

# Just What The Doctor Ordered; Another Acronym In Healthcare, DMAIC

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# Presentation Overview

Introduction to Oakwood Healthcare System

Roadmap to Six Sigma

Challenges of applying Six Sigma to healthcare

Six Sigma applied to Healthcare Performance  
Improvement



# Oakwood Healthcare, Inc.

4 Acute Care Hospitals

1307 Licensed Beds

44 Primary/Specialty care sites

9,758 Employees

1,256 Physicians

60,000 Discharges

205,000 ED Visits

179,000 Outpatient Visits

506,000 Ambulatory Visits





PDCA

POS

LOS

VHA

MSO

HEDIS

JCAHO

PRO

ICD-10

HMO

UB-82

DRG

CON

CPT-4

HIPAA

AMA

CMS

PHO

PPO

QA

CABG

UR

HCQIA

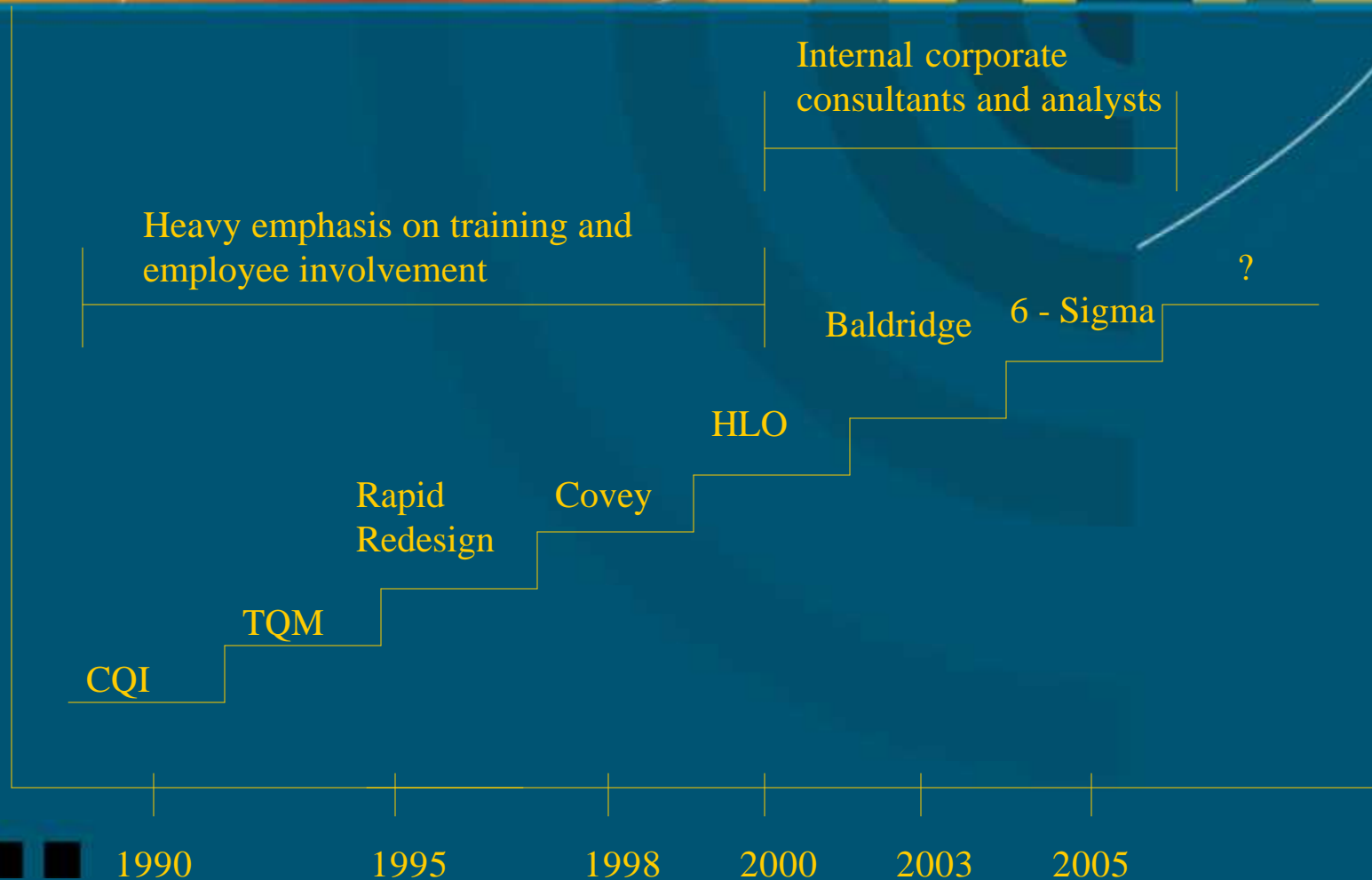
NCQA

PMPM

SNF



# Oakwood's Road to Six Sigma



# Challenges of Six Sigma in Healthcare

## 1. Nature of the Healthcare System

- Healthcare is a mixture of art and science. Processes are dynamic and complex and the inputs to our processes have inherent and significant variation

## 2. Data Inconstancy/ Deficiency

- Transaction data is plentiful, process measures are far and few in between
- Process data often collected manually and therefore relies on operators' individual understanding of the process measures



# Challenges of Six Sigma in Healthcare

## 3. Cultural Barriers

- Caregivers feel that they are too busy taking care of patient and they have no time for process improvement and measurement
- Challenge to help clinical staff understand the “big picture” from a process improvement point of view
- Understanding the value of senior management involvement in process improvement initiatives



# The Old Verses The New

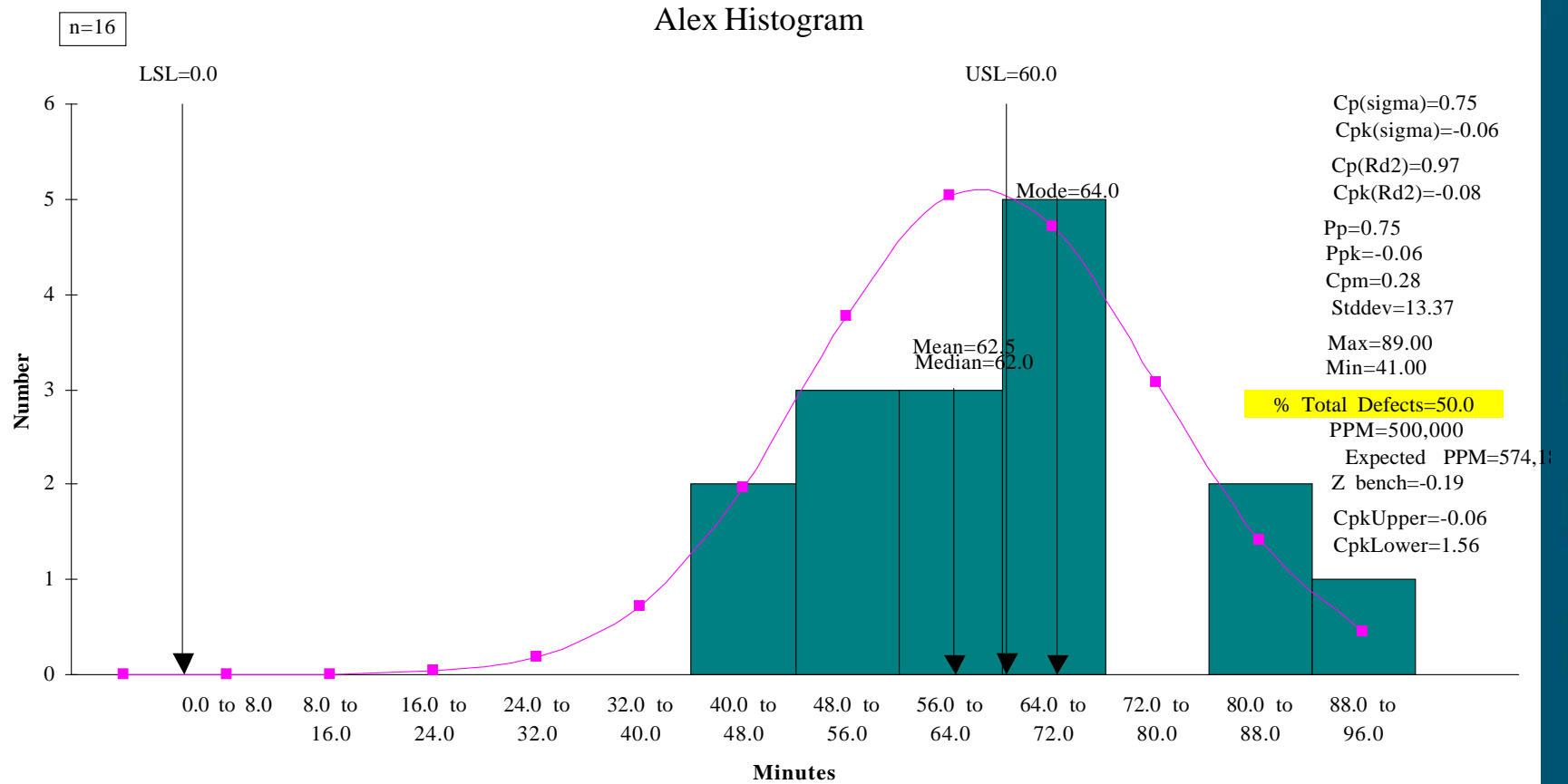
From looking at averages to looking at distributions and variation within the data.

Incorporating 6 sigma concepts of:

- Customer specification limits
- Calculation of defects and sigma value
- ROI



# The New



# The New

	July 2005 Cycle Time Data Collection		
	USL Target (minutes)	% Patients < USL	Sigma level *
<b>West Wayne Sites</b>			
Belleville	60	49%	1.5
Canton PC	60	78%	2.3
Canton OB	60	98%	3.6
Garden City FP	60	31%	1.0
Garden City Peds	60	57%	1.7
Plymouth	60	75%	2.2
<b>Med Ed sites</b>			
Mercury Drive	60	27%	<1.0
Belleville	60	74%	2.1
MEA	60	92%	2.9
Peds Clinic	60	31%	1
Westland	60	40%	1.3
<b>Downriver Sites</b>			
Lincoln Park	60	52%	1.3
Southgate Peds	60	62%	1.8
Southgate FP	60	84%	2.5



## Decreased Cycle Time = Increased Thru-put

- Cycle time decreased from 44 mins to 40 mins.
- 4 min savings per visit
- 40 mins saved for every 10 visits
- 40 min is new cycle time thus we can now see 11 visits (10+1) in the same time we used to see 10



# Applying DMAIC in a PDCA, JCAHO, TQM, CAP... World

OHS Six Sigma roadmap incorporates and integrates a vast set of **tools, techniques**, and **templates** required to successfully complete a process improvement project.

## Six Sigma application:

- No mass training rollout
- Project teams trained in the methodology and terminology as we go
- One Black Belt, several PI consultants familiar with Six Sigma



# Case Study – Nuclear Medicine Department

## Purpose

- Create a final process redesign that will eliminate long patient waits for stress testing
- Incorporate elements of time and distance to reduce Technician exposure to radiation



# Define

## Team Charter

*(Team not convened until Analyze step)*

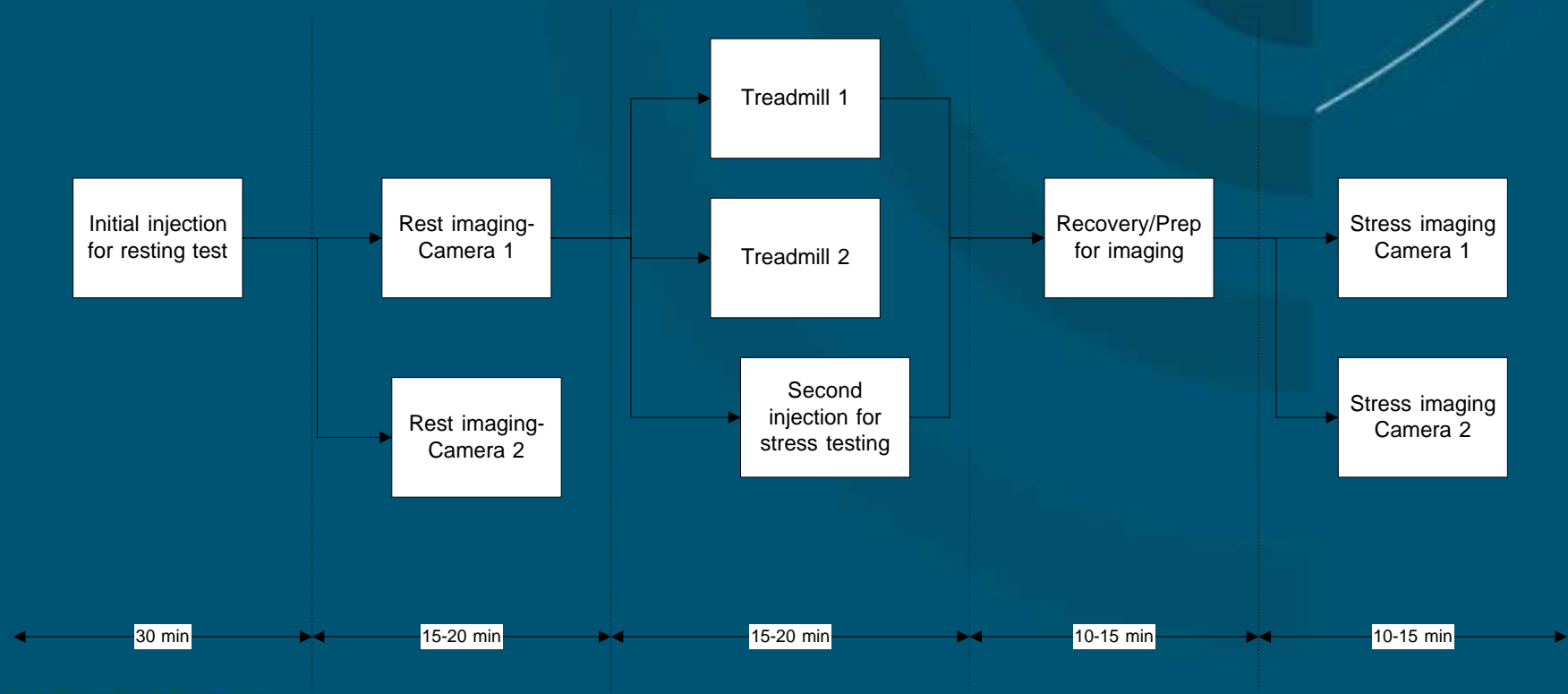
## Map the process

## Understand voice of customer



# Define

## Stress Test Process Map



# Measure

- Collect baseline data on defects and their possible causes
- Plot defect data over time and analyze for special causes
- Calculate Process Cycle Efficiency
- Create detailed facility layout flow diagram



# Measure

Defect defined as:

A staff person who exceeds the (DDE) ALARA 1 standard for quarterly accumulated dose equivalent radiation exposure.

The goal is Zero defects



# Calculation of Process Cycle Efficiency (PCE)

$$\text{PCE} = \text{Value Added Time} / \text{Process Cycle Time}$$

<b>Metric</b>	<b>Value</b>
Minimum Value Added Time	80 min
Maximum Value Added Time	100 min
Average Process Cycle Time	145 min
PCE Range	55 - 69%



# Analyze

- Bring team together cross functional team
- Develop a focused problem statement
- Explore potential causes
- Use statistical methods to quantify a cause and effect relationship



# Explore Potential Causes

- Current department layout has minimal waiting areas. Patients are waiting in the hallways, which causes dissatisfaction and increased staff exposure to radiation
- Patients are waiting in hallways for Patient Transportation to arrive
- Patients are scheduled too closely to one another
- There is a backup at the treadmill, which causes a domino effect throughout the day



# Explore Potential Causes

- Option to inject patients on the Inpatient unit not utilized
- Patients are not well informed about the testing process
- Patients arrive in Nuclear Medicine without the appropriate paperwork/material
- Patients arrive in Nuclear Medicine and they are not in the appropriate condition to be tested



# Cause and Effect

Patient waiting times can be dramatically reduced by systematically scheduling **patient arrivals**. Wait times and patient queues can be reduced by:

- *Scheduling arrivals such that they arrive at each workstation as close to “just in time” as possible, without sacrificing resource (employees and machines) efficiency*
- Original process was modeled in a simulation software to simulate patient flow and capture information on wait times and queue lengths
- Model was used to test and determine proposed scheduling method



# Simulation Model Results & Cause and Effect

	<i>Average Turn Around Time (min)</i>	<i>PCE Range</i>
<i>Original System</i>	145	55 - 69 %
<i>Proposed Model</i>	98	81 - 100 %

*This model shows the cause and effect of how altering the patient schedule can affect the patient turn around time.*



# Improve

- Create possible solutions for root cause
- Select solutions / develop plans
- Pilot
- Measure results
- Implement



# Improvement Opportunities

- New Scheduling algorithm / template
- Checklist for inpatients entering nuclear medicine,
- Consent process
- Video to inform Nuclear Medicine patients

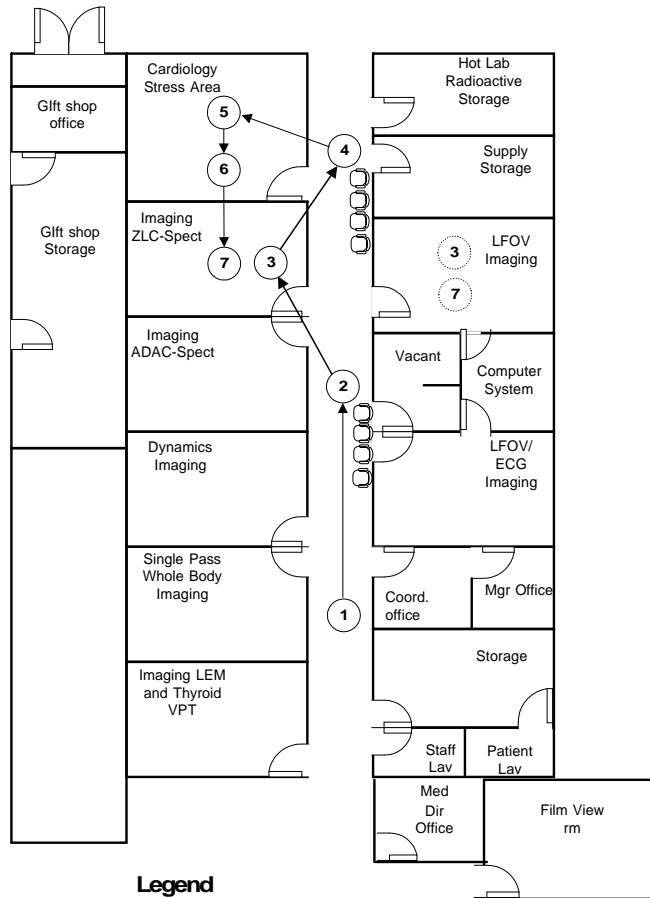


# Improvement Opportunities

- Conduct more stress echoes in Cardiology / physician ordering patterns
- Dedicated transporter for Nuclear Medicine departures
- New facility layout w/ patient waiting areas, minimal renovation and no additional sq. ft.



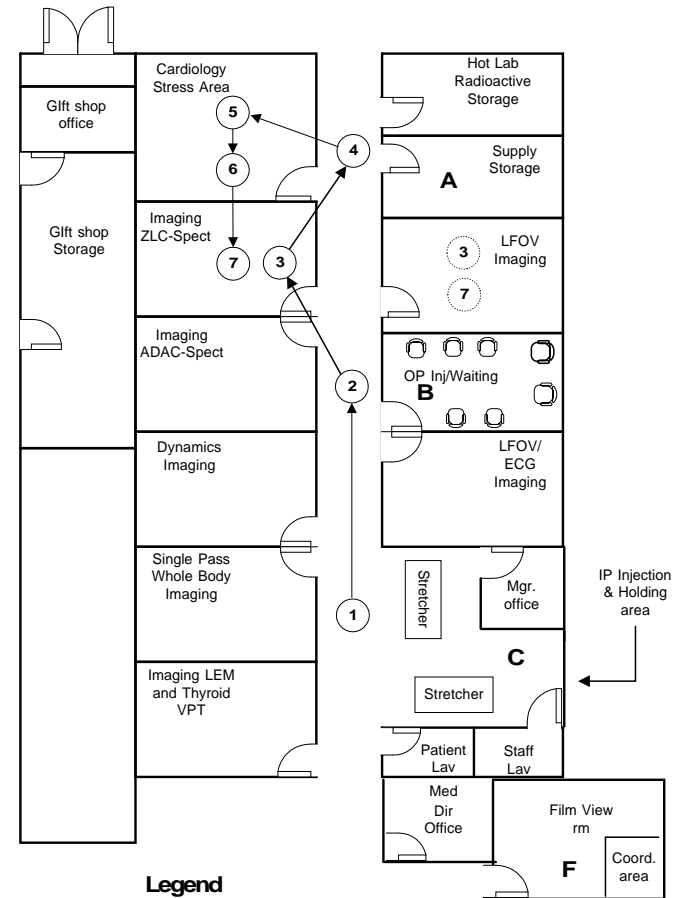
**Current Stress Testing Process Flow**  
**OHMC-D Nuclear Medicine**  
**August 2004**



**Legend**

- 1 = Patient comes in
- 2 = 1st Injection
- 3 = 1st Scan
- 4 = 2nd Injection
- 5 = On treadmill
- 6 = Rest
- 7 = 2nd Scan

**Proposal 2 Stress Testing Process Flow**  
**OHMC-D Nuclear Medicine**  
**August 2004**



**Legend**

- 1 = Patient comes in
- 2 = 1st Injection
- 3 = 1st Scan
- 4 = 2nd Injection
- 5 = On treadmill
- 6 = Rest
- 7 = 2nd Scan

# Control

Monitor performance

Recommendations and future plans

Measure	Baseline	Current	Target
Radiation exposure	52%	35%	0%
Patient waiting time (minutes)	45-65	19-39	< 20 min
Patient satisfaction (wait time)	78%	94%	98%
Process Cycle Efficiency	55-69%	67-84%	> 80%
Incremental volume	0	2	4



# Moving forward

Performance Improvement Group continues to use DMAIC on a project by project basis

Determine if 6 Sigma is the way we want to run our business and is our vehicle for cultural change or if DMAIC is just another tool in our consulting toolbox.



# Questions?

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