

Information Technology-Driven Analytics: The Link Between Data Aggregation, Analytics and EHRs

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June 27, 2011



Summary

- Analytics and EHRs are co-dependent and complementary
 - Analytics are crucial to population-change
 - EHRs are crucial to patient-level change
- Many “simple, standard” EHR tools are underutilized
- When leveraged together, the combination can be transformative
- Shifting payor dynamics will require this kind of change

Information-Transformation Continuum...

Data Generation

Data Aggregation & Analysis

Performance Measurement & Analysis

Knowledge Creation

Clinical Transformation

- Traditional care by-product
- Transactional
- Mixed forms
- Variable quality
- Increasingly patient self-reported

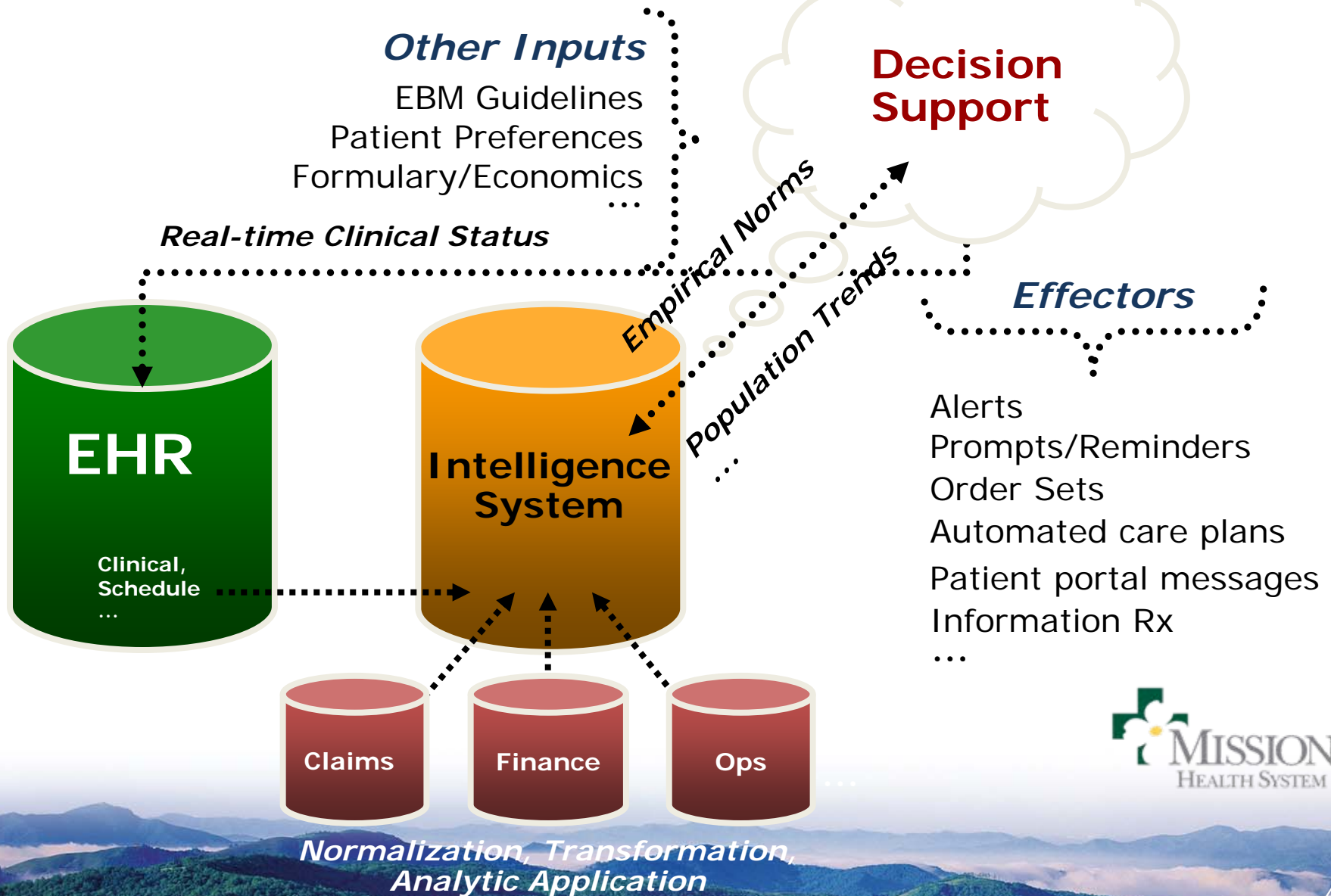
- Typical EHR "after-thought"
- Required for performance measurement

- Establishes current state
- Trended over time
- Can be compared to known or possible alternatives

- Insight derived from empirical analysis
- Critical adjunct to EBM
- Deployed in various ways (order sets, alerts, etc.)

- Fundamental clinical re-engineering
- Must alter clinical workflows
- Eliminate, automate, delegate, and activate

Analytics-Linked Intelligence System



Creating Real Value: Core Care Transformation Initiatives


- Population Health Optimization
 - Medical Home
 - Chronic Disease Care Optimization
- Acute Episodic Care Optimization
- Transitions of Care Optimization
- Patient engagement and activation throughout all initiatives




Value-Based Purchasing

FFY 2013

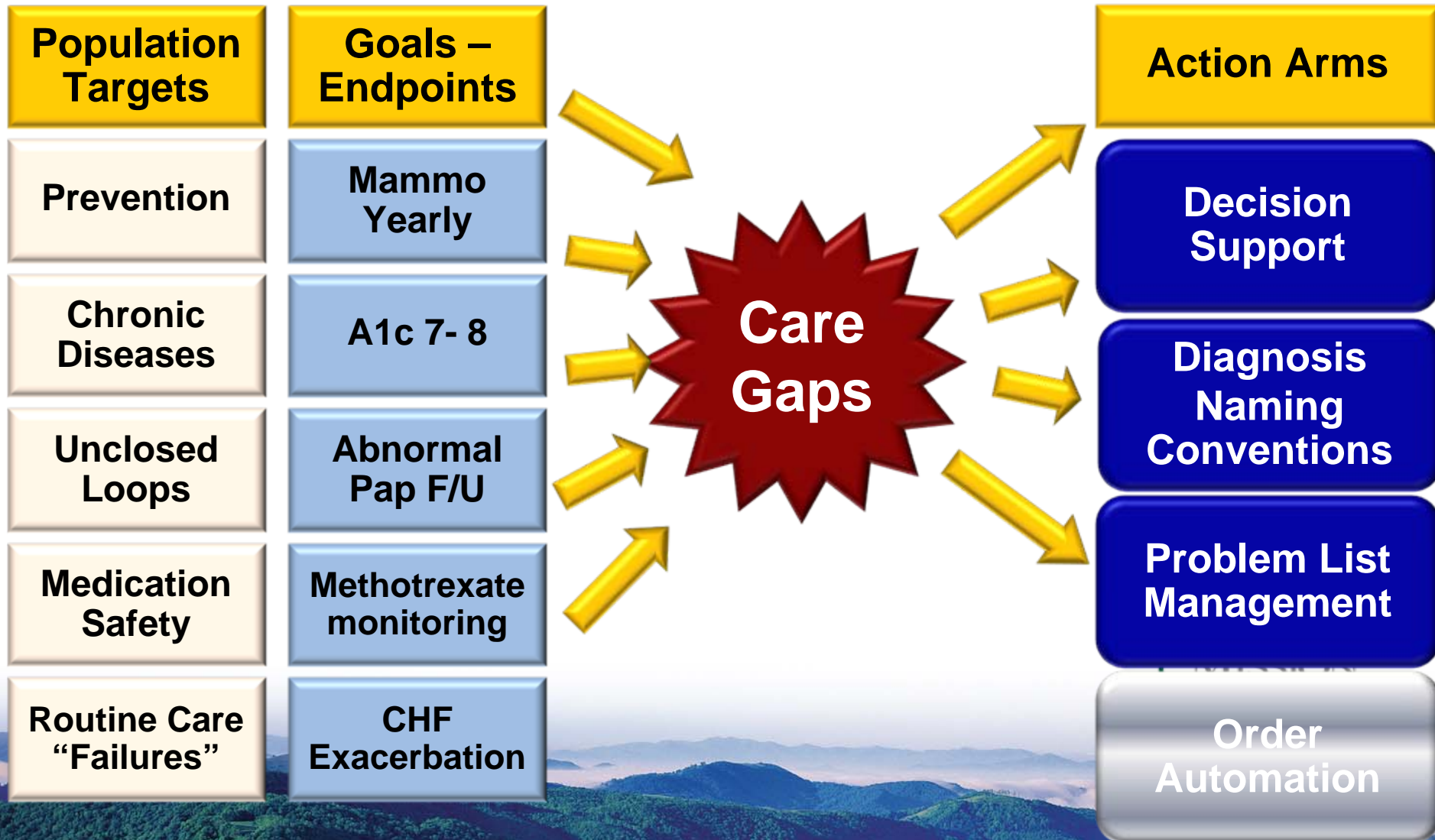
FFY 2015



Inpatient Readmissions	Inpatient Value-Based Purchasing	Health Care-Acquired Conditions	EHR Meaningful Use (ARRA)
<ul style="list-style-type: none">• Implemented October 1, 2012 (FFY 2013)• Reduces Medicare reimbursement by \$7 billion / 10 years nationwide; \$1 to NYS.	<ul style="list-style-type: none">• Implemented October 1, 2012 (FFY 2013)• Budget neutral; redistributive within PPS system.	<ul style="list-style-type: none">• Implemented October 1, 2015 (FFY 2014)• Reduced Medicare inpatient hospital reimbursement by \$ 1.4 billion / 10 years nationwide.	<ul style="list-style-type: none">• Medicare payment penalties assessed against eligible hospitals and physicians that fail to be meaningful users by October 1, 2014 (FFY 2015). 



Data and Action Arms: Populations, Goals and Care Gaps



Diagnosis Naming Conventions

- Controlled Terminologies: Translate clinical concepts into standardized vocabulary for medical transactions, billing, information exchange, etc. (e.g., ICD-9, SNOMED)
- Clinically, ICD-9 codes inadequate to meet the needs of providers and
- Diagnoses based upon provider assessment driving the goals of therapy
- Make generic diagnoses available, but they should be “uncomfortable”
 - “Heart Failure, etiology not known”
 - “DM Type 2, goal not determined”
- Mutually exclusive choices
- Human Factors review



Example: Heart Failure

- Nationally
 - 5.2 million Americans afflicted with an economic impact of \$10-24 billion
 - 5-yr survival: 25% in men, 38% in women
 - 90-day Readmissions: 33% w/in 90 days
- Locally
 - Over 5,000 heart failure pts
 - No digital method of assessing quality of chronic heart failure care

Heart Failure Taxonomy

Old Taxonomy	ICD-9	# of Pts
Congestive Heart Failure	428.0	3683
Heart Failure NOS	428.9	504
Congestive Heart Failure UNSPECIFIED	428.9A	237

Non-specific diagnoses make it difficult to identify patient needs



More accurately describe condition and care needs (e.g., revascularization, valve repair)

New Heart Failure Taxonomy
Heart Failure, Systolic due to CAD
Heart Failure, Diastolic due to HTN
Heart Failure due to Valve Dz

Example: Acute Bronchitis and Abx







- Measure: Utilization of antibiotics in acute bronchitis

Results	% of Visits with Abx
Pre: "Acute Bronchitis"	79%
Post: Acute Bronchitis (Abx Not Indicated)	32%
% Improvement (absolute)	47%



EHR Problem List and Population Identification

- Problem List has tremendous potential (decision support, reporting, etc.), but it is variably used, often with data quality issues

Problem List				
<input type="text"/>	<input type="button" value="+ Add"/>	<input type="button" value="+ CodeSearch"/>	<input checked="" type="checkbox"/> Full Co	
	Priority	Class	Noted	Resolved
 ▶ Heart Failure, Systolic due to CAD [428.22A] S/p anterior MI 2007, EF 35% 8/08 by echo			9/24/2009	<input checked="" type="button" value="Resolve"/>
 ▶ Cerebrovascular Dz, Post-Stroke [437.0A] Left MCA 2004, has done well with minimal sequelae			9/24/2009	<input checked="" type="button" value="Resolve"/>
 ▶ Vertebral Fracture, Osteoporotic [733.13A]			9/24/2009	<input checked="" type="button" value="Resolve"/>
 ▶ Post-Splenectomy [V45.89A]			9/24/2009	<input checked="" type="button" value="Resolve"/>
  Kidney Dz, Chronic (GFR 30-59) Stage III [585.3]			9/24/2009	<input checked="" type="button" value="Resolve"/>
▶ PLANTAR FASCIITIS [EP796]			9/24/2009	<input checked="" type="button" value="Resolve"/>
▶ Carotid Stenosis, infarct over 8 wks [433.10A]			9/24/2009	<input checked="" type="button" value="Resolve"/>

Example: Chronic Kidney Disease Background Review - 2007

- 13% of adult population with CKD*
- Increasing numbers of patients on dialysis
- High-risk for cardiovascular mortality
- “Late referral” to nephrology associated with poor outcomes
- CKD under-recognized

*Coresh J, JAMA, November 7, 2007—Vol 298, No. 17



CKD and Problem List Impact

	CKD by Labs but not on Problem List	CKD on Problem List
Total CKD Patients	5,653	2,112
CKD Encounter Diagnosis	390	1,546
No CKD Encounter Diagnosis	5,263	566
% pts w/CKD Encounter Dx	6.9%	73.2%

Patients with CKD on Problem List 10 times more likely to have condition addressed in a visit vs. patients with CKD (labwork) but no Problem List diagnosis.

CKD Stage 3 Performance Goals

Goal	CKD Stage 3 on Problem List
GFR monitoring	Every 12 months
Blood Pressure	Every 12 months, <130/80
Urine Protein	Every 12 months
Proteinuria Rx	ACE/ARB for proteinuria
Phosphorus	Every 12 months, 2.7-4.6
Hemoglobin	Every 12 months, ≥ 10.0
LDL	Every 12 months, <100



Best Practice and Maintenance Alerts

Health

Override

BestPractice Alerts

- ▼ **CKD-4. Hgb needed.**
Last HGB: Not on file
 Open SmartSet: BPA - GHS CKD STAGE 4, HEMOGLOBIN
(Last done by Andrew Peterman, Sys-Support at 1654 on 2/3/09)
[Jump to CKD Management Report](#)
- ▼ **CKD-4. Phosphorus needed.**
Base Name PHOSPHOROUS not found
 Open SmartSet: BPA - GHS CKD STAGE 4, PHOSPHORUS
[Jump to CKD Management Report](#)
- ▼ **CKD-4. PTH needed.**
Last PTHINTACT: Not on file
 Open SmartSet: BPA - GHS CKD STAGE 4, PTH
(Last done by Andrew Peterman, Sys-Support at 1654 on 2/3/09)
[Jump to CKD Management Report](#)
- ▼ **CKD-4. Calcium needed.**
Last CA: Not on file
 Open SmartSet: BPA - GHS CKD STAGE 4, CALCIUM
[Jump to CKD Management Report](#)

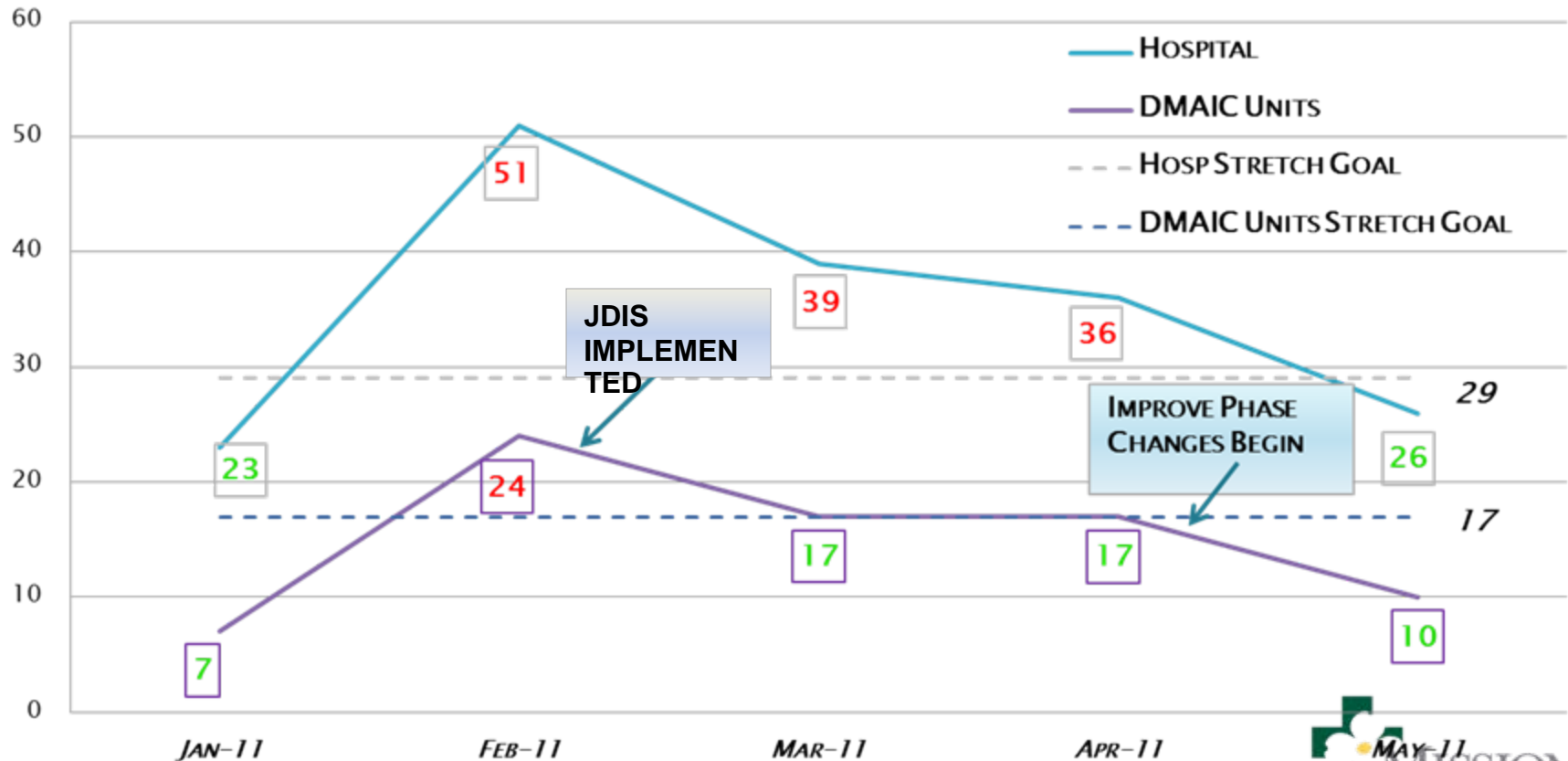
Refresh ✔ Accept

In the Last Nine Months...



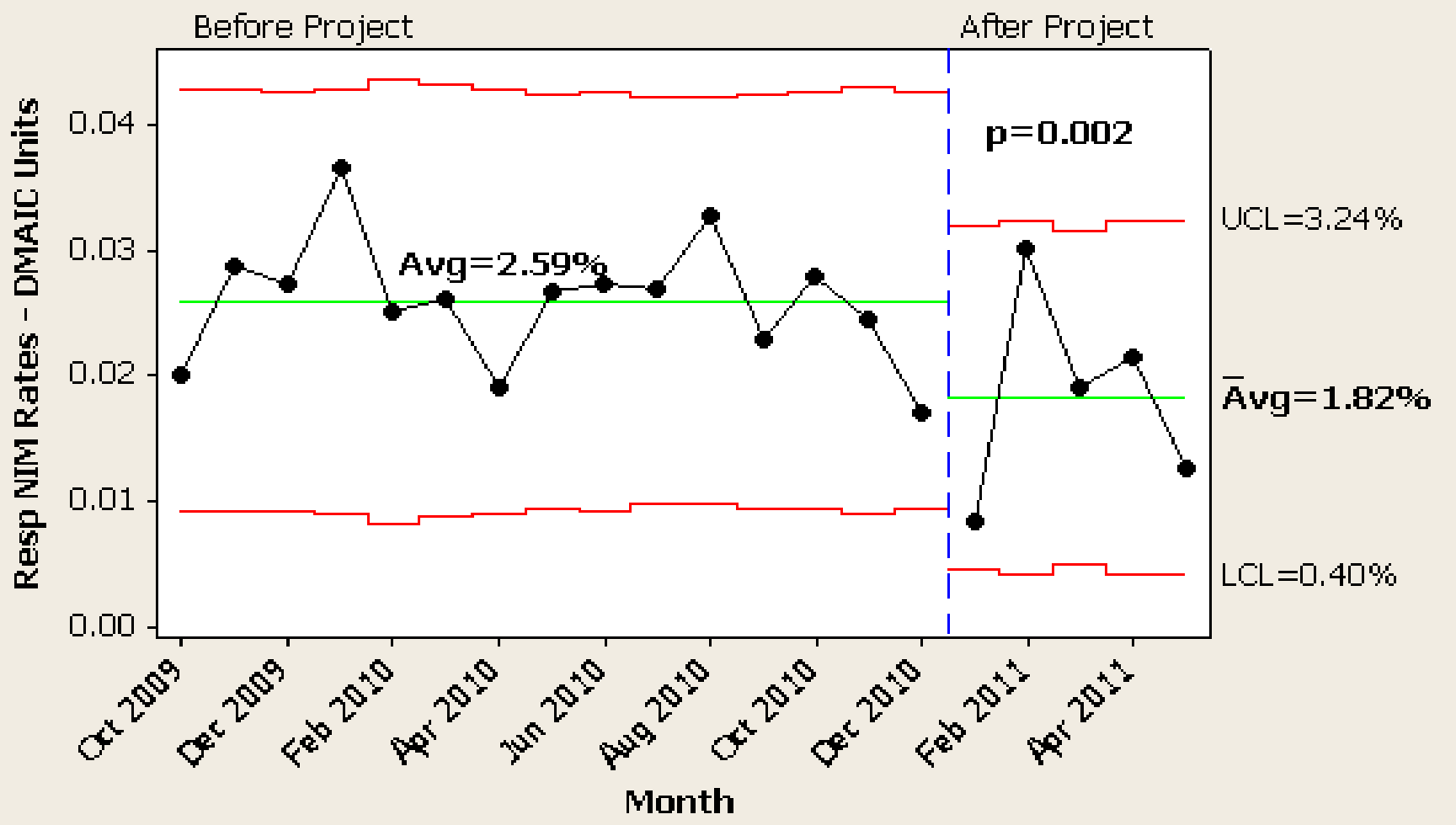
Respiratory NIMs, Jan – May, 2011

MONTHLY RESP NIM PERFORMANCE VS. GOAL, *JAN – MAY 2011*



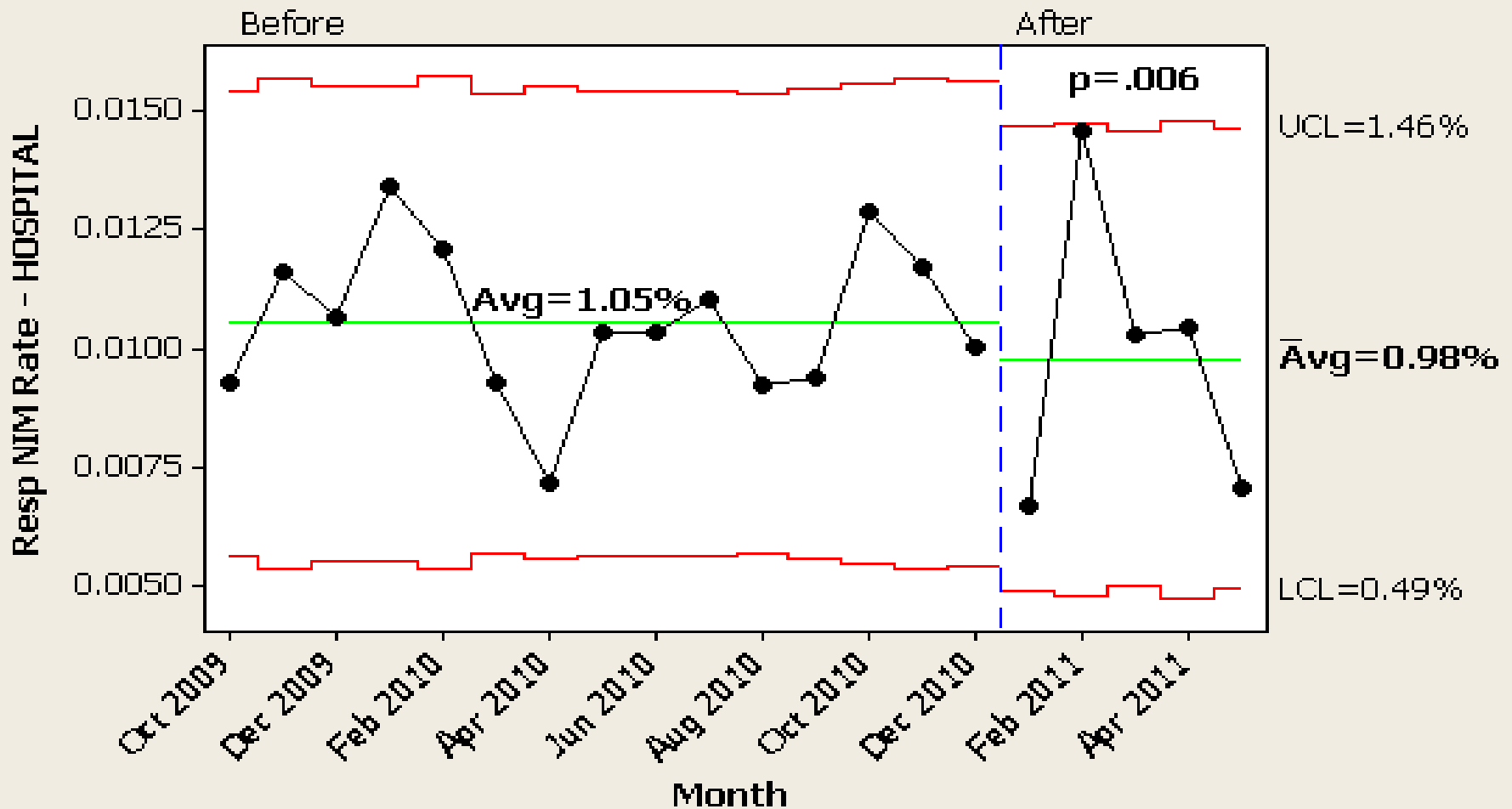
DMAIC Unit Respiratory NIMs Before/After Project Start

Control Chart of Resp NIMs (DMAIC Units) Before/After Project



Hospital Respiratory NIMs Before/After Project Start

Control Chart of Hospital Resp NIMs Before/After Project



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