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Customer Service in Radiology: Satisfying Your Patients and Referrers

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Abbreviation: ACR = American College of Radiology

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Radiology has long been a service-oriented specialty. Although physicians in other specialties have direct interactions with patients, radiologists' interactions with patients are often indirect, most often occurring as a direct result of another provider's order. As such, radiology practices have had to focus on two distinct groups, patients and ordering providers, to grow their businesses and retain their patients. One could argue that during the past 2 decades, many of the most visible customer service initiatives in radiology practices have been directed toward the ordering provider. These initiatives have included implementing picture archiving and communication systems to improve image distribution and availability, voice dictation systems to decrease report turnaround time, computerized order entry to ease the ordering process, and structured reporting to improve the readability of the radiology report. As the practice of radiology is evolving to become more patient oriented, it is clear that the specialty needs to pivot and implement more initiatives that directly benefit patients. In this article, the concepts of customer service and a radiology department's primary customer are defined and discussed, and the concept of service quality is introduced. In addition, the author highlights the five dimensions of service quality: reliability, assurance, tangibles, empathy, and responsiveness. Each dimension is described in detail, first by using an archetypal business example and then by using an example of a project that has been successfully implemented in the author's radiology department.

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Introduction

While most radiology departments work to optimize patient and employee experiences, often customer service does not receive the same level of attention. Many radiologists are reluctant to think of patients and ordering providers as customers. As a result, radiology practices are missing opportunities to learn lessons similar to those learned and used by successful businesses. Although there are clear differences between the fields of business and medicine, and thus between business customers and medical patients, medical practitioners can learn from their business colleagues. This article defines and discusses the concept of customer service and the different types of customers that a radiology department serves, describes the needs of the different types of customers, and discusses the five dimensions of service quality.

Rationale for Customer Service in Radiology

Service providers and consumers may evaluate the quality of customer service very differently. For example, a traveler arrives at the airport and boards an airplane for an on-time departure, and the pilot routes the plane safely to the expected destination ahead of schedule. From

TEACHING POINTS

- *Reliability* is defined as the ability to provide the service that was promised and to do so dependably and accurately.
- *Assurance* is defined as the knowledge and courtesy of employees and their ability to inspire trust and confidence.
- *Tangibles* is defined as the physical appearance of the department and the department equipment and personnel.
- *Empathy* is defined as the degree of caring and attention paid to individual customers.
- *Responsiveness* is defined as the willingness and ability to help customers promptly.

the pilot's point of view, this experience represents good customer service. However, if we follow the same scenario from the passenger's point of view, the impression might be different.

When booking his travel plans, the traveler must sort through a list of confusing fares that differ according to the time of travel and the day of the week the travel plans are made. On the day of the trip, the traveler arrives at the airport 2–3 hours before the departure time, only to learn that he has to pay additional fees to stow his baggage. Then, he must wait in line and partially undress to pass through the security checkpoint. After arriving at the gate, he has to wait until his boarding section is called. The plane departs on time. However, the seats are cramped and the food service items are limited and costly. The pilot routes the plane safely to the expected destination ahead of schedule. The passenger departs and heads to the baggage claim only to find that his luggage is lost. From the passenger's point of view, this same travel experience represents poor customer service.

A similar vignette can be created in the radiology setting. A patient arrives for her MRI appointment. The imaging examination is performed on time by using a new top-of-the-line imaging unit. After the examination is completed, a subspecialist radiologist expertly reads the study and creates a high-quality report for the referring provider. The report is finalized and sent to the referring provider within 1 hour, well before the patient's appointment later that day. From the radiologist's point of view, she has provided excellent customer service. However, once again, this impression might change when the same vignette is considered from the patient's point of view.

The patient is concerned about a new symptom and thinks that she may have cancer. After being examined by her primary care provider, the patient and the provider decide that an MRI examination is the best course of action. The patient is nervous as she schedules the MRI procedure, and unfortunately, the next available appointment is in 3 weeks. While waiting for the appointment, the patient receives a packet of information regarding the upcoming examination. The information is inconsistent and includes confusing instructions, such as the appointment time and arrival time. Mixed in with the appointment information is a note instructing the patient not to eat or drink beginning the night before the MRI examination.

The day of the appointment arrives, and the patient is hungry and unsure whether she should take her regular medication. She arrives for the appointment 2 hours early but spends 30 minutes looking for a place to park her car. Once she finds a parking space, she must navigate through a series of confusing hallways with inadequate signage to find the radiology department. Once in the radiology department, the patient is called to undergo her examination on time. The technologist is impersonal and makes comments that are relayed in medical jargon such as, "Oh, you didn't need to be NPO for this study" and "Do you have any ferromagnetic items on or in you?" The MRI procedure is performed on time with use of a new top-of-the line imaging unit.

After the imaging procedure is completed, a subspecialist radiologist expertly reads the study and creates a high-quality report for the referring provider. The report is finalized and sent to the referring provider within 1 hour, well before the patient's appointment later that day. Unfortunately for the patient, the two appointments could not be coordinated, so she must wait at the hospital several hours until the next appointment. While waiting, she attempts to log in to the patient portal within the electronic medical record. After logging in, she is surprised to see that the MRI report is already available. Unfortunately, it contains more medical jargon, including impression points such as "cystic renal lesion, Bosniak 2" and "small hyperenhancing lesion in hepatic segment VI without washout, LI-RADS 2." The patient must wait for her next appointment while convinced that she has cancer.

Finally, after the appointment has passed and the patient is reassured that she does not have cancer, she receives several bills, all for the same MRI procedure. One bill comes from the radiology practice, one comes from the hospital, and a third comes from the insurance company. None of the bills has the same bottom line payment required, and the patient must spend hours on the telephone trying to figure out who and how much to pay. From the patient's point of view, this experience represents poor customer service.

Defining Customer Service

As we begin to understand customer service, it helps to understand the terminology. *Customer service* can be defined as a series of activities intended

to enhance the level of customer satisfaction (1). In addition, because most definitions of customer service include the word *customer*, it is important to understand what a customer is and who our customers are. The business dictionary defines *customer* as "a party that receives or consumes products (goods or services) and has the ability to choose between different products and suppliers" (2).

In general, customers can be thought of as internal or external customers. Internal customers are the members of your organization who rely on your assistance to fulfill their job duties. External customers are those individuals who use your products or services but are not a part of your organization (3). The customer service efforts of most radiology practices are focused on major external customers, namely, patients and referring providers (ie, referring physicians). Thus, internal customers—that is, radiologists, technologists, nurses, and administrators who work for the practice—often are forgotten.

The Primary Customer and a Radiology Practice's Product

One of the more controversial topics in the business of radiology is the concept of the primary customer. A *primary customer* can be defined as the consumer of the end product or the group toward whom we direct organizational resources to create demand for our product (4). Depending on your point of view, either the ordering provider or the patient can be considered the primary customer of a radiology practice. Although most radiologists consider the patient to be the primary customer, their work output and general practice model do not always support this opinion. One could consider a radiology department to create two products from each patient visit: an imaging study and a final report interpretation of the study findings. Viewing each "product" individually helps to understand our customers.

The imaging study is perhaps the most complex product. The ordering provider is generally considered to be the arbiter of the need for the imaging examination. He or she determines the type of examination that is needed and provides the patient with locations where it can be performed. Many radiology practices spend time working with providers to make the ordering process and subsequent report delivery easier. In many instances, the patient undergoes the imaging examination where the ordering provider practices or at a location recommended by the ordering provider.

More recently, radiology practices have begun marketing directly to patients by way of print and video advertising. This type of patient-directed advertising typically is focused on price or location. While practices work with ordering providers to allow them to view images, patients often do not have access to their images unless they specifically request it. In these instances, the images typically are provided to them on outdated physical media such as CDs or DVDs.

When questioned, radiologists often consider the final report to be their primary work product. This product is created specifically for the ordering physician or the subsequent specialist. Radiology practices ensure that the report is delivered physically or electronically to the ordering physician and the patient's stated primary care physician.

Final radiology reports contain medical jargon and typically are not created to be read by patients. Electronic medical record portals recently have allowed patients direct access to their results. However, these systems usually do not provide a method by which the patient can ask the radiologist questions regarding the report or easily translate the report into layperson terms.

It should be noted that while the above statements regarding the imaging study and final report are true for many radiology practices, they do not encompass *all* radiology practices. For example, breast imaging is unique. Mammography services are focused directly on the patient. This is the one imaging examination for which the patient does not need an order from a referring provider to undergo the procedure and where a version of the final report is delivered in layperson terms directly to the patient. If additional imaging or a biopsy is needed, the radiologist consults directly with the patient before proceeding with the imaging workup.

The marked difference in approaches between general radiology and breast imaging procedures highlights the observation that the ordering provider is the primary customer of most radiology practices. This model fits with the adage that the radiologist is the "doctor's doctor." However, the practice of radiology is changing to become more patient oriented. Campaigns such as Imaging 3.0, implemented by the American College of Radiology (ACR), are aimed at maximizing the value of radiologists by empowering patients and focusing on appropriateness, efficiency, quality, safety, and satisfaction (5).

As the practice of radiology has changed, there has been a greater emphasis on making the patient the primary customer. Some of these changes include opening a radiology clinic so that patients can discuss upcoming imaging studies or recent results with radiologists, providing layperson translations of radiology reports, and offering patients easier access to their imaging results (6–14).

RadioGraphics

As the practice of radiology moves into the Imaging 3.0 era, it is becoming more important that we launch initiatives within the framework of customer service. Although medical practices differ from retail businesses, they can learn from the science that business scholars have applied to customer service.

In 1988, Parasuraman et al (15) first published their work describing a research tool that is used to capture data on consumer expectations based on the five dimensions used to represent service quality. The final questionnaire, termed *SERVQUAL* (SERVice QUALity), contains 22 standard questions and is designed to be administered in a face-to-face interview. Businesses use the SERVQUAL questionnaire to measure service gaps centered around service quality. The other potential service gaps (knowledge, standards, service delivery, and communication) cannot be measured (16). The SERVQUAL methodology has been applied to other business models, including health care (17).

In their work, Parasuraman et al (15) defined five dimensions of service quality: reliability, assurance, tangibles, empathy, and responsiveness (Table). In the remainder of this article, each dimension is defined, and examples of well-known businesses and radiology department initiatives that highlight each dimension are described.

Reliability

Reliability is defined as the ability to provide the service that was promised and to do so dependably and accurately (15). The McDonald's restaurant was founded by Richard and Maurice McDonald in 1940. The McDonald brothers initially became successful by devising a system to rapidly create and cook hamburgers. Ray Kroc saw the value in this system and eventually purchased the restaurant, advancing it from a local hamburger restaurant to the international chain that we know today. Kroc's genius was in seeing the value of the McDonald brothers' system and developing it at a large scale so that today, one can walk into almost any McDonald's in the United States and buy a hamburger that is constructed the same way with the same amount of ketchup, mustard, and pickles.

In radiology practices, reliability has been defined as "the measure of how consistently a system operates as it should" (18). While this definition differs slightly from that used in the SERVQUAL questionnaire, the basic premise is the same. Because the workflow in radiology facilities is mostly automated, our practice has become highly reliable. For example, because technologists select a patient's name from a Digital Imaging and Communications in Medicine (DICOM) modality worklist, spelling mistakes and medical record number errors are extremely rare. When errors do occur, it is typically because the technologists have veered from the standard protocol, as in cases of trauma or urgent inpatient examinations at which the modality worklist is not used.

In our radiology department, we implemented a project to improve the reliability of radiography and fluoroscopy orders from providers. Incorrect orders were occurring frequently and included examples such as orders for the wrong examination for a given indication, orders for imaging of the wrong body part, and orders for imaging of the wrong side of the body. To address incorrect orders, our radiography technologists are vigilant about checking orders; they review the clinical history provided with the order and ask patients to describe their symptoms (19). Once a potential order error is identified, the technologist must then verify the order with the ordering provider. However, this process is inefficient and remains error prone. To address this problem, we set out to decrease the percentage of changed orders for radiography and fluoroscopy from our baseline level of 4.2% to a desired level of 2.5%.

We started by using our electronic medical record system (Epic, Verona, Wis) to identify all changed radiography and fluoroscopy orders each week. We then compared the number of changed orders with the total number of orders to derive the percentage of changed orders each week. This percentage was plotted on a graph each week to create our project run chart (Fig 1). A Pareto chart of the most commonly changed orders helped us identify several issues that could be easily corrected (Fig 2).

We worked to reduce the number of changed orders by using a series of interventions. First, we deleted the unused orders from the electronic medical record. For example, our department initially had three separate orders for a fluoroscopic enema: barium enema, water-soluble enema, and air–contrast medium enema for intussusception reduction. Based on our internal departmental practice, all barium enema orders were changed to water-soluble contrast enema orders. Because of this practice, every barium enema order was incorrect. Once we removed the barium enema order, these order errors were resolved.

Reviewing the Pareto chart helped us identify another class of incorrect orders. We saw that "Fluoro-up to 1 hour" was our second most frequently changed order. After reviewing this order, we found that it was part of the peripherally inserted central catheter (PICC) placement order set. The technologists would see this order and change it to "Fluoro-OR up to 1 hour." The first order was to be used when a radiologist was

Dimensions of Service Quality

Dimension	Definition
Reliability	The ability to provide the service that was promised and to do so dependably and accurately
Assurance	The knowledge and courtesy of employees and their ability to inspire trust and confidence
Tangibles	The physical appearance of a department and the department equipment and personnel
Empathy	The degree of caring and attention paid to individual customers
Responsiveness	The willingness and ability to help customers promptly

Source.—Reference 15.

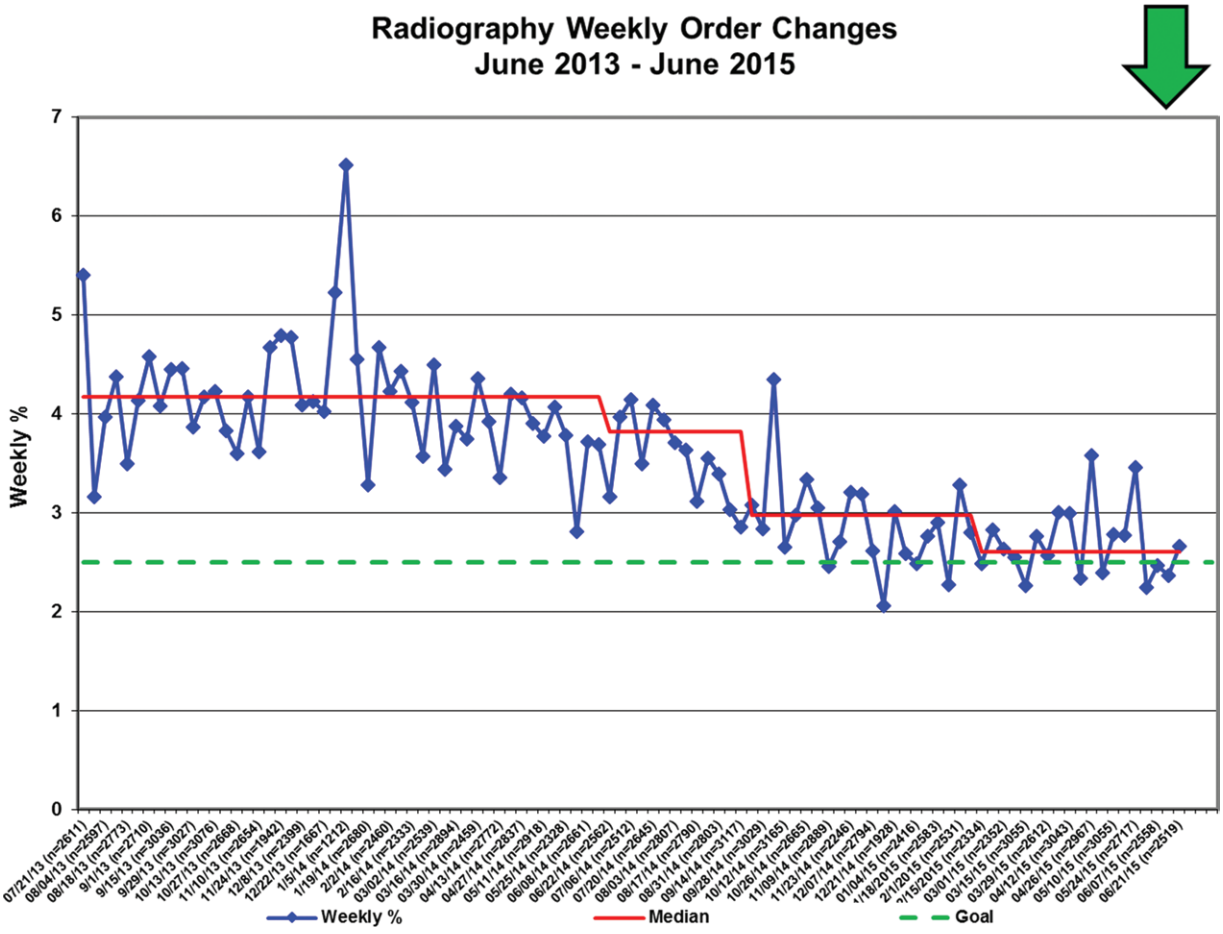


Figure 1. Project run chart shows the weekly percentage of changed radiography orders between July 2013 and June 2015. The blue diamonds represent the measured weekly percentages of changed orders. The red line represents the median percentage of changed orders over time. This line drops multiple times according to standard statistical process control rules. The dashed green line represents our goal percentage of changed orders. These graph data show that our median percentage of changed orders decreased from 4.2% at baseline to 2.6% at the completion of the project.

present. However, because a nurse service places PICCs at our institution, the second order, which does not imply that a radiologist is present, is more appropriate. We corrected the order set, eliminating 11% of our total number of errors.

Next, we moved to improve the experience of the ordering provider. We did this by working with each clinical division to revise its divisional preference lists within the electronic medical record (Fig 3). Orders were initially grouped alphabetically. Because of this, orders such as "Rad Cervical Spine (2-3V)" and "Rad Spine (1V) Cervical Spine" were in different locations. Providers were understandably confused and selected the first order that they found. After our changes were implemented, body parts

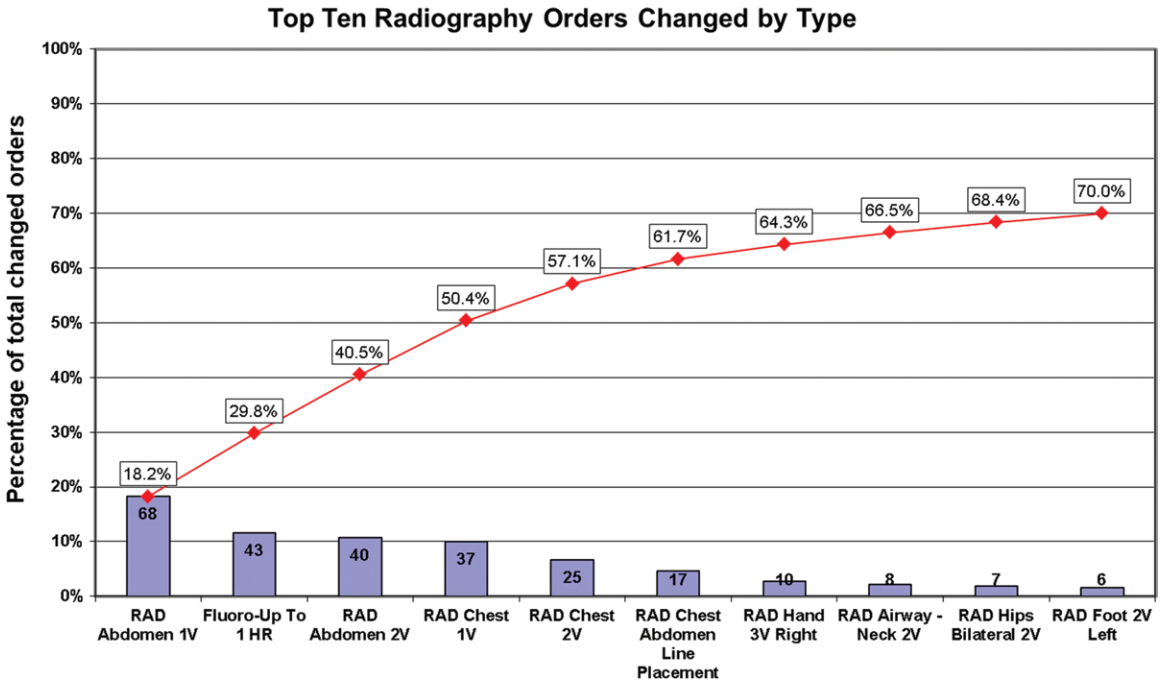


Figure 2. Pareto chart shows the most frequently changed radiography orders in our department at baseline. The four most commonly changed orders accounted for 50.4% of all of our changed orders. *1V* = one view, *2V* = two view, *3V* = three view.

were grouped together and similar studies were placed adjacent to each other, with parenthetical comments providing mild decision support. For example, "Rad Foot 2V (foreign body)" was placed adjacent to "Rad Foot 3V (fracture)." Revising the preference lists also helped us identify and remove orders that did not make sense for the ordering division. For example, the "Rad Hand Arthritis (2V)" order was removed from the emergency department's preference list.

After improving the divisional preference lists, we worked to improve the paper order form for community-based providers. We used a similar methodology, grouping orders by body part location and adding the most frequently ordered studies. In addition to these corrections, we worked to fix other problems with our initial paper order form. For example, on the initial form, there was only one location to write the side of the body that the provider wanted imaged. While this method worked for most indications, it failed when a provider needed to place orders to image multiple body parts affecting both sides of the body.

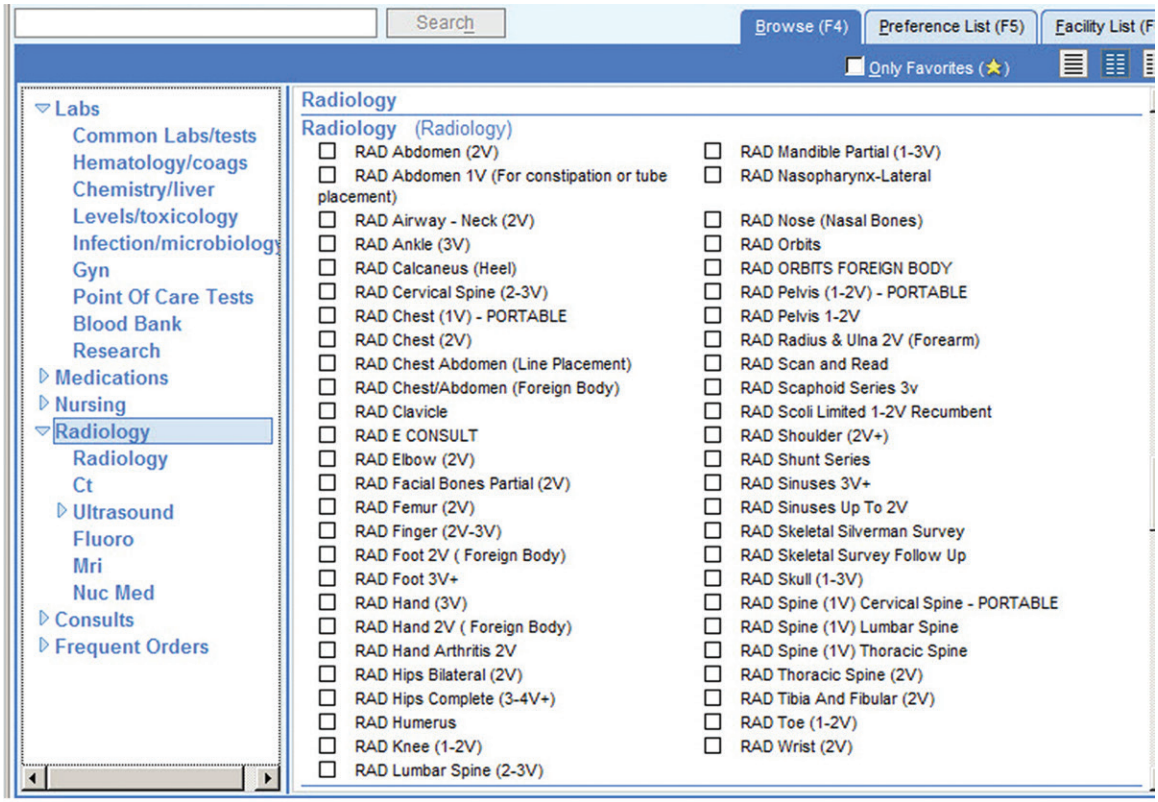
Finally, we worked to address our internal department protocols. This was done to better manage orders that were changed because of departmental protocol but had no effect on the indication for the study and were choices that were not apparent to the ordering provider. For example, we routinely changed a two-view pelvis radiograph order to an order for a bilateral hip imaging examination. This change resulted in extra work, but it did not change the imaging examination performed or the report that was dictated. By changing this protocol, we further reduced the number of changed orders.

At the end of the process, we had reduced the number of changed orders from 4.2% to 2.6% of all orders placed. This resulted in a more reliable process for our internal customers, the technologists, and helped to prevent the wrong examination from being performed on our external customer, the patient. Decreasing the number of changed orders also helped to decrease the burden of phone calls to our other external customer, the ordering provider.

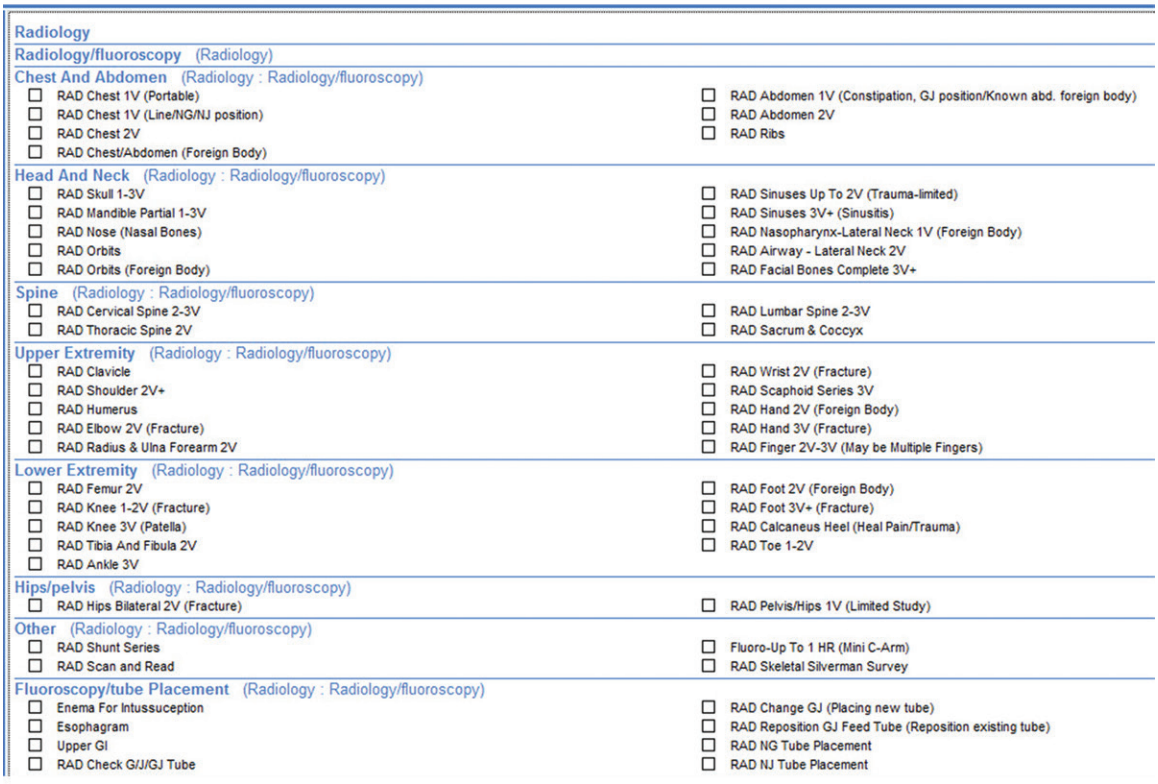
Assurance

Assurance is defined as the knowledge and courtesy of employees and their ability to inspire trust and confidence (15). During their research, Parasuraman et al (15) found that it is important to communicate service expertise to customers. If a customer does not realize that he or she is receiving a high-quality product, his or her confidence in the service will be lower (20). Providers can communicate quality in many ways, such as displaying their credentials on their badges, displaying their service awards or certificates in public areas, and including their certifications in communications.

Toyota Motor Corporation (Toyota, Aichi Prefecture, Japan) is known for its quality assurance program (21). Toyota was focused on quality assurance before most other car manufacturers. In the early 1960s, the company implemented its quality control program through its service



a.



b.

Figure 3. **(a)** Screen capture shows the preference list for emergency department providers at baseline. Note that the list is sorted alphabetically. Because of this, the order "Rad Cervical Spine (2–3V)" is separate from the order "Rad Spine (1V) Cervical Spine–PORTABLE." Inappropriate orders such as "Rad Hand Arthritis 2V" and "Rad Skeletal Survey Follow Up" are included on this list. **(b)** Screen capture shows the preference list for emergency department providers after the intervention. The preference list is now sorted by body part groups, with inappropriate orders removed. Parenthetical notes such as "(Foreign Body)" have been added after examination names for mild decision support guidance. *G* = gastric, *GI* = gastrointestinal, *GJ* = gastrojejunal, *J* = jejunal, *NG* = nasogastric, *NJ* = nasojejunal, *1V* = one view, *3V* = three view, *2V* = two view.

division. This allowed it to identify its customers; record their demographic information, including car purchases; and record vehicle repairs (21). By collecting these system data, the company could address quality issues promptly and prospectively before most customers became aware of the potential problem. Toyota's quality assurance program has helped to improve customer satisfaction and allowed the company to progress from selling 288 cars in its 1st year in 1958 to being the most popular car brand in the United States, selling 2 449 630 vehicles in 2016 (22,23).

In radiology, assurance is often thought of in the setting of peer review. However, services offered by external vendors and professional societies, such as the ACR, can be attributed to assurance. The ACR provides accreditation for imaging centers across nine modalities and practices (24). The accreditation arm of the ACR states on its website that by displaying their accreditation, practices can demonstrate to their patients, payers, and referring physicians that they are committed to providing the safest and best quality care (24).

One initiative that our department employed to promote assurance was to optimize the radiation dose for CT (25). Larson et al (25) chose to optimize radiation doses so that a patient of a given size was exposed to the lowest possible radiation dose that rendered adequate diagnostic image quality. Initially, radiologists reviewed a series of CT scans of the abdomen and pelvis that were obtained at different image noise levels in patients of different sizes (26). The researchers then determined the target image noise as a function of patient size and created image quality profiles for each reviewing radiologist. They then used the image noise data to create a departmental image quality preference curve and used the data from the curve to establish quality target settings for the department scans.

To confirm that examinations were performed using the appropriate scan technique, an automated system was developed to analyze each examination performed at our hospital (27). After implementing these changes, Larson et al (27) reported a decrease in the variation between the target doses and the actual doses used for CT examinations.

At the same time that Larson et al were conducting their work, other work being performed in the department was focused on creating a diagnostic reference range for pediatric abdominal CT (28). To create the diagnostic reference range, the researchers first worked with the ACR to build the Pediatric Dose Index Registry. This registry forms a part of the ACR National Radiology Data Registry and allows practices from across the country to provide data and then benchmark their data with other like providers (29).

After the Pediatric Dose Index Registry was created, the radiation doses from nearly 950 pediatric abdominal CT examinations performed at six pediatric institutions were reviewed (28). The effective dose and size-specific dose estimate for multiple body sizes were calculated. Then, the 75th percentile of the dose estimates for each body size was assigned as the upper boundary of the diagnostic reference range, and the 25th percentile was assigned as the lower boundary. To ensure that the lower level of the diagnostic reference range retained diagnostic image quality, multiple reviewers evaluated 106 studies comprising the median dose level, lower quartile dose level, and lowest overall dose levels (28). Six studies were deemed to be nondiagnostic, and five of the six nondiagnostic studies were obtained by using doses below the 25th percentile. The researchers concluded that the upper limit of the diagnostic reference range represented a target dose that a facility should strive not to exceed, while the lower limit of the range represented the minimal target dose that should be exceeded to acquire diagnostic quality images (28). The researchers stressed that the upper and lower limits should decrease over time as new technology such as iterative reconstruction is introduced.

After completing this work, our department realized that while performing CT with a low dose is important, it is also important to share this information with our patients and the ordering providers. We used materials created by the Image Gently Alliance to share information related to radiation dose with our patients. We provided this information in two ways: First, we created pamphlets explaining our common procedures (30). Each of these pamphlets contained information regarding radiation and the radiation dose ranges used at our institution. The pamphlets were placed in our waiting room, and our front desk staff were instructed to direct patients to the pamphlets for more information on the examination that they were scheduled to undergo.

Second, in addition to the pamphlets, we created an information kiosk. This kiosk contained a lot of the same information as the pamphlets and was also connected to the Image Gently website so that patients could learn more about the radiation dose used for their imaging study and the associated relative risk (31).

We used a different strategy to share our dose information with the ordering providers. While some information was shared by way of departmental and hospital communications, we relied mainly on provider-to-provider communications to share our dose levels and the relative risk

associated with those levels. This communication was focused mainly on the study protocoling process. In our department, every cross-sectional study is reviewed by a radiologist. During this review, the radiologist determines if the ordered study is appropriate for the given indication and then, if appropriate, selects the correct protocol. Frequently during this review the radiologist determines that a different study (typically US or MRI) would be more appropriate. At this point, the radiologist initiates a phone call to the ordering provider to discuss the study and works with the provider to identify the true best study for the given case. This discussion includes communications regarding the risks and benefits of each study type.

Tangibles

Tangibles is defined as the physical appearance of the department and the department equipment and personnel (15). Several companies focus on tangibles to differentiate themselves. Apple (Cupertino, Calif) is perhaps the most notable company in this regard. Steve Jobs and Jonathan (Jony) Ive resurrected Apple on the basis of product design. Jobs and Ive shared a belief that "simplicity is the ultimate sophistication" and "design was not just about what a product looked like on its surface; rather it reflected the product's essence" (32). These principles led Jobs and Ive to first design the product and then later figure out how the technology would fit into the design.

The design-first approach helped to make Apple devices stand out in a crowded field of technology products. Customers appreciated the innovative design of Apple devices and began purchasing products such as the iMac for its decorative potential and functional capability. Later, products such as the iPod and iPhone became popular because of their simplicity of form and function. Although these products were pocket sized, simple design elements such as white headphones helped them stand out and become status symbols and thus aided in the quick identification of product owners. By focusing on tangibles, Steve Jobs brought Apple back from a company on the brink of bankruptcy in 1997 to the world's wealthiest corporation at the time of his death in 2011.

In radiology, different practices use tangibles in different ways to attract customers. Examples of tangibles include child-specific decorations in a pediatric radiology department, freshly brewed coffee at an outpatient imaging center, or valet parking at a hospital. Each of these tangibles provides something extra for patients and helps to set the tone for their visit.

Tangibles can also be provided to ordering providers. Examples include having a single phone number that is answered by a customer service representative who can direct the call to a specific radiologist or to a radiology subspecialty reading room, embedding radiologists within key clinics such as orthopedics, and creating key images so that the ordering providers can easily find an abnormality and share the images with their patients.

In our department, we recently focused on tangibles in the redesign of our waiting room. We started by convening our Family Advisory Council and asking the members what they would like to see in the waiting room. The Council responded by naming four ways that we could improve our waiting room: varied spaces, more color, greater comfort, and more items to engage children. With these goals in mind, the architect began to create new designs for the space. As new designs were created, the Family Advisory Council was consulted until a final design was approved. At the end of this process, our waiting room was changed dramatically (Fig 4).

Initially, the room was a large open space with several rows of chairs. In this space, toys and video games were relegated to the periphery of the room, and there was no space for privacy or where older patients and parents could work. After the room was redesigned, there were multiple spaces for patients to explore. The redesigned room has nooks where children can sit and play, the surfaces have unique textures and hidden designs that appear when the child is coloring, and tablets are embedded in the technology zone. Parents and older children can sit in quieter areas with groups of tables and chairs, and outlets are placed at multiple locations so that devices can be charged while the patients are waiting. The most popular element of the old waiting room, our fish tank, has become the central feature around which the rest of the waiting room is designed. Water and fish are incorporated into the design throughout the room, adding color and a unifying theme to the design. The new design has been popular with our patients and their families.

Empathy

Empathy is defined as the degree of caring and attention paid to individual customers (15). Empathy is not a quality many people think of in association with most large retail chains. Rather, it is a quality that is usually associated with small or local businesses. Small businesses rely on their capability to provide individual attention to detail to compete with larger national chains. The larger businesses that emphasize empathy are often high-end stores that differentiate themselves by

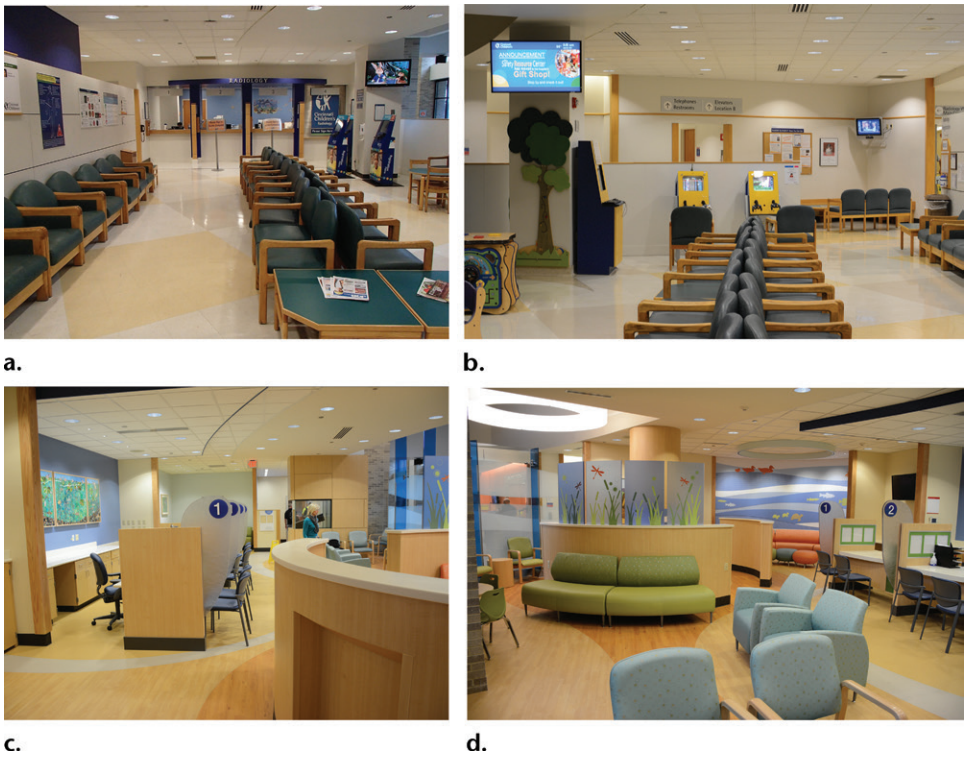


Figure 4. Photographs of our radiology waiting room before and after the redesign. **(a, b)** Before the intervention, the room was a large open space with a line of chairs and scattered locations where children could play. **(c, d)** With the intervention, the space is now bright and colorful, with varied spaces where children can explore and play. Separate places for older children and adults are not shown.

focusing on the individual, which serves as a benefit to attract high-paying customers. One large chain that has emphasized empathy in customer service is Nordstrom.

In their book *The Nordstrom Way,* Spector and McCarthy (33) state that Nordstrom's customer service philosophy is to do whatever it takes to create a satisfied customer. Corporate and individual store management empower employees to treat customers the way that they wish to be treated. This allows the company to provide its customers with extra benefits such as valet parking, soft chairs throughout the store, high-quality food and restaurant options, personal shoppers, and even thank-you notes. This attention to detail helps to build repeat customers who are willing to spend more money on clothes and services (33).

While the other qualities of customer service are not typically associated with health care, empathy is one of the primary attributes of most health care providers. Empathy has an even deeper meaning with regard to health care and can be defined as the "ability to recognize and share the emotions of another person" (34). Physicians, nurses, and technologists often enter the field of health care because of their willingness to serve and help others. Although many radiologists are empathic, empathy is not a trait often associated with them. This misconception stems from the fact that most radiologists are disconnected from patients. Radiologists sit in the reading room reading imaging studies and looking at pictures, often not seeing the person in whom the images were obtained. While there are benefits to this detachment, study results (35,36) have shown that adding patients' photographs to the images that they are reviewing helps radiologists identify wrong-patient errors and have more empathy for patients.

Although radiologists can be detached from patients, they are often the first to make life-changing diagnoses. In such instances, radiologists can show empathy. In our radiology department, we have implemented a program to deliver difficult news to our patients (37). This program was developed owing to our realization that while the discussion of the difficult news will not affect the diagnosis or the patient's long-term clinical outcome, it will be remembered for a lifetime. In their article, Koch et al (37) stated that "Even when difficult news is shared in a well-planned way, the conversation can result in feelings of devastation and helplessness for both the family and the radiologist." They stated further that when difficult news is communicated in a timely and compassionate way, with a standard set of procedures to support the family, the family's

memory of the situation is more likely to be that during which an empathetic group of radiology employees took time to comfort them, answer their questions to the best of their ability, and guide them to the next steps in an emotional journey (37).

Koch et al (37) identified five stages of delivering difficult news: initial discovery, evaluation, alert, communication, and debriefing. The initial discovery stage extends beyond simply making the diagnosis. Once the diagnosis is made, the radiologist initiates the difficult news process and identifies a point person. The point person stays with the patient throughout the process and helps to facilitate communication between the patient and the other health care providers.

The evaluation phase is next in the process (37). During this phase, the point person locates a room for the communication to take place. Most radiology departments are not designed in a way that allows radiologists to discuss results with patients. Examination rooms are often dark uncomfortable places with few places to sit. Key features of a consultation room include enough chairs for the patient, his or her family members, and key providers to sit and discuss results privately; facial tissues; and, if children are present, toys and/or quiet activities to distract them. During this stage, the radiologist reviews the original imaging study and determines whether other imaging examinations are needed.

The alert stage is next (37). During this stage, all of the background logistics are addressed. If other imaging studies are recommended to make a more definitive diagnosis, it is our practice to try and arrange these examinations before making other phone calls. Similarly, if a specialist is to be consulted, it is our practice to call the consulting service. Once the next steps have been planned, the radiologist calls the ordering provider. We sequence the events in this order to provide an actionable plan for the ordering provider. We have found that the ordering provider is often overwhelmed with determining what to do next and who to call. Easing the process for the ordering provider helps to make the delivery of difficult news more efficient and more empathetic for all involved.

When communicating with the ordering provider, the radiologist discusses how the difficult news should be shared with the patient and who should deliver the news. The ordering provider often prefers that the radiologist deliver the news because he or she is more knowledgeable about the imaging findings and the next steps for the patient. In these cases, the ordering provider occasionally chooses to be on the phone to discuss the results with the patient in tandem with the radiologist. If the provider is at the same location as the patient, he or she will often come to the radiology department to deliver the news in person. Once the decision of who will discuss the results with the patient is made, the point person moves the patient to the consultation room.

The communication stage of delivering the difficult news is next (37). During this stage, the radiologist, or other designated provider, communicates the results to the patient. The radiologist should be in the room with the patient, even if he or she is not the one delivering the results. It is helpful to have the radiologist in the room to aid in answering imaging questions and explain the next steps, as appropriate. During this stage, the point person is also in the room to take notes regarding information such as the name of the health care provider(s) who communicated the results, the terms used to discuss the diagnosis, and the next steps, including the providers whom the patient will see next and upcoming diagnostic tests, if applicable. It is important for the radiologist to spend time with the patient during this stage, answering his or her questions and helping to console the patient and his or her family.

The final stage of the process is the health care team debriefing (37). Delivering difficult news is a traumatic experience for everyone involved, including the health care providers. Conducting a debriefing immediately after delivering the difficult news helps the health care team cope with the trauma. During this stage, the team can identify how the process of delivering difficult news can be improved and what should be modified before the process is initiated the next time. Our department believes that by following these five stages, we are engaging in a process that demonstrates empathy for our patients, the ordering providers, and the department faculty and staff.

Responsiveness

The final dimension of quality customer service is responsiveness. *Responsiveness* is defined as the willingness and ability to help customers promptly (15). Amazon (Seattle, Wash) was built on a foundation of being responsive to its customers. Jeff Bezos, the founder of Amazon, has morphed the company from its early days of selling only books to today's massive corporation. Throughout its growth, this company has focused on being responsive to its customers. Today, Amazon attempts to answer two questions for each customer (38): "Do you have what I want and can you get it to me when I need it?" The entire customer experience is built around answering "Yes" to both of these questions. To answer these questions, Amazon has created many customer-interfacing products such as eReaders, home au-

tomation assistants, and cloud-based music storage—all of which are designed to help customers make purchases in the Amazon marketplace (38). By being responsive and anticipating its customers' needs, Amazon is continuing to grow at a massive scale.

Radiology practices typically focus on responsiveness as their primary service goal. Metrics such as turnaround time and time until the next available appointment dominate the scorecards and dashboards of most radiology departments (39–41). The metrics of responsiveness are aimed at providing quality service to our external customers. While our department has focused on these metrics of responsiveness, we have also initiated programs to help us be responsive to the needs of our internal customers–the employees who make up our department.

Our operational rounds were designed as a method to address the safety concerns of our frontline staff, enable direct communication between the department leadership and the frontline staff, and allow the department leadership to demonstrate its commitment to solving the problems identified by the frontline staff (42). In our department, operational rounds are performed semiannually within each modality-based division, allowing time for issues to be resolved and new issues to develop.

At each operational rounds meeting, departmental leaders meet with the divisional technologist manager, the divisional physician leader, technologists, nurses, and other divisional staff members. Prior to the operational rounds meeting, the departmental quality improvement leader collects known divisional issues, reviews the minutes from the prior meeting, and determines the resolution of the previously identified issues.

At the meeting, the department leaders first ask about any new safety concerns. This helps to reinforce the safety culture and the department leadership's commitment to safety. Next, the department leaders ask the attendees to relay any new operational issues that are affecting the department's ability to serve patients. When a new issue is identified, a department leader takes ownership of the issue and after the meeting develops an action plan to resolve it. After new issues are discussed, the meeting topic switches to issues identified at prior meetings. The older issues, along with solutions to them, are discussed. During this time, staff can comment on the effectiveness of the solutions and identify ongoing issues related to the original concern. The minutes of each meeting are taken and posted on the department's website.

Our operational rounds are conducted with the intention of being responsive to our frontline staff members' concerns. During the past 10 years of conducting operational rounds, we have identified and resolved hundreds of issues. Examples of two issues that were recently identified during operational rounds are described in the following paragraphs.

During fluoroscopic procedures, technologists identified several issues related to the lead aprons used by radiologists in our department. Concern was first raised when the closet used to hang aprons was repurposed for other equipment storage needs. The storage area for radiologist aprons was moved to the reading room. However, the technologists noted that the radiologists' aprons were not being hung properly. After a short discussion, it was determined that apron hangers were missing and that there was not enough space to hang the aprons in the appropriate location. Based on this discussion, two new apron racks were added to the fluoroscopy reading room (Fig 5). While this solution seems simple, it required minor construction to remove a counter to create space for the racks in the reading room.

In the second example, the lead technologist educator identified an issue regarding how MRI protocols were created or modified. During the discussion, we learned that the radiologist section heads were routinely submitting requests for new or modified MRI protocols. While this had worked well in the past, the number of new protocol requests and frequent changes related to new technology were making this process overwhelming. The problem was confounded by the large number of MRI units for which the new or modified protocols were needed. These problems led to confusion among radiologists and technologists regarding the imaging protocols.

Once this issue was identified, the radiologist operations leader worked with the technologist educator, MRI technologist manager, and quality improvement manager to create and implement a new protocol process. This group defined the process that should be followed for all new protocol requests.

Addressing the issues identified by the technologists and radiologists involved three major steps. First, a standard intake form was created (Fig 6). Use of this form ensured that technologists received the appropriate information with each request. Second, we made the protocol request process more transparent. The service expectation was defined so that the radiologists would know how long to expect the implementation of a protocol change to take. This was coupled with the creation of an online form so that technologists and radiologists knew which part of the process the protocol change was in currently and, more importantly, which imaging units already had the protocol change in production.

Figure 5. (a) Photograph of the fluoroscopy reading room shows lead aprons stacked on top of each other. **(b)** Photograph taken after the intervention shows one of the two new lead apron hangers added to enable radiologists to correctly store their lead aprons.

a. **b.**

The final component of the changed protocol process was formalized education. Each submitted protocol change request was now required to be accompanied by a slide from the radiologist explaining the rationale for the change. The technologist educator provided a second slide that explained the technical details of the change. The pair of slides was then sent to radiologists and technologists announcing the change.

Applying All Service Quality Dimensions in One Project

It is difficult to implement customer service initiatives in medicine that address each of the five service quality dimensions. One example initiative that we believe addresses each dimension is our critical results notification system (43). This system is based on three major components: a liberal definition of critical results, an easy selection of studies whose findings are to be communicated, and a reliable method of communicating results. Although this system is described in greater detail in a prior work (43), it is briefly described here, and the rationale for how it addresses each of the five dimensions of service quality for each customer is explained.

First, our department has a liberal definition of critical results, defined as any study requiring immediate medical attention where the result is communicated by telephone (43). Having a liberal definition allows the criticality of each study to be determined by multiple criteria, not just an emergent or unexpected finding. For example, if an ordering provider is going out of town and wants to be able to deliver the results to a nervous patient before leaving, the results of the study are important to both the patient and the provider, no matter what the impression of the report states. In our system, the results in this scenario can be considered critical.

To allow a maximum number of studies to be identified as a critical result, we allow multiple people to identify a result as critical (43). This determination can be made at the time the study is ordered, at the time the examination is performed, or at the time the study is interpreted. In our system, while the ordering provider is placing the order for a study, he or she can identify it as one for which the result should be called in. In this scenario, the radiology department staff will call in the result regardless of whether it is normal or abnormal.

The technologist can identify a study as one whose results need to be communicated during the image acquisition. This addresses our belief that the technologists serve as the eyes and ears of our department, as they can assess the patient and make judgements regarding the patient's health level and degree of nervousness. The technologist can make this selection in the picture archiving and communication system during image quality assurance.

Finally, the radiologist can determine if the results need to be communicated during the image interpretation process. With our system, the radiologist selects a button indicating that the results need to be communicated or a button indicating that he or she would like to talk directly with the ordering provider.

The final component of our critical results notification system is the reliable communication of results. We accomplish this by employing customer service representatives (43). Our customer service representatives are trained to follow a specific protocol regarding who to call, how to escalate the resolution of communication difficulties, what to communicate, and how to document the communication and communication attempts. Because this is the focus of their work, they can communicate critical results in an efficient and reliable manner. We believe that

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NEW MRI TRUNK PROTOCOL REQUEST FORM

Date Requested and by Whom:

Protocol Name:

Reason for Protocol Request (for tech education purposes):

Anatomy to be Included:

Contrast? If yes, what type?

Any Special Issues (i.e. positioning, prep, etc.)

Which scanners to build on? (Base, OP sites, GE, Philips, 1.5T, 3T)

Charges:

Does this need to be added to EPIC Protocol list?

Does a new EPIC order need to be created for providers?

	Plane + (2D vs 3D)	Sequence	Slice thickness range/Gap	Coverage	Image Options: (i.e. FS, RTr, navigator, etc.)	Reconstructed Images (i.e. in, out, fat, water, composite, reformats, etc.
1						
2						
3						
4						
5						
6						
7						
8						

Figure 6. Newly created document used to initiate a new protocol request for MRI. *FS* = fat saturation, *OP* = outpatient, *RTr* = respiratory triggered, *3D* = three dimensional, *2D* = two dimensional.

customer service representatives perform this task better (in terms of efficiency and documentation) than radiologists.

In 2011, we evaluated the effectiveness of our critical results notification system. At that time, we found that for 11.8% of all the studies obtained in our department, the results were communicated by our customer service representatives. At that time, we found also that the mean time to communicate critical results was 10.8 minutes, with more than 53% of the results communicated within 10 minutes. To ensure that the most critical results were communicated, we used our radiology reporting system to identify studies in which five critical diagnoses were made: torsion, tension pneumothorax, unexpected pneumoperitoneum, infarct, and embolism. At that time, the communication was documented in 95.7% (201/210) of the reports that contained a critical diagnosis. This compares favorably with

the results for other critical results communication systems. We have continued to monitor our notification system and have found that our results have persisted over time.

We believe that our critical results notification system addresses the service quality needs of our patients, the ordering providers, and the radiologists. The patient can have the results communicated to his or her ordering physician in a timely manner (responsiveness). Our liberal definition of a critical result allows providers and technologists to identify patients who are nervous or appear to be ill before the radiologist looks at the images (empathy). Ordering providers benefit from the identification of studies that are critical to them and from being called in a timely manner when results require their action (assurance). This allows them to better care for their patients. The radiologist benefits from having a simple process with which to identify studies that need to be communicated, having customer service representatives make the calls, and having good documentation of these communications (reliability, tangibles).

Conclusion

Radiology departments can learn from the customer service experiences of businesses. While many radiology practices have implemented customer service or patient experience initiatives, few practices have a comprehensive customer service program. Being cognizant of the five dimensions of service quality can help radiology practices target new customer service initiatives. As radiology departments are beginning to focus more on customer service, we believe that there is value in identifying projects that target each dimension of service quality.

The archetypal business examples described in this article show that there is value in identifying a single dimension of service quality and striving for excellence in that dimension. Although the described businesses have excelled in a single dimension of service quality, they have not ignored the other dimensions. In radiology departments, the concept can be similar. Some departments may choose to differentiate themselves by striving for excellence in one dimension. However, we believe that the majority of radiology departments will attempt to create a comprehensive customer service experience. With this model, most customer service projects will be focused on one dimension, but a suite of projects will be aimed at elevating service quality in each dimension. Even with this model, we believe that there is value in thinking about how each project can address each dimension of service quality and improve the overall experience for patients, ordering providers, and employees.

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