



Valley Baptist
Health System

Like Nowhere Else

Transforming Healthcare and
Sustaining Success with
Lean Six Sigma

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rio grande valley map







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Valley Baptist Health System

- Valley Baptist Medical Center - Harlingen
 - 611 Licensed Beds
 - Lead Level 3 Trauma Center
 - State of the Art Children's Center
 - # 1 Rated Orthopedics Service
 - Heart & Vascular Institute
 - Teaching facility for the Regional Academic Health Center of The University of Texas Health Science Center at San Antonio
- Valley Baptist Medical Center – Brownsville
 - 243 Licensed Beds
 - Level 3 Trauma Center
 - State of the Art Imaging Center
 - Center of Diabetes Management
- Other Entities
 - Golden Palms Retirement and Healthcare Center
 - Valley Health Plans
 - Advanced Medical Supply (DME)
 - Valley Baptist Ambulatory Surgery Center
 - Clinical Pastoral Education Center
 - Licensed Vocational Nurse School
 - Family Practice Residency Program
 - Home Health & Hospice
 - Rehabilitation & Wellness
 - Behavioral Health Services
- Attributes
 - Leading area employer
 - Major economic contributor
 - Community resource



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Valley Baptist Health System

- Mission:
 - Valley Baptist Health System is a community health service performing spiritually based health, education and charitable programs in accordance with the teachings and healing ministry of Jesus Christ.
- Core Beliefs:
 - In all we do we value the whole person – body, mind and spirit.
 - We treat all people with dignity and respect.
 - We pursue excellence.
 - We collaborate with others in the delivery of service.
 - We are earnest stewards of our organization and community resources.
 - Integrity and honesty are the foundation of all our relationships.
- Vision:
 - Valley Baptist Health System will be a faith based regional health care system serving patients and people throughout South Texas. It will be distinguished by high quality care, outstanding service and excellent operations.



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Valley Baptist Health System

- Strategic Initiatives
 - Disciplined Offering of Services
 - E-Business
 - Six Sigma
 - Innovation
 - Relentless Customer Service
 - Employee Partnerships
 - Growth
- Values
 - Disciplined
 - Accountable
 - Entrepreneurial
 - Performance Oriented
- ***With Six Sigma as our operating system, the others are possible!!***



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What is Six Sigma?

- A comprehensive and flexible program for achieving, sustaining and maximizing business success that:
 - Is uniquely driven by a clear focus on the “Voice of the Customer”
 - Is founded in a rigorous use of facts, data and statistical analysis
 - Provides for diligent attention on managing, improving and reinventing business processes.
 - Is an management methodology with three perspectives:
 - **A Measure of Quality**
 - **A Process for Continuous Improvement**
 - **An Enabler for Cultural Change**



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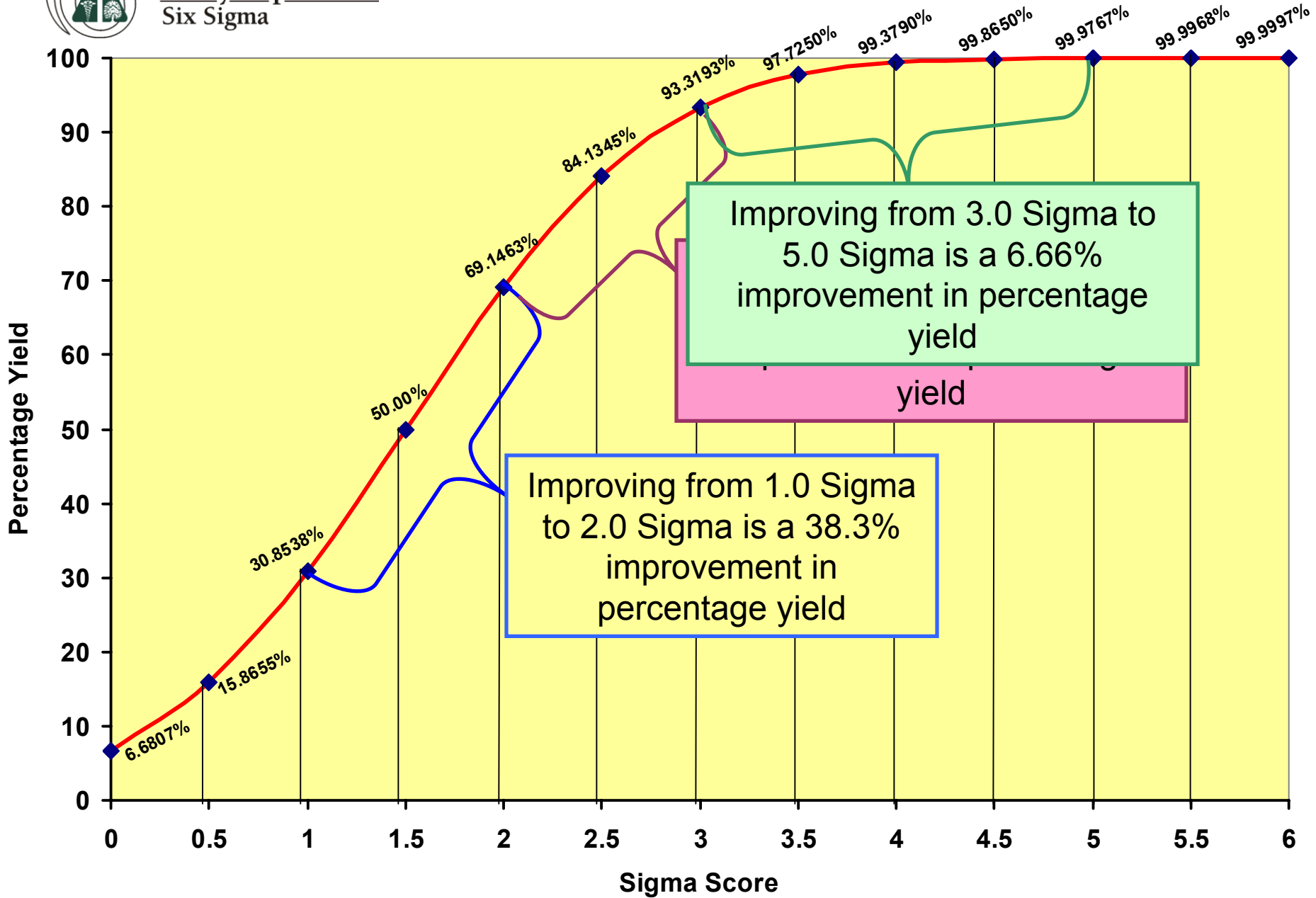
A Measure of Quality:

- Six Sigma is a statistical measure that expresses how close a service process comes to its quality goal
- Six Sigma refers to a process that produces only 3.4 defects per million opportunities

Sigma	DPMO	Yield
2	308,537	69.1463%
3	66,807	93.3193%
4	6,210	99.3790%
5	233	99.9767%
6	3.4	99.9997%



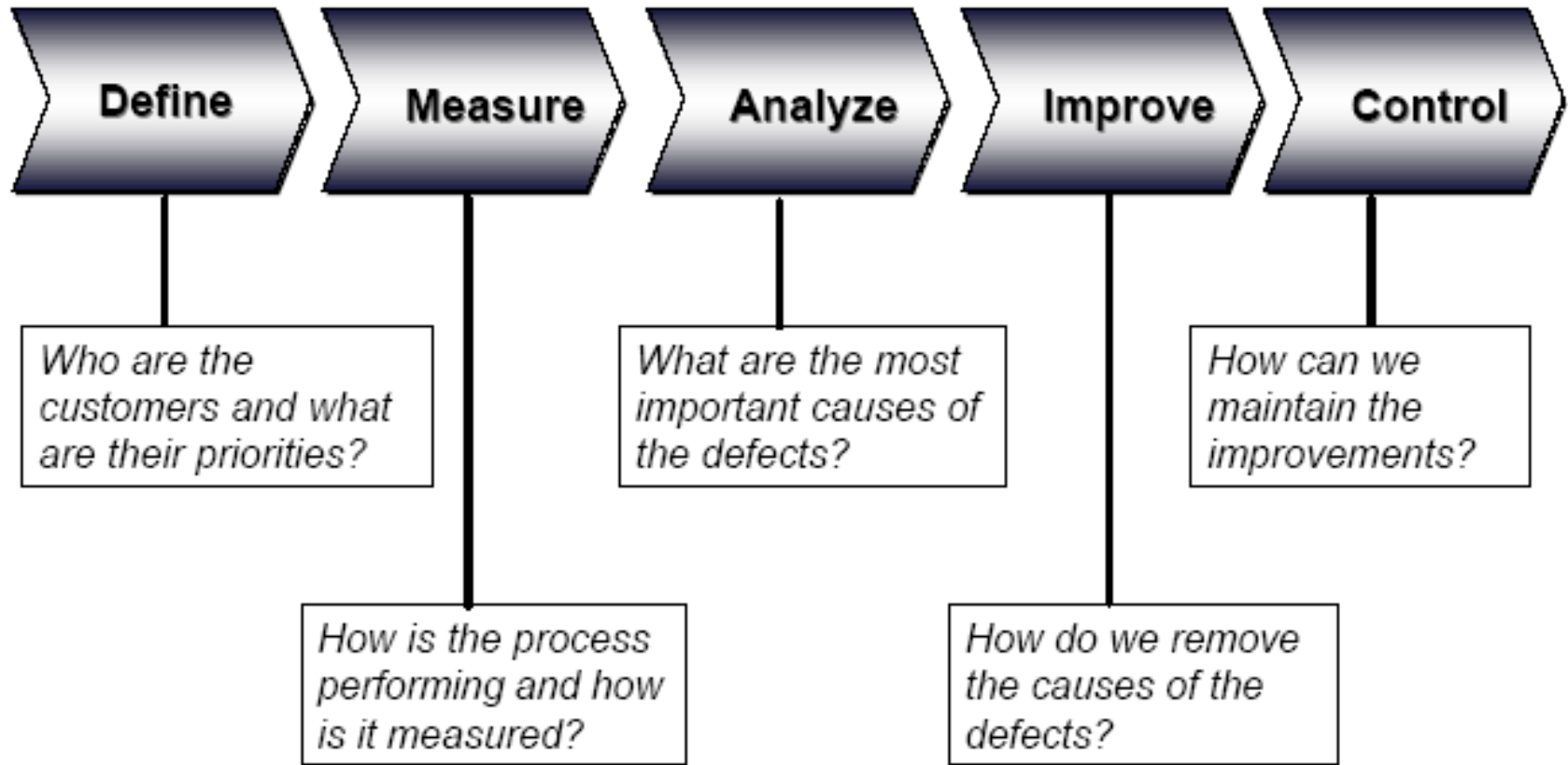
Sigma Score vs. Percentage Yield





DMAIC Methodology:

DMAIC: To improve any existing product or process





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Lean Six Sigma:

- 5 S's
 - *Seiri*.....Sort
 - *Seiton*.....Standardize
 - *Seiketsu*.....Simplify
 - *Seiso*.....Sweep
 - *Shitsuke*.....Sustain
- Value Added vs. Non-Value Added activity



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Six Sigma Themes:

- Genuine Focus on the customer
- Data and Fact Driven Management
- Process focus, management and improvement
- Proactive management
- Boundaryless collaboration
- Drive for perfection; tolerance for failure



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The Six Sigma Difference:

- Traditional Quality Programs
 - Driven internally
 - Focuses on outcomes
 - Fixes defects
 - Improves quality
 - Looks backwards
 - Concentrates on products
 - High on theory and people
- Six Sigma
 - Driven by the customer
 - Focuses on processes
 - Prevents defects
 - Improves bottom line
 - Looks forward
 - Concentrates on CTQs
 - High on methodology and data
 - Forces disciplined decision making



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Focus:

$$Y = f(x)$$

Y

- Dependant
- Output
- Effect
- Symptom
- Monitor

$X_1 \dots X_n$

- Independent
- Input & Process
- Causes
- Problems
- Control



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Six Sigma Effectiveness:

The Effectiveness (E) of the result is equal to the Quality (Q) of the solution times the Acceptance (A) of the idea times the Accountability (A) to solution execution

$$Q \times A^2 = E$$

Six Sigma
Methodology

Change
Acceleration
Process

Effective
Results

Work-Out™



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HEART FAILURE MANAGEMENT



Initiative Description:

Clinical evidence-based medical management is not consistently initiated and followed for inpatients with Heart Failure at VBMC-H, resulting in less than 100% compliance to CMS / JCAHO Core Measures.



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Title: Heart Failure Management

Sponsor: Dr. Garner Klein
Owner: Pam Warner
Green Belt: Carolyn Hutchinson
Master BB: Art Rangel

Finance Approver: Dr. Garner Klein
Project Start Date: 03/10/04
Project End Date: 08/21/04

Team Members:

- Jerry Salazar, RN-PCCU/3W
- Candy Wiley, RN-ER
- Janie Corkill, RN-CPIU/HF
- Leti Culbertson, RN-DM/CM
- Analiza Amaya-Diaz, Pharm. D.
- George Pierce, PA
- Dr. John Partin, Family Practice
- Dr. Lisa Dix, Cardiologist

Description:

Improve Quality by measuring and analyzing the four (4) quality indicators set by the CMS/Premier demonstration project for patients who suffer from Heart Failure.

Scope:

Inpatients with Heart Failure

Potential Benefits:

- Decrease readmissions
- Increase patient compliance
- Increase referrals to CPIU/HF clinic/Cardiac Rehabilitation
- Increase Patient satisfaction/Quality of life
- Decrease LOS
- Compliance to JCAHO standards
- CMS and Premier financial rewards
- Community Education

Alignment with Strategic Plan:

Growth, Six Sigma Quality, Relentless Customer Service, Innovation.



Y= 100% COMPLIANCE WITH ALL FOUR (4) CORE MEASURES FOR HEART FAILURE.

- Measurement of Left Ventricular Function documented
- On ACEI or contraindication documented
- Smoking cessation counseling documented
- Complete discharge instructions documented

What are the data sources? How will the data be collected?

- Medical Records
- Information Services
- Chart Audits

What is a defect, unit, opportunity?

- Defect - Noncompliance to any of the 4 Core Measures
- Unit – Patient Chart
- Opportunity – 1 opportunity per unit

What is your baseline capability?

Z Score = 1.7

DPMO = 420,000

Yield = 58%



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Attribute Gage R & R

Within Appraisers

Assessment Agreement

Appraiser	# Inspected	# Matched	Percent	95 % CI
1	100	100	100.00	(97.05, 100.00)
2	100	100	100.00	(97.05, 100.00)
3	100	100	100.00	(97.05, 100.00)
4	100	99	99.00	(94.55, 99.97)
5	100	97	97.00	(91.48, 99.38)

Matched: Appraiser agrees with him/herself across trials.

Between Appraisers

Assessment Agreement

# Inspected	# Matched	Percent	95 % CI
100	91	91.00	(83.60, 95.80)

Matched: All appraisers' assessments agree with each other.



95% Confidence Intervals for defects

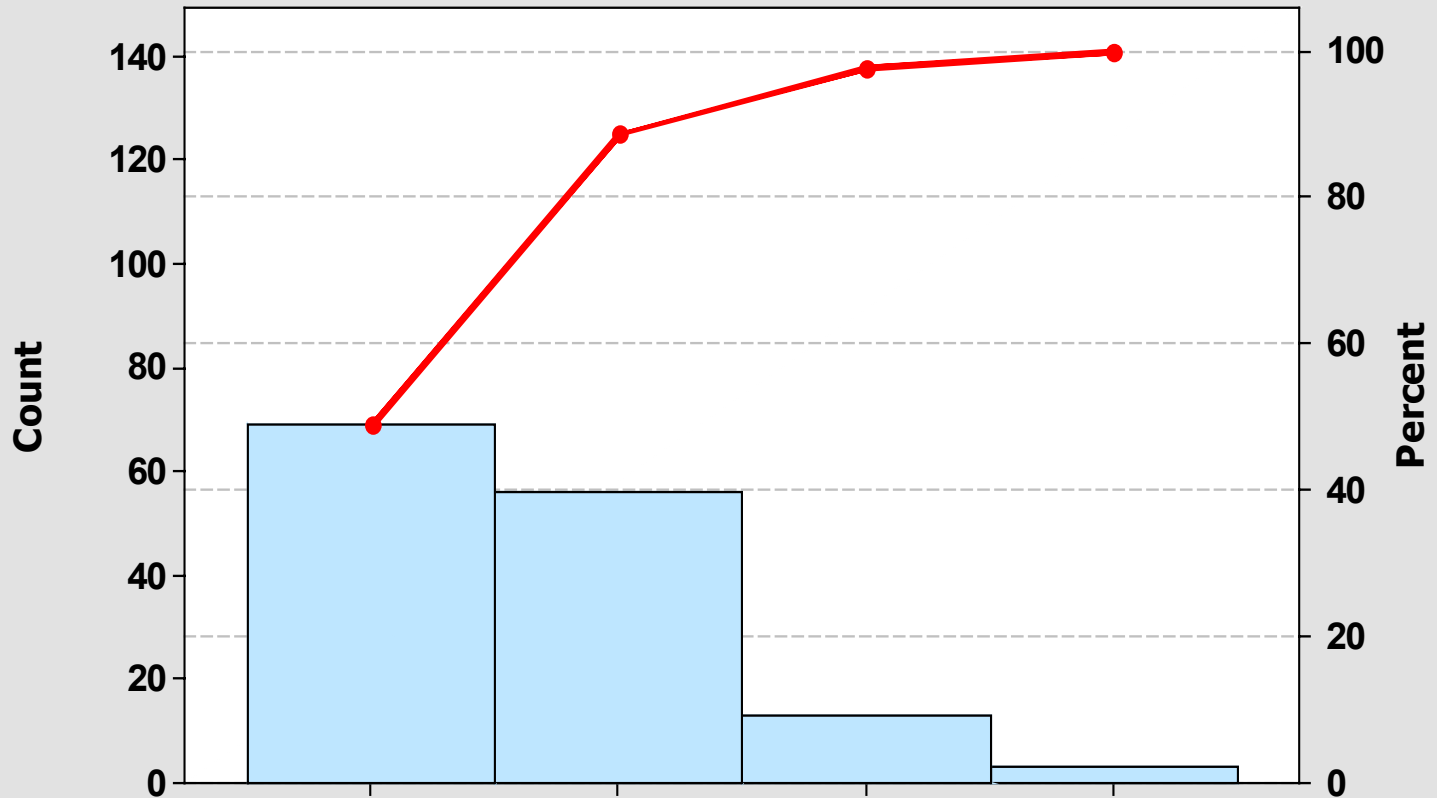
Confidence -->	0.95
Units -->	300
Opportunities -->	1
TOP's -->	300
Defects -->	126

	p(d)	Percent	ppm	Z _{ST}		Defects	
Upper Limit on Failure Rate	0.4781	47.8%	478077	1.55	<= "worst case" =>	143	95%
Nominal Value	0.42	42.0%	420000	1.70	<= "best estimate" =>		Confidence
Lower Limit on Failure Rate	0.3635	36.4%	363518	1.85	<= "best case" =>	110	Interval



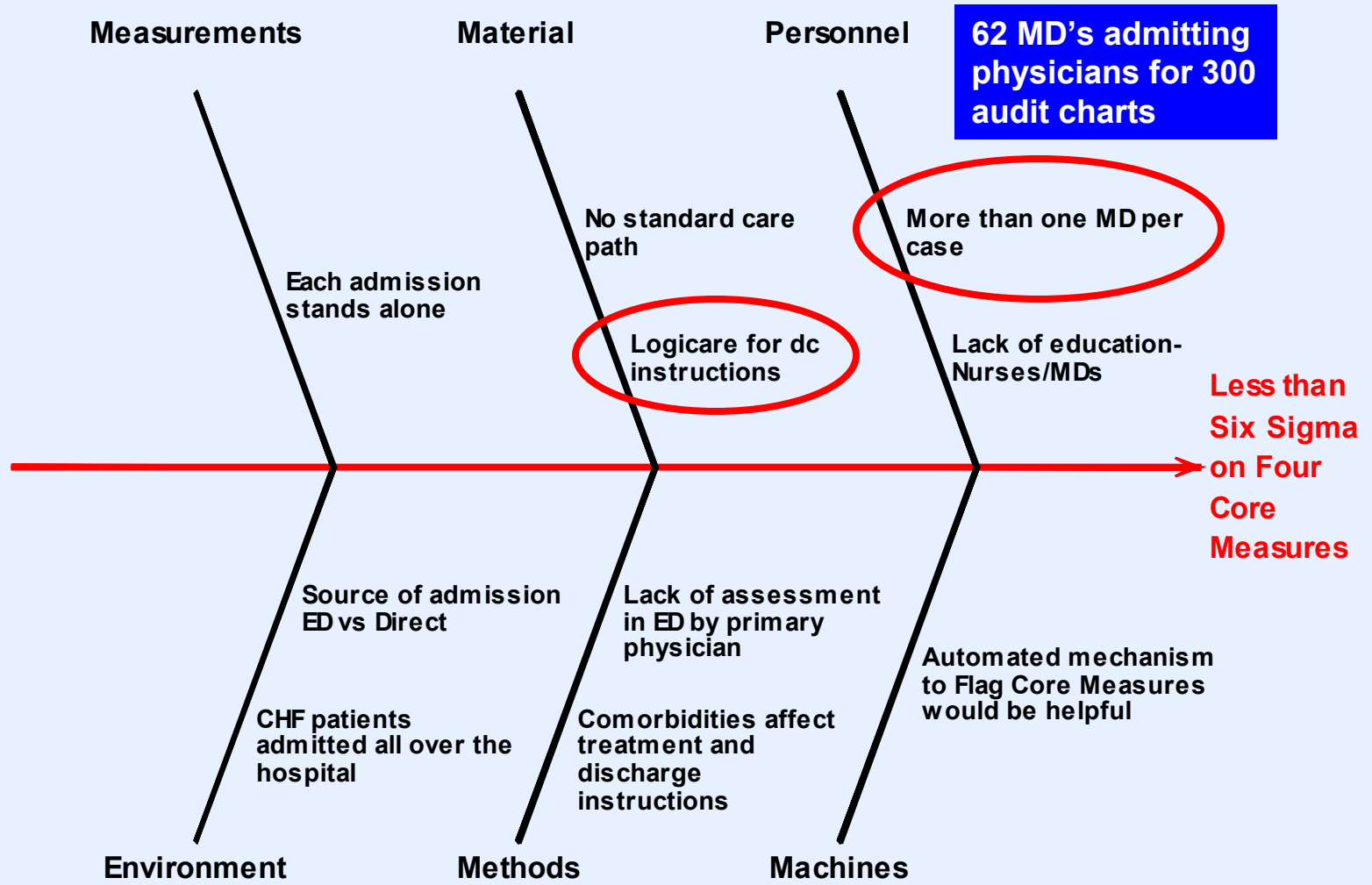
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CHF - Four Core Measures



C1	D/C Instructions	LVF Assessment	ACEI	Other
Count	69	56	13	3
Percent	48.9	39.7	9.2	2.1
Cum %	48.9	88.7	97.9	100.0

Cause-and-Effect Diagram





What X's (inputs) cause the most variation?

- Discharge Instructions
- LVF Assessment

However, all four core measures need to be addressed to ensure six sigma.

What is your improvement strategy?

- Develop a CHF order
- Process that ensures that all four core measures are addressed concurrently.
- B-type natriuretic peptide (BNP) automated daily report
- Documentation specialist to help address the core measures: LVF assessment & ACEI or contraindication documented
- Cardiac Rehabilitation utilized to address the core measures: smoking cessation education & discharge instructions
- Weekly audit of CHF patients to ensure core measures completion
- Documentation Specialist - MD
- Education, Communication - key factors



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Pilot

Begin – July 1st

End – July 16th

	Z Score	Yield	DPMO	N
Baseline	1.7	58%	420,000	300
Pilot	6+	100%	0	24

Did you achieve your goal? Yes



Chi-Square Test: Baseline, Pilot

Expected counts are printed below observed counts

Chi-Square contributions are printed below expected counts

	Baseline	Pilot	Total
1	126	0	126
	116.67	9.33	
	0.747	9.333	
2	174	24	198
	183.33	14.67	
	0.475	5.939	
Total	300	24	324

Chi-Sq = 16.495, DF = 1, P-Value = 0.000



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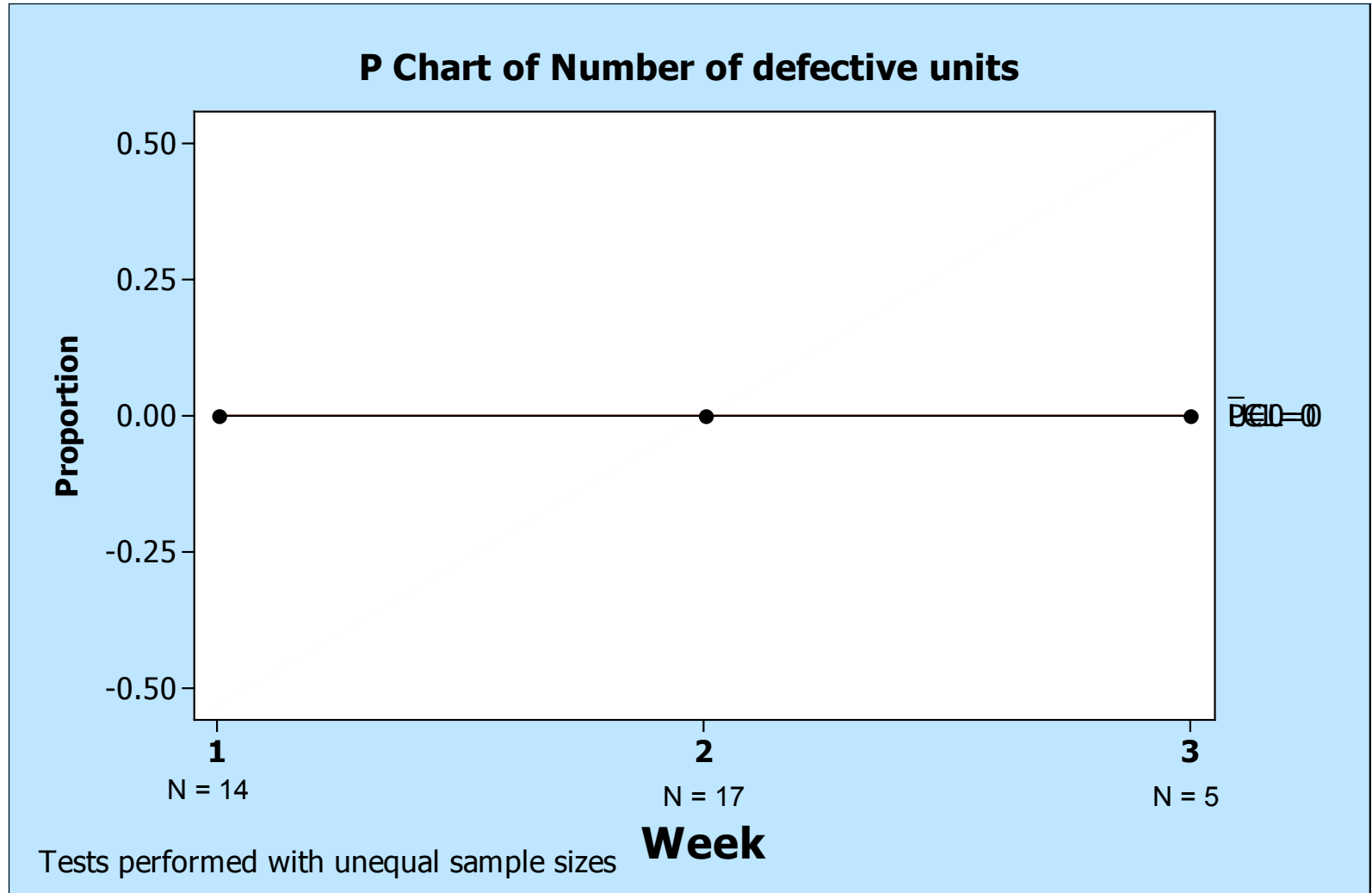
Control Plan

Variable	Variable Description	Variable Type (Data or Process)	Measurement Method	MSA GRR	Control / Monitoring	Frequency	Alert Flags	Action	Responsibility
BIG Y	100% compliance with all CHF Core Measures	Discrete	Manual Audit tool	If new auditor uses the tool then we will perform a new Gage R&R	All CHF charts audited and entered into database	Weekly	Audit sheets that report 1 defect in any of the core measures	Report any defects to physician responsible and have medical record held for deficiency	Pam Warner / Laurie Preston
y1	EF documented	Discrete	Manual audit tool	Educate New staff	Assessment of BNP's >100	M-F	MR with no EF documented	Query placed on noncompliant MRs	DS
y2	If EF <45%,ACEI, ARB or documented contraindication	Discrete	Manual audit tool	Educate new staff	Assessment of BNP's >100	M-F	MR with EF <45% With no ACEI/ARB or documented contraindication	Query placed	DS
y3	Smoking cessation counseling	Discrete	Manual Audit tool	Educate new staff	Assessment of BNP's>100	M-F	Diagnosis of CHF	Place CHF Logicare instructions on Record	CR rehab
y4	Complete CHF Instructions	Discrete	Manual audit tool	Educate new staff	Assessment of BNP's >100	M-F	Diagnosis of CHF	Place CHF Logicare instructions on Record	CR rehab



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Control Chart





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CAP Tools

Process Focus

In/out of frame

15 words

Threat vs Opportunity

Resistance Analysis

Stakeholder Analysis

Mobilizing Commitment

Best Practices Assessment

Communication Planning



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By applying the Six Sigma methodology to utilization and turnaround times at Valley Baptist Health System, improvements have been sustained on several key initiatives:

Emergency Department

- The amount of time it takes a patient to see a doctor after walking into the ED has been decreased **21%** from **105 minutes** on average in 2002, to **83 minutes** in 2005.
- The amount of time it takes to discharge a patient after the doctor has determined the discharge disposition has been decreased **30%** from **33 minutes** on average in 2003, to **23 minutes** in 2005.
- The amount of time it takes to admit a patient after the doctor has determined the admission disposition has been decreased **46%** from **226 minutes** on average in 2004, to **122 minutes** in 2005.

Operating Room

- The amount of time it takes to turnaround surgical suites from one case to the next has been decreased **34%** from **61 minutes** on average in 2002, to **40 minutes** in 2005.

Nursing

- The amount of time it takes to complete the Nursing Assessment on inpatients at VBMC – H has been improved **68%** from **102 minutes** on average in 2003, to **33 minutes** in 2005.
- Pain Management assessment and follow up has been improved **16%** from a compliance rate of **73%** in 2004, to **84%** in 2005.
- The amount of time it takes the nursing department to activate physician orders has been improved **76%** from **88 minutes** on average in 2002, to **21 minutes** in 2005.
- The amount of time it takes to discharge a patient after the physician has determined that the patient's discharge from the hospital is appropriate has been improved **73%** from **185 minutes** on average in 2003, to **50 minutes** in 2005.

- The amount of time it takes the pharmacy to verify a physician order has been improved **79%** from **110 minutes** on average in 2002, to **23 minutes** in 2005.

- Assignment on 12 DRGs has improved **31%** from an accuracy rate of **75%** in 2003, to **98.6%** in 2005.

Stroke Care

- The amount of time it takes for a stroke patient to arrive to a monitored bed has been improved **39%** from **350 minutes** on average in 2004, to **213 minutes** in 2005.

Patient Identification

- Proper patient identification prior to medical procedures has been improved from a compliance rate of **96.8%** to **100%**

Evidence Based Medicine

- The compliance with the Joint Commission on Accreditation of Healthcare Organization's core measures for Acute Myocardial Infarction has been improved from **94.6%** in 2004, to **100%** in 2005.
- The compliance with the Joint Commission on Accreditation of Healthcare Organization's core measures for Heart Failure Management has been improved from **58%** in 2004, to **100%** in 2005.

Wave 5, Wave 1
January – July 2005



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Valley Health Plan Physician Pay for Performance

- This initiative was designed to provide an incentive for physician compliance with Evidence-Based Medical Guidelines,
- The initiative included developing a “physician score card” to measure how well providers are complying with national guidelines for diagnosing and treating various conditions such as diabetes, coronary artery disease, and cancer.



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Interdisciplinary Communication VBMC-Harlingen

- Six Sigma performance in this initiative which ensures interdisciplinary collaboration and communication in patient care.
- Issues addressed included the use of multiple forms for communication among various disciplines.
- Improvement focused on developing an electronic Interdisciplinary Communication Record to include documentation from Nursing, Respiratory Care, Rehabilitation Services, Nutrition, Care Management, Pastoral Services, Cardiac Rehab, Enterostomal Therapy and Diabetes Educators.



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Radiology Turnaround Time VBMC-Brownsville

- This initiative reduces radiology turnaround time at VBMC-Brownsville in order to provide radiology results to physicians in line with industry standards.
- The “Big Y” in the initiative is the time from when an order is received in Radiology to the time the final report is posted in the chart.
- The implementation of Standard Operating Procedures and LEAN Six Sigma techniques reduced variation in the process and the mean turn-around time by an amazing 26 hours,



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Additional Successes

- **Medical Records Transcription Turnaround Process -- VBMC-Brownsville:** This initiative improved the turnaround time from an average of 53 hours to 6 hours for five dictated Health Information Management reports which are pertinent to providing timely and precise patient care.
- **Outpatient Registration Turnaround Time – VBMC-Brownsville:** This initiative decreased the registration process to 40 minutes from 63 minutes on average and improved the experience, access and care of our patients.
- **Emergency Dept. Hold Time – VBMC-Brownsville:** This initiative decreased the holding time in the E.R. at VBMC-Brownsville from the time a patient receives their admission orders until they actually leave the E.R. to go to their inpatient room from 9.5 hours to 2 hours.
- **Community Acquired Pneumonia – VBMC-Harlingen:** This initiative was designed to consistently initiate and follow clinical evidence-based medicine for pneumonia patients. Improvements efforts resulted in 89% accuracy.
- **ED Registration Process – VBMC-Harlingen:** This initiative improved the timeliness and accuracy of the Emergency Dept. registration process. The effort addressed the time from when a patient enters the ED to the time registration is complete. Turnaround time was reduced to 13 minutes from 31 minutes and accuracy increased to 95%.



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Additional Successes

- **ED Charge Accuracy – VBMC-Harlingen:** This initiative improved the Emergency Dept. charge accuracy to 92% resulting in less rework and improved productivity.
- **ICU Care Management Process – VBMC-Brownsville:** This initiative decreased the length of stay of patients in the Surgical Intensive Care Unit at VBMC-Brownsville to 47% of the DRG prescribed Geometric Mean Length of Stay (GMLOS), thereby helping free up beds for additional patients. The decreased costs from lower lengths of stay in the SICU could save VBMC-Brownsville up to \$3 million a year or more.
- **Ancillary Departments Results Availability – VBMC-Harlingen:** This initiative improved the timeliness of ancillary department test results from an average of 30 hours to 11 hours, from the time the test is completed until the time the report is placed in the patient's medical chart. The initiative was the first to address ancillary departments across the board, including Lab, Pathology, Echo, Heart and Vascular, Nuclear Cardiology, and Radiology.
- **Length of Stay Planning & Management Process – VBMC-Brownsville:** This initiative standardized the care management process, thereby improving the length of stay from 3.1 days over the GMLOS to 0.4 days under the GMLOS.
- **VBMC-Harlingen Accessibility:** This initiative seeks to ensure quick and easy access to services and departments at VBMC-Harlingen. As a result of the improvement efforts, 86% of visitors surveyed reported ease in locating their area of destination.

Six Sigma Improvement Initiatives:

Initiative:	Baseline Yield^a:	Baseline Sigma:	Pilot Yield^a:	Pilot Sigma:	Control Yield^a:	Control Sigma :
VBMC-H Accessibility	78%	2.27	82.6%	2.44	85.8%	2.57
Interdisciplinary Communication	1.9%	0	100%	6+	100%	6+
Ancillary Departments Results Availability	64.3%	1.87	75.8%	2.2	87.5%	2.65
Community Acquired Pneumonia	5%	0	86.7%	2.61	84.6%	2.52
ED Registration Process (accuracy and cycle time)	89.3%	2.74	93.3%	3	95.5%	3.24
	45.2%	0	89.1%	2.7	95.5%	3.24
ED Charges	80.3%	2.35	92.2%	2.92	92%	2.9

Six Sigma Improvement Initiatives:

Initiative:	Baseline Yield^a:	Baseline Sigma:	Pilot Yield^a:	Pilot Sigma:	Control Yield^a:	Control Sigma:
ICU Care Management	58%	1.70	80%	2.34	83%	2.46
Length of Stay Planning and Management Process	57%	1.68	86%	2.60	86%	2.21 ^b
OP Registration Turnaround Time	58%	1.70	88%	2.68	90%	2.81 ^c
Radiology Turnaround Time	29%	0.00	91%	2.82	90%	2.80 ^c
Medical Records/Transcription Turnaround Process	12%	0.00	85%	2.60	92%	2.90 ^c
Emergency Department Hold Time	54%	1.61	98%	3.67	96%	3.28 ^c

a. Yield = percent of opportunities with specification limit (customer requirements)

b. Translated to additional medical-surgical unit

c. Translated hospital wide

Six Sigma Translation Initiatives:

Initiative:	Baseline Yield^a:	Baseline Sigma:	Control Yield^a:	Control Sigma:
Patient ID				
–Labor & Delivery	99%	3.75	100%	6+
–Ancillary Departments	100%	6	100%	6+
AMI Core Measures	81%	2.39	100%	6+
CHF Core Measures	53%	1.56	96%	3.27
Surgical Preparation	73%	2.12	-	-

a. Yield = percent of opportunities with specification limit (customer requirements)



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Questions?

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