Gravette committed to use hospital funds to purchase a comprehensive package of new state of the art radiology equipment to furnish all radiology patient rooms. This new equipment led to the renovation of the radiology waiting room, timed perfectly with grant implementation efforts.

The OCH of Gravette's radiology department and KidSTRONG implementation is an impressive enhancement to the former pediatric program. Pediatric lead in kid-friendly designs ensures that children are getting the appropriate protection without undue weight while reducing radiation. KidSTRONG theme coordinating decals, décor, and equipment create an environment that is both welcoming and engaging for young patients (see Figures 1-4). Kid-sized transportation provides safe and comforting access to and within the imaging department, and age appropriate waiting room play equipment gives children hands-on activities that decrease stress and anxiety. A new, multi-colored lighting system was installed in patient rooms, making the area less intimidating and providing a calming affect for young patients. Pediatric patients get to wear superhero masks and capes prior to their procedures and all patients receive a KidSTRONG themed stuffed animal following their appointments.

The most integral component of the KidSTRONG program is the development and production of an informative video detailing the imaging process to prepare children and parents before an exam. This video is available for families to watch in the waiting room when checking in or through an online portal if an appointment is prescheduled. This instructional video tool includes education on the appointment process geared towards children, with the purpose of reducing anxiety and improving patient

Figure 1 • KidSTRONG Themed Decor

Figure 2 • KidSTRONG Themed Decor

Figure 3 • KidSTRONG Themed Decor

Figure 4 • KidSTRONG Themed Decor

satisfaction. The KidSTRONG pre-imaging instructional video can also be made available as a model template for other single-site hospitals, imaging centers, or facilities to develop a tailored instructional video for their unique needs.

The KidSTRONG program has proven to be an asset to OCH of Gravette, with a track record of satisfied patients since the program's start. Parents and children alike feel more prepared for radiology procedures and the thematic elements make a child-friendly, comfortable atmosphere for young patients. A pediatric radiology patient said it best: "I was really scared, but when I walked in the room I saw the blue lights on and stopped crying. It was really cool." The adults visiting the renovated area enjoy the space almost as much as the pediatric patients. It has improved their overall experience, and gives our staff a chance to further promote our wonderful KidSTRONG program to those who may never have heard about it prior to visiting.

The KidSTRONG program at OCH will help pediatric patients see imaging services as protecting them and helping them be active. It will also provide needed improvement to the existing hospital radiology department and increase community resources, thus enabling local families to access safe, quality and worry free care right in their hometown.

OCH of Gravette would like to thank AHRA and Toshiba for making this vision a reality, creating a positive radiology experience for the region's young patients and helping to launch the radiology department's growth.

Ronda Kruetzer, RT(R)(MR) is the radiology manager at Ozarks Community Hospital (OCH) of Gravette and received her degree from Baylor University Medical Center in Dallas, Texas. She has worked for the OCH health system for nine years and has more than 12 years' experience in the field. Ronda can be contacted at rkreutzer@ochonline.com.

The individuals who appear are for illustrative purposes only. All persons depicted are models and not real patients.

IMPORTANT SAFETY INFORMATION
CT Exprès 3D Contrast Media Delivery System

INDICATIONS
The CT Exprès 3D Contrast Media Delivery System is indicated for controlled automatic administration, on the venous side, of contrast media and saline, to human subjects while undergoing examination by means of a computed tomography (CT) scanner.

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IMPORTANT SAFETY INFORMATION
Isovue IS NOT FOR INTRATHECAL USE. Iopamidol Injection is available as Isovue-M® for intrathecal administration.

Caution must be exercised in patients with severely impaired renal function, those with combined renal and hepatic disease, or anuria, particularly when larger and repeat doses are administered. Radiopaque diagnostic contrast agents are potentially hazardous in patients with multiple myeloma or other paraproteinemia, particularly in those with therapeutically resistant anuria. Caution should be exercised in hydrating patients with underlying conditions that may be worsened by fluid overload, such as congestive heart failure.

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Diabetic nephropathy may predispose to acute renal impairment following intravascular contrast media administration. Acute renal impairment following contrast media administration may precipitate lactic acidosis in patients who are taking biguanides. Preparatory dehydration is dangerous and may contribute to acute renal failure in patients with advanced vascular disease, diabetic patients, and in susceptible nondiabetic patients (often elderly with preexisting renal disease). Patients should be well hydrated prior to and following iopamidol administration.

The possibility of a reaction, including serious, life-threatening, fatal, anaphylactoid or cardiovascular reactions, should always be considered. Patients at increased risk include those with a history of a previous reaction to a contrast medium, patients with a known sensitivity to iodine per se, and patients with a known clinical hypersensitivity (bronchial asthma, hay fever, and food allergies).

*The Isovue Imaging Bulk Package is for use with an automated contrast injector or a contrast management system approved or cleared for use with it.

Please see abbreviated ISOVUE IBP Prescribing Information on the following page. You are encouraged to report negative side effects of prescription drugs to the FDA. Visit www.fda.gov/medwatch or call 1-800-FDA-1088.

Reference: 1. Ma X, Singh A, Fay J, Boland G, Sahani DV. Comparison of Dual-Syringe and Syringeless Power Injectors in Outpatient MDCT Practice: Impact on the Operator's Performance, CT Workflow, and Operation Cost. *Journal of the American College of Radiology.* 2012;9(8):578–582.

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Please see full prescribing information. A brief summary follows.

Isovue®
Imaging Bulk Package

For use only with an automated contrast injection system or contrast management system approved or cleared for use with this contrast agent in this Imaging Bulk Package.

ISOVUE®-300
Iopamidol Injection 61%

ISOVUE®-370
Iopamidol Injection 76%

NOT FOR INTRATHECAL USE

Rx ONLY

CONTRAINDICATIONS None.

WARNINGS Severe Adverse Events-Inadvertent Intrathecal Administration Serious adverse reactions have been reported due to the inadvertent intrathecal administration of iodinated contrast media that are not indicated for intrathecal use.
These serious adverse reactions include: death, convulsions, cerebral hemorrhage, coma, paralysis, arachnoiditis, acute renal failure, cardiac arrest, seizures, rhabdomyolysis, hyperthermia, and brain edema. Special attention must be given to insure that this drug product is not inadvertently administered intrathecally.
General Nonionic iodinated contrast media inhibit blood coagulation, in vitro, less than ionic contrast media. Clotting has been reported when blood remains in contact with syringes containing nonionic contrast media.
The use of plastic syringes in place of glass syringes has been reported to decrease but not eliminate the likelihood of in vitro clotting.
Caution must be exercised in patients with severely impaired renal function, those with combined renal and hepatic disease, or anuria, particularly when larger doses are administered.
Radiopaque diagnostic contrast agents are potentially hazardous in patients with multiple myeloma or other paraproteinemia, particularly in those with therapeutically resistant anuria. Myeloma occurs most commonly in persons over age 40. Although neither the contrast agent nor dehydration has been proved separately to be the cause of anuria in myelomatous patients, it has been speculated that the combination of both may be causative. The risk in myelomatous patients is not a contraindication; however, special precautions are required.
Contrast media may promote sickling in individuals who are homozygous for sickle cell disease when injected intravenously or intraarterially.
Administration of radiopaque materials to patients known or suspected of having pheochromocytoma should be performed with extreme caution. If, in the opinion of the physician, the possible benefits of such procedures outweigh the considered risks, the procedures may be performed; however, the amount of radiopaque medium injected should be kept to an absolute minimum. The blood pressure should be assessed throughout the procedure and measures for treatment of a hypertensive crisis should be available. These patients should be monitored very closely during contrast enhanced procedures.
Reports of thyroid storm following the use of iodinated radiopaque diagnostic agents in patients with hyperthyroidism or with an autonomously functioning thyroid nodule suggest that this additional risk be evaluated in such patients before use of any contrast medium.

PRECAUTIONS General
Diagnostic procedures which involve the use of any radiopaque agent should be carried out under the direction of personnel with the prerequisite training and with a thorough knowledge of the particular procedure to be performed. Appropriate facilities should be available for coping with any complication of the procedure, as well as for emergency treatment of severe reaction to the contrast agent itself. After parenteral administration of a radiopaque agent, competent personnel and emergency facilities should be available for at least 30 to 60 minutes since severe delayed reactions may occur. Caution should be exercised in hydrating patients with underlying conditions that may be worsened by fluid overload, such as congestive heart failure.
Preparatory dehydration is dangerous and may contribute to acute renal failure in patients with advanced vascular disease, diabetic patients, and in susceptible nondiabetic patients (often elderly with preexisting renal disease). Patients should be well hydrated prior to and following iopamidol administration.
The possibility of a reaction, including serious, life-threatening, fatal, anaphylactoid or cardiovascular reactions, should always be considered (see **ADVERSE REACTIONS**). Patients at increased risk include those with a history of a previous reaction to a contrast medium, patients with a known sensitivity to iodine per se, and patients with a known clinical hypersensitivity (bronchial asthma, hay fever, and food allergies). The occurrence of severe idiosyncratic reactions has prompted the use of several pretesting methods. However, pretesting cannot be relied upon to predict severe reactions and may itself be hazardous for the patient. It is suggested that a thorough medical history with emphasis on allergy and hypersensitivity, prior to the injection of any contrast medium, may be more accurate than pretesting in predicting potential adverse reactions. A positive history of allergies or hypersensitivity does not arbitrarily contraindicate the use of a contrast agent where a diagnostic procedure is thought essential, but caution should be exercised. Premedication with antihistamines or corticosteroids to avoid or minimize possible allergic reactions in such patients should be considered. Recent reports indicate that such pretreatment does not prevent serious life-threatening reactions but may reduce both their incidence and severity. Pre-existing conditions, such as pacemakers or cardiac medications, specifically beta-blockers, may mask or alter the signs or symptoms of an anaphylactoid reaction, as well as masking or altering the response to particular medications used for treatment. For example, beta-blockers inhibit a tachycardiac response, and can lead to the incorrect diagnosis of a vasovagal rather than an anaphylactoid reaction. Special attention to this possibility is particularly critical in patients suffering from serious, life-threatening reactions.
General anesthesia may be indicated in the performance of some procedures in selected patients; however, a higher incidence of adverse reactions has been reported with radiopaque media in anesthetized patients, which may be attributable to the inability of the patient to identify untoward symptoms, or to the hypotensive effect of anesthesia which can reduce cardiac output and increase the duration of exposure to the contrast agent.
Even though the osmolality of iopamidol is low compared to diatrizoate or iothalamate based ionic agents of comparable iodine concentration, the potential transitory increase in the circulatory osmotic load in patients with congestive heart failure requires caution during injection. These patients should be observed for several hours following the procedure to detect delayed hemodynamic disturbances. Injection site pain and swelling may occur. In the majority of cases it is due to extravasation of contrast medium. Reactions are usually transient and recover without sequelae. However, inflammation and even skin necrosis have been seen on very rare occasions.
Extreme caution during injection of contrast media is necessary to avoid extravasation.

INFORMATION FOR PATIENTS Patients receiving injectable radiopaque diagnostic agents should be instructed to:
1. Inform your physician if you are pregnant.
2. Inform your physician if you are diabetic or if you have multiple myeloma, pheochromocytoma, homozygous sickle cell disease, or known thyroid disorder (see **WARNINGS**).
3. Inform your physician if you are allergic to any drugs, food, or if you had any reactions to previous injections of substances used for x-ray procedures (see **PRECAUTIONS-General**).
4. Inform your physician about any other medications you are currently taking, including nonprescription drugs, before you have this procedure.

Drug Interactions Renal toxicity has been reported in a few patients with liver dysfunction who were given oral cholecystographic agents followed by intravascular contrast agents. Administration of intravascular agents should therefore be postponed in any patient with a known or suspected hepatic or biliary disorder who has recently received a cholecystographic contrast agent.
Other drugs should not be admixed with iopamidol.

Drug/Laboratory Test Interactions The results of PBI and radioactive iodine uptake studies, which depend on iodine estimations, will not accurately reflect thyroid function for up to 16 days following administration of iodinated contrast media. However, thyroid function tests not depending on iodine estimations, e.g., T3 resin uptake and total or free thyroxine (T4) assays are not affected.
Any test which might be affected by contrast media should be performed prior to administration of the contrast medium.

Laboratory Test Findings In vitro studies with animal blood showed that many radiopaque contrast agents, including iopamidol, produced a slight depression of plasma coagulation factors including prothrombin time, partial thromboplastin time, and fibrinogen, as well as a slight tendency to cause platelet and/or red blood cell aggregation (see **PRECAUTIONS-General**).
Transitory changes may occur in red cell and leucocyte counts, serum calcium, serum creatinine, serum glutamic oxaloacetic transaminase (SGOT), and uric acid in urine; transient albuminuria may occur.
These findings have not been associated with clinical manifestations.

Carcinogenesis, Mutagenesis, Impairment of Fertility Long-term studies in animals have not been performed to evaluate carcinogenic potential. No evidence of genetic toxicity was obtained in in vitro tests.

Pregnancy: Teratogenic Effects Pregnancy Category B Reproduction studies have been performed in rats and rabbits at doses up to 2.7 and 1.4 times the maximum recommended human dose (1.48 gI/kg in a 50 kg individual), respectively, and have revealed no evidence of impaired fertility or harm to the fetus due to iopamidol. There are, however, no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, this drug should be used during pregnancy only if clearly needed.

Nursing Mothers It is not known whether this drug is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when iopamidol is administered to a nursing woman.

Pediatric Use Safety and effectiveness in children has been established in pediatric computed tomography (head and body). Pediatric patients at higher risk of experiencing adverse events during contrast medium administration may include those having asthma, a sensitivity to medication and/or allergens, cyanotic heart disease, congestive heart failure, a serum creatinine greater than 1.5 mg/dL or those less than 12 months of age.

ADVERSE REACTIONS Adverse reactions following the use of iopamidol are usually mild to moderate, self-limited, and transient.
The following table of incidence of reactions is based on clinical studies with ISOVUE in about 2246 patients.

	Estimated Overall Incidence	
System	**> 1%**	**< 1%**
Cardiovascular	none	tachycardia hypotension hypertension myocardial ischemia circulatory collapse S-T segment depression bigeminy extrasystoles ventricular fibrillation angina pectoris bradycardia transient ischemic attack thrombophlebitis
Nervous	pain (2.8%) burning sensation (1.4%)	vasovagal reaction tingling in arms grimace faintness
Digestive	nausea (1.2%)	vomiting anorexia
Respiratory	none	throat constriction dyspnea pulmonary edema
Skin and Appendages	none	rash urticaria pruritus flushing
Body as a Whole	hot flashes (1.5%)	headache fever chills excessive sweating back spasm
Special Senses	warmth (1.1%)	taste alterations nasal congestion visual disturbances
Urogenital	none	urinary retention

The following adverse reactions have been reported for Iopamidol: **Cardiovascular:** arrhythmia, arterial spasms, flushing, vasodilation, chest pain, cardiopulmonary arrest; **Nervous System:** confusion, paresthesia, dizziness, temporary cortical blindness, temporary amnesia, convulsions, paralysis, coma; **Respiratory:** increased cough, sneezing, asthma, apnea, laryngeal edema, chest tightness, rhinitis; **Skin and Appendages:** injection site pain usually due to extravasation and/or erythematous swelling, pallor, periorbital edema, facial edema; Urogenital: pain, hematuria; **Special Senses:** watery itchy eyes, lacrimation, conjunctivitis; **Musculoskeletal:** muscle spasm, involuntary leg movement; **Body as a whole:** tremors, malaise, anaphylactoid reaction (characterized by cardiovascular, respiratory and cutaneous symptoms), pain; **Digestive:** severe retching and choking, abdominal cramps. Some of these may occur as a consequence of the procedure. Other reactions may also occur with the use of any contrast agent as a consequence of the procedural hazard; these include hemorrhage or pseudoaneurysms at the puncture site, brachial plexus palsy following axillary artery injections, chest pain, myocardial infarction, and transient changes in hepatorenal chemistry tests. Arterial thrombosis, displacement of arterial plaques, venous thrombosis, dissection of the coronary vessels and transient sinus arrest are rare complications.

GENERAL ADVERSE REACTIONS TO CONTRAST MEDIA Reactions known to occur with parenteral administration of iodinated ionic contrast agents (see the listing below) are possible with any nonionic agent. Approximately 95 percent of adverse reactions accompanying the use of other water-soluble intravascularly administered contrast agents are mild to moderate in degree. However, life-threatening reactions and fatalities,mostly of cardiovascular origin, have occurred. Reported incidences of death from the administration of other iodinated contrast media range from 6.6 per 1 million (0.00066 percent) to 1 in 10,000 patients (0.01 percent). Most deaths occur during injection or 5 to 10 minutes later, the main feature being cardiac arrest with cardiovascular disease as the main aggravating factor. Isolated reports of hypotensive collapse and shock are found in the literature. The incidence of shock is estimated to be 1 out of 20,000 (0.005 percent) patients.
Adverse reactions to injectable contrast media fall into two categories: chemotoxic reactions and idiosyncratic reactions.
Chemotoxic reactions result from the physicochemical properties of the contrast medium, the dose, and the speed of injection.
All hemodynamic disturbances and injuries to organs or vessels perfused by the contrast medium are included in this category.
Idiosyncratic reactions include all other reactions. They occur more frequently in patients 20 to 40 years old. Idiosyncratic reactions may or may not be dependent on the amount of drug injected, the speed of injection, the mode of injection, and the radiographic procedure. Idiosyncratic reactions are subdivided into minor, intermediate, and severe. The minor reactions are self-limited and of short duration; the severe reactions are life-threatening and treatment is urgent and mandatory.
The reported incidence of adverse reactions to contrast media in patients with a history of allergy is twice that for the general population. Patients with a history of previous reactions to a contrast medium are three times more susceptible than other patients. However, sensitivity to contrast media does not appear to increase with repeated examinations. Most adverse reactions to intravascular contrast agents appear within one to three minutes after the start of injection, but delayed reactions may occur. Delayed reactions, usually involving the skin, may uncommonly occur within 2-3 days (range 1-7 days) after the administration of contrast (see **PRECAUTIONS**-General). Delayed allergic reactions are more frequent in patients treated with immunostimulants, such as interleukin-2.
In addition to the adverse drug reactions reported for iopamidol, the following additional adverse reactions have been reported with the use of other intravascular contrast agents and are possible with the use of any water-soluble iodinated contrast agent: **Cardiovascular:** cerebral hematomas, petechiae; **Hematologic:** neutropenia; **Skin and Appendages:** skin necrosis; **Urogenital:** osmotic nephrosis of proximal tubular cells, renal failure; **Special Senses:** conjunctival chemosis with infection; **Endocrine:** thyroid function tests indicative of hypothyroidism or transient thyroid suppression have been uncommonly reported following iodinated contrast media administration to adult and pediatric patients, including infants. Some patients were treated for hypothyroidism.

OVERDOSAGE Treatment of an overdose of an injectable radiopaque contrast medium is directed toward the support of all vital functions, and prompt institution of symptomatic therapy.

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Adding a Biopsy Service to Ultrasound

By Curtis Bush, MBA, CRA, FACHE

The credit earned from the Quick Credit™ test accompanying this article may be applied to the CRA asset management (AM) domain.

EXECUTIVE SUMMARY

- The changing climate in healthcare has led to some very hard decisions regarding revenue generation and cost avoidance. A decision was made to not allow the nephrologists to perform renal biopsies utilizing interventional radiology resources that had previously been available.
- For nephrologists that wanted to continue performing their own biopsies, the plan was to redesign how they were performed using only an ultrasound technologist in the room.
- The sonographers had never been required to perform any invasive procedure at this facility, and would be required to obtain skills and competencies in a short period of time for this to be successful.
- This is a guide through the change process for the technologists and physicians to ultimately lead to an efficient and safe way to perform procedures for the renal transplant physicians.

Recently, a change was made in the way radiology provided services for renal biopsy patients at Baylor University Medical Center (BUMC), which is a 900 bed Level 1 Trauma Center and a leading transplant center in Dallas, TX. Previously, the radiologists provided these services in conjunction with the nephrologist through the biopsy area of interventional radiology. This model did not allow the radiologist to generate a billable procedure for their professional services rendered because the nephrologist activated the biopsy gun once given the approval of the staff radiologist. The radiologists decided they would no longer provide this collaborative procedure unless they performed the entire exam.

The existing process of performing these procedures in the biopsy suite involved the technologist setting up the sterile tray; a registered nurse assessing the patient, documenting vitals, and in many cases administering moderate sedation; a radiology resident would align the biopsy gun to the appropriate level using ultrasound guidance, a staff radiologist would verify placement, angle, and depth settings; and the nephrologist would come in at the end and perform the actual biopsy (activate the biopsy gun). The performing provider in this process was the nephrologist, and they would perform a dictation and bill the professional component for the procedure.

In order to support both the radiologists and nephrologists, the plan was to continue to provide these services for both groups of physicians. This would require developing an alternative solution that would allow for the same level of patient care and minimize any physician challenges. The aim was to maintain the existing business relationships with the physicians, and retain current and future patients. The tentative go-live of September 2015 was established to begin this process, and would allow a four week window for training staff and the nephrologists in addition to some coordination with other stakeholders.

The plan was to train ultrasound staff and implement a process for providing the renal biopsy service within the ultrasound section. This would include gaining agreement for the process implemented from the nephrology physicians to perform biopsies with the support of sonographers. Future considerations will include:

- Train sonographers in sterile technique and tray set-up
- Familiarize the sonographers with invasive procedure requirements
- Validate they can recognize complete consents
- Meet with epidemiology and pathology to ensure location is acceptable
- Create q-site, CDM, RIS, and Eclipsys modifications to incorporate this new service

- Work with the nephrologists to approve a work flow for performing these biopsies

Expected challenges and associated influencing behaviors:

- Alter mindset of sonographers who have never been required to perform invasive procedures while at our facility
- Appealing to values by centering efforts on what is best for the patients
- Working with the ultrasound supervisor to model behaviors
- Collaborating with supply chain, IS, CDM, epidemiology, pathology, and nephrology to come up with the best solution for the parties involved and the patients
- Develop a work flow and process that can be agreed upon by the nephrologists who will be performing these procedures through collaboration of their prior experiences, and legitimizing best practices

External Analysis

As a part of gaining buy in from administration, the nephrologists, and the technologists, a detailed external analysis was performed both locally and nationally to provide some evidenced base metrics. An external analysis overview is provided in Table 1.

Fashion Pressure

Historically, percutaneous biopsy of the kidney was not an optimal choice for renal biopsy due to concerns about safety, accuracy, and sampling errors. Newly developed techniques, improved technology, and increasing expertise have increased the popularity of this procedure.[1] As technology, expertise, and patient expectations have changed, it has become fashionable to provide this service in an alternative environment and method. Patients and physicians prefer this method of renal biopsy for native and transplant kidneys due to the reduced time for the patient in the hospital and much lower risk for complications due to improved technology.

Mandate Pressures

The Centers for Medicaid and Medicare Services (CMS) have some very strict guidelines on what must be included as part of the pre and post procedure documentation. Some of these key components are a recent history and physical that is signed and dated by the physician; a 100% completed informed consent document; and the type of procedure and technique used which includes elements like depth of the biopsy, anatomic location of the biopsy (ie, organ/site), needle size and type, method of biopsy (Core vs fine needle), laterality of procedure, and documentation that a confirming image was taken. It is also important to include the findings and complete documentation of the impression along with an appropriate post-operative note containing all required elements.[2] If any element listed here is not complete and accurate, not only will imaging not be

TABLE 1. External Analysis

Environmental Pressures	Opportunity	Threat
Fashion	It is common for many less invasive biopsy procedures to be performed in ultrasound areas within the industry	Patients prefer sedation during many procedures and these scenarios don't allow for that practice
Mandate	Specific regulations govern the oversight of these procedures for good patient outcomes and improved reimbursement	Any negative outcomes can lead to regulatory change that will not allow these types of procedures in this specific arena
Geopolitical	Publicized articles and best practices will encourage more physicians to adopt this practice, and more patients to feel safe in this arena.	A negative outcome in Dallas, TX that makes the news will have less patients willing to have the procedures in this arena in Florida
Market decline	Performing procedures with less resources	Inadequate resources available for safety measures
Hypercompetition	Increase current sonography service line and skill set for a more cost effective, efficient, and safe procedure	Inability for staff and physicians to adjust, and continue to lose business or have negative outcomes

paid for the services provided; the hospital and physician cannot submit a bill for the services either.

Geopolitical Pressures

There were no geopolitical pressures that could be identified related to this initiative. While the threat of hemorrhage is always present during any invasive procedure, no events nationwide were identified that would cause concern. One study at the Mayo Clinic showed that the rate of excessive bleeding during a percutaneous kidney biopsy was about 0.5% or 70 out of about 15,000 exams.[3] This area was key to look at for the physicians in particular, and although no adverse outcome trends had been identified nationally, multiple bad outcomes or adverse events at our facility would have tremendous negative impacts on a very active transplant program.

Market Decline Pressures

No market decline pressures were identified, and Dr. Larry Melton mentioned that in order to more effectively care for our patients, it is important to offer this alternative service delivery model. In our practice, the volumes for transplant request are increasing faster than they can recruit new physicians (L. Melton, personal communication, April 16, 2015).

Hypercompetition Pressures

The physician group that BUMC works with has the ability to take their patients to an alternative site where they can perform the procedures as they would prefer. With the increased demand from patients, advances in technology, the need to improve cost efficient care, and the ability for an organization to be adaptable and perform rapid cycle improvements, it is critical to the survival for many healthcare entities.[4]

Internal Analysis

An internal analysis overview is provided in Table 2.

Growth Pressures

BUMC was a part of one of the largest healthcare systems in North Texas. In September 2013 it merged with another large health system in central Texas, and has become the largest non-profit health system in all of Texas. Its footprint is as large as the state of Virginia. With the growth come expectations of new capabilities, and the flow of improvement does not necessarily move as fast through large organizations as it should.

Integration and Collaboration

There are a significant amount of resources and technology at BUMC's disposal to encourage collaboration and integration. The facility itself and the campus it sits on is 42 city blocks. That poses a challenge because it's so spread out and decentralized that it creates a barrier to collaboration and integration, and many areas continue to operate in silos.

Identity

The logo for BUMC is one of the most recognized in all of North Texas for a healthcare facility. There is very strong brand power and awareness. Along with the 2013 merger was a new branding campaign. This has created some

TABLE 2. Internal Analysis

Organizational Pressures	Strength	Weakness
Growth	We are the largest non-profit health system in Texas	At times our services and facilities can grow faster than our staff resources
Integration and collaboration	There are plenty of resources to support collaboration and integration	The size of the facility is so large that at times collaboration and integration is difficult
Identity	Our hospital logo is very well known in DFW and in Texas	The brand is changing as a result of our recent merger
New broom	New leadership over the past 5 years has set the stage for continuous improvement and changing old habits	New leadership has wanted to move faster than the staff was ready to, and has increased resistance in some areas.
Power and politics	New departmental leadership drives for change and improvement	New supervisor who has been here for 20 years doesn't adapt to change as quickly as needed

confusion locally, but ultimately will end up being a stronger brand.

New Broom

In 2010, a longtime director and his assistant were replaced, and since then there has been significant effort to change culture and remove the phrase, "That's how we've always done it" from the employee vocabulary. There have been a few occurrences where leadership has expected to move faster than the staff was ready to, and that has caused some dissent in the ranks. There is often a gap from an organizational standpoint with readiness for change from a leadership versus front line staff perspective. Leadership will think that the organization is ready because they are driving the change; however, the mindsets of the individuals who are responsible for the implementations are not ready for a change

Power and Politics

In 2014, a supervisor position was filled with a long time employee who had shown great initiative. At times, the supervisor still holds on to old mindsets and is reluctant to drive change with her staff. While the vast majority of the leadership team is new, and drives change effectively; there may be opportunities to ensure that everyone is included in the process so they don't get left behind.

Other Analysis

Other internal factors that can either support or impede change are management, marketing, finance, information services (IS), and research and development (R&D).

The management is likely the biggest strength for change, and will support the efforts and remove all barriers for successful projects. Marketing has little impact on the change as it is being implemented, and can provide some significant support after successful implementation. This particular project will not have an impact on marketing since all key stakeholders are involved in the process. Finance can be a barrier for additional funding. Often, projects get delayed due to slow moving finance systems. This project will have minimal need for any finance interaction. Historically, IS has been the biggest barrier for all change projects. This project will not require their interaction. R&D is a proponent and supporter of change. This area will not have an impact on this project.

This change needs to be made because it is better patient care, and experienced technologists need to step up to show that they are willing and able to adjust and adapt to improve their service line.

The structural dilemmas of the group were fairly balanced, and while this indicates a balanced structure, it is essential to make this change to increase service line availability. See Box 1. An often overlooked step in implementation of any change is to ensure that the employees impacted by the change are actually ready to make the change. To identify this, a readiness to change survey was conducted and the results indicated the group was ready to take on the project.

Formulation

The recommended change is a first order adaptive change. This specific change is a reaction to a decision made by the interventional radiologists that adversely impacted the nephrologists. The ultrasound staff is willing to adjust, and also have some concerns related to scheduling, staffing, patient safety, and obtaining the appropriate knowledge, skills, and abilities in the short time frame given to implement the change.

There isn't much expectation for resistance to change for this process. Appropriate time will be given for training of the new skills prior to beginning any implementation. Communication will be daily and a Gantt Chart will be used to step out the expected time frames for completion given that the goal for implementation is 60 days. We will also make sure that epidemiology, scheduling, and the physician's office staff are all included in making the decisions as we progress through the process. With such a short time frame given it is very important to leadership to remove a barrier that may slow down or hinder the process.

This department as a whole has performed well financially, at a high quality, providing great service, with almost no staff turnover. However, they have forgotten that there can always be improvement. Complacent mindsets have set in, that if they just keep their heads down and do their work that they'll be left alone. This change needs to be made because it is better patient care, and experienced technologists need to step up to show that they are willing and able to adjust and adapt to improve their service line.

The image of change management will be that of the director. This image is used because the outcome is achievable, and the staff are seeking some direction in how to achieve the outcome.[5] Leadership has identified a gap in service line capability and without closing the gap there could be significant downstream effects to one of the top transplant programs in the country. This department has proven that they can move in a new direction; however, they are not self-starters and will need some direction. The image of director will provide the direction to get them started, and they will be presented the outcome to achieve with the resources to finish. It will be up to them to figure out their best path for success.

Box 1. Structural Dilemmas

Please respond to each of the following statements in regard to your organization.

1 represents very strong agreement with statement on the left-hand side.
4 represents the view that the two aspects are well balanced.
7 represents very strong agreement with the statement on the right-hand side.

Differentiation has not affected integration *Differentiation has affected integration*

1……..2……3……4……5……6……..7

Key tasks go unallocated *There's too much overlap of tasks*

1……..2……3……4……5……6……..7

Staff are underused *Staff are overloaded*

1……..2……3……4……5……6……..7

Roles are not clear enough *Roles are too narrowly defined*

1……..2……3……4……5……6……..7

We are left to work on our own too often *We can't work on our own enough*

1……..2……3……4……5……6……..7

Controls are too loose *Controls are too tight*

1……..2……3……4……5……6……..7

Changes may be needed where you have provided a 1 or 2, or a 6 or 7 response.

Implementation

Kotter's eight stem model was first published in a 1995 *Harvard Business Review* article. This particular model is one of the most recognizable models for change.[6,7]

1. **Increase Urgency.** The need or urgency has been established due to the negative downstream effects of one of the nation's top transplant programs. We needed to quickly redesign an alternative method to perform renal biopsy for the nephrologists, so they would not take their patients to alternative locations.
2. **Build the Guiding Team.** This group has seven participants, and they are very invested in their positions and organization. We will communicate and involve them in the decision making process to ensure that there are no gaps left during implementation. They are the experts.
3. **Get the Right Vision.** A vision is a clear, compelling statement that is easy to communicate to stakeholders and clarifies the direction of the team.[6] The vision acts as a compass for the organization and inspires members to accomplish goals.[8] The vision of BUMC is "to be the most trusted name in giving and receiving safe, quality, compassionate health care."
4. **Communicate for Buy-in.** The organization's vision is used to begin meetings and embodied by the members of the organization. This will be communicated with the staff to ensure they understand the reasons for this change.
5. **Empower Action.** The staff will be incorporated into all the decisions to ensure that the experts can come to a solution that works for them.
6. **Create Short Term Wins.** Utilizing the Gantt chart we will be able to celebrate as we achieve each leg of the journey.
7. **Don't Let Up.** This is going to involve meeting with the stakeholders outside

the department: the physicians, office staff, schedulers, coders, and day hospital staff. This will need to be a combined effort to provide great patient care.

8. **Make it Stick.** Change occurs in this organization on a regular basis, and there is a good start on embedding it into the culture. The director of this department has a dream of having each employee come to work looking for something to make better than it was the day prior. Once that occurs, he will know that the old culture has been removed.

   Action steps include:

- Train technologists on proper sterile technique
- Engage patient safety and epidemiology to determine appropriate room location
- Train technologists on documentation review to ensure billing compliance
- Create additional room to schedule biopsy exams in, and limit schedule to four per day
- Gain acceptance from physicians on established order of events
- Order supplies and coordinate with supply chain for inventory management and billing
- Ensure emergency measures are in place in the event of a patient event.

Communication Plan

BUMC, like many others, strives to be an employer of choice in the community and nation. Empowering employees is one method to accomplish this. On the job training is used to do this, on top of it increasing their skill sets. Utilizing on the job training along with reflective communication has shown to have significant improvement in work place learning.[9]

The first step was to gather all stakeholders, and define the boundaries, regulations, and needs. We identified that the ultrasound supervisor, the director of imaging, the chief of the neurology section, the CMO, the medical director of radiology, the VP of operations, and the IR section chief would be the correct people to help identify gaps and needs to design this alternative service. After a couple iterations and modifications a workflow was approved by all parties, and the nephrology chief distributed that information to his section. There were a couple of nephrologists who were not on board initially with the new process, and went to administration for discussion. We were able to explain why the changes needed to be made, and that we were providing an alternative that is within community and national standards. It was just new at our facility.

Second, a staff assessment will need to be done to identify any knowledge, skills, and ability gaps. Changing the mindset of staff will be a key factor in the success of this implementation, as well as a review of technology systems to ensure all information is available when needed. Identifying the two or three staff members to take charge of different tasks will be important to gain "buy in." There will be weekly meetings scheduled to assess specific task completion as outlined on the Gantt Chart. Lunch will be provided at the meetings as a reward for completion of the prior task and staying on target. Upon implementation, there will be follow up meetings on a weekly basis for the first two months, and then as needed based on outcomes, peer review, and patient satisfaction with services provided. Ultrasound staff who work in the diagnostic area of the radiology department had never been expected to perform any procedures. This was the only location within the department where ultrasound services were offered, and the only area biopsies would be able to be performed. We began training with a senior tech from the OR to show them the proper way to set up sterile trays and how to work around the trays. The ultrasound staff were then assigned to work with our IR team to set up trays and work around a sterile field. Each technologist needed to complete five procedures with no errors or breaking the integrity of the sterile field. We also arranged for the technologists to work with our IR nurses and coder to ensure the accuracy and proper completion of all pertinent information on the consent forms.

Measurement

The organization uses Deming's model for all performance improvement initiatives. In countries like Japan, nearly every manager has been trained in its use and it is a part of their overall management model.[10] Healthcare systems around the world and especially in the United States have adopted Lean Management Systems and the Deming Cycle is a key underlying component. The Deming Cycle consists of four stages that can repeat. The first is the "Plan," which begins initiating the change by understanding the current operations, and the root cause of the problems. The next step is "Do," which entails carrying out small scale experiments to test the hypothesis. Third is the "Check" stage, or testing the results of the experiments or pilots. Finally, is the "Act," or adjust to modify the experiments or pilots based on the results of the prior stage.[11]

The Plan, Do, Check, Act model has been in use for the last four years, so the staff is very familiar with it. The Check of this project will occur with coding reviews of appropriate documentation, and a peer review model of the procedures. We will look for accuracy of target, how many passes with the needle, appropriate tissue sample, and adverse patient events or complications. This will be new to the physicians as well as the technologists, so quality metrics on both sides will be used.

Results

Through this implementation, we were able to train 8 ultrasound technologists to perform invasive procedures that none had performed at BUMC. This was key to the success of the program, and their diligence and willingness to accept the challenge made this alternative solution work. We did identify that there were not many nephrologists who were willing to perform the biopsy procedures, and they

opted to still schedule them in the IR biopsy suite. The nephrologists who continued to perform renal biopsy were very successful and developed great relationships with the ultrasound staff assisting in their procedures. Outside of a couple initial documentation errors in the post op note for coding purposes, the transition was very successful.

Conclusion

Given the immediate need to change a long accepted practice, this department needed to shift their mindsets to focus on the services to the patients and not their internal feelings of having more work added. With strong leadership from the organization, department, and physicians an improved process for the delivery of this specific service will be a welcomed improvement. The staff is excited to be involved, and many of them expressed that they are looking forward to broadening their skill sets. A key aspect of this change is to continually focus on the organizational vision, and the importance of continuous improvement. Stagnation leads to complacency, which leads to safety concerns for patients. The first step in this implementation actually began in 2010 with new departmental leadership. The staff understands that there is an expectation that improvement is needed every day. Even with a high functioning department there is room for improvement. Once upon a time, this very tenured department had visions of just coming to work, doing their eight hours, and going home. Now, they are proving that it is never too late to improve skill sets, and re-energize their co-workers with a new focus on the vision of being the best place to give and receive safe, quality, and compassionate healthcare.

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QUESTIONS

Instructions: Choose the answer that is most correct. Note: Per a recent ARRT policy change, the number of post-test questions has been reduced from 20 to 8.

1. **What was an early action item that occurred with the implementation of the new process?**
   a. Hire additional sonographers
   b. Train sonographers in sterile technique
   c. Develop a complicated process for patient access
   d. Tell the doctors to go to a different location

2. **Which is not one of the pressures looked at during external analysis?**
   a. Mandate pressures
   b. Fashion pressures
   c. Tire pressures
   d. Hypercompetition pressures

3. **What type of tracking mechanism was used to monitor the progress of different steps while implementing the change?**
   a. Pressure Gauge
   b. Histogram
   c. Gant Chart
   d. Pie Chart

4. **Which is not a step in Kotter's eight stem model for change?**
   a. Empower action
   b. Communicate for buy-in
   c. Increase urgency
   d. Force staff to change

5. **How many procedures without error did each technologist need to complete during training?**
   a. 2
   b. 3
   c. 4
   d. 5

6. **What are the four steps of the PDCA cycle?**
   a. Plan, Duck, Cycle, Act
   b. Plan, Do, Check, Act
   c. Push, Dim, Check, Ace
   d. Plan, Do, Cut, Ace

7. **Win what state did this article take place?**
   a. Wisconsin
   b. Florida
   c. Texas
   d. Louisiana

8. **This change was related to a new process for performing renal biopsies.**
   a. True
   b. False

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The Secret Sauce

By Mark Lerner

For those of you who may not know, when I am not writing the "Workforce Planning" column for *Radiology Management* I'm working on my blog (www.parentshaveschoolchoicekidswin.com) that covers the charter school movement in Washington, DC. I create my articles most mornings during the work week between 5 AM and 6 AM.

It turns out that the nation's capital has one of this country's strongest charter school sectors. Almost 39,000 pupils attend one of these alternative educational institutions which enroll 44% of all students attending public school in the city in which I live. Many of the 62 charters on 114 campuses are academically high performing. Excitingly, some of them have even been able to successfully close the academic achievement gap; a feat traditional schools have rarely if ever been able to match. Some of my most popular posts for readers involve interviews I conduct with charter school leaders. I find many of these individuals fascinating in that their jobs inherently require knowledge of business skills. Charters are schools run independent of a central district administration and so heads of these facilities have wide ranging responsibilities including identifying buildings in which to operate, managing a budget, and the hiring and supervising of staff. Needless to say someone holding one of these positions does not work an eight hour day Monday through Friday.

It is common for administrators of well respected charters to be asked for their "Secret Sauce." People want to know how they have been able to do what others have not been able to attain. In my seven years of meeting these dynamic directors I can tell you the one constant refrain from all of them when this inquiry is made. They uniformly assert that the clandestine information being sought does not exist. Those I have talked to will attribute their triumph to a multitude of diverse factors such as the skill of the professionals working under them and the specific curriculum that has been adopted and refined over the years. I am consistently informed that there is absolutely no formula that can be followed to replicate their schools. If this was the case, I'm instructed, there would simply be many more really good schools.

The same is true when it comes to radiology management. There really is no secret sauce to excelling in your chosen vocation. Throughout my career I will modestly admit that I have been described as a well-regarded director. I've been in my current position for nine years and I held my last job for eight. This amount of tenure is becoming rare in our field. During these times the departments where I've been employed have been characterized by miniscule levels of employee turnover, exceedingly high levels of staff engagement, and rare adverse patient safety events. We always meet or exceed budget projections for volume and income after expenses.

So what is the magic recipe? I'm afraid that, as with the school leaders, a simple answer cannot be offered. The plain truth is that it takes a lot of effort to have a strong department. It means looking at how you practice your profession with a fresh, objective viewpoint essentially on a daily basis. It requires that when you are leaving the office and exhausted you must review the events that transpired while you were at work and figure out what you could have done better.

Radiology managers have so many areas of responsibility. Our bosses expect us, perhaps unrealistically, to be good at all of them. This, frankly, means that we have to constantly re-evaluate what we are spending our time accomplishing and how we are carrying out these activities. We have to attend continuing education meetings and continually network with others to learn best practices. In addition, radiology administrators should stay abreast of the current thinking in the field. Only with this level of focus and determination will we have others coming to us for answers as to how they can become great.

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MR Safety and The Kanal Method

By Wendy J. Stirnkorb, CRA, RT(R) (MR)

The credit earned from the Quick Credit™ test accompanying this article may be applied to the CRA operations management (OM) domain.

EXECUTIVE SUMMARY

- The Kanal Method is a scientific method of focusing and standardizing efforts in MR safety as it applies to each specific patient. Its value, along with the American Board of Magnetic Resonance Safety (ABMRS) and the Magnetic Resonance Safety Officer (MRSO), Magnetic Resonance Medical Director (MRMD), Magnetic Resonance Safety Expert (MRSE)™ board certifications, is demonstrated and in practice.
- People learn the Kanal Method in the MRSO/ MRMD/ MRSE courses. Such certification helps to ensure a standard knowledge base and competency among those overseeing departmental, organizational, and/or enterprise MR safety.
- As with all patient care activities, the team approach is necessary for best practices and for more positive patient outcomes. With this methodology, technologists, physicists, and physicians can improve best practices for their patients.

For years within the global MRI industry, it was understood that something more needed to be done to advance MR safety practices. The need manifested itself daily in patient delays, denials, and/or rescheduled patients. Hours were spent researching implants and devices. Adverse MRI safety events continued to rise. Exams were cancelled due to confusion about the ability to meet the many MR conditions, including those involving spatial magnetic gradients.

There was an awareness of why change was needed to improve MR safety practices. Unhappy patients, disengaged technologists, frustrated radiologists, and annoyed administrators were evidence that change was needed. Unhappy patients equated to abysmal patient satisfaction scores. Disengaged, frustrated, and annoyed staff and faculty linked to appalling employee engagement scores. These key performance indicators guide payments and reimbursements and should have been influencing, to a greater degree, how and where organizational dollars were spent to improve safety operations. With a few exceptions, the front line MRI technologist and the radiologist/MR medical director (the most experienced persons in MR safety at almost all MR sites) were missing from many conversations on what MRI safety practices were needed and how to allocate MR safety dollars—if any funds were made available at all. And still, adverse MRI safety events kept rising.

Many attempts to fix MR safety failings were cobbled together—our own "bubble gum and duct tape" MR safety solutions that were, in turn, superglued onto historical operational processes. Was this better than having no MRI safety processes? Probably. However, those practices seemed to have the operational feel of driving a car when one of the wheels was about to fall off. MRI departments were perpetually waiting for a sentinel MR safety event and hoping one didn't occur on their watch. That was then.

The Kanal Method: Background

Now, there's an alternative to the homebrew tactic that epitomized the way many learned and practiced MR safety. The Kanal Method, developed and taught by Dr. Emanuel Kanal, is a scientific method of focusing and standardizing efforts in MR safety. There is a new way of thinking, a different process for approaching MR safety in a way that is specifically patient centered, not device or implant centered. There is an algorithmic methodology for evaluating each potential risk to the patient, and it is very much

patient dependent. There is a process for dissecting the potential risks that do—or do not—apply to a given implant or device or clinical/research situation for that specific patient. This is a decision matrix that provides the MR technologist and the radiologist a tool to assess each potential risk independently of each other, and then arrive at a scientifically sound and even quantifiable assessment as to what the potential risks might be for safely scanning that individual patient. It defines and applies specific risk assessments to precisely which risks do—and do not—apply to the patient/implant/MR study in question, and dissects out the specific issues relating to static magnetic fields, static magnetic field gradients, radiofrequency transmitted power, temporal imaging gradient magnetic fields, gadolinium based contrast agents, etc and applies each to the presented clinical situation.

This is an actual method for determining how MRI personnel may safely image a specific patient with a given implanted medical device, on the particular MRI scanner in that facility, based on the acuity of the specific patient, allowing for a well informed risk versus benefits assessment. Like all algorithms, however, this one does nothing if it only exists hidden away in a policy and procedure manual. To be meaningful, it must be put into the hands of capable practitioners. So who are these magi, those who can wield these algorithms for improved patient safety and departmental efficiency? They are probably people already within the organization who simply need the opportunity to learn, have administrative support, and be trusted with the freedom to implement the process.

With this methodology, technologists, radiologists, and physicists can provide efficient, effective, and timelier patient services. They can do so with fewer delays, reduced implant and device research time, and they can minimize exam cancellations. All of which are key components to improved patient and provider satisfaction. All are factors which directly impact volumes and drive positive revenues. Metrics have been obtained from sites that calculated hours spent researching medically implanted devices to determine if patients could safely undergo MRI exams.

One such site, with 10 clinical magnets, performing annual total MRI volumes of 44,600 pre-Kanal Method training, spent 70 hours per week researching medically implanted devices. That same site was denying services to patients who had coronary stents, unsure their MR systems could meet the vendor stated spatial magnetic gradient conditions. Other patients were delayed for days or weeks while the conditions to safely image the patient implant were meticulously researched and confirmed, even if those criteria did not apply for the particular prescribed MR exam. This site had top box patient satisfactions scores for MRI of 32.4%, based on Press Ganey results. This means only roughly 32% of patients thought the performance of this MRI department was "excellent," "exceptional," or "very good." Equally dismal employee satisfaction and employee engagement results made for uncomfortable leadership meetings, staff meetings, and physician meetings. MRI leadership believed there had to be a better way and sought out learning how to improve the metrics of the department. They found the Kanal Method.

The site demonstrated some astonishing metrics post Kanal Method training. The 70 hours per week researching the safety of medically implanted devices was reduced by applying the Kanal Method decision matrix algorithm, to 24 hours per week (from almost 2 FTE to 0.6), freeing those highly paid lead techs to focus on hands-on patient care and leadership development. The annual volumes increased by 32%, from 44,600 to 58,872 MRI exams the first year following the initial Kanal Method training. This was attributed to fewer denials based on critical thinking skills of the Magnetic Resonance Safety Officer's (MRSOs) use of the decision matrix taught during the course and less cold table time since fewer patients were being delayed or denied services. These practices, in conjunction with fewer delays and denials, begin to manifest in higher patient satisfaction scores for the MRI department. In a 9 month period, the top box scores improved 32 percentile points. Remarkably, the employee satisfaction scores improved, as well, moving 2.02 points from an overall 2.65 to 4.67 in that same 9 month period.

As the other front line technologists began to adopt the Kanal Method way of critically thinking through each specific patient case, relationships with radiologists also improved. As the technologists became more confident and knowledgeable in discussing safe scanning conditions, physicians began engaging more with the technologists and this trust relationship developed into a better patient care continuum.

MRMD, MRSO, and MRSE MR Safety Certified™ (MRSC™)

In the past few years, the MR industry has witnessed a major advance in MR safety initiatives: the formation of the American Board of Magnetic Resonance Safety (ABMRS), whose sole purpose is to certify and credential those professionals charged with maintaining safety in the MR environment. These are the Magnetic Resonance Medical Director (MRMD), the MRSO, and the Magnetic Resonance Safety Expert (MRSE), as described in the recently released "Recommended responsibilities for management of magnetic resonance safety."[1] The responsibilities of each member of the MR safety team are clearly defined in the international consensus document noted above. Each role has a defined set of expectations and realms of responsibility, established either by law, licensure, contract, or agreement/delegation within a specific organization.

MR Medical Director (MRMD)/MR Research Director (MRRD)

The MRMD/MRRD is the person that is ultimately responsible for the safety of the

patient and/or research subject undergoing MR procedures. The MRMD/ MRRD is responsible for the patient even if they are not within the MRI suite at the time of imaging. As such, the MRMD/MRRD should plan to be readily available to the MR technologists whenever MR imaging is occurring. The MRMD/MRRD should assure that at least one MRSO is designated and available/responsible for each MR system (one MRSO can reasonably oversee more than one MR system; sites with multiple scanners in different buildings/ locations should consider more than one MRSO). The MRMD/MRRD should also review and provide input for all MR specific policies and procedures pertaining to the safe operation of MR services and assure all MR safety and QA programs are reviewed periodically.

MR Safety Officer (MRSO)

The Magnetic Resonance Safety Officer (MRSO) credential is designed for those with a senior MR safety role at the point of patient care. The role of MRSO is often carried out by the senior MR technologist, but other suitably trained individuals could also fill this role. Multiple MRSOs could be appointed, provided only one is in charge at a given time. His/her responsibilities would include being readily accessible and available to the MR technologists whenever MR imaging is occurring; developing written safety procedures, operating instructions, and emergency procedures for review and acceptance by the MRMD/ MRRD; assuring the established MR policies and procedures are followed during daily operations; and developing MR safety education and training for medical, technical, nursing, and ancillary staff that may enter the MR environment. The MRSO should also report to the MRMD/ MRRD and imaging leadership any MR safety related issues. Imaging leadership should also consider the counsel of the MRSO during the capital equipment decision process to assure any MR vendor specific conditions are noted, written into procedure, and implemented.

MR Safety Expert (MRSE)

The Magnetic Resonance Safety Expert (MRSE) credential is designed for those in an expert, technical consulting role who may help determine the safety of complex conditions that may be beyond the ken of an MRMD and/or MRSO. While not exclusive to MR medical physicists, this role is most frequently filled by a medical physicist. This role is expected to serve as a resource for the MRMD/ MRRD and/or MRSO. The MRSE would not normally have medical education and training and, hence, would neither be expected nor required to have any expertise regarding the safety of prescription medications or other non-MR medical procedures. It is understood that there may not be a sufficient number of individuals with the necessary qualifications to provide for the physical presence of an MRSE at each MR facility, and it may also not be necessary to have an MRSE at each site. Thus, the requirement is for ready access to the services and advisory assistance of an MRSE on an as-needed basis. The MRSE roles include, but are not limited to providing high level advice on the engineering and scientific aspects of MR safety as it applies to a specific MR unit, provide safety advice regarding acceptance testing after a new installation or upgrade, and be an advisor for the safe implementation of MR protocols, especially those involving MR imaging of medically implanted devices.

With these criteria becoming international industry standards, there are individuals making the decisions to invest in themselves and organizations choosing to invest in their employees, truly putting patient safety first. Globally, several thousand technologists, radiologists, and physicists have already attended one of the MRMD / MRSO / MRSE safety courses. Still others are clamoring for budgetary dollars from their administrators to attend future sessions. The sessions are intense, focused, practical, and energizing. Attendees from each of the three areas of specialty learn their roles in MR safety, often surprised by just how robust that role can be in the patient care continuum. These people leave the course with a transformed MR safety mindset, a changed perspective on, and confidence in, safe patient care, and a renewed passion for their chosen field.

Applying this knowledge to clinical and research MR settings can immediately improve how service and care is provided to MR patients/research subjects.

The Value of ABMRS Certification

People learn the Kanal Method in the MRSO/ MRMD/ MRSE courses. If they wish, they may also sit for the ABMRS board certification exam. Course attendance is not a prerequisite for sitting for the exam. If they demonstrate the knowledge to pass the exam, they then earn the board certification of "MR Safety Certified" from the American Board of Magnetic Resonance Safety. Many attendees of the MRMD/MRSO courses have attempted to earn the appropriate ABMRS MRSO, MRSE, or MRMD MRSC™ certifications. This challenging board certification (overall pass rate in 2015 for roughly 350 examinees was 71%) demonstrates a deeper MR safety understanding, a recognition of a different way of thinking about MRI safety and how this new knowledge can be applied to patient care. Applying this knowledge to clinical and research MR settings can immediately improve how service and care is provided to MR patients/research subjects. They have earned this credential by applying basic science and MR safety knowledge in conjunction with the algorithms defined in the Kanal Method. Such certification helps to ensure a standard knowledge base and competency among those overseeing departmental, organizational, and/or enterprise MR safety.

The combination of formal MR safety certification together with the ability to apply the methodology provides

the industry with a scientifically based standard by which to assess and quantify patient MR-related risk together with a standard approach to determine by whom that patient care is to be provided. As with all patient care activities, the team approach is necessary for best practices and for more positive patient outcomes.

Results

Technologists, physicists, and physicians can improve best practices for their patients. They can improve patient care, streamline workflow, and increase overall MR safety for their patients and coworkers. By applying the Kanal Method, MR professionals can make a positive fiscal impact for their organizations through increased volumes from providing services to previously denied patients and by improving patient satisfaction scores due to happier patients being seen on time with fewer delays. This, in turn, elevates employee engagement scores because the technologists and radiologists are confidently working together as a team. They can effectively influence patient engagement daily. They make a greater difference because they can, armed with the knowledge to confidently say "yes, we can safely scan this patient" allowing the organization to provide better, safer patient care in a logical, quantifiable, and consistent manner.

This paradigm shift in MR safety thinking elevates how MR technologists, radiologists, and physicists provide services to patients. Earning the MRSO, MRMD or MRSE MRSC™ board certification is crucial in that there is now a bar of MR safety knowledge that is demonstrated by obtaining this credential.

The elite MRI professionals who have earned these credentials have an objective measure of their knowledge. Each can implement safe MR patient care practices with relative assurance. They have the confidence, based on their demonstrated knowledge, to be an active patient care partner to ordering providers, radiologists, and nursing teammates.

The MRSC™ board certified MRSOs, MRMDs and MRSEs are the most valuable tools an organization can have to manage the risks and more successfully promote safe patient care in the unique MR environment. These MR safety-certified professionals can confidently, logically, efficiently, and safely provide access to diagnostic MR imaging services to patients in a timely fashion, with skill and empathy, and can do so with meticulous patient focus.

Conclusion

Patient care must be patient specific. People have physical, emotional, medical, and social needs and those needs are unique to each patient. One of the most valuable lessons learned in applying the Kanal Method is that the clarity of decision making for each specific patient is focused and sharpened even when device labeling and standards are less-than-helpful. This concept is reinforced by reminding technologists and radiologists that, while we may be concerned about a specific implant, we are attempting to safely image and best meet the needs of this one specific person. As the Kanal Method teaches, it is easy to say "no" to performing an MR exam on a patient out of fear or uncertainty, but it takes knowledge, critical analysis skills, and confidence to say "yes." By learning and implementing this compassionate care model and applying the Kanal Method, technologists and radiologists say "yes" with much greater frequency and confidence and with far better patient—and system—outcomes.

This Kanal Method training is firmly based in science and purposefully puts the needs of the patient first. The ABMRS certification provides others with the confidence in entrusting the safety of their patients to us, knowing that we have demonstrated a unique level of knowledge and set of reasoning skills specific to the unique MR environment, building trust with patients and physician referrers. That is the value of the Kanal Method, the ABMRS and the MRSO, MRMD, MRSE MRSC™ board certifications.

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[1]"Recommended responsibilities for management of Magnetic Resonance safety." *OSHwiki*. 23 Oct 2015, 07:05 UTC. Available at: http://oshwiki.eu/index.php?title=Recommended_responsibilities_for_management_of_Magnetic_Resonance_safety&oldid=245505. Accessed March 16, 2016.

[2]American Board of Magnetic Resonance Safety. Available at: http://www.abmrs.org/. Accessed June 14, 2016.

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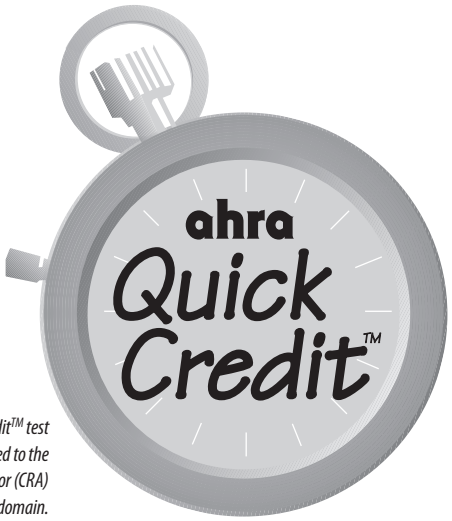

The credit earned from the Quick Credit™ test accompanying this article may be applied to the AHRA certified radiology administrator (CRA) operations management (OM) domain.

QUESTIONS

Instructions: Choose the answer that is most correct. Note: Per a recent ARRT policy change, the number of post-test questions has been reduced from 20 to 8.

1. **The Kanal Method is the scientific method of focusing and standardizing efforts in MR safety as it applies to what?**
   a. MRI scanners
   b. Protocols
   c. Infection Prevention
   d. Each specific patient

2. **The sole purpose of the American Board of Magnetic Resonance Safety is to certify and credential those professionals charged with maintaining safety in the MR environment.**
   a. True
   b. False

3. **Who is ultimately responsible for the safety of the patient or research subject undergoing MR procedures?**
   a. The performing MR technologist
   b. The patient's ordering provider
   c. The organization getting paid for the exam
   d. The MR medical director / MR research director

4. **The role of the MRSO is most often carried out by whom?**
   a. The radiologist
   b. Any MR technologist
   c. The ED charge nurse
   d. The senior MR technologist

5. **According to the article, the counsel of the MRSO should be considered by imaging leadership during which process?**
   a. Hiring of new technologists
   b. Capital equipment decision process
   c. Budgetary planning
   d. Physician relations

6. **According to the article, the MRSE resource will most frequently be filled by?**
   a. The MR radiologist
   b. The senior MR technologist
   c. The MR medical physicist
   d. The imaging administrator

7. **For the 2015 calendar year, what was the pass rate for the ABMRS board certification for all roles combined?**
   a. 25%
   b. 42%
   c. 71%
   d. 88%

8. **The MRMD, MRSO, and MRSE board certification credentials demonstrate what, according to the article?**
   a. A standard bar of MR Safety knowledge
   b. MR specific credentials
   c. Basic MR scanning skills
   d. Improved Patient satisfaction scores

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Watch Out for the Curve Balls

By Melody W. Mulaik, MSHS, CRA, FAHRA, RCC, CPC, CPC-H

With the exception of certain preventive services, Medicare coverage is statutorily limited to items and services that are reasonable and necessary for the diagnosis or treatment of an illness or injury and within the scope of a Medicare benefit category. National Coverage Determinations (NCDs) are made through an evidence-based process, with opportunities for public participation. In some cases, CMS' own research is supplemented by an outside technology assessment and/or consultation with the Medicare Evidence Development & Coverage Advisory Committee (MEDCAC).

The NCDs are found in the Medicare National Coverage Determinations Manual. Individual NCDs can be located by using the Medicare Coverage Database search function:

http://www.cms.gov/medicare-coverage-database/

There are NCDs for many different types of imaging services, including:

- Bone mineral density studies
- Computed tomography
- Magnetic resonance imaging
- Magnetic resonance angiography
- Mammograms
- Non-invasive tests for cardiac function
- Nuclear radiology procedures
- Positron emission tomography
- Single photon emission computed tomography
- Ultrasound diagnostic procedures

In the absence of a national coverage policy, an item or service may be covered at the discretion of the Medicare contractor, based on a Local Coverage Determination (LCD). Medical necessity and ICD-10-CM coding updates come in a variety of forms including updates to the LCDs and NCDs.

On May 13, 2016, CMS released Transmittal 1665 which contained updates to the covered diagnosis codes for 12 NCDs.[1] As with previous NCD code updates, the Transmittal addresses only coding changes, not coverage changes. CMS has instructed the contractors not to make mass adjustments to these claims, but to adjust any claims that are brought to their attention.

The Transmittal includes changes to both ICD-9-CM and ICD-10-CM codes. It states that certain ICD-9-CM codes that were covered prior to ICD-10 implementation may no longer be considered acceptable, either because the mapping from ICD-9 to ICD-10 is not one-to-one, or because Medicare Administrative Contractors have discretion regarding coverage of a particular service.

Diagnostic Mammograms

The biggest change is for diagnostic mammograms and is retroactive to October 1, 2015. CMS removed more than 20 nonspecific diagnosis codes from the covered list for diagnostic mammograms. Examples include code N60.09 *(Solitary cyst of unspecified breast)* and C50.019 *(Malignant neoplasm of nipple and areola, unspecified female breast)*. Table 1 contains all of the ICD-10-CM codes that are now covered for diagnostic mammograms.

Percutaneous Transluminal Angioplasty

In order to correct problems related to hospital payment for inpatient services, CMS removed a number of different ICD-10-PCS procedure codes from this NCD. CMS also removed diagnosis codes and modifiers for clinical trial services (eg, Z00.6), although providers are still required to report them when applicable. Finally, CMS added a number of diagnosis codes for PTA and stenting of the intracranial arteries. The Transmittal states that PTA with or without stenting to treat obstructive lesions of the vertebral or cerebral arteries is noncovered regardless of the indication. Furthermore, PTA without stenting is noncovered except for the specific indications listed in the NCD. However, contractors may make coverage decisions regarding any types of PTA with stenting that are not specifically covered by the NCD.

Colorectal Cancer Screening

A large number (43) of covered ICD-10-CM codes have been added for high risk screening colonoscopy (G0105) and screening barium enema (G0120).

TABLE 1. Covered ICD-10-CM Diagnosis Codes for Diagnostic Mammograms NCD 220.4

Code	Description
C43.52	Malignant melanoma of skin of breast
C43.59	Malignant melanoma of other part of trunk
D03.52	Melanoma in situ of breast (skin) (soft tissue)
D03.59	Melanoma in situ of other part of trunk
C44.501	Unspecified malignant neoplasm of skin of breast
C44.509	Unspecified malignant neoplasm of skin of other part of trunk
C44.511	Basal cell carcinoma of skin of breast
C44.519	Basal cell carcinoma of skin of other part of trunk
C44.521	Squamous cell carcinoma of skin of breast
C44.529	Squamous cell carcinoma of skin of other part of trunk
C44.591	Other specified malignant neoplasm of skin of breast
C44.599	Other specified malignant neoplasm of skin of other part of trunk
C50.011	Malignant neoplasm of nipple and areola, right female breast
C50.012	Malignant neoplasm of nipple and areola, left female breast
C50.111	Malignant neoplasm of central portion of right female breast
C50.112	Malignant neoplasm of central portion of left female breast
C50.211	Malignant neoplasm of upper-inner quadrant of right female breast
C50.212	Malignant neoplasm of upper-inner quadrant of left female breast
C50.311	Malignant neoplasm of lower-inner quadrant of right female breast
C50.312	Malignant neoplasm of lower-inner quadrant of left female breast
C50.411	Malignant neoplasm of upper-outer quadrant of right female breast
C50.412	Malignant neoplasm of upper-outer quadrant of left female breast
C50.511	Malignant neoplasm of lower-outer quadrant of right female breast
C50.512	Malignant neoplasm of lower-outer quadrant of left female breast
C50.611	Malignant neoplasm of axillary tail of right female breast
C50.612	Malignant neoplasm of axillary tail of left female breast
C50.811	Malignant neoplasm of overlapping sites of right female breast
C50.812	Malignant neoplasm of overlapping sites of left female breast
C50.911	Malignant neoplasm of unspecified site of right female breast
C50.912	Malignant neoplasm of unspecified site of left female breast
C50.021	Malignant neoplasm of nipple and areola, right male breast
C50.022	Malignant neoplasm of nipple and areola, left male breast
C50.121	Malignant neoplasm of central portion of right male breast
C50.122	Malignant neoplasm of central portion of left male breast
C50.221	Malignant neoplasm of upper-inner quadrant of right male breast
C50.222	Malignant neoplasm of upper-inner quadrant of left male breast
C50.321	Malignant neoplasm of lower-inner quadrant of right male breast

(*continued*)

TABLE 1. Covered ICD-10-CM Diagnosis Codes for Diagnostic Mammograms NCD 220.4 (*Continued*)

Code	Description
C50.322	Malignant neoplasm of lower-inner quadrant of left male breast
C50.421	Malignant neoplasm of upper-outer quadrant of right male breast
C50.422	Malignant neoplasm of upper-outer quadrant of left male breast
C50.521	Malignant neoplasm of lower-outer quadrant of right male breast
C50.522	Malignant neoplasm of lower-outer quadrant of left male breast
C50.621	Malignant neoplasm of axillary tail of right male breast
C50.622	Malignant neoplasm of axillary tail of left male breast
C50.821	Malignant neoplasm of overlapping sites of right male breast
C50.822	Malignant neoplasm of overlapping sites of left male breast
C50.921	Malignant neoplasm of unspecified site of right male breast
C50.922	Malignant neoplasm of unspecified site of left male breast
C56.1	Malignant neoplasm of right ovary
C56.2	Malignant neoplasm of left ovary
C77.3	Secondary and unspecified malignant neoplasm of axilla and upper limb lymph nodes
C78.01	Secondary malignant neoplasm of right lung
C78.02	Secondary malignant neoplasm of left lung
C78.1	Secondary malignant neoplasm of mediastinum
C78.2	Secondary malignant neoplasm of pleura
C78.7	Secondary malignant neoplasm of liver and intrahepatic bile duct
C79.2	Secondary malignant neoplasm of skin
C79.31	Secondary malignant neoplasm of brain
C79.32	Secondary malignant neoplasm of cerebral meninges
C79.40	Secondary malignant neoplasm of unspecified part of nervous system
C79.49	Secondary malignant neoplasm of other parts of nervous system
C79.51	Secondary malignant neoplasm of bone
C79.52	Secondary malignant neoplasm of bone marrow
C79.61	Secondary malignant neoplasm of right ovary
C79.62	Secondary malignant neoplasm of left ovary
C79.81	Secondary malignant neoplasm of breast
C80.0	Disseminated malignant neoplasm, unspecified
C45.9	Mesothelioma, unspecified
C80.1	Malignant (primary) neoplasm, unspecified
D22.5	Melanocytic nevi of trunk
D23.5	Other benign neoplasm of skin of trunk
D24.1	Benign neoplasm of right breast
D24.2	Benign neoplasm of left breast

TABLE 1. Covered ICD-10-CM Diagnosis Codes for Diagnostic Mammograms NCD 220.4

Code	Description
D04.5	Carcinoma in situ of skin of trunk
D05.01	Lobular carcinoma in situ of right breast
D05.02	Lobular carcinoma in situ of left breast
D05.11	Intraductal carcinoma in situ of right breast
D05.12	Intraductal carcinoma in situ of left breast
D05.81	Other specified type of carcinoma in situ of right breast
D05.82	Other specified type of carcinoma in situ of left breast
D05.91	Unspecified type of carcinoma in situ of right breast
D05.92	Unspecified type of carcinoma in situ of left breast
D48.5	Neoplasm of uncertain behavior of skin
D48.61	Neoplasm of uncertain behavior of right breast
D48.62	Neoplasm of uncertain behavior of left breast
D49.1	Neoplasm of unspecified behavior of respiratory system
D49.2	Neoplasm of unspecified behavior of bone, soft tissue, and skin
D49.3	Neoplasm of unspecified behavior of breast
D49.6	Neoplasm of unspecified behavior of brain
D49.7	Neoplasm of unspecified behavior of endocrine glands and other parts of nervous system
I80.8	Phlebitis and thrombophlebitis of other sites
N60.01	Solitary cyst of right breast
N60.02	Solitary cyst of left breast
N60.11	Diffuse cystic mastopathy of right breast
N60.12	Diffuse cystic mastopathy of left breast
N60.21	Fibroadenosis of right breast
N60.22	Fibroadenosis of left breast
N60.31	Fibrosclerosis of right breast
N60.32	Fibrosclerosis of left breast
N60.41	Mammary duct ectasia of right breast
N60.42	Mammary duct ectasia of left breast
N60.81	Other benign mammary dysplasias of right breast
N60.82	Other benign mammary dysplasias of left breast
N60.91	Unspecified benign mammary dysplasia of right breast
N60.92	Unspecified benign mammary dysplasia of left breast
N61	Inflammatory disorders of breast
N62	Hypertrophy of breast
N64.0	Fissure and fistula of nipple
N64.1	Fat necrosis of breast

(*continued*)

TABLE 1. Covered ICD-10-CM Diagnosis Codes for Diagnostic Mammograms NCD 220.4 (*Continued*)

Code	Description
N64.2	Atrophy of breast
N64.89	Other specified disorders of breast
N64.3	Galactorrhea not associated with childbirth
N64.4	Mastodynia
N63	Unspecified lump in breast
N64.51	Induration of breast
N64.52	Nipple discharge
N64.53	Retraction of nipple
N64.59	Other signs and symptoms in breast
N64.81	Ptosis of breast
N64.82	Hypoplasia of breast
N64.89	Other specified disorders of breast
N64.89	Other specified disorders of breast
N64.9	Disorder of breast, unspecified
N65.0	Deformity of reconstructed breast
N65.1	Disproportion of reconstructed breast
M79.5	Residual foreign body in soft tissue
M70.90	Unspecified soft tissue disorder related to use, overuse and pressure of unspecified site
M70.98	Unspecified soft tissue disorder related to use, overuse and pressure other
M70.99	Unspecified soft tissue disorder related to use, overuse and pressure multiple sites
M79.9	Soft tissue disorder, unspecified
M70.98	Unspecified soft tissue disorder related to use, overuse and pressure other
M79.81	Nontraumatic hematoma of soft tissue
M70.80	Other soft tissue disorders related to use, overuse and pressure of unspecified site
M70.88	Other soft tissue disorders related to use, overuse and pressure other site
M70.89	Other soft tissue disorders related to use, overuse and pressure multiple sites
M79.89	Other specified soft tissue disorders
R59.0	Localized enlarged lymph nodes
R59.1	Generalized enlarged lymph nodes
R59.9	Enlarged lymph nodes, unspecified
R92.8	Other abnormal and inconclusive findings on diagnostic imaging of breast
R92.0	Mammographic microcalcification found on diagnostic imaging of breast
R92.2	Inconclusive mammogram
R92.1	Mammographic calcification found on diagnostic imaging of breast
R92.8	Other abnormal and inconclusive findings on diagnostic imaging of breast
R93.9	Diagnostic imaging inconclusive due to excess body fat of patient

TABLE 1. Covered ICD-10-CM Diagnosis Codes for Diagnostic Mammograms NCD 220.4

Code	Description
S21.001A	Unspecified open wound of right breast, initial encounter
S21.002A	Unspecified open wound of left breast, initial encounter
S21.011A	Laceration without foreign body of right breast, initial encounter
S21.012A	Laceration without foreign body of left breast, initial encounter
S21.031A	Puncture wound without foreign body of right breast, initial encounter
S21.032A	Puncture wound without foreign body of left breast, initial encounter
S21.051A	Open bite of right breast, initial encounter
S21.052A	Open bite of left breast, initial encounter
S28.211A	Complete traumatic amputation of right breast, initial encounter
S28.212A	Complete traumatic amputation of left breast, initial encounter
S28.221A	Partial traumatic amputation of right breast, initial encounter
S28.222A	Partial traumatic amputation of left breast, initial encounter
S21.021A	Laceration with foreign body of right breast, initial encounter
S21.022A	Laceration with foreign body of left breast, initial encounter
S21.041A	Puncture wound with foreign body of right breast, initial encounter
S21.042A	Puncture wound with foreign body of left breast, initial encounter
S20.01xA	Contusion of right breast, initial encounter
S20.02xA	Contusion of left breast, initial encounter
S29.001A	Unspecified injury of muscle and tendon of front wall of thorax, initial encounter
S29.009A	Unspecified injury of muscle and tendon of unspecified wall of thorax, initial encounter
S29.091A	Other injury of muscle and tendon of front wall of thorax, initial encounter
S29.099A	Other injury of muscle and tendon of unspecified wall of thorax, initial encounter
S29.8xxA	Other specified injuries of thorax, initial encounter
S29.9xxA	Unspecified injury of thorax, initial encounter
S39.001A	Unspecified injury of muscle, fascia and tendon of abdomen, initial encounter
S39.091A	Other injury of muscle, fascia and tendon of abdomen, initial encounter
S39.81xA	Other specified injuries of abdomen, initial encounter
S39.91xA	Unspecified injury of abdomen, initial encounter
T85.41xA	Breakdown (mechanical) of breast prosthesis and implant, initial encounter
T85.42xA	Displacement of breast prosthesis and implant, initial encounter
T85.43xA	Leakage of breast prosthesis and implant, initial encounter
T85.44xA	Capsular contracture of breast implant, initial encounter
T85.49xA	Other mechanical complication of breast prosthesis and implant, initial encounter
T85.79xA	Infection and inflammatory reaction due to other internal prosthetic devices, implants and grafts, initial encounter
Z85.3	Personal history of malignant neoplasm of breast

(*continued*)

TABLE 1. Covered ICD-10-CM Diagnosis Codes for Diagnostic Mammograms NCD 220.4 (*Continued*)

Code	Description
Z85.831	Personal history of malignant neoplasm of soft tissue
Z85.89	Personal history of malignant neoplasm of other organs and systems
Z77.123	Contact with and (suspected) exposure to radon and other naturally occuring radiation
Z77.128	Contact with and (suspected) exposure to other hazards in the physical environment
Z77.9	Other contact with and (suspected) exposures hazardous to health
Z91.89	Other specified personal risk factors, not elsewhere classified
Z92.89	Personal history of other medical treatment
Z98.82	Breast implant status
Z98.86	Personal history of breast implant removal
Z08	Encounter for follow-up examination after completed treatment for malignant neoplasm
Z08	Encounter for follow-up examination after completed treatment for malignant neoplasm
Z03.89	Encounter for observation for other suspected diseases and conditions ruled out

Summary

These changes represent the beginning of the updates and new coding and coverage changes that will occur. Next, you should see lots of LCD changes coupled with, or followed by, commercial payor policy changes. It is critical that you review the changes so that you do everything possible to minimize denials and ensure you're receiving appropriate reimbursement.

The journey to ensure correct coding, compliance, and reimbursement continues . . .

Reference

[1]Centers for Medicare & Medicaid Services (CMS). CMS Manual System Pub 100-20 One-Time Notification. May 13, 2016. Available at: https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/Downloads/R1665OTN.pdf. Accessed June 8, 2016.

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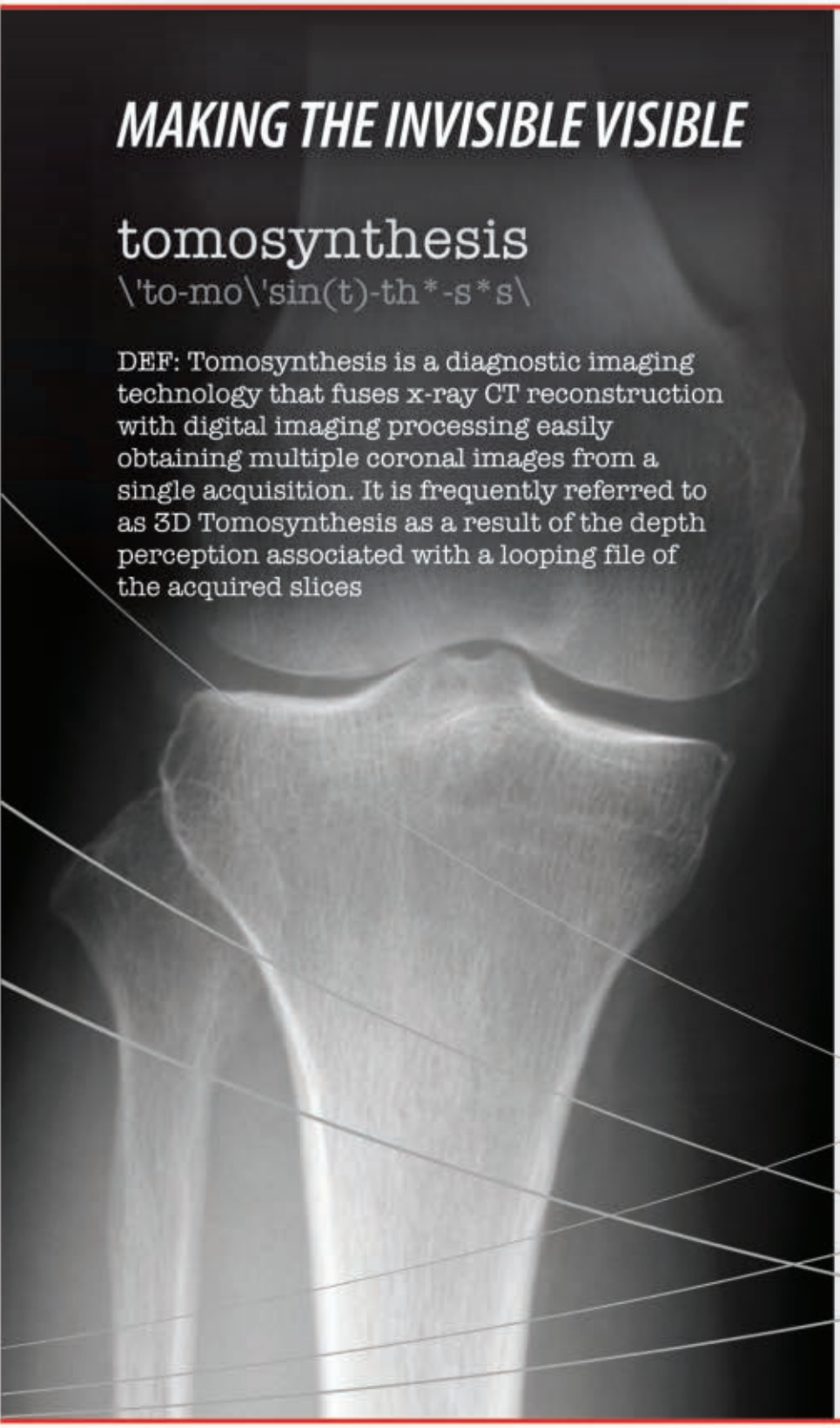

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ICD-10: FY 2017 Changes

By Melody W. Mulaik, MSHS, CRA, FAHRA, RCC, CPC, CPC-H

In March of this year the National Center for Health Statistics released a listing of new, revised, and deleted ICD-10-CM diagnosis codes for Fiscal Year 2017, which begins October 1, 2016. This is not a complete list, because some code change proposals were still open for public comment at the time it was released. However, it includes nearly 2,000 new codes. The official 2017 ICD-10-CM Addenda and Guidelines are posted at the following location on the NCHS website:

http://www.cdc.gov/nchs/icd/icd10cm.htm

This is not a complete list and does not reflect any changes to the ICD-10-CM Index or Guidelines as of the writing of this column.

Neoplasms

New codes have been created in subcategory C49.A- for gastrointestinal stromal tumor (GIST) and in subcategory D49.5- for neoplasm of unspecified behavior of specific genitourinary organs such as the kidneys. Additionally, a new code (D47.Z2) has been created for Castleman disease, a type of lymphoproliferative disorder.

In category C81 *(Hodgkin lymphoma)*, the term "classical" has been deleted from the code definitions to be consistent with current usage.

The code for elevation of prostate specific antigen (PSA) has been replaced with two new codes for elevated PSA (R97.20) and "Rising PSA following treatment for malignant neoplasm of prostate" (R97.21). Also, two new codes have been created for "Hormone sensitive malignancy status" (Z19.1) and "Hormone resistant malignancy status" (Z19.2). These codes will be reported in addition to the neoplasm code to indicate whether the cancer responds to hormone therapy.

Endocrine

Numerous diabetes codes have been revised and expanded to provide additional information about proliferative diabetic retinopathy and diabetic macular edema. Also, a new code (Z79.84) has been established for long-term use of oral hypoglycemic drugs.

Cardiovascular

New codes have been created for hypertensive urgency (I16.0), hypertensive emergency (I16.1), and unspecified hypertensive crisis (I16.9).

Codes have been added to category I63 *(Cerebral infarction)* for infarction due to occlusion of bilateral precerebral or cerebral arteries.

The codes for subarachnoid hemorrhage involving the right, left, and unspecified anterior communicating artery (I60.20-I60.22) have been deleted since the anterior communicating artery is not a paired vessel. There is now a single code (I60.2) for nontraumatic subarachnoid hemorrhage from the anterior communicating artery.

Codes for several types of precerebral and peripheral artery aneurysm and dissection have been added to category I72 *(Other aneurysm)* and subcategory I77.7- *(Other arterial dissection)*.

Respiratory

Subcategory J98.5- *(Diseases of mediastinum, not elsewhere classified)* has been expanded to include a specific code for mediastinitis (J98.51).

Gastrointestinal

Category K85 *(Acute pancreatitis)* has been expanded to indicate the specific type of acute pancreatitis, such as biliary or alcohol-induced, and whether there is necrosis or infection.

Subcategory K55.0- *(Acute vascular disorders of intestine)* will be expanded to include specific and detailed codes for various types of intestinal ischemia and infarction.

New codes have been established for:

- Necrotizing enterocolitis outside of the neonatal period (K55.3-)
- Irritable bowel syndrome with constipation (K58.1) and other irritable bowel syndrome (K58.8)
- Drug-induced constipation (K59.03) and chronic idiopathic constipation (K59.04)
- Exocrine pancreatic insufficiency (K86.81)
- Microscopic colitis (K52.83-)
- Indeterminate colitis (K52.3)

- Toxic megacolon (K59.31) and other megacolon (K59.39)

Musculoskeletal

The codes for disc disorders in the mid-cervical region have been expanded to identify the specific level affected. For example, it is now possible to indicate that a patient has disc degeneration at C4-C5 (M50.321) rather than C5-C6 (M50.322).

Periprosthetic fractures are currently classified as mechanical complications (subcategory T84.0-) but are being reclassified to the musculoskeletal section of ICD-10-CM (category M97) since they result from trauma or bone disease rather than a problem with the prosthesis. The new codes will require a 7th character for the encounter.

There are numerous new codes in subcategory M84.75- for atypical femoral fractures. These are fractures of the proximal femur, other than the femoral neck or intertrochanteric area, which are not spiral or comminuted, show no evidence of bone malignancy, and are not periprosthetic. Atypical femur fractures have been linked to use of bisphosphonates for osteoporosis.

There are numerous revisions to subcategory M26.6- *(Temporomandibular joint disorders)* to reflect laterality.

New codes have been established in subcategory M21.6- for bunion and bunionette. Additionally, there are new codes (M25.541-M25.549) for pain in the joints of the hands.

Genitourinary

Code N10 *(Acute tubulo-interstitial nephritis)* has been renamed to "Acute pyelonephritis," and category N40 *(Enlarged prostate)* has been renamed to "Benign prostatic hyperplasia." These changes are being made to reflect the terminology commonly used in the United States.

Category R93 *(Abnormal findings on diagnostic imaging of other body structures)* has been expanded to include codes for abnormal findings involving specific parts of the urinary system.

Subcategory N99.11 *(Postprocedural urethral stricture, male)* has been revised and expanded to describe the specific area involved.

New codes have been added for:

- Testicular pain (N50.81-), scrotal pain (N50.82), and chronic bladder pain (R39.82)
- Hydronephrosis with ureteropelvic junction obstruction (N13.0)
- Bacteriuria (R82.72) and other abnormal microbiological findings in urine (R82.79)
- Voiding difficulties (R39.19-), such as the need to immediately re-void
- Specific types of dysplasia of the prostate (N42.3-)
- Asymptomatic microhematuria (R31.21) and other microscopic hematuria (R31.29)
- Erectile dysfunction following radiation therapy and other treatments (N52.3-)
- Pre-pubertal vaginal bleeding (N93.1)

The code for inflammatory disorders of the breast (N61) has been expanded to include codes for mastitis without abscess (N61.0) and abscess of breast and nipple (N61.1).

Numerous codes in category N83 *(Noninflammatory disorders of ovary, fallopian tube and broad ligament)* have been deleted and replaced with specific codes for laterality. For example, there is now a specific code for a corpus lutum cyst of the left ovary (N83.12).

Obstetrics

The ectopic pregnancy codes in category O00 have been expanded to include codes for simultaneous intrauterine and ectopic pregnancy.

Category O44 *(Placenta previa)* has been revised and expanded to include specific codes for complete placenta previa, partial placenta previa, and low-lying placenta. The default code assignment for placenta previa will change from "with hemorrhage" to "without hemorrhage."

New codes have been added to hypertension categories O11-O16 to identify hypertension and pre-eclampsia complicating childbirth and the puerperium.

Code O33.7 *(Maternal care for disproportion due to other fetal deformities)* now requires a 7th character for the fetus.

New codes have been added to subcategory O24.4 *(Gestational diabetes mellitus)* to indicate that the patient's blood sugar is controlled by oral hypoglycemic drugs.

The code for scar from previous cesarean delivery (O34.21) has been expanded to indicate whether the scar is low transverse (O34.211), vertical (O34.212), or unspecified (O34.219). Additionally, a new code has been created for history of uterine scar from previous surgery in a patient who is not currently pregnant (Z98.891).

Code O70.2 *(Third degree perineal laceration during delivery)* has been expanded to include specific codes for grade IIIa, IIIb, and IIIc lacerations.

Two new codes (Z31.7 and Z33.3) have been established for services provided to a gestational carrier, who is a woman carrying another woman's fetus.

Perinatal and Congenital

Two new codes have been created for newborns 2500 grams or over that are designated as light for gestational age (P05.09) or small for gestational age (P05.19).

New codes have been added for:

- Specific types of congenital vascular malformations, such as double aortic arch (Q25.45) and anomalous origin of the subclavian artery (Q25.48)
- Various types of congenital longitudinal vaginal septum (Q52.12-)

New codes have been established in category Z05 *(Encounter for observation of newborn for suspected diseases and conditions ruled out)* for infants seen for a perceived problem that is ruled out. At the same time, codes in categories P00-P04 *(Newborn affected by maternal factors and by complications of pregnancy, labor, and delivery)* have been revised to remove the words "(suspected to be)." For example, code P02.0, currently defined as "Newborn (suspected to be) affected by

placenta previa" has been revised to read "Newborn affected by placenta previa."

Neurologic

A series of new codes (R29.700-R29.742) has been created for reporting the patient's score on the NIH Stroke Scale (NIHSS), which reflects the severity of neurologic impairment from a stroke.

The codes in subcategory R40.24- for total Glasgow coma scale score have been expanded. These codes are used only when the patient's individual component scores have not been recorded. The codes for total coma score will now require a 7th character to indicate when the score was recorded (for example, in the field vs on arrival in the emergency department).

Injury

The codes for concussion with more than 30 minutes' loss of consciousness (LOC) have been deleted, since this represents a more severe form of traumatic brain injury rather than a concussion. There are now only three choices: Concussion without loss of consciousness (S06.0X0-), concussion with LOC 30 minutes or less (S06.0X1-); and concussion with LOC of unspecified duration (S06.0X9-).

The codes for certain head injuries have been expanded to reflect laterality, including fracture of the skull base (S02.1-), orbital floor (S02.3-), maxilla (S02.4-), mandible (S02.6-), and other skull and facial bones (S02.8-). Likewise, the codes for jaw dislocation (S03.0-) and sprain (S03.4-) have been expanded for laterality.

A new subcategory S92.81- *(Other fracture of foot)* has been created for fractures of the sesamoid bones and other unclassified foot bones.

New codes have been established for physeal fractures of the calcaneus (S99.0-), metatarsal (S99.1-), and phalanx of toe (S99.2-).

ICD-10-CM currently uses the terms "Salter-Harris" and "Salter Harris" inconsistently. To correct this problem, code descriptions throughout Chapter 19 will be revised to use the hyphenated form (Salter-Harris).

A new external cause category, X50 *(Overexertion and strenuous or repetitive movements)*, will include codes for overuse from strenuous movement or load, prolonged static or awkward postures, repetitive movements, and other.

External cause category W26 *(Contact with knife, sword or dagger)* will be revised and expanded to allow reporting of cuts from other sharp objects such as the lid of a tin can. Additionally, the codes in category W45 *(Foreign body or object entering through skin*) for paper or can lid entering through skin will be deleted.

Complications

ICD-10-CM has been revised to distinguish between postprocedural hemorrhage, which indicates ongoing bleeding, and postprocedural hematoma, which indicates that bleeding has stopped. Since the codes for postprocedural hemorrhage and hematoma are located throughout the body system chapters of ICD-10-CM, these changes affect multiple categories (D78, E89, G97, H59, H95, I97, J95, K91, L76, M96, and N99).

In-stent restenosis is the narrowing of a stented artery due to tissue response to the stent placement. Two new codes have been established for in-stent restenosis in coronary arteries (T82.855) and peripheral vessels (T82.856).

There are a number of changes for complications of genitourinary devices, implants, and grafts:

- The codes in category T83 *(Complications of genitourinary prosthetic devices, implants and grafts)* have been revised and expanded to better reflect the device type, such as urethral catheter vs nephrostomy catheter vs ileal conduit.
- New codes have been established for erosion (T83.24) and exposure (T83.25) of a urinary organ graft such as a pubovaginal sling using rectus fascia.
- Subcategory T83.7- *(Complications due to implanted mesh and other prosthetic materials)* has been revised and expanded to capture complications of vaginal mesh.
- Subcategory N99.5- *(Complications of stoma of urinary tract)* has been revised and expanded to distinguish between continent and incontinent urinary stomas. A continent stoma stores urine internally and must be periodically catheterized and emptied.

The code descriptions in subcategory T82.8- *(Other specified complications of cardiac and vascular prosthetic devices, implants and grafts)* and T83.8- *(Other specified complications of genitourinary prosthetic devices, implants and grafts)* have been reworded to clarify that the complication is caused by the device. For example, code T82.817 has been revised from "Embolism of cardiac prosthetic devices, implants and grafts" to "Embolism due to cardiac prosthetic devices, implants and grafts."

The codes for complications of nervous system devices in category T85 *(Complications of other internal prosthetic devices, implants and grafts)* have been revised and expanded for specificity. For example, the new codes allow specific reporting of complications affecting a neurostimulator generator vs those affecting an electrode (lead).

Z Codes

Four codes have been established for minimally invasive procedures converted to open procedures, including laparoscopic (Z53.31), thoracoscopic (Z53.32), arthroscopic (Z53.33), and other procedures (Z53.39).

The codes in subcategory Z22.5 *(Carrier of viral hepatitis)* have been deleted to reflect World Health Organization changes to ICD-10. These cases will now be coded as chronic viral hepatitis (B18).

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Formal Leaders' Perceptions of Informal Leaders

By Christopher S. Hunt, DHA, FACHE, Roy T. Landry, PhD, and Bernard J. Kerr, PhD, FACHE

EXECUTIVE SUMMARY

- Informal leaders are present in healthcare organizations. They exercise influence over their peers, which can impact the effectiveness and efficiency of the organization. The purpose of this study was to explore formal leaders' perceptions of informal leaders in their organizations in order to further the knowledge base and permit managers to better develop positive informal leader strategies.
- A total of 322 respondents (AHRA members) returned valid surveys in response to the study. Questions contained in the survey assessed the following factors: Professional Competency, Supporting the Mission, Influence of Informal Leaders, and Future of Informal Leaders.
- The results of the survey suggest that personal demographics and facility characteristics do not account for significant variation in formal leaders' perception of informal leaders in their organizations.

Traditionally, healthcare organizations tend to be hierarchical. As a result, rigid policies and procedures are formed and staff are expected to strictly follow orders. As healthcare becomes more complex and more input is needed in managerial decisions, a different approach to leadership and organizational communication is required. With increasing costs, ever-changing regulations, decreasing reimbursements, and increased competition, contemporary healthcare management and communication networks need to become adaptive and support innovation to be effective.

Hierarchical organizations tend to communicate in a top-down fashion. This leaves little opportunity for cross-functional collaboration or upward idea sharing.[1] As these hierarchies break down we find, emerging from the ranks, informal leaders who work closely with and are influential among their peers. Informal leaders, because they are credible and respected by their peers, can be a valuable resource if recognized and managed appropriately.[2] Essentially then, informal leaders are employees whose position or title does not grant them power or influence over their peers; nonetheless, they have power and influence with their peers based on their personal characteristics and knowledge.

Informal Leaders

Whether the discussion involves leaderless workgroups, such as self-directed teams, or the traditional organizational structure with defined formal leaders, informal leaders are ultimately selected by their peers.[3-6] In small groups gathered for specific tasks, informal leaders influence group efficacy.[7] Group efficacy is defined as "the group members' collective estimate of the group's ability to perform a specific task." [7] One study suggests that, particularly early in a group's lifespan, an emergent informal leader in the group will significantly influence the group's perception that the team's task is attainable.

This study also suggests that over time, as team members become more familiar with the task, the informal leaders will exert less influence over group efficacy. The diminishing influence over time of emergent leadership behaviors was echoed in a study of virtual self-managed teams.[8] The implication for this finding is that "leadership behaviors—regardless of group type—need to be established early in order to impact performance. The existence of these behaviors later in a group's life, while not unimportant, appears to serve more of a maintenance function." [8]

Group efficacy is closely related to group goal attainment.[7] Researchers reported that groups that included an emergent informal leader outperformed those that did not produce a group leader. In addition, the emergent informal leader's "personal goal for the group strongly influenced the group's chosen goal for the group."[3]

Another researcher concluded that informal leaders are perceived more positively as leaders than formal leaders overall.[9] Specifically, informal leaders are more likely to include a moral and inspiring purpose, provide for the common good, and create meaning. Consequently, the primary role of informal leaders, in this circumstance, is the dissemination and understanding of information as it relates to task performance.

One researcher saw the informal nurse leader as having another unique role in the workplace, that is, to facilitate nurse satisfaction. The informal nurse leader can "envision a preferred future for the quality of the working environment."[10] This is accomplished through creative problem solving and process improvement that is rooted in the context and view of the staff nurse working directly with patient care.

Informal leaders also have an impact on organizational change processes. A study of principal effectiveness was performed at the middle-school level to determine if principal success, as measured by the nationally recognized assessment tool the *Audit of Principal Effectiveness*, was impacted by the formal leader's (principal's) recognition and inclusion of informal teacher leaders in decision making.[11] The study showed that effective principals not only could identify informal leaders, but also consistently sought their input for decision making. Informal teacher leaders were instrumental in developing programs, determining the educational climate, and influencing the curriculum within schools.

There is a knowledge gap surrounding formal leaders' perceptions of informal leaders in their organizations.

While much has been written about informal leaders and their influence on organizations, there is a knowledge gap surrounding formal leaders' perceptions of informal leaders in their organizations. Specifically, it is not known whether formal leader characteristics such as gender, level of education, years of healthcare management experience, age, number of employees managed, or non-personal organizational factors are related to leadership perceptions of informal leaders in their organizations. Without this information, healthcare leaders may not have all of the information they need to best utilize the informal leader resources in their organizations.

The purpose of this research was to explore the relationship between formal healthcare leaders' perception of informal leaders and the formal leaders' gender, level of education, years of management experience, age, number of employees, and non-personal organizational factors.

Radiology leaders are believed to be a practical population to explore this subject because they present with varied educational backgrounds and appear to be evenly distributed across personal demographics such as gender, age, and experience. In addition, radiology leaders manage employees of multiple skill levels, from entry-level support staff to highly skilled technologists. The results of this research provide useful information to healthcare leaders and researchers for better understanding how best to utilize informal leaders.

Survey

A survey instrument was developed specifically for this study and was designed to measure formal leaders' perceptions of informal leaders within their organizations. Items were conceptually related to informal leadership and emerged from reviewing the literature. Therefore, survey development followed the conceptual process of establishing content validity.

Demographics

A total of 322 respondents (AHRA members) returned fully completed surveys in response to the study. A review of the descriptive statistics for the continuous independent variables (Table 1) revealed the following mean values:

- 51.81 years of age
- 20.42 years of management experience
- 94.04 full-time-equivalents (FTEs) supervised
- 329.79 beds for the number of beds in the hospitals

TABLE 1. Descriptive Statistics for the Continuous Independent Variables

Variable	Mean	Standard deviation	Minimum	Maximum
Age (X_1)	51.81	8.32	25.00	74.00
Years of management experience (X_3)	20.42	10.69	0.00	44.00
FTEs (X_5)	94.04	122.29	4.00	1400.00
Number of beds (X_6)	329.79	315.07	20.00	2000.00

TABLE 2. Numbers and Proportions of Survey Participants Contained in Each Classification of the Categorical Independent Variables

Variable	Number of survey participants	Proportion
Gender		
Male	149	.463
Female	173	.537
Profit status		
For-Profit	29	.090
Non-Profit	293	.910
Hospital category		
Community	245	.761
Academic	51	.158
Other	26	.081
Level of education		
No college degree	26	.081
Associate degree	56	.174
Bachelor's degree	123	.382
Graduate degree	117	.363

The number and proportion of the survey participants contained in each classification of independent variables are presented in Table 2. A review of the data indicates that a majority of the respondents were female (54%), and a substantial majority (91%) worked for non-profit hospitals. The majority of respondents worked in hospitals classified as community hospitals (76%). With respect to educational levels of the respondents, the largest proportions of the respondents were found in the bachelor's degree and graduate degree categories.

Factor Analysis

A factor analysis was performed to determine whether the questions contained in the leadership questionnaire measured one dimension (factor) or multiple dimensions (factors). If the factor analysis produced one factor, the total scores recorded on the leadership questionnaire would be used as the dependent variable in the eight research questions posed in this study. If, however, the factor analysis produced two or more factors and those factors could be given relevant meaning, the eight research questions would be examined for each of those factors. The value of producing multiple dimensions or factors would be the ability to reduce a large number of variables, such as the 20 survey questions, into a smaller set of derived variables, or factors, for analysis.

To determine whether a factor was appropriate, the Eigen value was calculated. The Eigen value, in essence, measures the variance within the proposed factor. To be considered, a factor must have an Eigen value equal to or greater than one. To identify the various questions contained in the leadership questionnaire that loaded on a given factor, varimax rotation was applied to the generated factors. Four factors emerged from the factor analysis. The factor analysis results are presented in Table 3.

The factors were given labels, and the questions contained in the leadership questionnaire that loaded on each factor are as follows:

- Professional Competency (Factor 1)—Q10, Q11, Q12, Q13, Q14, Q15, Q 16, Q17, Q18
- Supporting the Mission (Factor 2)—Q4, Q5, Q6, Q7, Q8, Q9
- Influence of Informal Leaders (Factor 3)—Q1, Q2, Q3
- Future of Informal Leaders (Factor 4)—Q19, Q20

These four factors served as the dependent variables for this study. The descriptive statistics for each of these four dependent variables are contained in Table 4.

The Professional Competency factor encompassed questions that were asked to ascertain formal leaders' perception of professional and clinical competency of informal leaders. The results are displayed in Table 5. The response for "strongly agree" plus "agree" in the professional competency category was *0%.

TABLE 3. Factor Analysis Results

Factor	Eigen value	% of variance	Cumulative % variance	Cronbach's alpha
Factor 1	9.31	46.6	46.6	.93
Factor 2	1.67	8.3	54.9	.89
Factor 3	1.57	7.9	62.8	.69
Factor 4	1.16	5.8	68.6	.77

TABLE 4. Descriptive Statistics of the Factors

Factor	Mean	Standard deviation	Minimum	Maximum
Professional competency (Factor 1)	32.72	4.93	17.00	40.00
Supporting the mission (Factor 2)	21.75	3.81	10.00	30.00
Influence of informal leaders (Factor 3)	12.01	1.77	4.00	15.00
Future of informal leaders	7.76	1.43	2.00	10.00

The strongest positive response was to Q11 (88%), which states that "Informal Leaders are a valuable technical resource to the department staff." The least positive response was to Q17 (69%), which states that informal leaders "provide a positive role model for department staff."

Factor 2 (Supporting the Mission), included questions that were asked to determine formal leaders' impression of how supportive informal leaders are of their organizational mission. This category only yielded a 61% "strongly agree" or "agree" rate. In fact, 30% of the respondents were neutral or "neither agree or disagree" in their responses. The highest positive response was to Q4 (74%), which states that "Informal leaders . . . provide a positive voice concerning work processes." The least positive response was to Q9 (48%), which stated that "informal leaders in my department provide an optimistic view of the attainability of the organization's goals."

Factor 3 (Influence of Informal Leaders), included questions that were asked to determine formal leaders' view of how influential informal leaders were in their organizations. This category had positive results, with 81% rating informal leaders' influence in the "strongly agree" or "agree" response categories. Q1 showed a positive result of 97% in informal leaders' ability "to influence the opinions of their peers." Formal leaders were much less positive when relating the ability of informal leaders' ability to influence "my opinion," at only 68%

The final factor in the survey spoke to the "Future of Informal Leaders." Only two questions (Q19 and Q20), addressed this subject. Q19 stated that informal leaders were becoming more prevalent, and 69% believed that to be true (either "strongly agree" or "agree"). When asked if informal leaders were becoming more important, respondents responded positively 75% of the time.

Overall, the survey questions were answered in an overwhelmingly positive manner. For all questions, respondents indicated "agree" 50% of the time and "strongly agree" 24% of the time. The highest positive rating on the survey was Q1 (97%) indicating that informal leaders do influence the opinions of their peers. The least positive result was Q9 (48%), which asked whether informal leaders provided a positive view about the attainability of organizational goals. Clearly, the formal leaders that were surveyed believe that informal leaders have impact on technical quality and peer opinions. In addition, the respondents believe that informal leaders are becoming more prevalent and important in today's organizations.

Methodology

To measure the internal consistency of the four factors generated by the factor analysis, Cronbach's alpha values were calculated. The Cronbach's alpha values for Factors 1 through 4 were .93, .89, .69, and .77, respectively. Standard practice dictates that a Cronbach's alpha value above 0.70 is considered reliable.[12] Internal consistency measures the reliability of the survey questions and scale for each factor.

TABLE 5. Survey Results

Question	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
Q1: Informal leaders in my department influence the opinions of their peers	48.04%	48.83%	2.35%	0.52%	0.26%
Q2: Informal leaders in my department influence the opinions of formal leaders in my department	17.75%	61.62%	14.10%	5.48%	1.04%
Q3: Informal leaders in my department influence my opinion	14.10%	54.31%	22.19%	7.83%	1.57%
Q4: Informal leaders in my department provide a positive voice concerning work processes	17.49%	56.14%	19.58%	6.53%	0.26%
Q5: Informal leaders in my department provide a positive voice concerning change	13.84%	53.26%	23.24%	9.14%	0.52%
Q6: Informal leaders in my department communicate support for formal department leaders	12.79%	52.74%	27.94%	6.53%	0.00%
Q7: Informal leaders in my department provide a positive voice concerning the value of the organization's goals	9.92%	47.52%	33.94%	8.62%	0.00%
Q8: Informal leaders in my department provide an optimistic view of the future to their peers	6.27%	48.04%	34.99%	9.92%	0.78%
Q9: Informal leaders in my department provide an optimistic view of the attainability of the organization's goals	6.53%	41.51%	40.73%	10.97%	0.26%
Q10: Informal leaders in my department excel in their patient care/technical skills	39.43%	46.48%	12.01%	1.83%	0.26%
Q11: Informal leaders in my department are a valuable technical resource to the department staff	41.25%	47.00%	10.44%	1.31%	0.00%
Q12: Informal leaders in my department are patient care and patient safety advocates	39.16%	46.21%	12.79%	1.83%	0.00%
Q13: Informal leaders in my department are clinical/technical mentors to their peers	34.46%	47.52%	14.62%	3.13%	0.26%
Q14: Informal leaders in my department are helpful to me in my job	31.85%	50.65%	13.84%	2.87%	0.78%
Q15: Informal leaders in my department positively affect department productivity	30.03%	44.39%	20.37%	4.70%	0.52%
Q16: Informal leaders in my department play a key role in day-to-day operations	28.20	55.35%	12.53%	3.92%	0.00%
Q17: Informal leaders in my department provide a positive role model for department staff	21.67%	47.52%	23.50%	7.31%	0.00%
Q18: I can rely on the appropriateness of front-line decisions made by informal leaders in my department	18.02%	53.52%	21.67%	6.53%	0.26%
Q19: Overall, I believe that informal leaders are becoming more prevalent in healthcare organizations	17.75%	51.70%	25.07%	4.96%	0.52%
Q20: Overall, I believe that informal leaders are becoming more important in healthcare organizations	23.76%	51.44%	19.84%	4.18%	0.78%

Statistical Analysis

Since the factor analysis revealed four factors, a multiple linear regression analysis was applied using three base models to each of the four factors, thus labeled Models 1 through 12, to determine the statistical significance of each of the independent variables in relationship to the four dependent variables. Base model 1 is designated as the full model, that is, it contains all of the independent variables ($Y = aU + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_{11}X_{11} + b_{12}X_{12} + b_{13}X_{13} + E_1$). The academic hospital and community hospital variables are deleted from base model 1 to form base model 2, which is a restricted model ($Y = aU + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_{11}X_{11} + b_{12}X_{12} + b_{13}X_{13} + E_2$). In base model 3, the second restricted model, the three Level of Education variables contained in base model 1 are deleted ($Y = aU + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_8X_8 + b_{11}X_{11} + b_{12}X_{12} + b_{13}X_{13} + E_3$).

Subsequently, the models were given unique labels as they are applied to each factor, as follows:

1. Professional Competency (Factor 1)—Model 1, Model 2 and Model 3
2. Supporting the Mission (Factor 2)—Model 4, Model 5 and Model 6
3. Influence of Informal Leaders (Factor 3)—Model 7, Model 8 and Model 9
4. Future of Informal Leaders (Factor 4)—Model 10, Model 11 and Model 12

The analysis of the four full models (ie, Models 1, 4, 7, and 10) revealed that age, gender, years of management experience, profit status, FTEs, and number of beds were not significantly related to any of the four factors. In addition, none of the full models accounted for more than 6.4% of the variation in any of the dependent variables. Finally, the analysis of the restricted models (ie, Models 2, 3, 5, 6, 8, 9, 11, and 12) in conjunction with the full models revealed that hospital categories and level of education were not related to any of the four factors.

The results of the survey suggest that personal demographics and facility characteristics do not account for significant variation in formal leaders' perception of informal leaders in their organizations.

Limitations and Future Research

One of the limitations of this study was that it only looked at radiology managers who were members of AHRA and responded to the survey. AHRA members may not be representative of radiology managers at large and radiology managers may not be representative of healthcare managers at large. Consequently, it would be desirable to attempt to duplicate the results of this study with a broader spectrum of healthcare formal leaders.

As previously discussed, the factor analysis revealed four evident factors present in the survey tool. However, it should be noted that Influence of Informal Leaders (factor 3) and Future of Informal Leaders (factor 4) contained few items, three and two respectively. An expansion of the measurement of these factors through the inclusion of additional items should be considered for future research.

A limitation of the analytic method that was used was that Influence of Informal Leaders (factor 3) had a borderline internal consistency measurement using Cronbach's alpha value. The measured value of .69 was slightly lower than the generally accepted value of .70 for reliability.

This study suggests that non-behavioral characteristics, such as personal demographics and facility characteristics do not account for significant variance in relation to total score. This seems to suggest that behavioral and managerial style characteristics may account for the unexplained variation in this study. This may require identifying management behavioral styles using an established tool, such as The Leadership Grid, developed by Blake and Mouton and later revised by Blake and McCanse.[13] Using an established management style tool will facilitate reproducibility in future research.

Summary

Informal leaders are present in healthcare organizations. Informal leaders exercise influence over their peers, which can impact the effectiveness and efficiency of the organization. The purpose of this study was to explore formal leaders' perceptions of informal leaders in their organizations in order to further the knowledge base and permit managers to better develop a positive informal leader strategies.

Utilizing a survey instrument with a sample of 4,000 radiology managers, 322 respondents provided personal demographic data, facility characteristics, and their opinions surrounding informal leaders in their organizations. The survey instrument was subjected to a factor analysis and provided a stable factor solution matrix. Additionally, the factor scores could be clustered into four conceptual areas with relevant meaning: (1) informal leaders' professional competency, (2) informal leaders' support for the mission, (3) informal leaders' influence, and (4) the future of informal leaders.

The results of the survey suggest that personal demographics and facility characteristics do not account for significant variation in formal leaders' perception of informal leaders in their organizations. This opens the door for further investigation into the significance of behavioral and managerial style traits in explaining significant variance in formal leaders' attitudes towards informal leaders.

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The Changing Landscape of Technologist Continuing Education

By Philip A. Femano, PhD

Technologist continuing education (CE) is no longer mainly about credits. It's now about tangible outcomes. Targeted, professional, educational content for technologists has become such a necessary operational component of any successful radiology practice that CE credits are becoming a secondary concern, and rightly so.

Managers in radiology now have the opportunity—and arguably the *responsibility*—to direct their technologists not merely to a source of "credits," but to targeted professional CE content that can directly and measurably impact the success of their radiology operations.

What CE Was

Twenty years ago, ARRT instituted its CE mandate of 24 credits per 24 months as *". . . a method of assuring the medical community and public that an individual is qualified by knowledge and skills to practice within the profession . . .,"* and also because *". . . advancing technology and changing job responsibilities may require technologists to update their knowledge and skills consistent with any new developments . . ."* (ARRT, *Continuing Education Requirements*)

This clearly was a noble objective, but it soon became apparent that instead of measuring the quality of CE on the basis of "knowledge and skills," many CE providers and technologists placed an inordinate focus simply on "number of credits," often with greater emphasis on "cheap and easy" instead of "relevant and effective." Understandably, ARRT became concerned that too many technologists were accumulating CE credits simply to fulfill the biennial 24 credit requirement even though the CE content wasn't relevant to what they actually did, or intended to do, in the workplace.

Using credits earned as a metric of the value or quality of a CE activity actually may tend to reduce the value and quality of a CE activity. Such a metric can motivate providers to develop the simplest pulp content, eg, with long read-times or seminars that lack useful information. A credit-centric focus promotes lax procedures for signing into and out of seminars, quick lookup answers to self-study post-tests (ie, "easy" credits), and does not necessarily help technologists through the difficult, complex concepts they confront in daily patient exams.

The focus on credits earned may often result in minimal learning, thereby relegating expensive capital equipment to less than optimal use with substandard safety awareness, throughput, and diagnostic quality. Putting emphasis on credits earned rather than skills learned may adversely affect patient care.

What CE Has Become

A new dynamic has been taking place in the CE industry. We first noticed it a few years ago when we started getting calls from technologists who wanted to spend their hard-earned cash to learn MRI and CT primarily because their employers required them to work (and in many cases achieve certification) in the modality. The interesting twist was that the technologists didn't need the CE credits since they already had accumulated more than enough credits from free lunch seminars, membership societies, applications training, etc. Instead, they were willing to waive their opportunity to earn more CE credits so that they could get primary and supplemental self-study course materials as soon as possible without being required to actually participate.

This was the beginning of what has become a common occurrence today: technologists are realizing that to stay up to date in their field of work, they often need CE in more topics than the minimum 24 credits provides in a given biennium.

The increasing pressure on managers to achieve specific operational objectives in the workplace has helped to fuel the evolution of technologist CE beyond being the mere credit game it once was. CE has blossomed into a large and powerful cognate industry that offers a broad

spectrum of didactic and practical skills to every corner of the nation. CE has become an essential, pragmatic tool for keeping skills relevant and up to date in the midst of the increased complexity and rapid changes in radiologic technology, best medical practices, and safety/regulatory issues, regardless of whether any additional CE credits need to be earned.

And CE developers are rising to that challenge. While format, accessibility, cost, objectives, and quality vary considerably, more content is available today that rises above the emphasis on credits and, instead, focuses more on skills and outcomes that can directly benefit the bottom line and quality of care of every radiology facility, regardless of size and location.

Of course, this means that not all Category A credits are created equal. Some CE activities still offer "cheap and easy" credits while other CE activities inspire the participant to break out the colored pencils and jot copious notes to make the best use of the relevant and rich educational content. Managers would do well to discern such differences in quality when recommending CE content to their technologists as an effective means to further optimize their radiology operations. The CE industry clearly is heading in the direction of workplace outcomes and away from just credits. And that is very good news for everyone concerned, especially the patient.

To be clear, while CE accreditation for Category A credits is necessary in order to attest to a professional standard, earning CE credits is no longer a *sufficient* measure of quality attesting to relevance and efficacy. Indeed, more technologists are borrowing educational content from their colleagues just to learn new skills they need in the workplace, with no intention of actually earning credits from that particular material.

Where CE Is Going

The latest confirmation of the importance of CE in helping technologists achieve operational and career objectives is The Joint Commission's recent announcement that as of January 1, 2018 all technologists performing diagnostic CT exams should be CT certified through either ARRT or NMTCB. In establishing this new standard, The Joint Commission has acknowledged that technologists now have access to sufficient CE to help prepare them to achieve modality certification even if located in the most remote parts of the USA.

Meanwhile, ARRT continues its effort to encourage CE developers to expand their offerings while elevating the professionalism and efficacy of CE as it pertains to what technologists do in the workplace. ARRT is taking steps to veer the CE industry away from focusing primarily on credits and is putting more emphasis on targeted skills and outcomes per its original CE mission.

Testimony to ARRT's strategy is its recent introduction of the Continued Qualification Requirement and the Structured Education Requirement, both of which further ensure that technologists will continue to rely on CE to stay up to date in the latest best medical practices, clinical applications, safety and regulatory issues, and new technologies that are most relevant to their specific credentials rather than focusing on the number of credits earned. This also benefits radiology managers and patients.

What are some of the challenges that are causing this transformation in CE? To name a few:

- Greater awareness of safety concerns
- The need for earlier stage detection
- Increasing complexity of technology
- New clinical applications
- Expanding the versatility of the technologist pool
- Greater patient throughput and utilization
- Reduced callbacks
- More emphasis on the patient experience
- Smaller reimbursement margins
- Demand for multi-modality training
- Rapid evolution of hybrid imaging
- Improved communication with the radiologist

Professional CE has become uniquely positioned to promptly address each of these critical challenges in ways that schools and publishers cannot. One reason is that those traditional venues typically require longer lead times to assimilate the latest developments and create the corresponding educational content. In contrast, the CE industry has demonstrated the ability to deliver valuable, relevant, late-breaking information relatively quickly and economically. This is one reason that manufacturers are relying more on dedicated CE providers, whose core expertise is educational design and current content, to deliver such training to the installed base in an economical and timely way.

Conclusion

Although Category A accreditation is a minimum necessary criterion for a professional technologist CE activity, CE accreditation is no longer a sufficient metric for high quality education. The technologist CE market is moving past the obsolete credit-centric model because new challenges require technologists to focus more on acquiring the knowledge and skills that will help their facilities keep up with the feverish pace of the 21st century.

CE has become an essential component in the economics, logistics, patient experience, quality of healthcare, and overall solvency of the modern radiologic facility. Identifying reliable, relevant, affordable CE resources that can be tapped as needed is becoming commonplace, and will become more important as radiology facilities confront the new challenges that are imminent in the short term.

As such, radiology managers have begun to embrace the responsibility to direct their technologists to CE that offers the practical knowledge and skills necessary to help ensure operational solvency and a high standard of patient care.

Philip A. Femano, PhD is CEO of MIC and has been a member of AHRA since 1996. He can be contacted at feedback@MICinfo.com.

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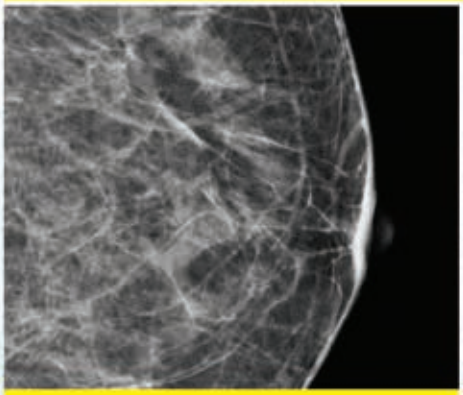
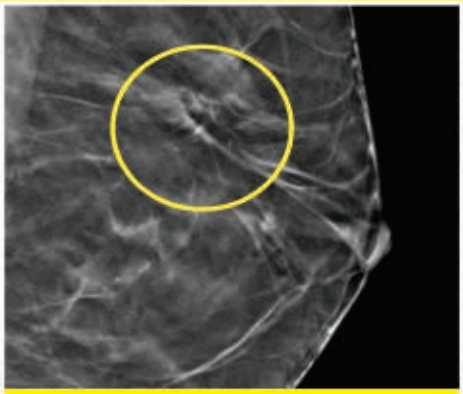
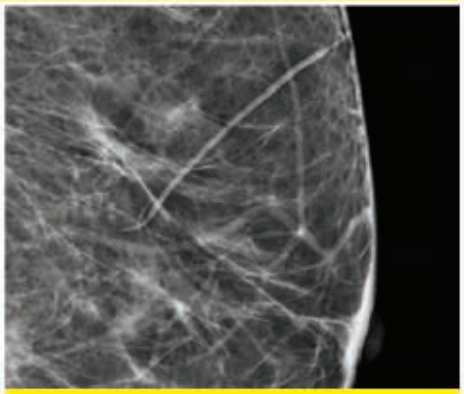


2015 screening mammogram in DBT. Left MLO, 2D view.
No abnormalities noted.



2015 screening mammogram in DBT. Left MLO, 3D view.
3D slice shows architectural distortion not seen on 2D.



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[1]Case study courtesy of David Gruen, MD, Director of Women's Imaging, Stamford Health, Stamford, CT

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Say What?

By Gordon Ah Tye, FAHRA

There are times when what I do and say are like out of body experiences. I've been around long enough to know the proper things to say in most situations. I am fascinated by elders, though, and how open they are to say what's on their minds. No tip toeing. From mentation to verbalization. I'll never forget when I was about 18, our family was having dinner together. We were having a normal dinner conversation regarding the values of marriage. My father was a quiet man, but had a strong, resonant voice. Out of the blue he blurted out: "I give your mom plenty of good lovin'!" My mom put her face in her hands and said, "OH, ED!" We laughed so hard. Clearly it was a sign my dad was getting old.

As I grow older, when I observe or experience things that seem absurd, thoughts are teetering in my brain, uncertain as to whether I should blurt them out. Let me provide you with some true life examples:

The Baffled Technologist. We terminated an employee because she was in our central processing area (still a throwback when we had processors) wrapped up in a blanket one afternoon, sound asleep. *The Appropriate Thing to Say:* It's against hospital policy to sleep on the job. It can lead to grounds for termination. *What I Wanted to Say*: What on earth makes you think you can sleep here? Are you nuts? Go! Shoo! And don't come back! Ever!

The Angry Physician. A surgeon was very upset because we couldn't send a fifth tech to surgery for a C-Arm case, when all we had were five techs total. He threatened to talk to the CEO. *The Appropriate Thing to Say*: I am so sorry for this inconvenience. Unfortunately, we only have five technologists on duty to see that our ED and house patients are being cared for, and 4 are already in surgery. *What I Wanted to Say:* Are you freaking kidding me? We staff following our routine needs and when you suddenly add four cases on a Friday evening without any notice we may not have the staffing. Go ahead and talk to the CEO you *#@%!

The Bitter Surveyor. A JC surveyor spent two days dissecting my logs for Critical Values. He said, "Are you sure you didn't just throw these together?" After the third day of convincing him they were reviewed on a weekly basis, he accepted my word. He walked away disgusted, and said, "Now I have to go find something else!" *The Appropriate Thing to Say*: Sir, all I can tell you is that I run this report weekly and review our final dictated reports showing that the referring physician was called. There is no way I could have fabricated the past three years of records. *What I wanted to Say:* What? You think I'm lying? The only thing you should be surveying are lines in the road at an intersection! Go search for something else in another country!

The California Highway Patrolman. I was on the way to an AHRA meeting in Las Vegas and was behind two semi-trucks and there was finally a passing lane a mile ahead. It was a 65 mile per hour speed limit, and the trucks were going 55. The passing lane came and I floored it to get by them, going 78. As I passed, a CHP is going the other direction. I slow to 65, but see a cloud of dust in my rear view mirror. I see the red lights behind me. He pulled me over and said, "You were going 78 in a 65 mph zone." *The Appropriate Thing to Say:* I hope you can understand that I only went that fast so I could pass the two semi-trucks that were going 55. It's next to impossible to pass these trucks safely going 65 miles per hour in a short passing lane! *What I Wanted to Say:* I can't believe you would go so far out of your way to give a guy a ticket for speeding while in a passing lane. Getting your quota or just looking for suckers heading to Vegas to cash them out?

So, in my Geezer-Intern years, I need to follow the rules of life no matter how insane or ludicrous the situation. I can't wait for another 10 years when saying what I'm thinking is normal for a fully aged Geezer. But for now, it's better to say the appropriate things to keep my job and stay out of jail.

Gordon Ah Tye, FAHRA is director of imaging and radiation oncology services for Kaweah Delta Health Care District in Visalia, CA. He holds a bachelor's degree in biological sciences from California State University in Fresno. Gordon is a past president of AHRA, received the AHRA Gold Award in 2001, and received the 2006 Minnie for Most Effective Radiology Administrator of the year. He may be contacted at gahtyes@aol.com.

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