

Assessing the Relationship between Patient Safety Culture and EHR Strategy

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SAFETY CULTURE

- High Reliability Organizations (HROs)
 - Complex tasks in hazardous and turbulent conditions
 - Low levels of adverse events and elimination of catastrophic failures
- Safety performance success attributed to strong safety culture
 - Open flow of information
 - Accountability in their coordination
- IOM reports call for development of patient safety culture (PSC)
 - Essential in care quality improvement



PATIENT SAFETY CULTURE

- Hospitals with strong PSCs:
 - Promote behaviors that enhance collective learning
 - Address unproductive beliefs and attitudes about errors
 - Identify the root causes errors and work to eradicate mistakes
- Strong PSC linked to reduced:
 - Rates of hospital readmission
 - Medication and other order entry errors
- Senior executives crucial in developing a strong PSC
 - Shared cultures rarely emerge without an effort due to loose coupling



Electronic Health Records

- EHR functionalities expected to:
 - Lead to better care quality
 - Unnecessary cost avoidance
 - Instill a patient safety focus as a cultural norm
- “Meaningful Use” (MU) program designed to promote Electronic Health Records (EHRs) implementation and adoption
- MU will roll out in stages to ensure manageable implementation
 - Stage one (2013) includes applications that target known patient safety issues (e.g., computerized provider order entry)



EHR Adoption and Implementation Strategies

- EHR adoption and implementation strategic decisions are critical:
 - Expensive costs
 - Administrative complexity
 - Difficulty associated with switching EHR systems
- Hospital administrators seek to match their EHR with existing operational and decision-making structures

EHR Adoption and Implementation Strategies

- Adoption Strategies:
 - Best-of-breed
 - Single vendor
 - Best of suite
 - Self-developed
- Implementation Strategies:
 - “Big Bang”
 - Incremental
- More organizational change for ‘best of breed’ and ‘best of suite’
 - Suggests that EHR adoption strategy might influence culture as well

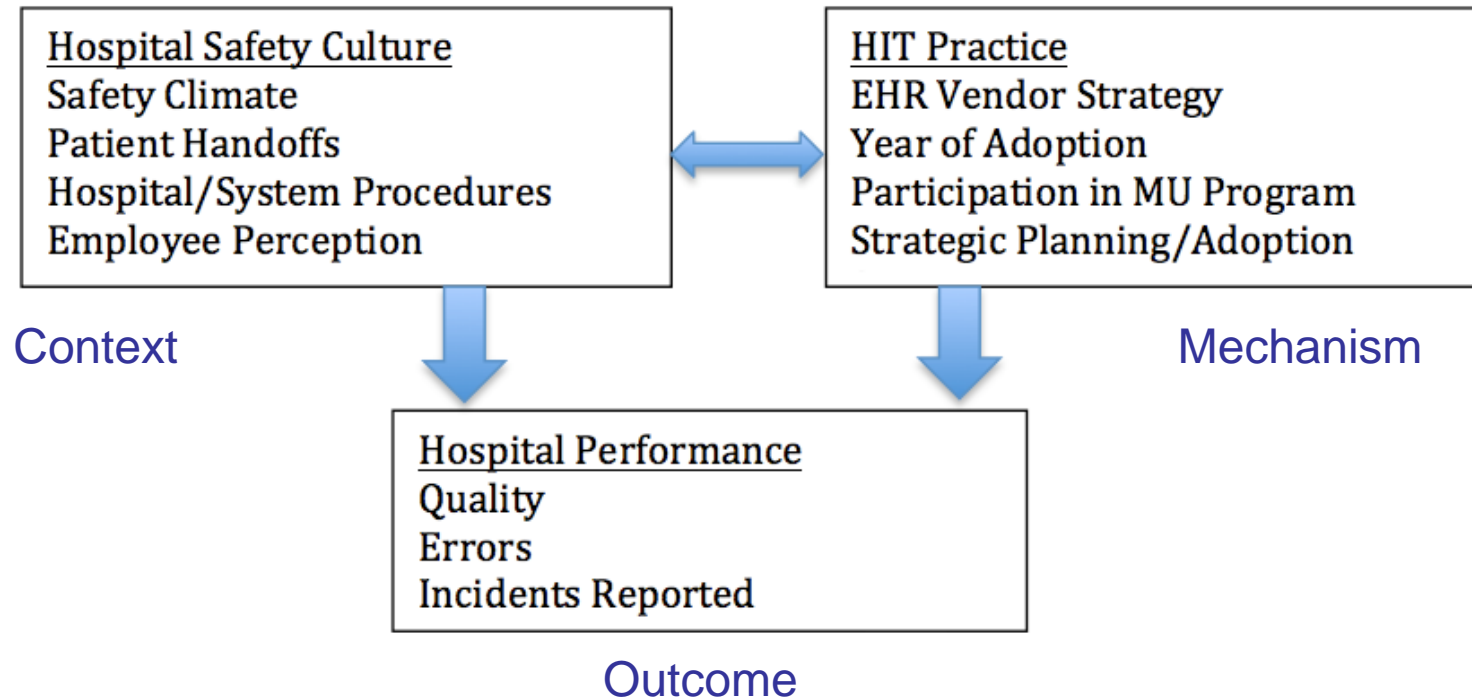
RESEARCH CONTRIBUTION

- PSC and EHR studies each identify patient safety outcomes as central to high quality care
 - The relationship between them has not yet been explored
 - Critical to justifying ongoing funding for major federal and state programs
 - Enables appreciation of the influence of implementing new technologies on organizational culture

The purpose of this analysis is to explore the relationship between hospitals' EHR adoption and implementation strategies and their patient safety cultures

Conceptual Framework

Figure 1: Conceptual Framework: Context + Mechanism = Outcome



- H_1 : Hospital safety culture will be positively correlated with HIT Practice
- H_2 : Hospital HIT Practice will be positively correlated with hospital performance

METHODOLOGY

■ Data Sources

- AHRQ's Hospital Survey on Patient Safety Culture (Hospital SOPS) from 2007 – 2011 (n= 88,000 individual respondents across 147 hospitals)
- American Hospital Association (AHA) Information Technology Supplement

■ Statistical Analyses

- Hierarchical Linear Model (HLM)

■ Dependent Variables

- *Patient Safety Grade*
- *Number of Events Reported*

■ Independent Variables

- EHR MU Target YR variables
- EHR implementation year
- EHR vendor strategy

■ Control Variables

- Procedures/Systems Prevents Errors
- Work Climate Promotes Patient Safety
- Climate Promotes Patient Safety (Avg.)
- Exchange of Information
- Hospital Region
- Teaching Status
- Bed Size
- Government Ownership



RESULTS

(ABBREVIATED)

	Patient Safety Grade	Number of Events Reported
Implementation Year (Continuous)	0.00 ⁺⁺ (0.00)	-0.00* (0.00)
Meaningful Use Target YR (2011)		
MU Target YR Missing	-0.03 ⁺ (0.03)	0.07 (0.06)
MU Target YR 2012	-0.02 ⁺ (0.02)	-0.12 ⁺ (0.03)
MU Target YR 2013	0.00 ⁺ (0.03)	-0.01 (0.06)
MU Target YR 2015	-	-
Do Not Know MU Target	-0.00 ⁺ (0.02)	-0.06 ⁺ (0.04)
EMR/EHR Description (Best of Breed)		
Single Vendor	0.01 ⁺⁺ (0.01)	0.06 ⁺ (0.03)
Self-developed	-0.01 (0.07)	-0.12 (0.15)
Average Work Climate	-0.11 ⁺ (0.03)	-0.03 (0.07)
Model Fit		
Log Likelihood (10³)	-79.9	-111.8
Wald test (10³) (p < .001)	52.6	1.5
LR hierarchical model test	205.44	615.08

DISCUSSION

- Results support H_2 , but not H_1
 - Hospital EHR strategy was related to the patient safety outcomes
 - However not related to PSC
 - Mixed support for the application of the CMO model
- EHRs heighten provider awareness through feedback channels
 - EHR implementation is likely to raise awareness around patient safety incidences
 - Some additional form of feedback is needed to translate the incidences to the abstract *Patient Safety Grade* measure
- Difference in two items may reflect a form of bias
 - *Number of Events Reported* may serve as leading indicator of facility patient safety reliability
 - *Patient Safety Grade* could be inflated in comparison to the events reported measure
 - Low performers tend to overestimate their abilities

IMPLICATIONS

- The results of this study have implications for both healthcare policy and practice
 - MU policies may have a significant relationship to patient safety outcomes
 - EHR systems may be aiding in hospitals' attainment as HROs
- Exploration of the temporal inferences of this relationship would extend this inquiry
 - Determine whether a strong PSC frame EHR strategies as a mechanism
 - EHR systems mechanically focus attention toward specific patient safety routines therein impacting the PSC
- The inconsistencies between *Number of Events Reported* and the *Patient Safety Grades* can be explored across:
 - Types of providers
 - Departmental units

Shared Patient Safety Culture Perceptions & Outcomes

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Purpose

- To explore the relationship between management and clinical professionals' safety culture beliefs and the care quality outcomes within those organizations.

Methods

- Two data sets were used: 2011 AHRQ Hospital Survey on Patient Safety Culture and CMS Hospital Compare Data. Linear regression is used to analyze the relationship between hospitals' safety culture and patient satisfaction controlling for other factors.

Relationships between manager-clinician patient safety culture agreement and adherence to processes of care among US hospitals

Patient safety culture domains: agreement/disagreement between clinicians and managers perceptions	Global measure of adherence to processes of care for acute myocardial infarction, heart failure, and pneumonia (B)			
Communication Openness	Group 1	Group 2	Group 3	Group 4
	Reference	-2.03***	-1.47**	-1.67**
	1.67***	Reference	.09	.01
	1.47**	-.56	Reference	-.20
	1.67**	-.36	.20	Reference
Feedback	Group 1	Group 2	Group 3	Group 4
	Reference	-.47	-.01	-.31
	.70	Reference	1.14	.58
	.01	-.47	Reference	-.31
	.31	-.16	.31	Reference
Teamwork within units	Group 1	Group 2	Group 3	Group 4
	Reference	-.87	-.52	.15
	.50	Reference	.86	1.02
	.52	-.35	Reference	.67
	-.15	-1.03	-.67	Reference
Teamwork across units	Group 1	Group 2	Group 3	Group 4
	Reference	-.13*	-.14**	.72
	1.03*	Reference	.63	1.76**
	1.42*	.41	Reference	2.14**
	-.72	-1.73**	-2.14**	Reference

Group 1: Managers and clinicians agree that patient safety culture is high;

Group 2: Managers and clinicians agree that patient safety culture is low;

Group 3: Managers perceive that safety culture is high, but clinicians perceive that it is low;

Group 4: Managers perceive that safety culture is low, but clinicians perceive that it is high.

Examination of the relationship between management and clinician perception of patient safety culture and patient satisfaction

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Purpose

- The purpose of this study is to explore the relationship between professionals' safety culture beliefs and the patients' satisfaction with those organizations. In particular, the agreement between managers and providers on the quality of their patient safety culture is disaggregated.

Methods

Two data sets were used: 2012 Hospital Survey on Patient Safety Culture and the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS). Linear regression is used to analyze the relationship between hospitals' safety culture and patient satisfaction controlling for other factors. The dependent variables were four HCAHPS patient satisfaction measures: communication with nurses, communication with doctors, communication about medicines and discharge information. The main independent variables were four safety culture domain groups: communication openness, feedback, and communication about errors, teamwork within units, and teamwork between units. Each hospital was assigned into one of the four groups based on the agreement/disagreement between managers and clinicians (physician, assistant, nurse practitioner, registered nurse, licensed practical nurse, medical assistant) on patient safety culture. Each individual's response was categorized as either "high" (above the median) or "low" (below the median). The following groups were formed: 1) managers and clinicians agree that patient safety culture is high; 2) managers and clinicians agree that patient safety culture is low; 3) managers perceive that safety culture is high, but clinicians perceive that it is low; 4) managers perceive that safety culture is low, but clinicians perceive that it is high.

Results

- Patient satisfaction was significantly higher if managers and clinical staff agreed that patient safety culture is high, or if only clinicians perceived the culture as high.

Conclusions

- The findings highlight the importance of clinicians having a positive view of patient safety culture for the patient satisfaction to also have positive outcomes. Additionally, the results support the notion that patients' satisfaction reviews reflect the managers and clinicians shared patient safety culture perceptions – either positive or negative. However, absent the clinicians' positive patient safety culture views, positive management perspectives were not found to correlate with above average patient satisfaction.