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Improving Abstraction Quality Through Metric Deconstruction

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REFERENCES:
1. National Cardiovascular Data Registry. American College of Cardiology
2.Artificial intelligence as the next step towards precision pathology. Acs B, Rantalainen M, Hartman J. J Intern Med. 2020;288:62–81. doi: 10.1111/joim.13030.

BACKGROUND

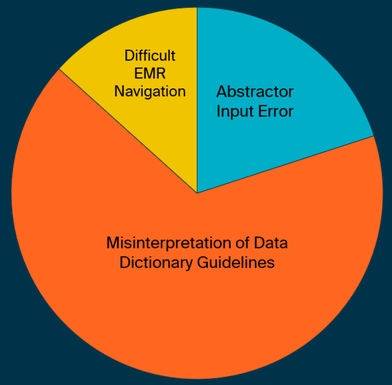
Despite consistent data collection, one of our contracted sites continued to struggle with poor performance related to NCDR CathPCI© Quality metric 4462. This revealed a disconnect between simply submitting data and using it to drive improvement. To address this, our project focused on breaking down the metric into its core components and creating a structured analysis process. This approach helped uncover documentation gaps, abstraction errors, and opportunities for targeted process improvement.

METHODOLOGY & DATA ANALYSIS

- **Identified performance concerns:** A participating site flagged metric 4462 as a persistent outlier despite regular data submission, prompting a need for deeper case-level analysis.
- **Extracted and filtered relevant data:** Using the CathPCI Data Extract feature, all elective PCI cases performed in 2024 were isolated to ensure a complete metric-specific dataset.
- **Deconstructed the metric components:** A custom spreadsheet was developed reflecting numerator, denominator, and exclusion criteria (e.g., stress test results, imaging dates, FFR/iFR values).
- **Populated spreadsheet with raw data:** Data from the extract was aligned by metric logic, and formulas calculated whether stress testing fell within the 182-day window; conditional formatting helped flag cases.
- **Analyzed and identified discrepancies**: We identified cases with no stress test, indeterminate results, missing FFR/iFR or CT-FFR values, and urgency misclassifications.
- **Escalated cases for review:** Outliers underwent deeper chart review and team discussion to verify documentation and abstraction decisions.
- **Developed targeted improvements:** Findings were shared with abstractors and clinicians, enabling focused training on exclusions, result interpretation, and data element capture.

			Criteria				Exclusions								
Metric Fallout - Requires Review	Procedure Date	PCI Status	Days between Stress Test + PCI	Results	FFR (<=0.8)	iFR (<=0.89)	Severe Aortic Stenosis	Staged PCI	New Onset Angina	Urgent/ Emergent/ Salvage PCI	STEMI	NSTE-ACS	Post-Cardiac Transplant	Pre-op Eval AND Solid Organ Transplant	Stable Known CAD AND Stable Angina AND Brachytherapy
Ok	1/6/2025	Elective	None	N/A	0.6	N/A	No	No	No				No	No	No
Ok	1/15/2025	Elective	7	Positive	N/A	N/A	No	No	No				No	No	No
Ok	2/13/2025	Elective	None	N/A	N/A	N/A	Yes	Yes	No				No	No	No
Ok	1/24/2025	Elective	None	N/A	0.79	0.76	No	No	No				No	No	No
Fallout	2/11/2025	Elective	>6 mos.	Positive	N/A	N/A	No	No	No				No	No	No

Analysis of the 15 reclassified cases revealed three main error types:



Difficult EMR Navigation:
2 cases were incorrectly coded d/t inability to find Stress Tests

Abstractor Input Error:
3 cases were incorrectly coded d/t abstractor error

Misinterpretation of Data Dictionary Guidelines:
10 cases were incorrectly coded d/t confusion around how to code specific data elements

Pt. charts missing pertinent Stress Test information (2)
Stress Test miscoded as Negative instead of Positive (1)
Staged PCI procedures miscoded (2)
DFR value coded in the wrong data field (3)
Failure to code CT-FFR data (3)
Incorrect Cath Lab Indication (Worsening vs. New Onset Angina) (2)
Misclassified PCI Status (Elective vs. Urgent) (2)

Further analysis of the 7 true fallout cases found:

- Stress tests that were positive but performed outside the 6-month (182-day) inclusion window (4)
- Cases interpreted as Staged PCIs by providers, but they exceeded the NCDR's 90-day window for classification as staged procedures (2)
- Stress test performed within the acceptable timeframe; however, the results were indeterminate, excluding it from the numerator (1)

Of the 66 elective PCI procedures performed in 2024, 22 (33%) were initially flagged as Metric 4462 fallouts. Upon structured reanalysis, only 7 (11%) were confirmed as true fallouts, demonstrating a 68% reduction. This outcome was driven by improved abstraction accuracy and documentation review.

VALUE PROPOSITION

By breaking down complex CathPCI metrics into actionable data points, our project enables providers to identify documentation gaps, improve abstraction accuracy, and enhance clinical decision-making, ultimately leading to better care efficiencies and patient outcomes. Recognizing the potential to scale this approach, we are integrating AI-assisted tools to automate data extraction and analysis, which will power future dashboards and empower sites to develop targeted solutions more efficiently. This not only supports providers but also contributes to broader healthcare cost control and improved quality across systems

CONCLUSION

This project demonstrated that breaking down registry metrics into their component data elements can identify hidden abstraction errors and improve both data quality and operational outcomes. By combining manual review with plans for AI integration, we established a scalable framework that other sites can adopt. While manual review remains resource-intensive, the future integration of AI will greatly enhance consistency and efficiency in our efforts toward quality improvement.