Clinical Decision Support (CDS) Volume Impact Analysis

Guidance in Developing and Analyzing CDS Data

By 2020, imaging programs must comply with the Medicare CDS mandate for advanced imaging exams, otherwise known as the Medicare AUC Program. This program requires providers to consult appropriate use criteria (AUC) through an electronic clinical decision support system (CDS) when ordering advanced outpatient imaging exams. Implementation of this tool has the potential to impact current imaging volumes, because clinical guidelines may prompt providers to reduce inappropriate imaging orders and/or shift orders to more appropriate modalities.

Steps to Measure CDS Impact

Studies from early adopters of CDS reveal that successful implementation of the tool has the greatest impact on CT and MRI exams, generally with CT exam utilization decreasing and MRI exam utilization increasing after CDS use. This is mainly attributable to the higher radiation doses found in CT exams, since guidelines embedded in CDS tools may prompt providers to order MRIs to mitigate radiation dose concerns.

Organizations follow the steps below to track and measure the impact of CDS on volumes:

1. **Collect Baseline Utilization Data**: Prior to CDS go-live, collect baseline data for at least two months, up to one year, to understand current ordering patterns and utilization rates. Collect metrics that show utilization such as:

Per capita (or per 1,000) utilization rate

Per capita (or per 1,000) utilization rate variation by specialty, presenting condition

2. **Obtain Real-Time CDS Data**: Many vendors provide data tracking within their basic CDS software or allow organizations to purchase more robust packages. Access CDS data on a regular basis, such as monthly or quarterly. Continue to also track and analyze progress against key metrics collected during the baseline period.

3. **Develop a Plan to Analyze and Use Data**: Develop a plan internally to continually analyze the data and to prepare for major volume shifts that may impact capacity or scheduling processes.

Common Challenges in Measuring Impact

While stakeholders are eager to project volume shifts resulting from CDS implementation, it's difficult to provide national benchmarks. Modality shifts are unique to each organization depending on the level of appropriate ordering existing before CDS and providers' willingness to respond to appropriate use criteria.

Account for Important Caveats

Assume unique baseline of appropriate ordering due to existing organizational utilization management initiatives, influence of RBMs[1]

Expect organizational, physician preferences will contribute to individual implementation experience

1) Radiology Benefit Managers.

Source: Imaging Performance Partnership interviews and analysis.

Three Organizations' CDS Experiences

To guide estimates of CDS volume impact, three organizations' experiences are outlined below. These early adopters saw a significant impact from CDS implementation. However, it is important to note that their experience is not likely to be universal, for several reasons:

- These early adopters have embedded CDS and CDS education into referring physician workflows more thoroughly, and for a longer time, than many other providers.
- These early adopters implemented CDS before the wide use of preauthorization by payers. For providers subject to preauthorization, there is already a utilization control mechanism in place, so volume decreases due to CDS are not likely to be as significant.
- Organizations with an existing baseline of highly appropriate imaging may see no change at all.

Massachusetts General Hospital[1], 2007 - 2013

28% Utilization rate decrease for all high-cost imaging[2]

33% Utilization rate decrease for CT

5% Utilization rate decrease for MRI

Compare to:

Compare to:

Compare to:

Smaller MRI utilization decrease at MGH than Medicare suggests CT to MRI shift due to CDS

Other (non-CDS) providers[3], 2007 - 2013

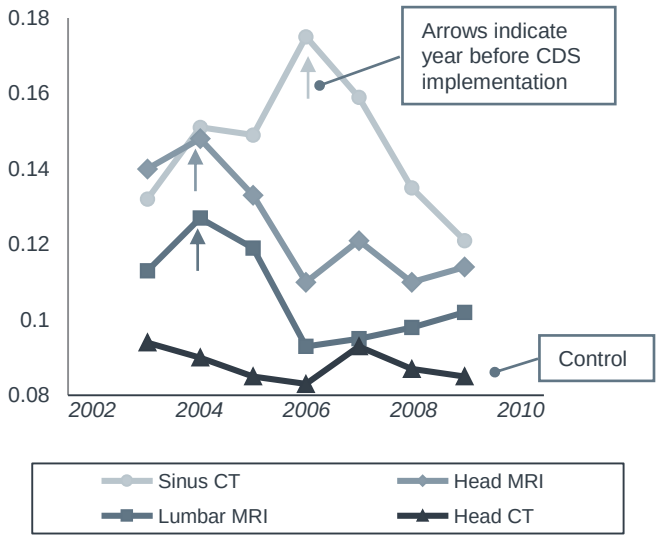
20% Utilization rate decrease for high-cost imaging exams at Massachusetts providers using RBM

23% Utilization rate decrease in CT under Medicare Part B

13% Utilization rate decrease in CT under Medicare Part B

Utilization for Specific High-Cost, Low-Value Exams at Virginia Mason

Rate of Outpatient Imaging for Patients with Disease-Specific Billing Codes From Regional Payer



1) Implemented CDS in 2005, tracked results in outpatient and emergency department for all insurance types over seven year period, 2007 – 2013.
2) High-cost imaging: sum of CT MRI, nuclear imaging, and PET.
3) Did not implement CDS.
4) Implemented CDS in 2007; tracked results in outpatient setting for all insurance types over two month period before and after.

HealthPartners CDS Outcomes, 2007[4]

36% Decrease in CT Head exams for 72 indications

vs.

3.3% Increase in MRI Head exams for 68 indications

Source: Blackmore C, et al., "Effectiveness of Clinical Decision Support in Controlling Inappropriate Imaging," Journal of the American College of Radiology 8 (2011): 19-25; Harvey L. Neiman Health Policy Institute, Neimanhpi.org; Solberg LF, et al. "Effects of Electronic Decision Support on High-Tech Diagnostic Imaging Orders and Patients," *Am J Manag Care*, 16, no. 2 (2010): 102-106; Weilburg, Jeffrey B, et al. "Utilization Management of High-Cost Imaging in an Outpatient Setting in a Large Stable Patient and Provider Cohort over 7 Years," *Radiology,* 284, no. 3 (2017): 766-776. Imaging Performance Partnership interviews and analysis.

Additional Resources to Guide Analysis

- Blackmore C, et al., "Effectiveness of Clinical Decision Support in Controlling Inappropriate Imaging," Journal of the American College of Radiology 8 (2011): 19-25.
- Ip, Ivan K., et al. "Impact of IT-enabled Intervention on MRI Use for Back Pain," *Journal of Medicine*, 127 (2014): 512-518.
- Khorasani, Ramin, et al. "Ten Commandments for Effective Clinical Decision Support for Imaging: Enabling Evidence-Based Practice to Improve Quality and Reduce Waste," *American Journal of Roentgenology*, 203 (2014): 945-951.
- Min, Adam, et al. "Clinical Decision Support Decreases Volume of Imaging for Low Back Pain in an Urban Emergency Department," *J Am Coll Radiol*, 14 (2017): 889-899.
- Moriarity, Andrew, K., et al. "The Effect of Clinical Decision Support for Advanced Impatient Imaging," *J Am Coll Radiol*. 12 (2015): 358-363.
- Raja, Alis S., et al. "Effect of Computerized Clinical Decision Support on the Use and Yield of CT Pulmonary Angiography in the Emergency Department," *Radiology*, 262, no. 2 (2012): 468-474.
- Solberg LF, et al. "Effects of Electronic Decision Support on High-Tech Diagnostic Imaging Orders and Patients," *Am J Manag Care*, 16, no. 2 (2010): 102-106.
- Weilburg, Jeffrey B, et al. "Utilization Management of High-Cost Imaging in an Outpatient Setting in a Large Stable Patient and Provider Cohort over 7 Years," *Radiology,* 284, no. 3 (2017): 766-776.

Source: Imaging Performance Partnership interviews and analysis.