AI POWERED ANALYTICS-AN INNOVATIVE APPROACH FOR OPTIMIZING THE COST, QUALITY, AND OUTCOMES OF SURGICAL PROCEDURES

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ABSTRACT: Many health systems in the US are operating within thin or negative margins and are under tremendous pressure to reduce costs. With the right strategy driven by data, cost reduction can be achieved while improving quality by reducing unnecessary variations and waste in surgical procedures. The clinical supply chain team at Bon Secours Mercy Health developed a data analytics tool to gain insights into quality improvement and cost reduction opportunities, but the tool itself is complex and requires training and analyst support. We applied an Artificial Intelligence (AI) module to the tool to enable any user to rapidly access usable data by asking simple questions in natural language. This enabled operational and clinical stakeholders to identify opportunities for cost and quality improvement in real-time. This poster introduces the AI capabilities of the tool and potential future applications in optimizing surgical service lines.

BACKGROUND: Delivering safe and cost-effective care requires the ability to measure quality/outcomes and cost-per-case (CPC) for each patient encounter and analytics that enable visibility into opportunities to improve both, ideally simultaneously.

The supply chain team (known as Advantus Health Partners) of Bon Secours Mercy Health (a 48-hospital health system in 5 states and 2 countries) created a digital tool to measure CPC and quality/outcomes for all in-patient procedures. The tool, known as the CQO Tool, was created in partnership with a third-party data/software development company and incorporates data from multiple sources, including the electronic health record, healthcare cost accounting system and the master data management system.

The CQO Tool was designed to provide a comprehensive perspective into the cost and utilization of clinical supplies and the associated impact to the hospital and patient outcomes focusing on unnecessary variations that cause waste and poor outcomes.
For the initial analysis, the top 5 procedures by volume were identified for four surgical specialties: Orthopedics, spine, neurosciences, and surgery. The CQO Tool was used to analyze:

- Cost and outcome assessments by specialty, procedure, physician, and product.
- Compare physician, procedure, supply utilization and outcome metrics to identify variances for standardization to best practice

ANALYSIS: Initial analysis revealed a combined $25M savings opportunity (annualized). However, implementation of the opportunities would require a more robust interactive dashboard that clinical leaders can use daily to ask questions to validate results and monitor progress. Getting answers in real time would take hours, so applying AI to the tool would be an ideal use case to change the way leaders can communicate and collaborate with clinical teams to optimize making quick decisions and operationalize changes.

Combined Annualized Savings Opportunities

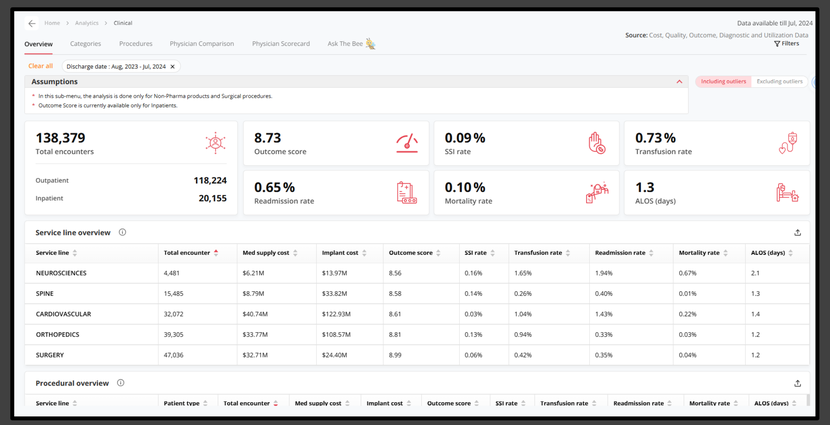
	10th %ile	25th %ile	50th %ile
Spine	$6.02M	$4.04M	$2.36M
Orthopedics	$13.59M	$9.13M	$5.28M
Neuroscience	$2.53M	$1.69M	$932.02K
Surgery	$2.86M	$1.95M	$1.15M
TOTAL	**$25.00M**	**$16.81M**	**$9.72M**

** Based on procedures performed Sep 23 to Feb 24*

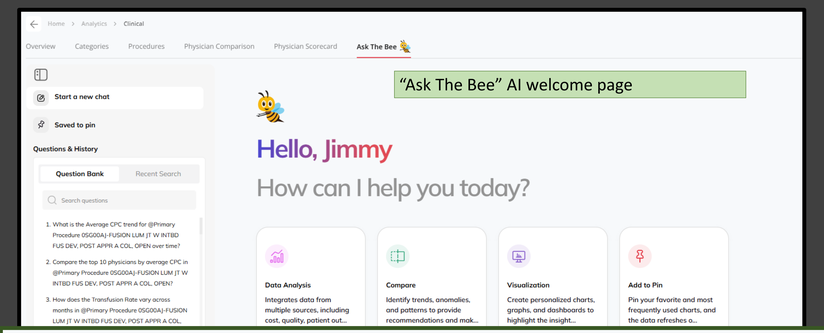
ARTIFICIAL INTELLIGENCE (AI): To the existing CQO Tool, a generative AI chatbot powered by ChatGPT-4o (OpenAI) was incorporated to enable asking questions using natural language and ICD-1/CPT terminology. Users can type questions in a free-text box or choose a common question from a question bank. Examples of commonly asked questions include:

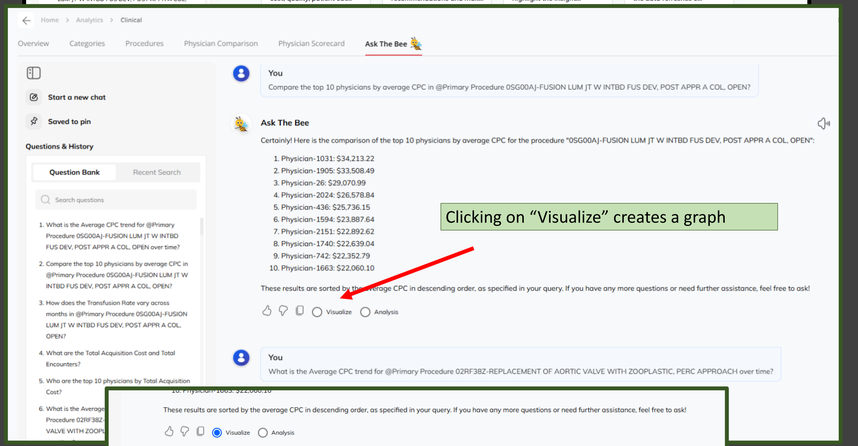
1. What is the Average CPC trend for @Primary Procedure over (time)?
2. Compare the Physicians based on number of encounters, Cost per case, and Outcome Score for @primary procedure
3. What is the transfusion rate for @Primary Procedure over (time) by physician?
4. What is the 10th percentile System Benchmark CPC for @Primary Procedure?
5. What is the Outcome Score trend over the years for @Service Line Spine?
6. Compare the number of encounters, cost per case, outcome score, SSI rate, and transfusion rate for the top 10 procedures by encounters at @Facility.
7. How does SSI rate vary across different patient types?
8. Compare the average LOS for @Primary Procedure by physician.
9. Compare average outcomes scores for @Primary Procedure by facility
10. Compare off-contract spend for @ Service Line by physician

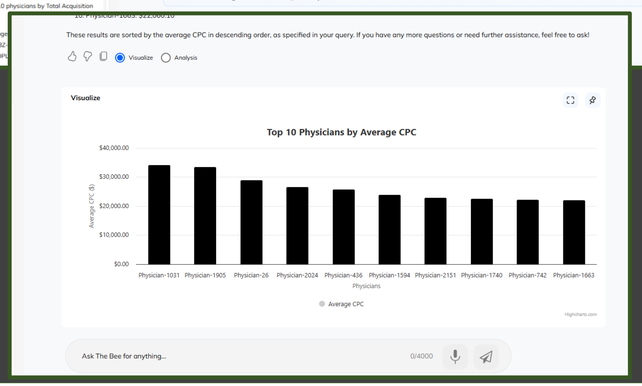
Discussion: The CQO Tool and Ask The Bee demonstrates how AI can enable health care leaders to use data real time make quick decisions and facilitate conversations with clinicians on how care can be improved and more cost effective. As with any data tool, care must always be taken to ensure data accuracy and integrity. The topic of AI itself is broadly controversial due to potential for hallucinations and amplification of human errors. While it will take time to fully validate the tool's integrity and effectiveness, oversight of the tool using a Continuous Process Improvement model will allow monitored launch and use in real world clinical settings.



CQO Tool dashboard







Note: All data depicted here are fictitious and are for demonstration purposes only. The CQO Tool and "Ask The Bee" are products of SupplyCopia Inc. and presented with permission.