Clinical and Financial Benefits of IT Implementation

October 24, 2014

HIMSS
CENTRAL & SOUTHERN OHIO *Chapter*

Who Is HIMSS Analytics ?

- **A subsidiary of HIMSS**
- **We collect data on what information systems are deployed in healthcare systems in the U.S., Canada on a census basis**
  - On a sample basis in Europe, the Middle East and AsiaPac
- **From this data, we populate the EMR Adoption Models (EMRAM)**
- **EMRAM** = the acute care model that reflects increased sophistication in deployment and use of healthcare IT

United States EMR Adoption Model [SM]			
Stage	Cumulative Capabilities	2014 Q1	2014 Q2
Stage 7	Complete EMR; CCD transactions to share data; Data warehousing; Data continuity with ED, ambulatory, OP	3.1%	3.2%
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), full R-PACS	13.3%	15.0%
Stage 5	Closed loop medication administration	24.2%	27.5%
Stage 4	CPOE, Clinical Decision Support (clinical protocols)	15.7%	15.3%
Stage 3	Nursing/clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology	27.7%	25.4%
Stage 2	CDR, Controlled Medical Vocabulary, CDS, may have Document Imaging; HIE capable	7.2%	5.9%
Stage 1	Ancillaries - Lab, Rad, Pharmacy - All Installed	3.2%	2.8%
Stage 0	All Three Ancillaries Not Installed	5.6%	4.9%
Data from HIMSS Analytics® Database ©2014		N = 5449	N = 5447

Why Do We Do It?

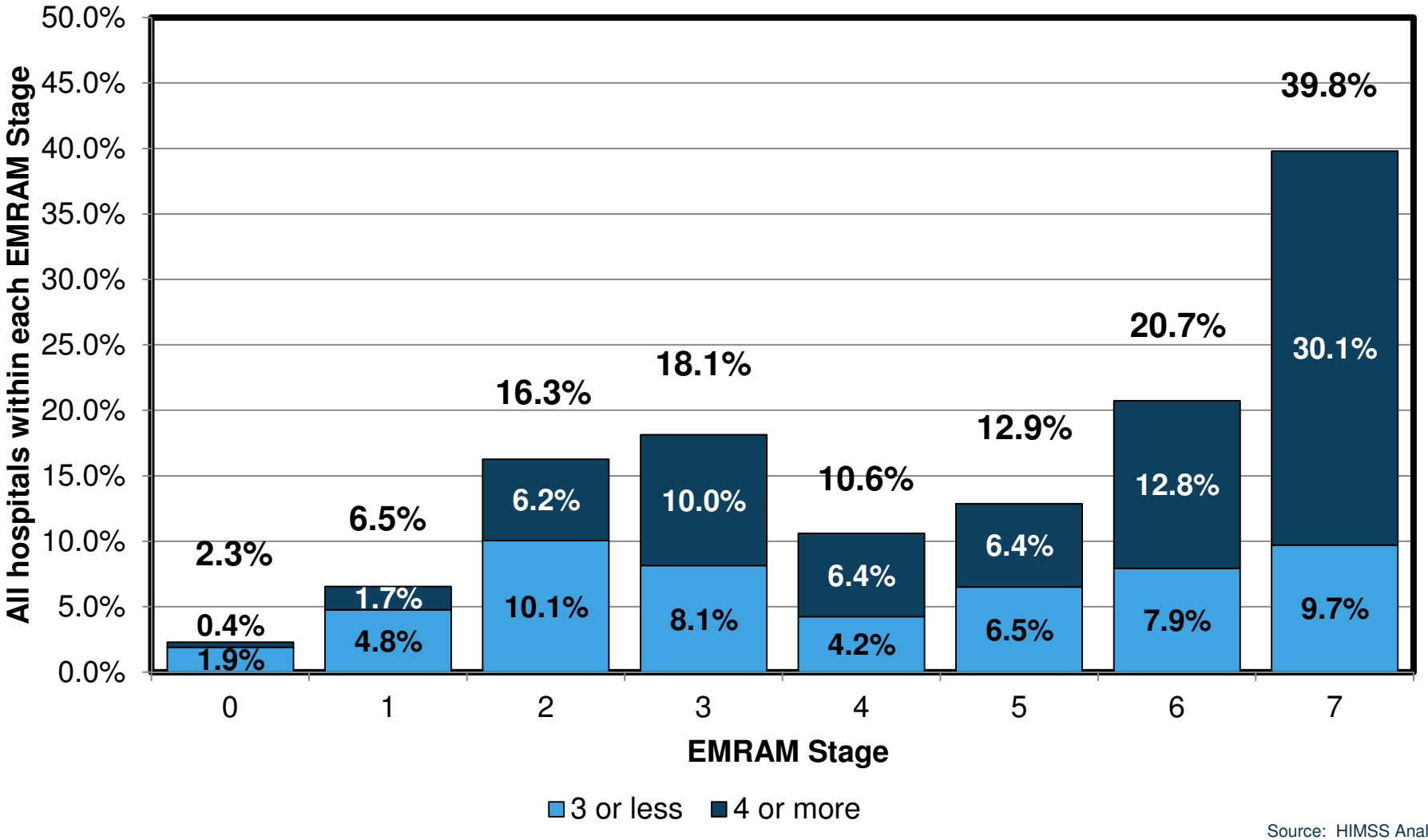
- **Thought leadership**
  - Quality, Safety, Efficiency improvements
- **To inform government policy**
  - Numerous countries and regions use HIMSS Analytics to gather data for their policy formulation
- **To reflect the market**
  - Where is the market heading
- **To "drive the market"**

The Burning Question

- **Is the EMR an effective tool?**
  - In theory…
    - Yes
    - Governmental incentives
  - In practice…
    - Mixed results
    - Limited research

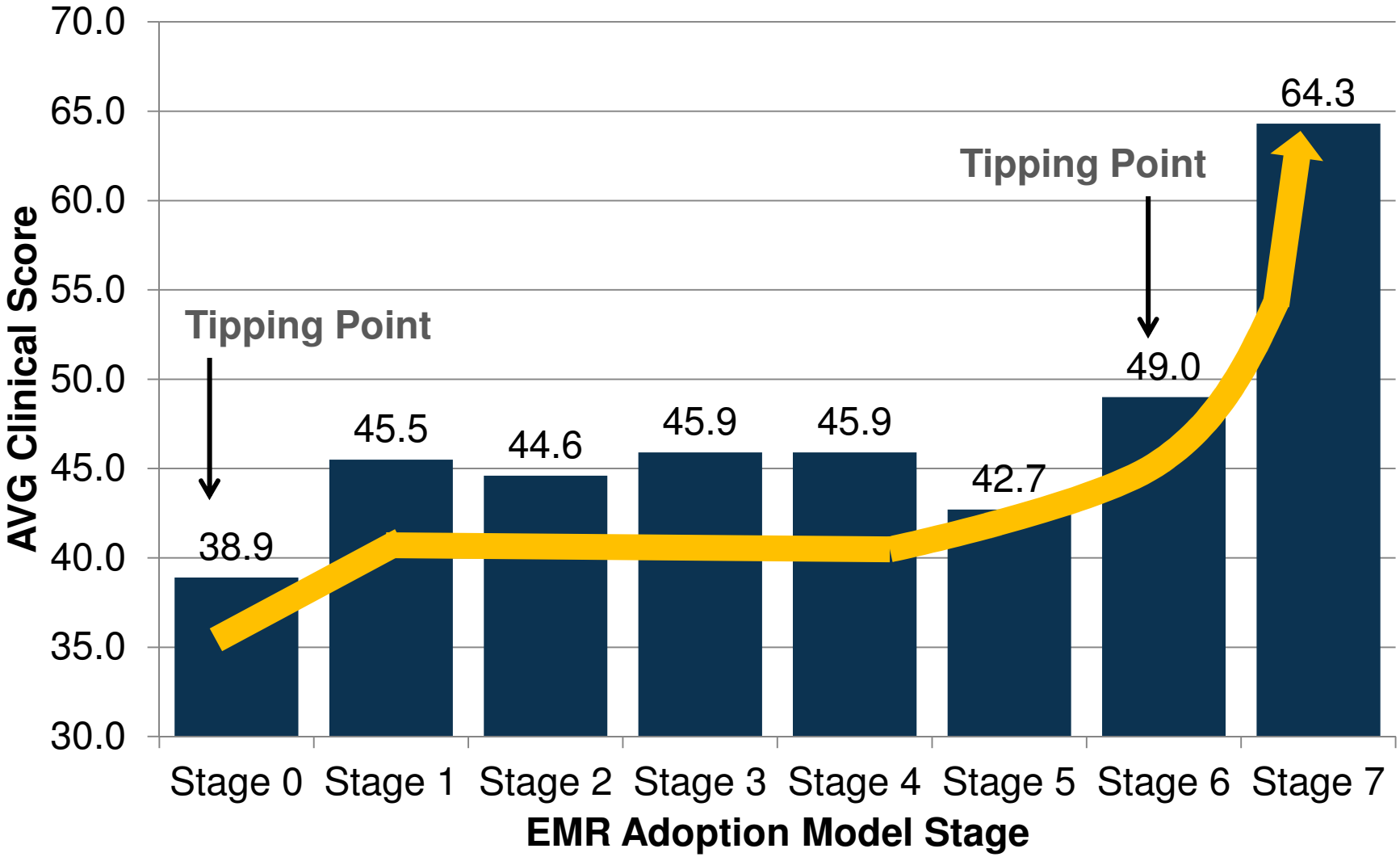
STAGE 7 STUDIES
CLINICAL PERFORMANCE

Representation of TJC Top Performing Hospitals BY Number of Quality Metrics Excelling In, within each EMRAM Stage

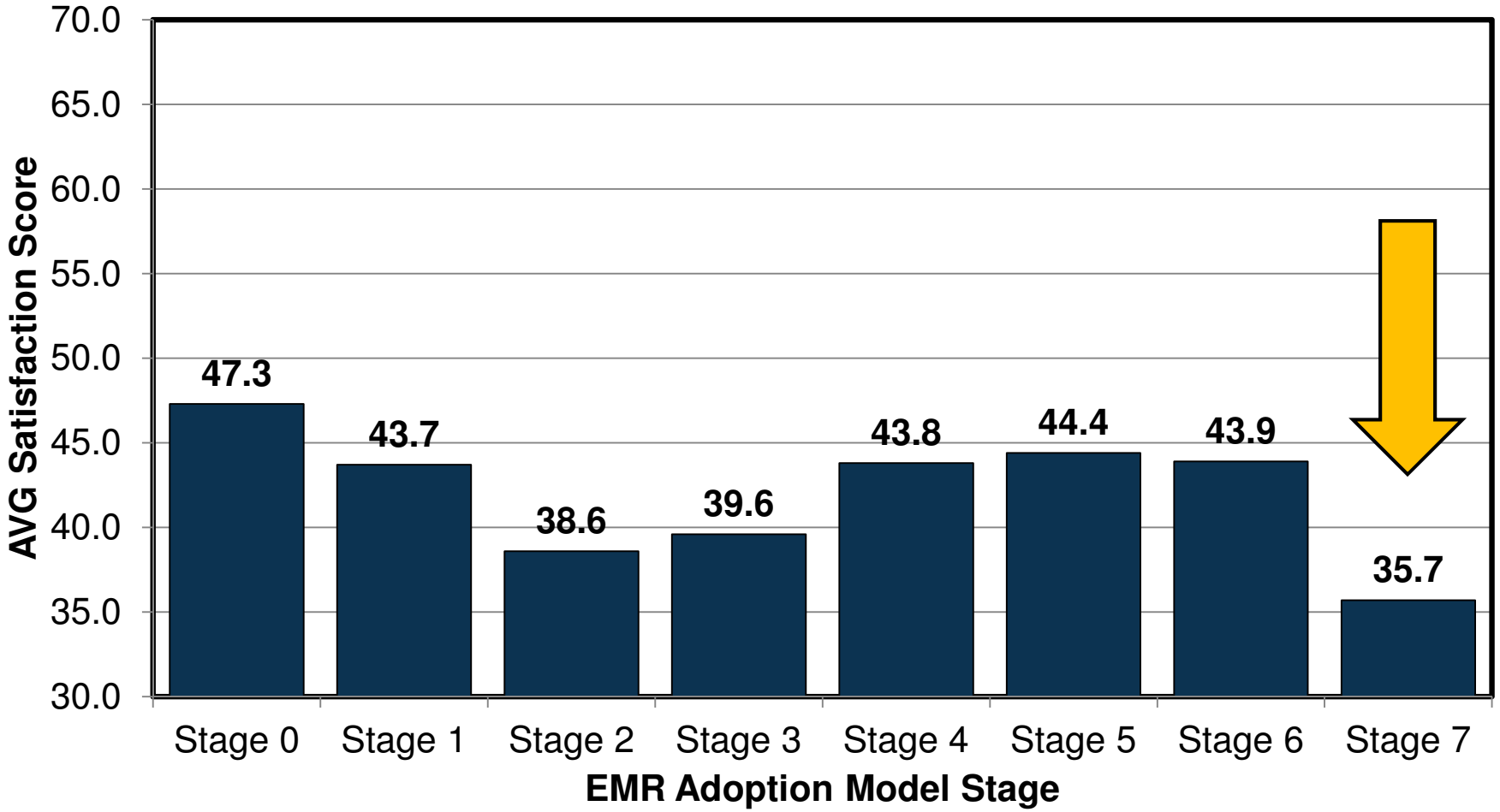


Source: HIMSS Analytics

Value Based Purchasing (VBP) Clinical Scores



Value Based Purchasing (VBP) Patient Satisfaction Scores



Source: HIMSS Analytics™ Database

WHAT: Our Approach

- **Leverage two of the largest, most robust data sets to explore effectiveness of the EMR.**

Research Questions

- Is there a relationship between **EMR capabilities** and hospital **clinical performance**?
- What aspect of performance (actual rate, predicted rate, or z-score) is related most strongly to advanced EMR capabilities?
- Are there certain clinical areas where this relationship is stronger / weaker?
- What additional variables, if any are related to advanced EMR capabilities?

WHAT: Our Approach – EMR Capabilities

- **EMR capabilities defined by… HIMSS Analytics EMRAM scores.**

EMRAM = Electronic Medical Record Adoption Model

- What is it?
- How was it used in this study?
  - Average progression over three year period
  - Converted quarterly EMRAM score to binary indicator:
    - **High EMRAM**: average 3 year score of EMRAM Stage 6 or above
    - **Low EMRAM**: average 3 year score of EMRAM stage 2 or below

WHAT: Our Approach – Clinical Effectiveness

- **Clinical effectiveness defined by… mortality rates BY Healthgrades' cohorts and service lines.**

- Utilized three years of Medicare data (2010 – 2012)
- Clustered data by Healthgrades defined service line
- Created 5 statistical models by service line
- Outcome measures were actual mortality rate, predicted mortality rate, and z-score

Model 1	Model 2	Model 3	Model 4	Model 5
Cardiac	Critical Care	Gastrointestinal	Neuroscience	Pulmonary
- Coronary Bypass - Valve replacement - Coronary interventional procedures - Heart attack - Heart failure	- Pulmonary embolism - Diabetic emergency - Sepsis - Respiratory Failure	- Bowel obstruction - GI bleed - Pancreatitis - Esophageal/Stomach Surgeries - Small intestine surgeries - Colorectal surgeries	- Stroke - Neurosurgery	- Chronic obstructive pulmonary disorder - Pneumonia

WHAT: The Findings – Question #1

- **Is there a relationship between EMRAM and hospital clinical performance?**

- **Yes**, there is a relationship between EMRAM scores and hospital performance.

- All five service line models resulted in statistically significant fits.

- There is some variation in the nature of this relationship by service line and cohort.

WHAT: The Findings – Question #2

- **What aspect of performance (actual, predicted, or score) is related most strongly to EMRAM?**

- On average higher EMRAM scores are associate with increases in the **predicted rate** as well the **z-score**.
  - This suggests that increased EMRAM scores are related to increases in documentation and coding capture.

- There tends to be a limited relationship between increased EMRAM scores and the **actual mortality rate**.

WHAT: The Findings – Question #3

- **Are there certain clinical areas as defined by Healthgrades cohorts, where this relationship is stronger / weaker?**
  - **Yes**, there are cohorts within each service line where performance is related to EMRAM

- **Findings scenarios**
  - No difference on any measure (4/19)
  - Decreased actual rate (3/19)
  - Increased predicted rate and z-score (7/19)
  - Increased z-score only (3/19)
  - Other (2/19)

WHAT: The Findings – Question #3

No difference on any measure

Service Line	Cohort	Predicted mortality rate	Actual mortality rate	z-score*
Cardiac	CABG	No Difference	No Difference	No Difference
Cardiac	Valve replacement	No Difference	No Difference	No Difference
Neuroscience	Neurosurgery	No Difference	No Difference	No Difference
Critical Care	Pulmonary Embolism	No Difference	No Difference	No Difference

WHAT: The Findings – Question #3

Decreased ACTUAL mortality rate with advanced EMR capabilities

Service Line	Cohort	Low EMRAM	High EMRAM	DELTA
Cardiac	Heart Attack	16.8%	10.3%	6.5%
Gastrointestinal	Small Intestine Surgery	9.2%	8.0%	1.2%
Critical Care	Respiratory Failure	26.7%	19.4%	7.3%

All things being equal… High EMRAM hospitals saw 6.5% fewer mortalities from heart attack than Low EMRAM hospitals.

WHAT: The Findings – Question #3

Increased PREDICTED mortality rate with advanced EMR capabilities†

† and increased z-score

Service Line	Cohort	Low EMRAM	High EMRAM	DELTA
Cardiac	PCI	3.1%	3.9%	0.8%
Cardiac	Heart Failure	2.6%	4.7%	2.1%
Pulmonary	Pneumonia	3.4%	4.4%	1.0%
Neuroscience	Stroke	4.7%	5.5%	0.8%
Gastrointestinal	Bowel Surgery	2.0%	2.4%	0.4%
Gastrointestinal	Pancreatitis	1.7%	2.1%	0.4%
Gastrointestinal	Colorectal Surgery	4.1%	4.9%	0.8%

Capture of prediction of the risk of mortality from Heart Failure in High EMRAM hospitals improved 44.7% compared to Lower EMRAM hospitals.

HIMSS Analytics

healthgrades

WHAT: The Findings – Question #3

Increased z-score only

Service Line	Cohort	Low EMRAM	High EMRAM	DELTA
Pulmonary	COPD	-0.359	0.122	0.481
Gastrointestinal	GI Bleed	-0.096	0.017	0.114
Gastrointestinal	Esophageal / Stomach Surgery	-0.121	0.029	0.150

While hospitals did not differ in COPD ACTUAL outcomes or PREDICTED outcomes, there was enough of a difference between these to register a statistical difference.

WHAT: The Findings – Question #3

Other Outcomes

Service Line	Cohort	Predicted mortality rate	Actual mortality rate	z-score*
Critical Care	Diabetic Emergency	Decrease	No Difference	No Difference
Critical Care	Sepsis	Increase	Increase	Increase

Diabetic Emergencies show a 1.1% point difference in predicted rates (lower for high EMRAM) but no difference in actual rates or in the z-score.

WHAT: The Findings – Question #3

Other Outcomes

Service Line	Cohort	Predicted mortality rate	Actual mortality rate	z-score*
Critical Care	Diabetic Emergency	Decrease	No Difference	No Difference
Critical Care	Sepsis	Increase	Increase	Increase

Sepsis resulted in a 3% point difference in actual rates (higher for high EMRAM) with a 5% point reduction in prediction of the risk of mortality from Sepsis in High EMRAM hospitals.

The result was net better performance for high EMRAM hospitals as measured by statistical improvement in z-score

WHAT: The Findings – Question #4

- **What additional variables, if any are related to EMRAM?**

- For all models cohort volume, teaching status, and hospital location had a statistically significant relationship with the EMRAM score.
- In general major teaching facilities were more likely to have high EMRAM scores.
- Additional urban facilities were also more likely to have high EMRAM scores.
- Volume was statistically significantly related to EMRAM, but the odds ratio for this relationship was never greater than 1.012. This suggests that while significant the relationship with volume was minor.

SO WHAT: The Implications

- **Is the EMR an effective clinical tool?**
  - In practice… generally YES
- **Findings encourage…**
  - EMR adoption
  - EMR refinements

STAGE 7 STUDIES
FINANCIAL PERFORMANCE

What We Found in Researching

- **Hospitals that implemented EMR between 1996 and 2009 did NOT generally see a reduction in operating expense, EXCEPT:**
  - Cost rise immediately during and following implementation and then fall back to previous levels

- **However:**
  - Hospitals in locations with IT intensive industry found **cost reductions** after three years
  - Hospitals in other locations found costs increased
  - The initial cost increases was smaller for those in IT intensive locations

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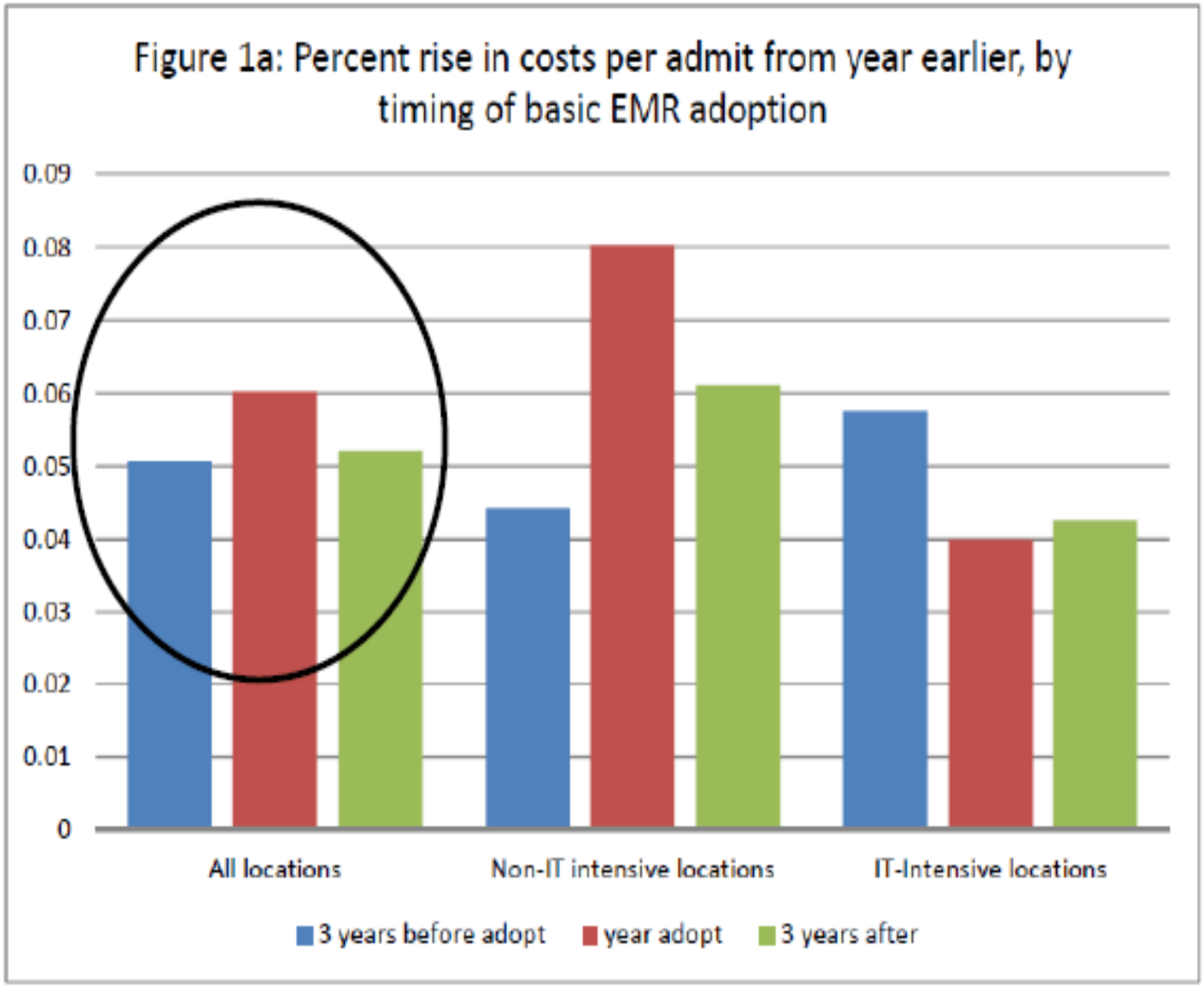
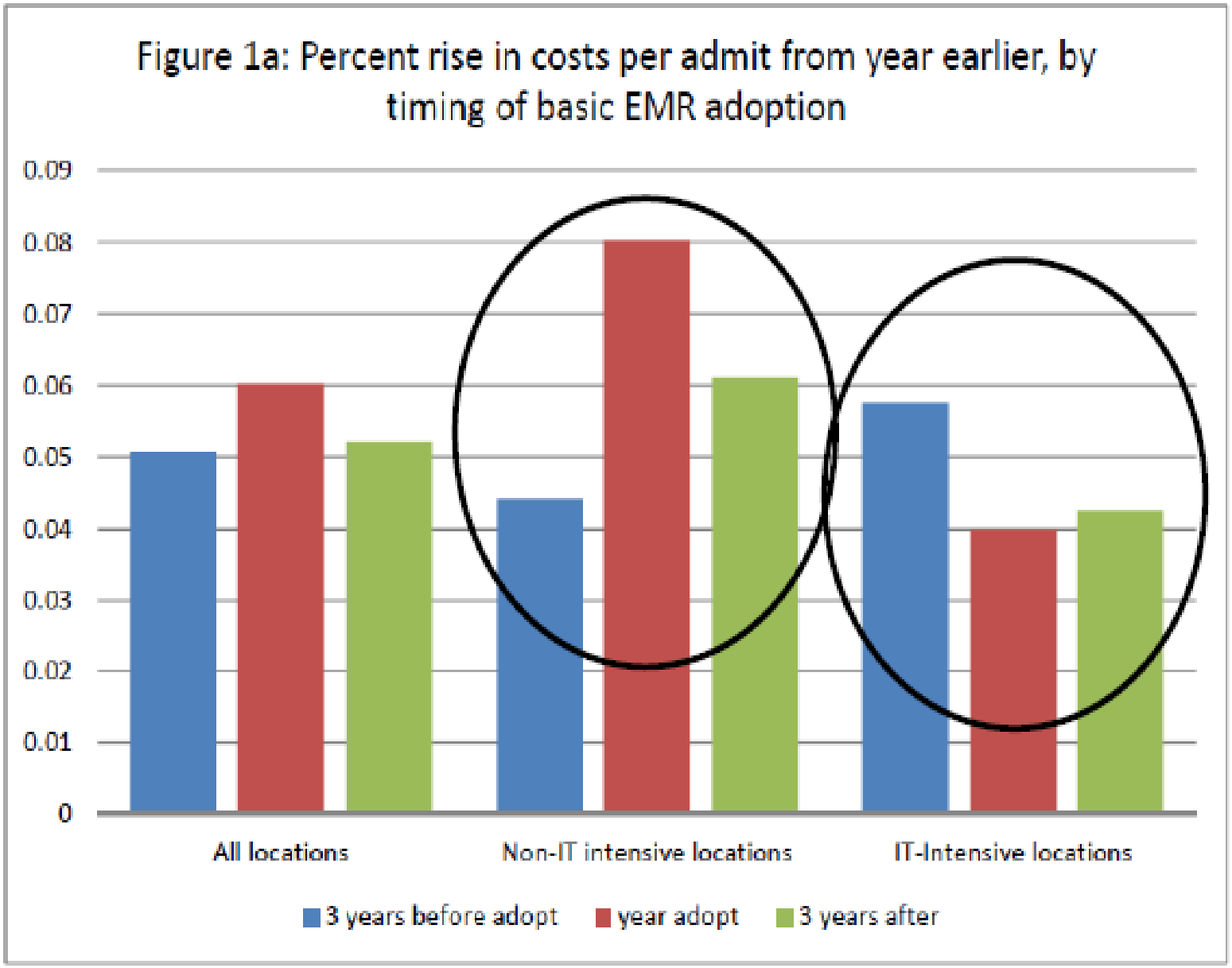
Rotman School of Management
UNIVERSITY OF TORONTO





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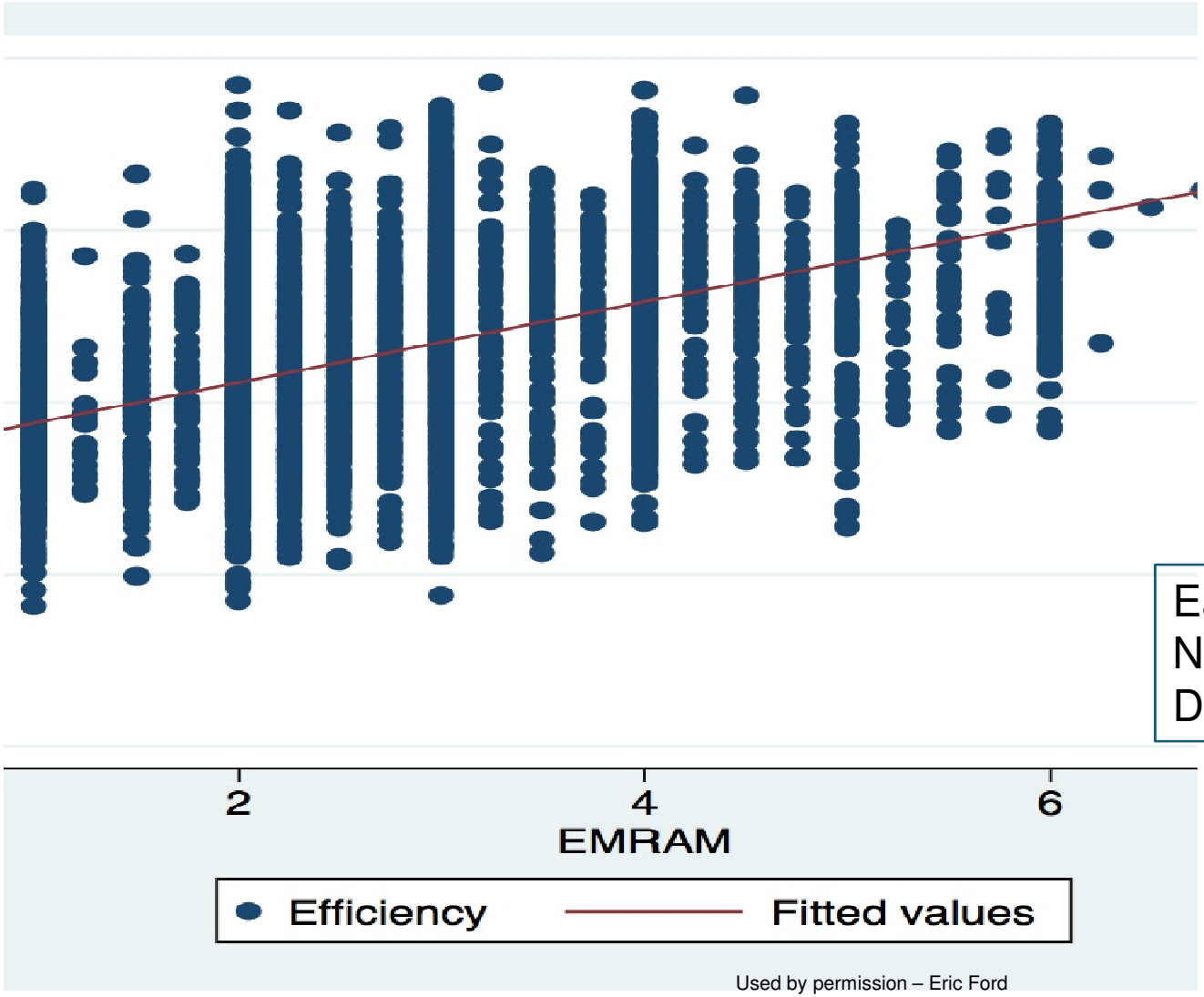
Efficiencies Adjusted for

- Case Mix Index
- Quality scores
- Readmission rate
- Labor input
- etc. ….

Hospital Cost Efficiencies BY EMRAM Stage



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ACCESSING EVIDENCE

The HIMSS Health IT Value Suite

www.himss.org/ResourceLibrary/ValueSuite.aspx#/steps-app

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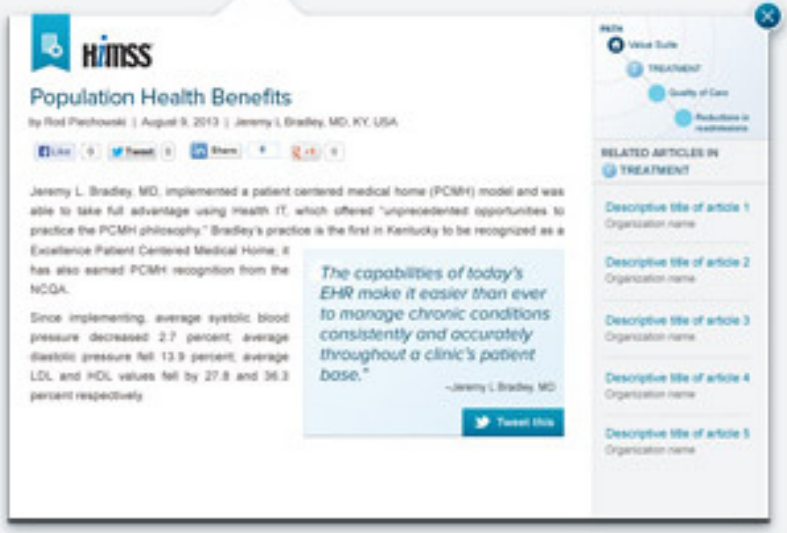
Operational

Each of the **Value STEPS™** contains **categories** and **subcategories** to explore...

Reduction in overtime

Decrease nursing overtime

...which leads you to **specific articles** on the topic you need.



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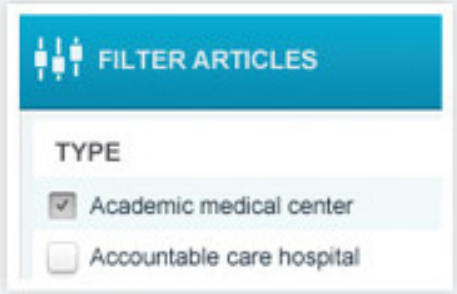
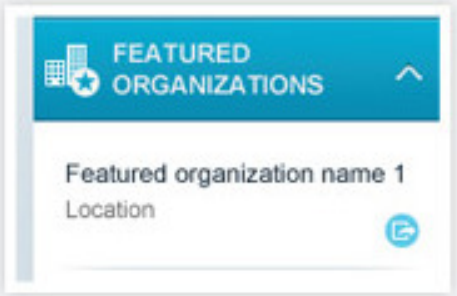
Filtering the Value STEPS™

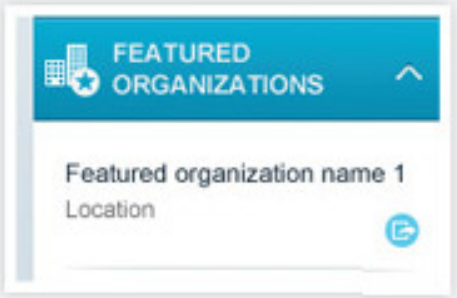
Use the sidebar to **filter results** by specific criteria or to view **featured organizations** and **articles**.



Filter articles by different classifications such as organization type, awards, federal designations, location, and more.



Featured organizations are highlighted because of their many examples of proven value through the use of health IT.



Featured articles are selected to highlight recent or extremely significant examples of the Value STEPS™.

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SATISFACTION

Satisfaction

Provider Satisfaction

- Improved Communication with staff
- Overall increased provider satisfaction
- Improved quality of life
- Improved communication with other providers

Patient Satisfaction

- Increased in overall patient satisfaction and/or survey score
- Increased use of patient portal

Staff Satisfaction

- Increased staff morale/job satisfaction
- Overall improved internal communication

Other Satisfaction

- Other Satisfaction Benefits

TREATMENT/CLINICAL

Treatment/Clinical
Efficiencies • Increased efficiency in scheduling patients • Other efficiencies • Increased use of e-prescribing (Orders and refills) • Improved accessibility of lab/x-ray reports • Overall increased efficiencies • Decreased redundancy in testing (labs/x-ray) • Real time/remote access to health records • Increased time for patient interaction
Quality of Care
Safety
Other Treatment/Clinical

TREATMENT/CLINICAL (cont'd)

Treatment/Clinical

Efficiencies

Quality of Care

- Reduction in hospital acquired infections
- Other quality of care benefits
- Decreased response time to patient requests
- Overall improved quality of care
- Reduction in readmissions
- Increased information sharing between providers
- Improved continuity of care
- Reduction in hospital acquired pneumonia
- Improved management of diabetes
- Other Treatment/Clinical benefits

Safety

Other Treatment/Clinical

TREATMENT/CLINICAL (cont'd)

Treatment/Clinical
Efficiencies
Quality of Care
Safety • Improved clinical documentation • Improved use of clinical alerts • Reduction in medical errors • Other safety benefits • Overall improved patient safety • Reduction in medication related errors
Other Treatment/Clinical

ELECTRONIC INFORMATION/DATA

Electronic Information/Data

Data Sharing and Reporting

- Improved quality measures reporting
- Improved claims management
- Other Data Sharing & Reporting
- Overall increased data sharing/improved data recording
- Increased clinical trends tracking
- Increased population health reporting
- Improved security of patient records.

Evidence Based Medicine

- Improved access to data for research
- Increased # of patients tracked/included in data warehouse
- Improvement in medical education

PREVENTION & PATIENT EDUCATION

Prevention/Patient Education

Patient Education

- Improvement in disease surveillance
- Overall improvements in prevention
- Increased immunizations
- Increased cancer screenings
- Increased disease tracking
- Longitudinal patient tracking
- Longitudinal patient analysis
- Other Prevention benefits

Prevention

- Improved patient engagement
- Increase in distribution of patient educational
- Improved patient compliance
- Overall improved patient education
- Increased patient awareness of disease symptoms
- Other Patient Education benefits

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SAVINGS

Savings

Efficiency Savings

- Reduction in transcription costs
- Improved workflow/practice efficiency
- Reduced patient wait times
- Reduction in emergency department admissions
- Overall increased efficiency
- Other efficiency savings

Financial/Business

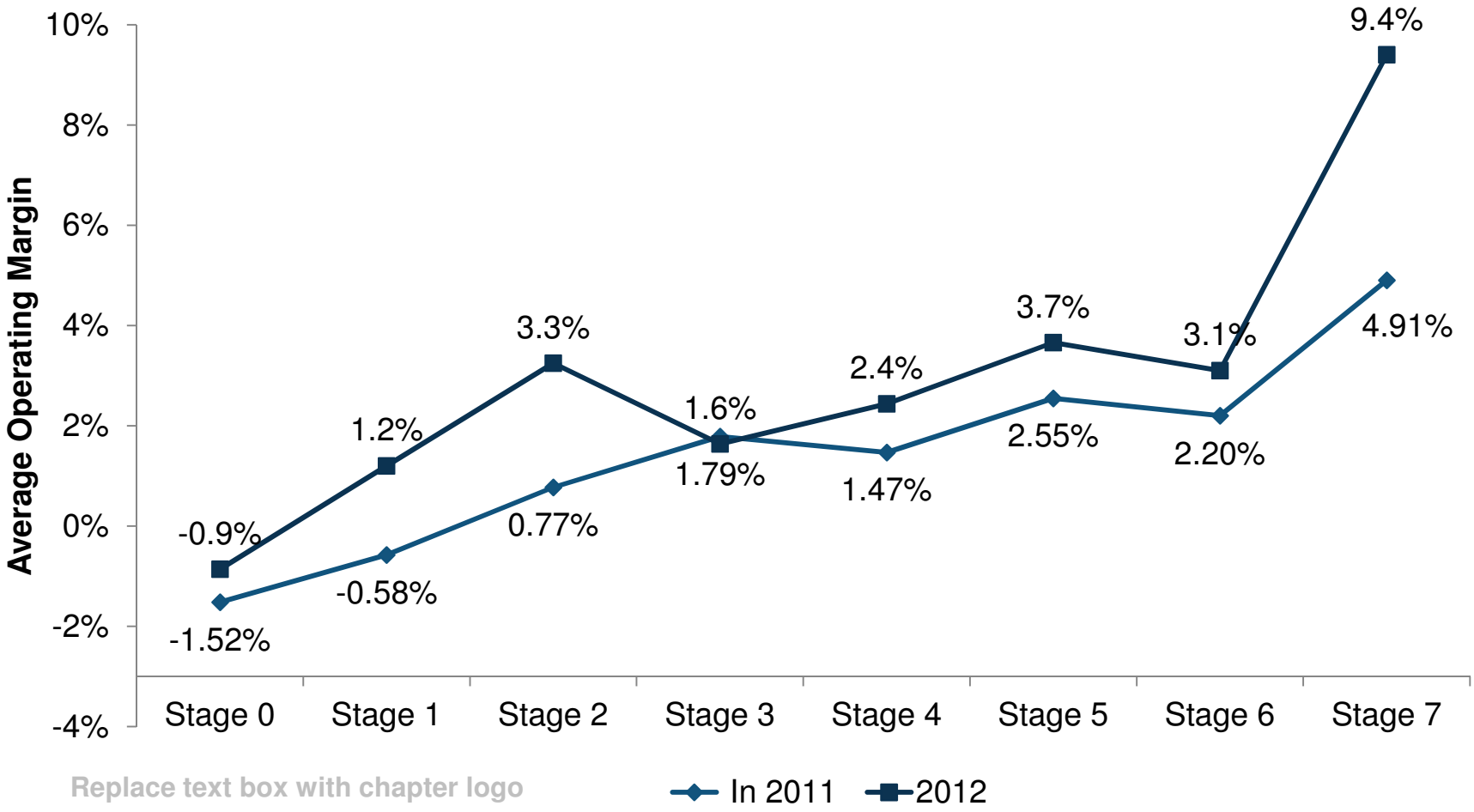
- Increased coding accuracy
- Increased patient revenue
- Reduction in days in accounts receivable
- Other Financial / Business benefits
- Reduction in length of inpatient stay
- Overall improved financial results

Operational Savings

- Improved use of space
- Other operations savings
- Improve inventory control
- Reduction in FTEs or employee hours
- Improved business recovery planning (e.g. disaster preparedness)
- Reduction in overtime

SAVINGS

Financial Performance (Profitability)



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How to use the HIMSS Health IT Value Suite

- **Visit the website: www.himss.org/ValueSuite**
- **Review the continuing website development**
  - HIMSS Health IT Value STEPS™ description
  - Examples and tools for providers
- **Share provider and patient stories**
  - "Share your story" Link
- **Primary contacts**
  - Pat Wise, Vice President, HIS, for HIMSS at pwise@himss.org *(to request information from the Value Suite)*
  - Rod Piechowski, Sr. Director, HIS at rpiechowski@himss.org

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Thank You

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