

Electronic Health Records in the Post-HITECH Era: Rethinking Vendor Performance and Certification

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Three Key Points

Thee Key Takeaways

- There is significant variation across vendors in hospital Stage 2 Meaningful Use criteria performance
- Some vendors were consistently associated with higher performance, others had mixed results
- **BUT:** most variation in performance is not explained by vendor or other observable characteristics

Background and Significance

HITECH: Quick Overview

- 2009: Health Information Technology for Economic and Clinical Health
- \$35 billion to support HIT adoption
- Medicare and Medicaid Electronic Health Record (EHR) Incentive Program
 - Ensure the “meaningful use” of EHRs
- ONC Health IT Certification Process

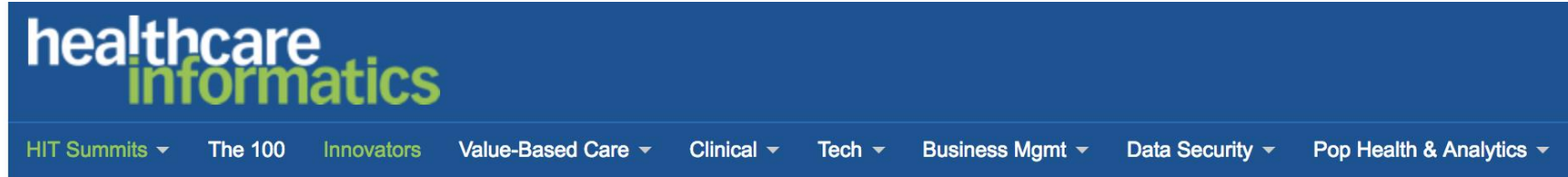
Meaningful Use

- Attestation necessary to receive subsidy (and avoid penalty in later stages)
- Multiple stages
- Core and Menu criteria
- "All or nothing" - must meet minimum threshold for each criteria to receive credit, no bonus for exceeding threshold

ONC EHR Certification Process

- Meant to ensure EHR products can meet Meaningful Use criteria
- Products submitted by vendors and certified by Office of the National Coordinator for Health IT process
- Recent changes in certification has moved towards self-report attestation of capabilities

ONC EHR Certification Process



eClinicalWorks Will Pay \$155M to Settle False Claims Act Allegations

May 31, 2017 by Heather Landi

In addition to the monetary settlement, the vendor must give customers updated versions of their software free of charge and allow customers to transfer their data to another EHR software provider, without service charges

EHR Performance

- ONC certification guarantees only a minimum level of performance
- Anecdotal evidence of performance differences across products
- Prior studies detailing variation across vendors in the display of test results¹ and clinical decision support²
- Clear differences in design choices between vendors

1. Sittig DF, Murphy DR, Smith MW, et al. Graphical display of diagnostic test results in electronic health records: a comparison of 8 systems. *J Am Med Inform Assoc.* 2015;22(4):900–04.

2. McCoy AB, Wright A, Sittig DF. Cross-vendor evaluation of key userdefined clinical decision support capabilities: a scenario-based assessment of certified electronic health records with guidelines for future development. *J Am Med Inform Assoc.* 2015;22(5):1081–88.

What's at Stake?

- EHR implementations are hugely expensive¹
 - Hundreds of millions of dollars in many large hospitals
 - Partners HealthCare: \$1.2 billion!
- Quality / value-based payment
- Role of policymaking and regulation

Objective

Research Questions

- Does EHR vendor choice impact hospital performance on Meaningful Use criteria?
- Are those effects consistent across Meaningful Use criteria?
- How much performance is explained by vendor choice?

Methods

Data Sources

- Dependent variables: 6 Stage 2 Meaningful Use criteria scores
 - CPOE for Medications
 - View / Download / Transmission of Data Available to Patients
 - View / Download / Transmission of Data Used by Patients
 - Medication Reconciliation Performed
 - Summary of Care Record Electronically Created
 - Summary of Care Record Sent Electronically
- Independent variables of interest: Certified Health IT Product List database
- Control variables: American Hospital Association annual survey and IT supplement

Study Population

- Non-federal hospitals
- Those who had attested to Stage 2 Meaningful Use in 2014
- 1,436 unique hospitals
- Important caveats about sample apply here.

Analysis

- Descriptive statistics
- Ordinary least squares regression
- Robustness: instrumental variables

Results

Sample Descriptive Statistics

Hospitals with at least 1 certified criteria coming from this vendor:	Freq. (%)
Epic	393 (27.4)
Cerner	360 (25.1)
MEDITECH	282 (19.6)
McKesson	141 (9.8)
MEDHOST	109 (7.6)
Healthland	71 (4.9)
Allscripts	60 (4.2)
Other	137 (9.5)
EHR system characteristics	
Complete EHR	413 (28.8)
Modular EHR	1023 (71.2)
Among modular EHRs:	
Only 1 vendor	561 (54.84)
More than 1 vendor	462 (45.16)
Measure of vendor fragmentation	Mean (range)
Herfindahl-Hirschman index	0.92 (0.16–1.0)
Stage 2 meaningful use performance levels	
Medication CPOE	84.6 (60.1–100%)
View/download/transmit available	87.6 (50.1–100%)
View/download/transmit used	15.1 (5.1–100%)
Medication reconciliation	85.9 (50.4–100%)
Summary of care records provided	78.4 (50.2–100%)
Summary of care records sent electronically	36.1 (22.0–100%)

Hospitals in Top Quartile of Number of MU Criteria

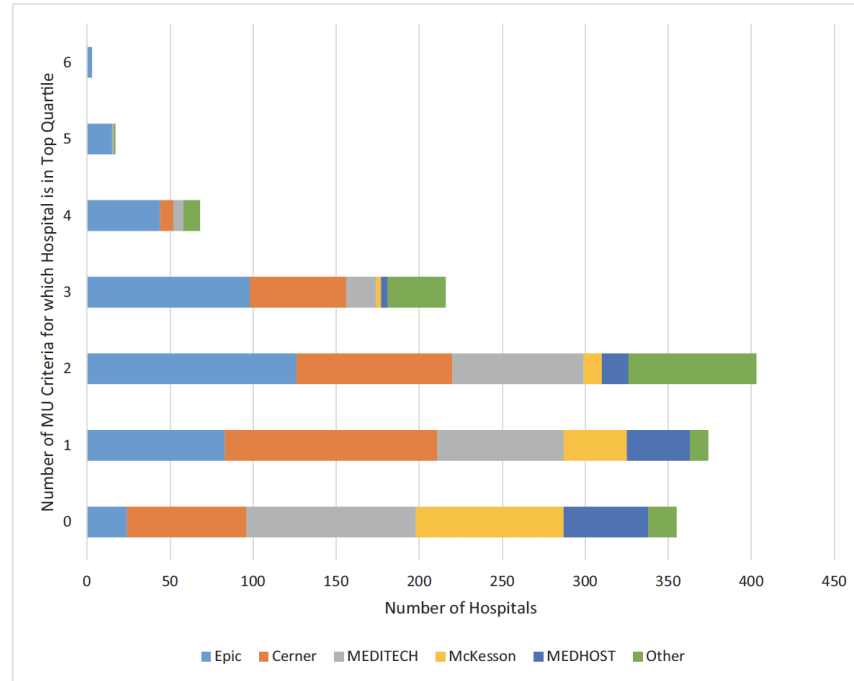


Figure 1. Meaningful use achievement across criteria: counts of hospitals in the top quartile for Stage 2 meaningful use criteria by vendor.

Vendors Used by Hospitals in Top Quartile by Criteria

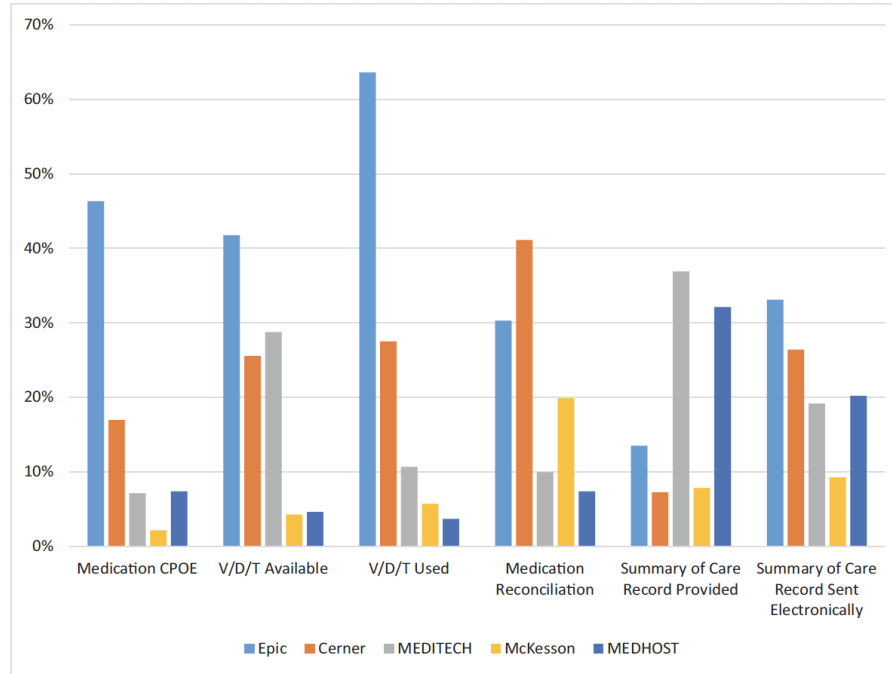


Figure 2. EHR vendors used by hospitals in the top quartile of Stage 2 meaningful use criteria by individual criterion.

OLS Regression

	CPOE for Medications	VDT Available	VDT Used	Medication Reconciliation	SCR Created	SCR Sent Electronically
Epic	10.33*	8.34*	24.62*	3.09*	-0.15	10.61*
Cerner	4.02*	0.64	14.70*	4.39*	-6.69*	2.89
MEDITECH	-1.13	-2.26	10.58*	-5.28*	3.80	1.08
McKesson	-2.39	-10.19*	7.43*	-4.00*	-7.58*	-5.75*
MEDHOST	-0.41	2.18	6.85*	-9.66*	3.48	-1.53

* Represents $p < 0.05$

Regressions included hospital control variables not shown including: ownership, size, RHIO participation, CAH status, teaching status.

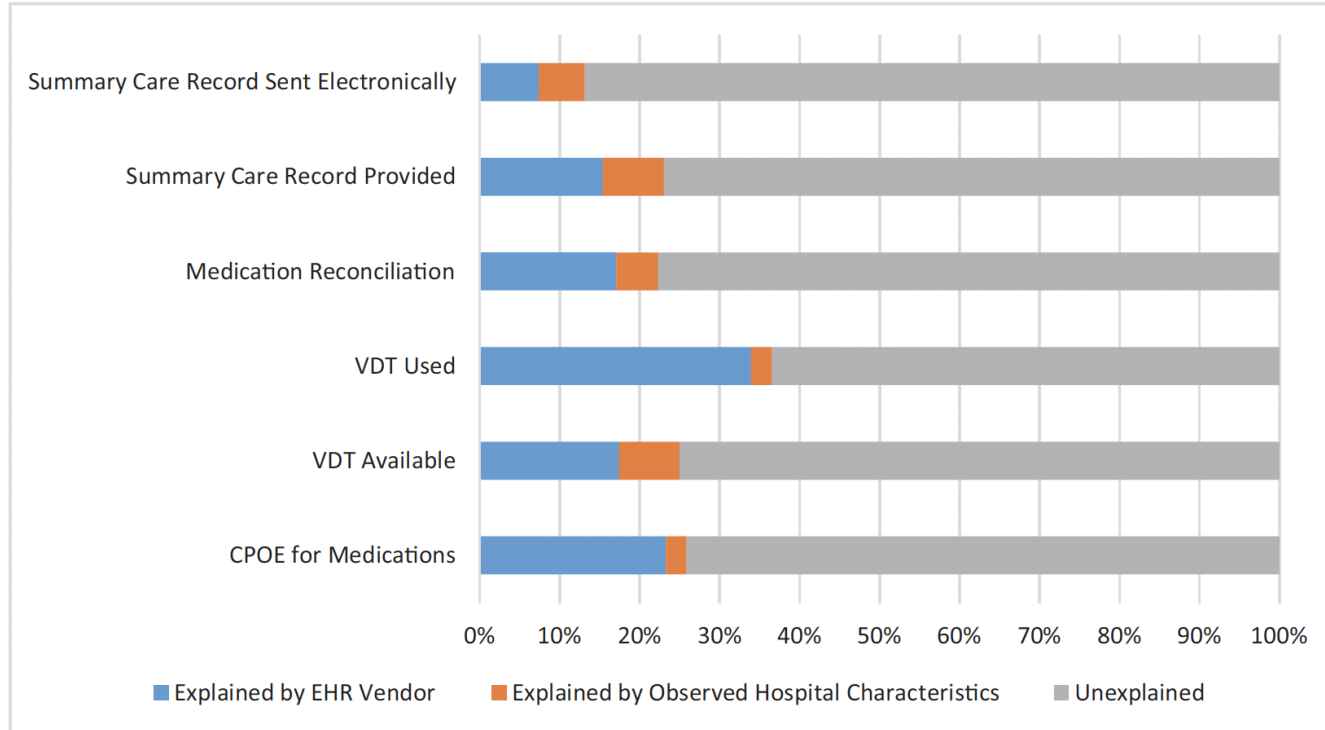
Instrumental Variables Regression

	CPOE for Medications	VDT Available	VDT Used	Medication Reconciliation	SCR Created	SCR Sent Electronically
Epic	11.51*	15.61*	13.60*	5.88	-2.96	5.48
Cerner	-5.93	6.29	-23.33*	-2.24	-0.24	-26.33
MEDITECH	-2.04	-5.69	-4.38	8.20	-17.87	-24.74
McKesson	3.71	-18.15	2.00	-6.97	-13.37	0.26
MEDHOST	3.71	1.18	0.09	0.37	13.63*	11.97

* Represents $p < 0.05$

Regressions included hospital control variables not shown including: ownership, size, RHIO participation, CAH status, teaching status.

Variation Explained by Observable Characteristics



Discussion

What Our Results Mean

- EHR vendor is significantly associated with performance on our Stage 2 Meaningful Use measures
- Some vendors are consistently positive, while others have mixed results
- Vendor choice matters, but not nearly as much as unobserved characteristics

For Practitioners

- EHR vendor choice matters
- Helpful data for making purchasing decisions
- BUT, other things matter more

For Policymakers

- There is significant variation in EHR products
- What is the goal of the certification process?
- How should we regulate EHR products?

Important Limitations

- Non-random sample
- Stage 2 Meaningful Use criteria are not a perfect proxy for quality
- Endogeneity / causality concerns (despite instrumental variables)
- No obvious next steps

Conclusion

Key Points Revisited

- There is significant variation across vendors in hospital Stage 2 Meaningful Use criteria performance
- Some vendors were consistently associated with higher performance, others had mixed results
- **BUT:** most variation in performance is not explained by vendor or other observable characteristics

Thank You!