



***The GE Toolkit at Virtua
Health...
Responding to the Health
Care Challenge***

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Quality Colloquium

August 24, 2004

Virtua Health

- Four hospital system in Southern New Jersey
- Two Long Term Care Facilities
- Two Home Health Agencies
- Two Free Standing Surgical Centers
- Ambulatory Care - Camden
- Fitness Center
- 7000 employees + 1700 physicians
- 7,000 deliveries
- \$600 million in revenues
- STAR Culture

Virtua Imperatives 2004

- The Strategic Plan
- Virtua's Leadership and Management Systems
- Manage Cost and Expense to Best Practice
- Enhance Revenue
- Manage Length of Stay
- Implement Medical Staff Development Plan

Systems and Structures for Supporting the STAR

Mission and Values

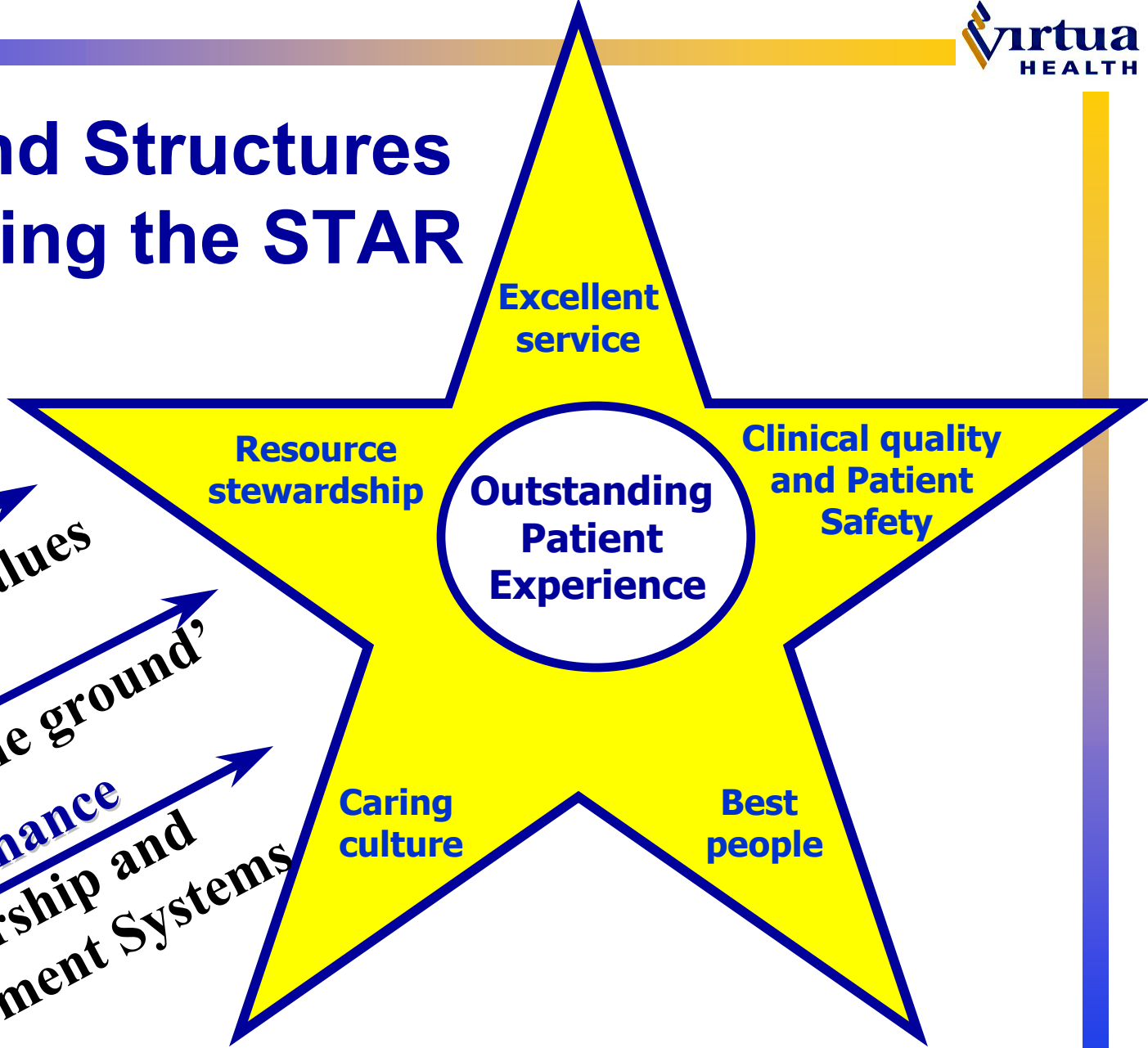
New Business Values

Strategy

The 'stake in the ground'

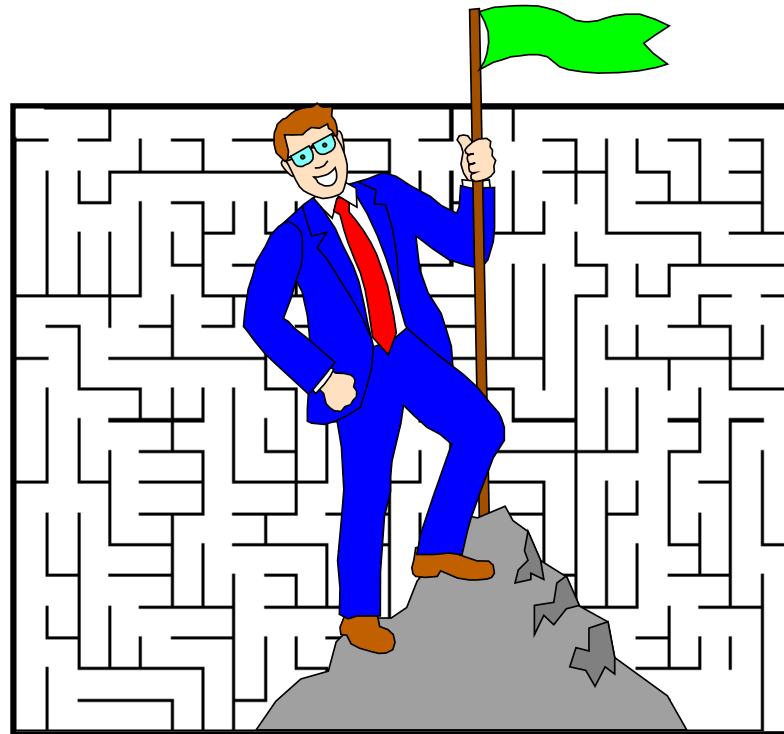
Performance

Leadership and Management Systems



It's Great to Have a Philosophy ... But We Need a Strategy !!

Current State:
STAR
Commitment



Desired State:
STAR
Performance

*Six Sigma is part of our strategy
on our journey through the maze*

VIRTUA'S Performance Journey Continues...

Virtua Health: LEAN, Simulation, Management Engineering
November 2003

Virtua Health: STAR, Six Sigma/CAP/Workout,
Becoming a Learning Organization - October 2000

WJ: Re-engineering / Patient Centered Care: mid 1990's
MH: Metric Focused Quality Improvement (AQP) /
Patient Focused Care: mid 1990's

WJ: Total Quality Management: early 1990s
MH: Total Quality Management 1990 - 1995

WJ: Quality Assessment: late 1980's
MH: Quality Assessment mid to late 80's (Leadership explores
Total Quality Management Concepts with VHA 1988 - 1990)

WJ: Quality Assurance: mid 1980's
MH: Quality Assurance: mid 1970's to mid 1980's

WJ: Quality Circles: early - late 1980s
MH: Morbidity and Mortality Reviews, Quality Audits

Why GE?

- Pre-existing relationship
- Highly respected for their business processes and leadership development
- Pioneer in Six Sigma application and knowledge transfer
- Comprehensive Toolkit (Six Sigma, CAP and WorkOut)
- Talented, highly competent consulting and implementation team



Cardiac Medications Project

Define Phase

Cardiac Medications: Define

- Board-Medical Staff Quality Retreat in October 2001
 - Issue: Performance Metrics
 - Example: Cardiac Medication Administration
 - Status
 - Reported to CMS
 - Available on Internet sites
 - Observation: “The data is not valid”
 - Response: “It’s your data”

Cardiac Medications: Define

- Performance Issues
 - Clinical performance
 - Data integrity
- Retreat action steps
 - Cardiac Program of Excellence
 - CMS targets included in Management Incentive Compensation Program for 2002
 - Metric: 4th quarter performance at or above CMS targets

VIRTUA HEALTH
Performance on CMS Cardiac Medications Standards

MEASURE	BENCH MARK	2001	1st Qtr 02
Use of ASA with Acute MI patients within 24 hours of arrival to hospital (%)	90	85	87
Use of beta blockers within 24 hours of arrival to hospital (%) in AMI	90	84	83
Use of aspirin at discharge (%) in AMI	90	86	83
Use of beta blocker at discharge (%) in AMI	90	86	85
Appropriate use/non use of ACEI at discharge (Patients with LVEF < 40% (%) in AMI	90	78	72
Appropriate use/non use of ACEI at discharge (Patients with LVEF < 40%) (%) in CHF	90	89	48

Cardiac Medications: Define

- “Usual” improvement techniques applied
- No movement in metrics by 6/02
- Use of Six Sigma revisited
- Project chartered 7/02

Define

R0 Cardiac Medication Indicators

Project Title: Cardiac Medication Indicators Six Sigma Project
Sponsors: Jim Dwyer, Ann Campbell, Ellen Guarnieri, Adrienne Kirby, Mike Kotzen
Champions: Pat Orchard & Jane Slaterbeck
Master BB: Mark Van Kooy
Black Belt: Adrienne Elberfeld
Green Belt: Ted Gall
Finance Approver: Gerry Lowe
Project Start Date: July 22, 2002

Team Members: Jay Brewin, Darlene Euler, Christine Gerber, Val Torres, Kathy Halstead, Kathy Plumb, Cindy D'Esterre, Lori Edell, Heather Scheckner, Angie Smolskis, Pat Quackenbush, Ronald Kieft, Michelle Weaks, Robert Singer, Vince Spagnuolo, Steve Fox

Project Description: Increase quality of patient care by use/non-use and appropriate documentation of aspirin, beta-blockers, and ACE inhibitors in CHF or AMI patients to achieve or exceed Virtua benchmark goals.

Project Scope: To have all four acute care facilities, within all medical disciplines, meet the standards of Core/JCAHO guidelines

Potential Benefits: To achieve improved outcomes for patients with AMI/CHF diagnosis by adhering to evidence based practice through education, documentation, and compliance while meeting regulatory standards and enhancing quality of patient care at Virtua.

Alignment with Strategic Plan: IIA-Cardiology; Global MICP Goals for Virtua.



Cardiac Medications Project

Measure Phase

Measure

QRA Chart Review Gage R&R

Each Appraiser vs Standard

Assessment Agreement

Appraiser #	Inspected #	Matched	Percent (%)	95.0% CI
Appraiser A	12	4	33.3	(9.9, 65.1)
Appraiser B	12	11	91.7	(61.5, 99.8)
Appraiser C	12	9	75.0	(42.8, 94.5)
Appraiser D	12	10	83.3	(51.6, 97.9)

Matched: Appraiser's assessment across trials agrees with standard.

Assessment Disagreement

Appraiser	# 1/0	Percent (%)	# 0/1	Percent (%)	# Mixed	Percent (%)
Appraiser A	0	*	8	66.7	0	0.0
Appraiser B	0	*	1	8.3	0	0.0
Appraiser C	0	*	3	25.0	0	0.0
Appraiser D	0	*	2	16.7	0	0.0

1/0: Assessments across trials = 1 / standard = 0.

0/1: Assessments across trials = 0 / standard = 1.

Mixed: Assessments across trials are not identical.

Between Appraisers

Assessment Agreement

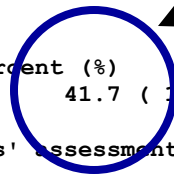
# Inspected	# Matched	Percent (%)	95.0% CI
12	5	41.7	(15.2, 72.3)

Matched: All appraisers' assessments agree with each other.

•During this gage, it was determined that there was variation between the QRA's review of charts

•A Workout was held on September 18th with the QRA's and Case Management Directors to develop SOP's in reviewing of all CHF and AMI patients for core indicators

Percentage of time QRA's agreed on assessment





Containment

Containment Activities

- 100% chart review
- All hands on deck!
 - Nursing
 - Case Management
 - Quality
 - Physicians

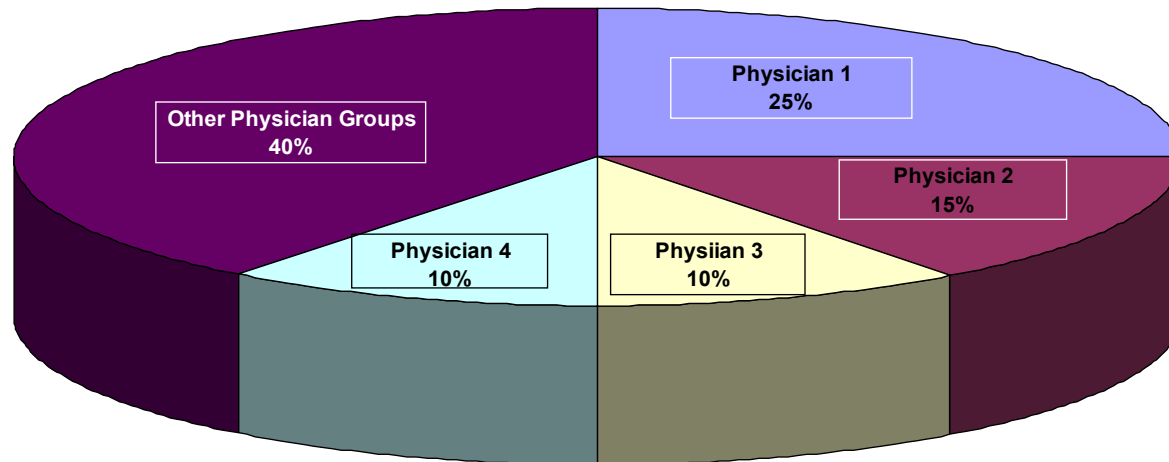


Cardiac Medications Project

Analyze Phase

Analyze

WJ Physician Defects July-Dec 2002

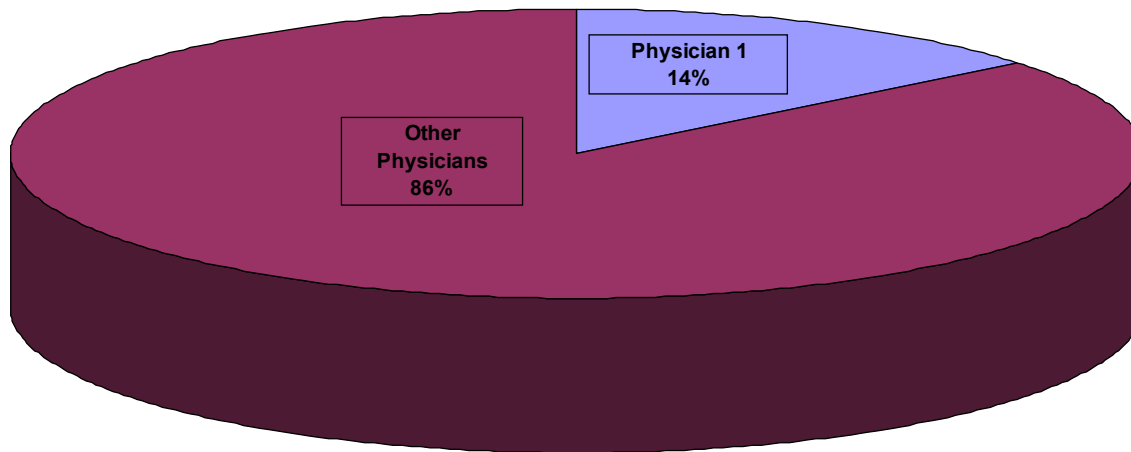


48 Total Defects
46 Documentation Related
2 Quality of Care Issues

All defects related to a cardiac medication indicator are reviewed by the physician champion at the local site. The champion follows-up directly with the individual physician.

Analyze

Memorial Physician Defects Jul-Nov 2002

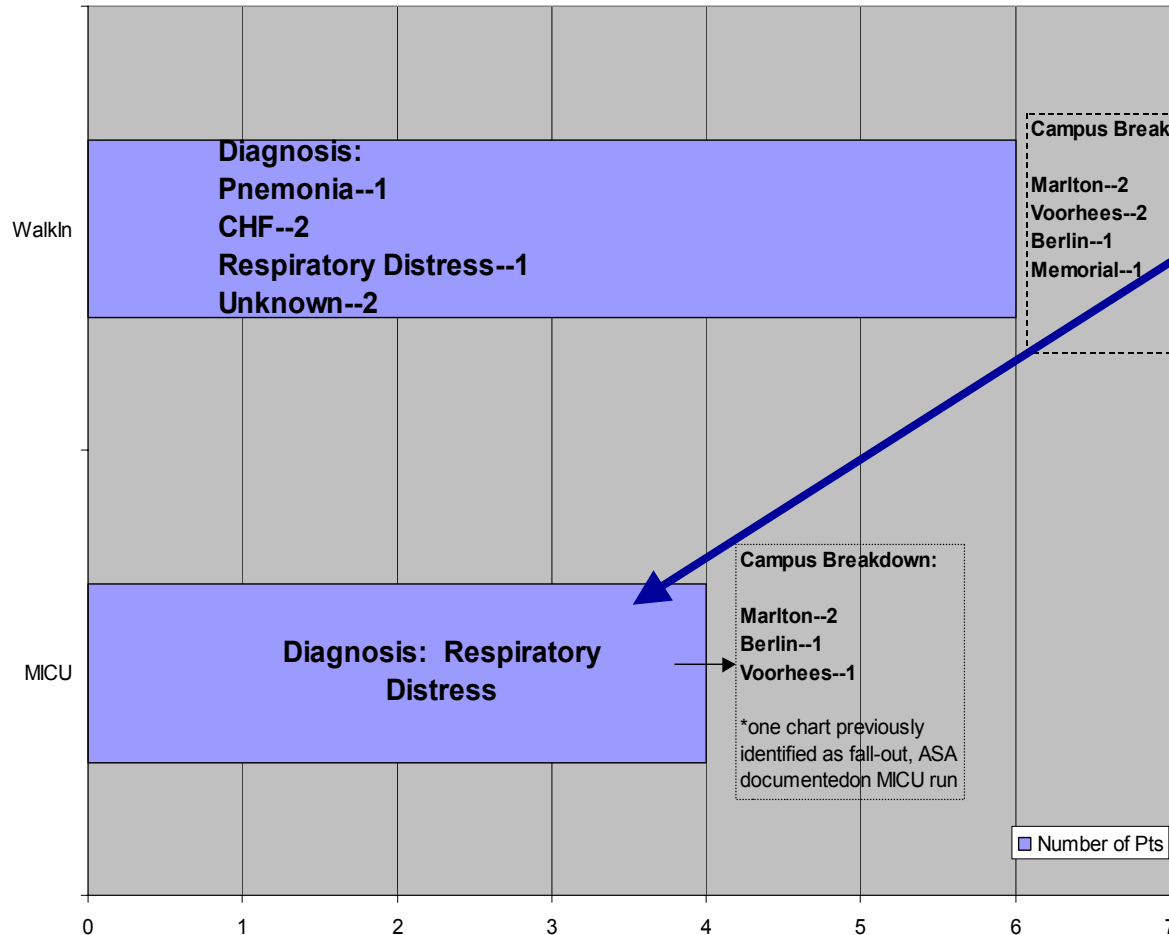


**100% Documentation
Related Issues**

Best practice at Memorial: Physician based Case Management teams to work directly with doctors in evaluating care of the patient.

Analyze

Analysis of AMI patients that did not receive aspirin within 24 hours



Key takeaway:

Patients diagnosed as "Respiratory Distress" by MICU were 100% of the fall-outs.

Need to educate MICU staff per results and review of symptom related diagnosis



Cardiac Medications Project

Improve Phase

Improve

Documentation

Practice

No consequence for non-compliance X,N

Stickers lost in chart (QA stickers) X

Physician not noting the importance of documentation X

- Completed
- CHF Team
- Physician Leadership

Accountability for competing d/c form X

Discharge process X

Need to be consistent across Virtua X

Sticker importance; not using as a tool X

Nursing Education & Communication X

Appropriate use of ARB's and documentation X

Nursing lack of understanding & knowledge X
Education - as tool X

No standard d/c form X

Consistency with documentation among MD disciplines X

Education (PRO indicators- what are they?)
7th Scope CAP 4/4/03

Physician Compliance X

Lack of communication/education X

Knowledge base/know studies X

MD not noting importance of documentation X

Co-morbid conditions not documented X

Need to identify time drug given X

Need to document common knowledge X

Contraindication to Med Not Documented X

Allergy to medication not documented X

Lack of Documentation X

Multiple D/C instruction forms X

NO Pathways for AMI X WorkOut April 8th & 9th, 2003

Pathway for CHF not followed X

Proper Documentation of med given in ED in numerous areas of chart X

Updated med list X

MR completion X

24 hour compliance in giving Med X

Data collection inconsistent amongst QRA's X
WorkOut 9/18/02

Patient Condition

Methods

Measurements

Through WorkOut, pilot of best practice, and coordination of medical leadership with nursing and case management the team was able to standardize practice and reduce the variables

Improve

Expected Results of Proposed Solutions

Improvement

Y Benefit

Quality Benefit

MICU run sheets on patient charts within 24 hours of admission	Increased compliance for aspirin given with 24 hours	Compliance with PRO indicators for aspirin given within 24 hours of admission
Physician completion of written discharge instructions for cardiac patients	Compliance and proper documentation of care for discharge medication indicators	Proper quality of care administered as per PRO indicators and documented
Standard Operating Procedures by Nursing and Case Management in chart review, stickie reminders for physicians, and availability of discharge instructions	Increased compliance in care and documentation for all indicators	Coordination of care for the cardiac patient by the multi-disciplinary team
Consistent education of nursing per cardiac medication indicators	Increased compliance for medications given within time frames	Increased knowledge base of the nursing staff of the cardiac medications for AMI and CHF patients
Accurate daily census with diagnosis available through Oasis Gold and Canopy	Increased compliance in care and documentation for all indicators	Proper quality of care administered as per PRO indicators and documented
Appointment of a Process Owner at each hospital to coordinate care with directives from Cardiac Programs of Excellence	Sustained improvement in all indicators	Data reported to PRO and public benchmarks Virtua in 95% for compliance



Cardiac Medications Project

Control Phase

Define

Measure

Analyze

Improve

Control
Closeout

Root Cause Analysis

<u>Factor</u>	<u>Root Cause</u>	<u>Proposed Solutions</u>
MICU run sheets not available on charts	Medics unable to complete; shortened documentation not part of permanent chart	As per DOH regulations, MICU run sheets to be available within 24 hours. Preliminary report to be left by medic at patient transfer.
Inconsistent availability of patient census with diagnosis for Nursing and Case Management	IS integration with Canopy system; initial information input by ICD-9 code, not description	OAS Gold pathway from registration to nursing patient census report completed. Canopy census 90% completed, still working on change of status patients within HIS project manager.
Physician compliance in completion of discharge instructions	Inconsistent follow-through	Two week audit showed 100% compliance of discharge forms at Memorial, (25% cardiac specific), and 90% compliance of generic or physician specific discharge forms for West Jersey for documentation of the instruction of medication usage.*
Consistent practice of multi-disciplinary care of the patient across Virtua	Need for champion at each campus to lead initiatives of the Cardiac Programs of Excellence	Appointment of Nurse Leader within each facility to coordinate activities of Cardiac Programs of Excellence at local level.
ACE Inhibitor non-compliance	Physicians are treating patients with ARBs which are no longer routine care, unless pt. has contraindication	Document of contraindication on discharge instructions and physician education.

* 1 out of 5 elements tracked on completion of physician discharge instructions.

Define

Measure

Analyze

Improve

Control
Closeout

AMI Indicators	April			May			June			Q2 2003		
	Eligible	No	% Yes	Eligible	No	% Yes	Eligible	No	% Yes	Eligible	No	% Yes
ASA 24 hrs												
Berlin	14	0	100.0%	8	0	100.0%	11	1	90.9%	33	1	97.0%
Marlton	16	0	100.0%	10	1	90.0%	14	1	92.9%	40	2	95.0%
Memorial	30	0	100.0%	18	0	100.0%	21	0	100.0%	69	0	100.0%
Voorhees	21	2	90.5%	18	0	100.0%	25	1	96.0%	64	3	95.3%
Virtua	81	2	97.5%	54	1	98.1%	71	3	95.8%	206	6	97.1%
WJ	51	2	96.1%	36	1	97.2%	50	3	94.0%	137	6	95.6%
BB 24 hrs												
Berlin	10	0	100.0%	7	0	100.0%	7	0	100.0%	24	0	100.0%
Marlton	17	1	94.1%	9	0	100.0%	11	1	90.9%	37	2	94.6%
Memorial	26	0	100.0%	20	0	100.0%	20	0	100.0%	66	0	100.0%
Voorhees	17	1	94.1%	17	1	94.1%	20	0	100.0%	54	2	96.3%
Virtua	70	2	97.1%	53	1	98.1%	58	1	98.3%	181	4	97.8%
WJ	44	2	95.5%	33	1	97.0%	38	1	97.4%	115	4	96.5%
ASA @ dc												
Berlin	5	0	100.0%	2	0	100.0%	4	0	100.0%	11	0	100.0%
Marlton	6	0	100.0%	6	0	100.0%	5	1	80.0%	17	1	94.1%
Memorial	17	0	100.0%	4	0	100.0%	11	0	100.0%	32	0	100.0%
Voorhees	6	0	100.0%	6	0	100.0%	11	0	100.0%	23	0	100.0%
Virtua	34	0	100.0%	18	0	100.0%	31	1	96.8%	83	1	98.8%
WJ	17	0	100.0%	14	0	100.0%	20	1	95.0%	51	1	98.0%
BB @ dc												
Berlin	5	0	100.0%	4	0	100.0%	3	0	100.0%	12	0	100.0%
Marlton	6	0	100.0%	6	0	100.0%	4	0	100.0%	16	0	100.0%
Memorial	18	0	100.0%	4	0	100.0%	12	0	100.0%	34	0	100.0%
Voorhees	6	0	100.0%	5	0	100.0%	13	0	100.0%	24	0	100.0%
Virtua	35	0	100.0%	19	0	100.0%	32	0	100.0%	86	0	100.0%
WJ	17	0	100.0%	15	0	100.0%	20	0	100.0%	52	0	100.0%
ACE @ dc												
Berlin	3	0	100.0%	0	0	100.0%	1	0	100.0%	4	0	100.0%
Marlton	3	0	100.0%	2	0	100.0%	1	0	100.0%	6	0	100.0%
Memorial	6	2	66.7%	1	0	100.0%	2	0	100.0%	9	2	77.8%
Voorhees	1	0	100.0%	1	0	100.0%	3	0	100.0%	5	0	100.0%
Virtua	13	2	84.6%	4	0	100.0%	7	0	100.0%	24	2	91.7%
WJ	7	0	100.0%	3	0	100.0%	5	0	100.0%	15	0	100.0%
CHF Indicator												
ACE @ dc												
Berlin	2	0	100.0%	5	0	100.0%	4	0	100.0%	11	0	100.0%
Marlton	4	0	100.0%	8	1	87.5%	5	0	100.0%	17	1	94.1%
Memorial	11	0	100.0%	9	1	88.9%	8	1	87.5%	28	2	92.9%
Voorhees	10	1	90.0%	6	0	100.0%	4	0	100.0%	20	1	95.0%
Virtua	27	1	96.3%	28	2	92.9%	21	1	95.2%	76	4	94.7%
WJ	16	1	93.8%	19	1	94.7%	13	0	100.0%	48	2	95.8%

Monthly Dashboard for POE Tracking

Define

Measure

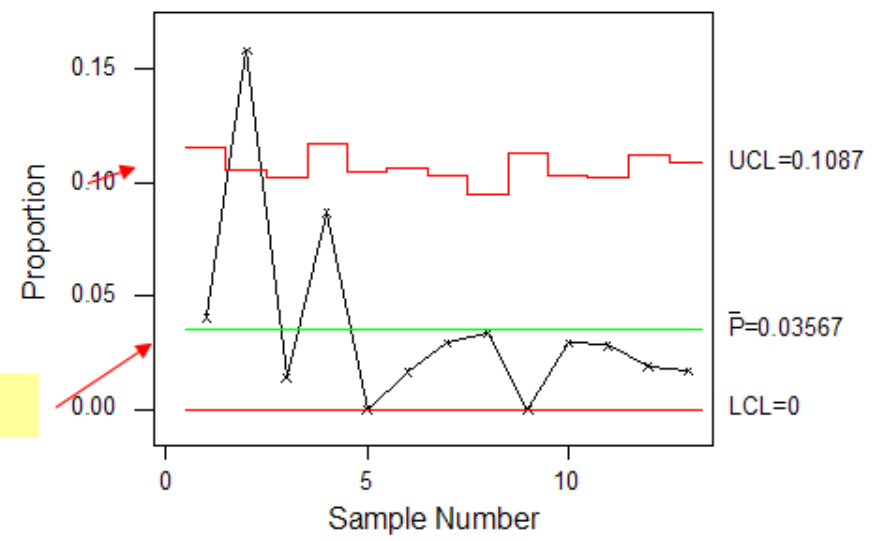
Analyze

Improve

Control
Closeout

P Control Charts

P Chart for No BB 24



Standard set by CMS for Virtua of 90% or >

Start of project

Take away: Process is capable and in control.

VIRTUA HEALTH
Performance on CMS Cardiac Medications Standards

MEASURE	BENCH MARK	2001	1st Qtr 02	4th Qtr 02	1st Qtr 04
Use of ASA with Acute MI patients within 24 hours of arrival to hospital (%)	90	85	87	95.8	94.2
Use of beta blockers within 24 hours of arrival to hospital (%) in AMI	90	84	83	97.1	98.6
Use of aspirin at discharge (%) in AMI	90	86	83	90	100
Use of beta blocker at discharge (%) in AMI	90	86	85	100	100
Appropriate use/non use of ACEI at discharge (Patients with LVEF < 40% (%) in AMI	90	78	72	100	100
Appropriate use/non use of ACEI at discharge (Patients with LVEF < 40%) (%) in CHF	90	89	48	90.5	90.5



**New Jersey 2004
Hospital Performance Report**
A Report on Acute Care Hospitals for Consumers



James E. McGreevey
Governor



Clifton R. Lacy, M.D.
Commissioner

Heart Attack Treatment Scores

This information summarizes hospital performance (rates) on treating heart attacks, including an overall score, the administration of aspirin at arrival and discharge, beta blockers at arrival and discharge and ACE inhibitor at discharge. The rate is the percent of time that a hospital gave patients the correct treatment. The hospitals are presented from the highest (best) to lowest overall score.

Hospital Name	County	Overall Score	Aspirin Arrival	Aspirin Discharge	Beta Blocker Arrival	Beta Blocker Discharge	ACE Inhibitor Discharge
Top 10% of hospitals scored equal to or higher than:		97	99	99	97	99	93
Top 50% of hospitals scored equal to or higher than:		90	94	88	91	90	78
Virtua-West Jersey Hospital Berlin	Camden	100	99	100	100	100	SN
RWJ University Hospital at Hamilton	Mercer	99	99	99	99	99	SN
Deborah Heart and Lung Center	Burlington	98	SN	100	SN	99	90
Robert Wood Johnson University Hospital	Middlesex	98	96	100	94	99	94
Irvington General Hospital	Essex	98	100	SN	SN	SN	SN
Virtua-West Jersey Hospital Voorhees	Camden	97	98	97	97	98	SN
St. Peter's University Hospital	Middlesex	97	99	97	96	95	SN
Our Lady of Lourdes Medical Center	Camden	97	99	98	98	98	88
St. Clare's Hospital-Sussex	Sussex	97	SN	SN	SN	SN	SN
Overlook Hospital	Union	97	97	93	97	100	SN
Barnert Hospital	Passaic	97	SN	SN	SN	SN	SN
RWJ University Hospital at Rahway	Union	97	95	93	99	98	SN
Virtua-West Jersey Hospital Marlton	Burlington	96	96	96	95	100	SN
Kimball Medical Center	Ocean	96	99	98	93	95	SN
Morristown Memorial Hospital	Morris	96	96	99	95	98	86
Englewood Hospital and Medical Center	Bergen	96	92	99	96	99	94
St. Francis Medical Center	Mercer	96	99	98	98	95	80
Virtua-Memorial Hospital Burlington Cty.	Burlington	96	96	94	98	98	77
Hackensack University Medical Center	Bergen	96	98	97	93	95	93
Meadowlands Hospital Medical Center	Hudson	95	96	SN	100	SN	SN
Mountainside Hospital	Essex	95	94	97	96	98	SN
South Jersey Hospital-Elmer	Salem	95	97	SN	92	SN	SN
Community Medical Center	Ocean	95	96	89	96	94	92
Capital Health System at Mercer	Mercer	94	97	100	93	97	SN
Hunterdon Medical Center	Hunterdon	94	95	SN	96	SN	SN
Capital Health System at Fuld	Mercer	93	96	SN	95	SN	SN
Cooper Hospital/ University Medical Center	Camden	93	94	96	91	91	88
Southern Ocean County Hospital	Ocean	93	91	98	93	91	SN
UMDNJ- University Hospital	Essex	93	97	92	93	95	76
Hackettstown Community Hospital	Warren	92	91	SN	95	89	SN
Valley Hospital	Bergen	92	93	93	92	94	83
Newton Memorial Hospital	Sussex	92	95	SN	92	92	SN

Acute Rehab Services

What the Rehab Team Did ...

- Eliminated case screening for appropriateness by physical therapists, relied on nursing assessment
- Flexed staff between facilities to reduce staffing-demand mismatch
- Moved to bedside PT model

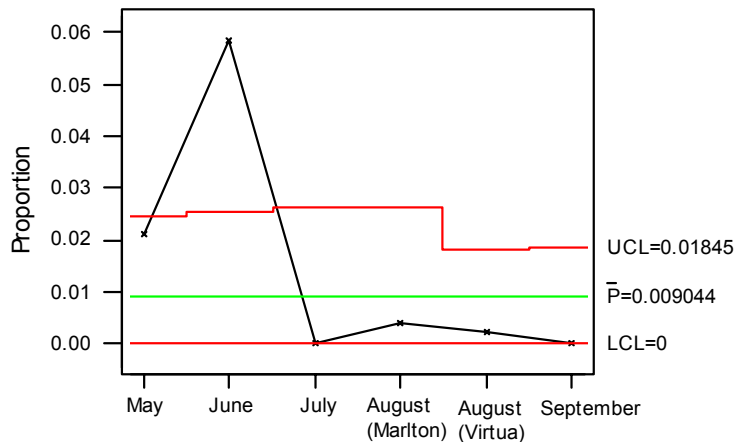


Why They Did It ...

- Inappropriate referrals were found to be rare, screening reduced productivity
- Varying demand between facilities limited productivity
- PT in department resulted in delayed treatments and reduced productivity

P Control Chart of Physician Consults

Virtua May-September Eval Completions



Project Results ...

- “Consults completed within 24 hours” achieved Six Sigma
- Patient and staff satisfaction increased
- Achieved targeted increases in PT productivity

First Virtua Project to Achieve Six Sigma Level of Performance!

Acute Anticoagulation Services

What the Team Did ...

- Transitioned UFH to LMWH for DVT/PE and Acute Coronary
- Mistake-proofed UFH and LMWH administration processes (inc WBH MAR)
- Created SOPs for weighing patients and for communicating critical lab results



Why They Did It ...

- Reduced process complexity from 92 to 21 steps
- “Catastrophic” failures were drivers of adverse outcomes
- Variation in approaches was creating opportunities for error

Learnings ...

- Labs were obtained, reported and addressed appropriately in the vast majority of cases
- Rare failures were gross deviations from protocols
- Simplification and Mistake-proofing are critical to patient safety

Project Results ...

- WBH protocol performance fully characterized
- Successful transition to LMWH
- Improved Lab-Nursing communication
- Bed scales, new pumps, MAR

Complex Clinical Processes Require Simplification and Error Prevention!

What Makes Six Sigma Different?

Adapted with permission from Hamadi Said, US Mint Philadelphia, PA

TQM

Solid tools but....

- **Quality tool**
- **Vague goals**
- **No standard metrics**
- **Open-ended, unstructured**
- **Department-based**
- **Focus on product quality**

Six Sigma

Real results that matter to customers....

- **Business tool**
- **Clear goals/deliverables**
- **Clear, consistent metrics**
- **Rigorous timeline**
- **Business-based**
- **Focus on customer**

Six Sigma builds on Lessons Learned from prior approaches

Questions or Comments?

