

InnOVATIONS:

Recognizing Advances in Health Care

An Issue Brief from the St. Louis Area Business Health Coalition

Process Redesign and Physician Engagement Reduce Double CT Scans

Abstract Advanced imaging can provide physicians detailed information to support effective clinical decisions. Yet some of these tests, particularly computed tomography (CT) scans, pose risks to patients by exposing them to cancer-causing radiation. Recent research suggests that unless use of CT scanning, x-rays and other nuclear medicine tests decrease, 3% to 5% of all future cancers may result from exposure during imaging.¹

To reduce overuse and promote efficiency, the Centers for Medicare and Medicaid Services (CMS) in 2010 began measuring and reporting rates of four tests that are often not supported by clinical evidence. They are MRI for low back pain, mammography follow-up, and “double” CT scans of the abdomen and chest. The results have been impressive.

Since CMS began reporting the percentage of Medicare patients that received double CT scans in 2010, rates have decreased for nearly every hospital in St. Louis. Des Peres, Christian and SSM DePaul are among the hospitals having the largest declines.

From 2000 to 2009, imaging utilization grew 85% nationwide. This was more than double the growth rate of physician visits or major procedures during the same period, according to CMS.

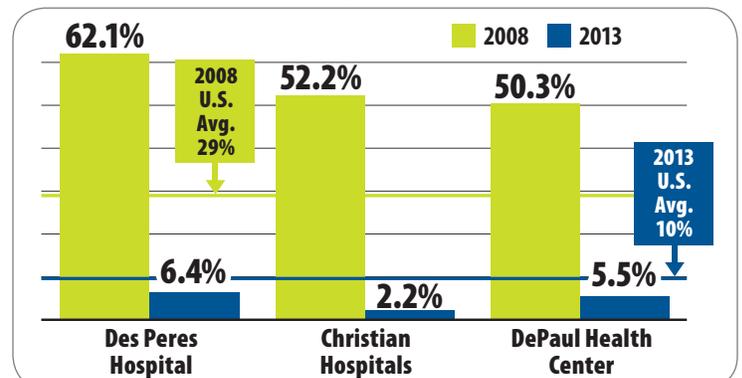
While the growth in advanced imaging such as CT studies is concerning, imaging can be beneficial. Imaging procedures such as CT scans have led to improvements in the diagnosis and treatment of numerous medical conditions. Yet, certain tests, such as “double” CT scans, are usually not necessary. In a double CT scan, a patient undergoes a regular CT scan first, and then gets a second scan with a contrast dye that makes certain areas more visible. Only 30% of the hospitals in Consumer Reports’ ratings had double-scan rates of 5% or less in both the chest and abdominal categories, which is the cut-off they use for a top rating.

Prompted by the dramatic nationwide increases in imaging, CMS first reported rates of imaging by hospital on Hospital Compare in 2010. Consistent with reporting for the majority of CMS data, there was a two-year time lag so the initial data was from 2008. Nationally, the average percentage of Medicare patients undergoing a double CT scan of the abdomen was 29% in 2008 and rates varied widely. In St. Louis, rates ranged from 0% to 77%. The average was 28% for hospitals in St. Louis.

Across the nation and in St. Louis, rates of abdominal double CT scans remained high until the 2010 reporting year. By 2013, the national rate had decreased to 10% and St. Louis rates had fallen to range from 1.9% to 23.8%. Des Peres, Christian and SSM DePaul had the largest decrease in rates from 2008 to 2013, illustrated in the graph to the right.

What enabled these dramatic declines? Each hospital’s approach was different, yet there were common themes. First, computer technology used to read the image has improved. In the early years, CT studies needed high doses of radiation or multiple sequences to produce a good image. Now, advances in computer post-processing techniques have reduced radiation needs to a fraction of the dose previously used and double CT scans are usually not necessary. Second, radiologists are playing a more active role in deciding which test a patient receives. Before, the radiologist’s responsibility was to perform the test ordered, read the image and report the findings. Now, the radiologist is more likely to collaborate with the ordering physician to advise them on the most appropriate exam that delivers the least amount of radiation to the patient. Further, new processes such as more detailed guidelines have been embedded into electronic and paper order forms to inform the physicians’ decision-making and support accountability efforts.

**% Double CT Scans of the Abdomen Selected
St. Louis Hospitals 2008 - 2013**



¹ Smith-Bindman, R, et al. “Radiation Dose Associated With Common Computed Tomography Examinations and the Associated Lifetime Attributable Risk of Cancer,” *Archives of Internal Medicine*, 2009;169(22):2078-2086.

Christian Hospital is a member of the BJC HealthCare hospital system. Several years ago, BJC developed a Best in Class Quality Performance Report Card to drive quality improvement among its member hospitals. BJC's Center of Clinical Excellence determines the measures to be included on the Report Card and sets the bar for performance for each facility. Hospital executives' incentive compensation is based in part on how well their facility meets these goals. The Quality Report Card has included metrics to reduce double CT scan utilization for the last two years.

First, Christian had to win the support of its radiologists. "This was relatively easy and took only two to three months to accomplish," said Steven Costley, Director of Clinical Quality and Performance Improvement. "The radiologists recognized physicians were ordering double CT studies out of habit."

Part of the problem stemmed from outdated radiology order sheets. "Usually the physician's office manager orders the test. We found some of them were using order sheets from 10 years ago," said Dr. Sebastian Rueckert, Chief of Radiology. "Christian developed a new radiology order sheet that clearly identifies specific diagnosis and procedure codes that would justify the need for a double CT study.

Then, the process was redesigned making Christian's CT technicians the first point of contact and giving them the authority to evaluate the order, stop the process if the diagnosis is on the exclusion list and contact the ordering physician. The hospital and its radiologists provide back-up in case of any push back from physicians when technicians coach them on the new guidelines.

If a practice is found to be ordering double CT scans frequently, a radiologist may provide one-on-one physician education. Educating the office staff is often just as important. Christian's radiology marketing staff outreaches to physician offices that order double CT studies frequently. "By targeting practices with the highest frequency and providing education, it is not all that often double CT scans are ordered," said Dr. Rueckert.



Sebastian Rueckert, M.D., Chief of Radiology, Christian Hospital (Photo courtesy of Christian Hospital of BJC HealthCare)



Steven Costley, Director of Clinical Quality and Performance Improvement, Christian Hospital (Photo courtesy of Christian Hospital of BJC HealthCare)

The results are significant. **In 2008, Christian Hospital performed abdominal double CT scans on more than 52% of its Medicare patients according to CMS Hospital Compare. In 2013, the rate dropped to just 2.2% of Medicare patients,** the largest decline of any hospital in the St. Louis area.

SSM DePaul Health Center is a member of the SSM Health hospital system. According to Dr. Robert Gresick, Medical Director, Diagnostic Imaging, CT scans are very useful for getting answers quickly for acutely ill patients that present to the emergency department, particularly those that have suffered trauma to internal organs. "We can quickly determine what type of surgeon is needed to most effectively treat the patient," Dr. Gresick said.

The radiology department at DePaul is accredited by the American College of Radiology (ACR) which has led a national initiative called Imaging Wisely to promote safety by reducing radiation in adult medical imaging. Radiologists at DePaul have developed imaging protocols that are consistent with ACR imaging guidelines. "Improvements in computer post-processing techniques are sufficiently sophisticated to produce a quality image while using only a fraction of the radiation dose, reducing the need for multiple scan sequences," Dr. Gresick said, "While in the past guidelines recommended a double CT scan for a medical condition, now with advances in technology the literature says one CT scan is good enough."

DePaul's CT technicians also play a role in reducing the number of double CT scans. When a CT study is ordered, the CT technician determines whether the order is consistent with the hospital's protocols. If clearly not, the CT technician changes the test and talks with the patient about the change. If the condition falls into a grey area, a DePaul radiologist will speak directly with the ordering physician. "Radiology is moving in the right direction," Dr. Gresick said, "Before, we would ask physicians to tell us what they want and we would do it. Now, we advise physicians on the best approach and proceed with the most appropriate exam that delivers the least radiation to the patient."

Des Peres Hospital, which is part of Tenet, a national for-profit health system, relies on a similar approach to make it easy for physicians to order the right test for the right patient. Des Peres performed double CT scans of the abdomen on more than 62% of its Medicare patients in 2008, the fifth highest percentage of any hospital in the region. Yet, by 2013 the rate was down to 6.4%, the second largest decrease among St. Louis hospitals.

Greater use of an electronic medical record (EMR) has played a major role in driving the decline in double CT scans for inpatient imaging at Des Peres. "The EMR has a list of diagnosis codes embedded in it that are excluded for double CT scans of the abdomen," said Susan Aly, MHA, RT (R), Director of Radiology. "When a physician orders a double CT scan of the abdomen and enters one of the excluded diagnosis codes, the EMR automatically issues an alert that the test is not appropriate. In addition, the EMR does not allow providers to order double CT scans of the chest."

A limitation of Des Peres' system is that orders for outpatient imaging tests are not entered in the EMR. When a radiology technologist receives an order for outpatient double CT scans on paper they must



Dr. Robert Gresick, M.D., Medical Director, Diagnostic Imaging (Photo courtesy of SSM DePaul Health Center, a member of the SSM Health hospital system)



Susan Aly, MHA, RT (R), Director of Radiology (Photo courtesy of Des Peres Hospital, a member of the Tenet hospital system)

evaluate them manually. If the diagnosis is one that does not warrant a double CT scan, the technologist automatically calls the physician's office and educates the office staff regarding the protocol. "Dr. Greg Cizek, Chief of Radiology, meets with physician groups on at least a quarterly basis to educate them regarding the protocol. The CMS initiative has really made a positive impact on patient safety and how things are ordered," Aly said.

In addition to managing the Radiology departments at Des Peres and St. Louis University hospitals, Aly serves as the co-chair of Tenet's National Imaging Advisory Council. Dr. Art Radow, also co-chair of the Council and Chief of Radiology at Tenet's Vanguard Hospital in Phoenix, received a grant from CMS to test new decision-support software for radiology as part of the Medicare Imaging Demonstration (MID) project.

The MID project tested whether physician use of clinical decision support systems (DSS) could improve the quality of imaging care by reducing unnecessary overuse. The DSS provides physicians with immediate feedback about whether a study is the most evidence-based choice for the patient, and, if not, guidance as to what might be a more appropriate, safer alternative. Magnetic resonance imaging (MRI) and ultrasound, which do not use radiation to produce images, can sometimes be used as a substitute for CT.

Seven groups of clinicians participated in the MID project from 2010 to 2012. Results of the MID project **indicated clinicians are responsive to feedback and are willing to change their original orders when guidelines on alternatives are available.**² CMS saw a significant drop in utilization as a result of the project, even though almost two-thirds of the advanced imaging orders placed through a DSS were not linked to a guideline. This means providers did not receive feedback on the most appropriate

imaging modality for the majority of orders placed. A leading MID recommendation for enhancing the effectiveness of DSSs called for a more comprehensive set of guidelines for advanced imaging.

Tenet's DSS software scans the patient's chart, gives the physician advice on the most appropriate test at the lowest radiation risk, and tracks the amount of radiation the patient receives over time if they receive an imaging test within the hospital system.

² Rand Report to Congress, April 2014

What Patients Need to Know

Patients should be fully informed of the risks involved with CT scans, the clinical importance of the study and if there is another imaging test that could be substituted that delivers less radiation. If CT scan is the only option, patients should ask their doctor to avoid double scans and repeat exams to reduce the amount of radiation exposure. Large adults may need more radiation to get a quality image. However, in smaller adults and children less radiation is needed so the dose should be lowered as much as possible or an alternative imaging test that delivers less radiation should be strongly considered.

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