Lean Six Sigma:
Improving the DSRIP Reporting Process

August 20, 2014

Meeting Agenda

- **High-level Overview of Lean Six Sigma**
  - Lean
  - Six Sigma
  - Integrated both methodologies

- **Texas Children's DSRIP Lean Six Sigma Project**
  - Project Scope
  - DMAIC Phases
  - Results and Project Benefits
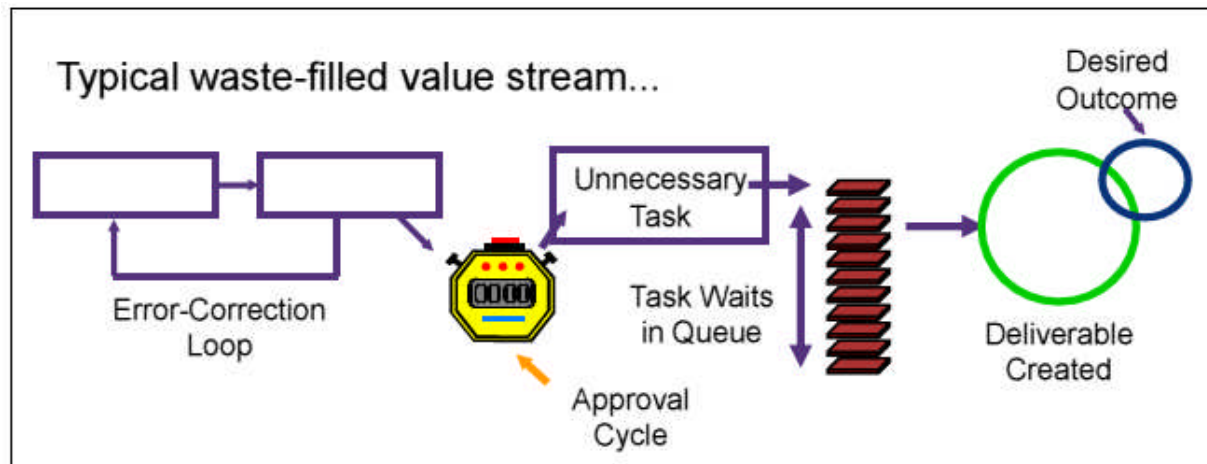
- **Discussion/Questions**

Lean Six Sigma Introduction

- **Texas Children's Hospital - Lean Six Sigma Green Belt certification**
    - Texas Children's has 16 Category 1 projects and 1 Category 2 project
    - The Government Relations Department is responsible for overseeing the implementation and successful execution of all DSRIP metrics and milestones. Additionally, our department completes reporting requirements for all DSRIP projects.
    - Our goal was to ensure DSRIP reporting was being completed timely and accurately by each department, the first time.
        - Annual reporting
        - Performance Logic

- **What is Lean Six Sigma**
    - A common improvement methodology to impact the overall business
        - Fact-based decision making
        - Focused on minimizing waste and variation
    - Developed from the merging of two highly successful improvement methodologies: Lean and Six Sigma

Lean Introduction

- Methodology used to create faster, more efficient process design
- Focus is to eliminate waste or non-value added activities to create flow
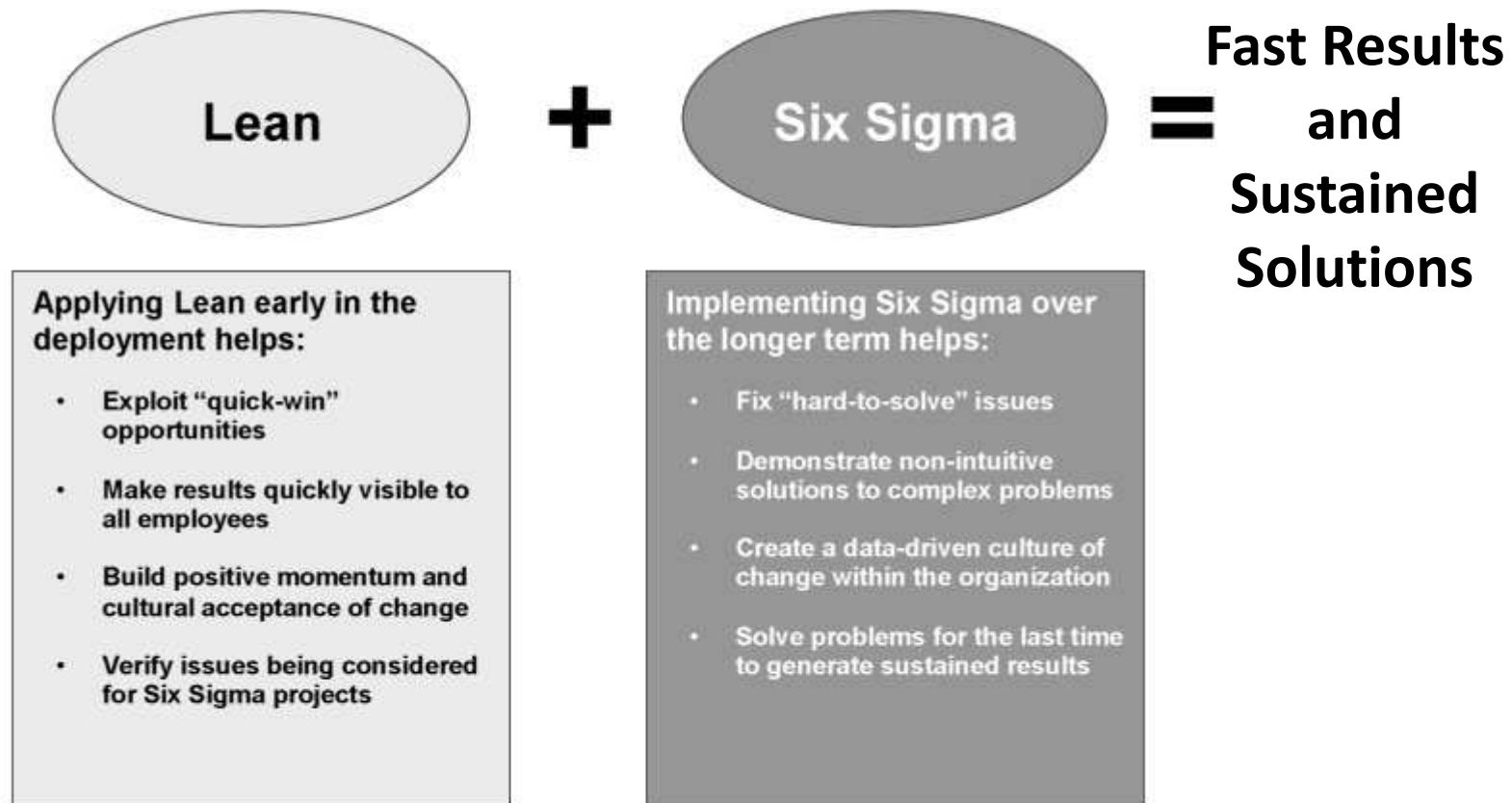- The principles of Lean thinking were derived from the success of the Toyota Motorola Company

Typical waste-filled value stream...

Desired Outcome

Unnecessary Task

Error-Correction Loop

Approval Cycle

Task Waits in Queue

Deliverable Created

...and a lean value stream for the same process:

Desired Outcome

Six Sigma Introduction

- A methodology for decreasing defects which arise due to variability in process execution. It is used to create consistent, defect-free processes

- Focus is eliminating defects and reducing process variation

- The term "Six Sigma" and the basic methodology was derived at Motorola in the 1980's

- Six Sigma, in its most basic form, it is a metric measuring a defect rate
  - Defect is defined as the failure of any process to deliver the intended result
  - Represents 3.4 defects per million opportunities (99.9997%)

Leveraging Lean and Six Sigma

Texas Children's Hospital

Lean **+** **Six Sigma** **=** **Fast Results and Sustained Solutions**

Applying Lean early in the deployment helps:

- Exploit "quick-win" opportunities
- Make results quickly visible to all employees
- Build positive momentum and cultural acceptance of change
- Verify issues being considered for Six Sigma projects

Implementing Six Sigma over the longer term helps:

- Fix "hard-to-solve" issues
- Demonstrate non-intuitive solutions to complex problems
- Create a data-driven culture of change within the organization
- Solve problems for the last time to generate sustained results

Integrating Lean and Six Sigma

- Value and objective must be understood

- Process must be measurable

- Depending on the nature of the project, Lean tools, Six Sigma tools, or a combination may be best to solve the problem

- The final solution must be controlled

- **The Golden Rule of Lean Six Sigma: the outputs of any process are a function of the inputs of that process**

$$Y = f(x)$$

X_1
X_2 → Process → Y
X_n

Define → Measure

Lean tools ← Measure → Six Sigma tools

Analyze

Improve

Control
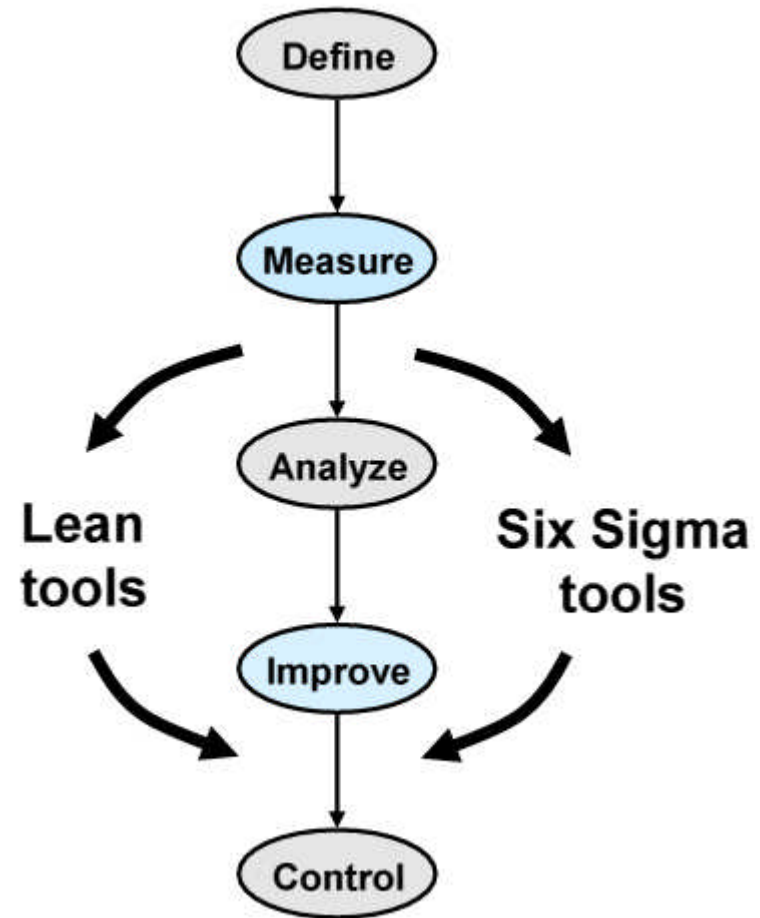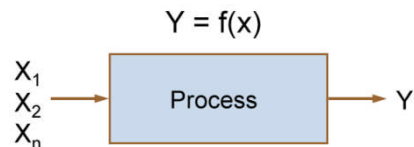
TCH's Lean Six Sigma Project: Define and Measure

DEFINE PHASE:

Charter Element	Description
Problem Statement	Based on data from October 2013, the overall defect rate for DSRIP data submission was **24%** and the late submission rate was **18%**. Of the 17 projects, certain departments had a comparatively larger defect and late submission rate. High defect and late submission rates will impact the hospital's ability to meet all DSRIP metric and milestones
Defect Definition	**Defect Rate** – required reporting questions that were not completely answered, included grammatical/spelling mistakes, and/or were failed to address the question. **Late Submission Rate** – DSRIP reports that were not submitted timely
Primary Metric	1) DSRIP data defect rate 2) Late submission rate
Objective	To decrease the overall defect rate to **10%** and late submission rate to **5%**. Additionally, evaluate the current reporting process and determine improvement opportunities.

MEASURE/ANALYZE PHASE:

Measurement System Analysis (Data Validation)

- Graph illustrates the defect rate by question
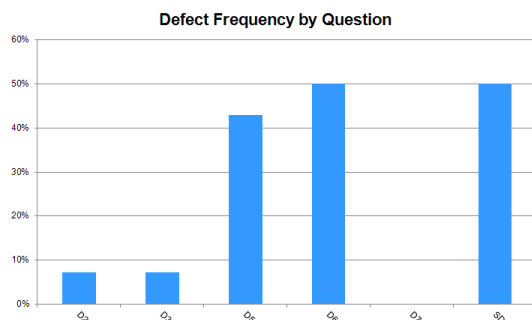
Baseline Measurement System Analysis (Data Validation)

- Graph illustrates the October defect % for each DSRIP participating department.
- Average defect rate = 24%
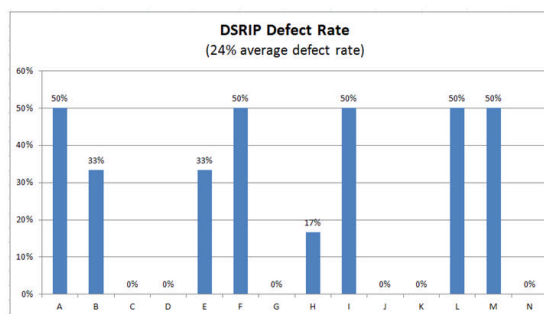
Baseline Measurement System Analysis (Data Validation)

- Graph illustrates the October late submissions rate for each DSRIP participating department
- Average late submission was 18%
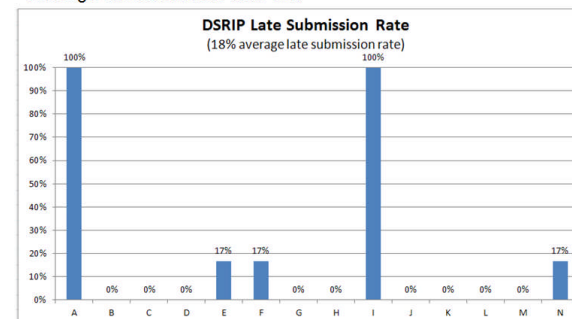
TCH's Lean Six Sigma Project: Analyze and Improve

ANALYZE PHASE

- Determined which departments were statistically weak performers
- Communicated with each department
- Increased internal communication

IMPROVE PHASE

- Improved the information request template
- Clarified questions with higher defect rates
- Request information monthly instead of annually

Un-batched and re-vamped the DSRIP templates

Measurement System Analysis

Identified departments that were statistically high and weak performers (Chi-Square Test)

$Chi-Sq = 18.475$, $DF = 13$, $P-Value = 0.140$
28 cells with expected counts less than 5.

C1-T	C2	C3
Dept	incorrect	correct
1	3	3
2	2	4
3	0	6
4	1	5
5	2	4
6	3	3
7	0	6
8	1	5
9	3	3
10	0	6
11	0	6
12	3	3
13	3	3
14	1	5

Chi-Square Test: incorrect, correct

Expected counts are printed below observed counts
Chi-Square contributions are printed below expected counts

Strongest Performers:
- 3
- 10
- 11

Weakest Performers:
- 1
- 6
- 9
- 12
- 13

Template - Before

DSRIP DY2 Reporting Requirements

Template - After

TCH's Lean Six Sigma Project: Results
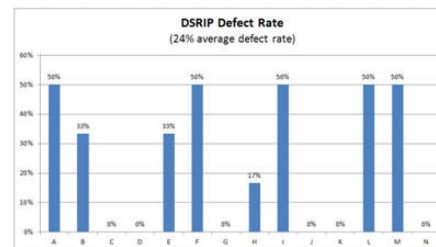
Results:

- **Performed the 2 Proportion Test in Minitab**
- **P-value = 0.000, which indicates a statistical difference was made (H_A validation)**
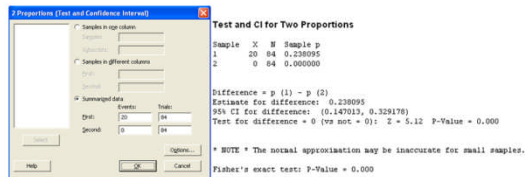
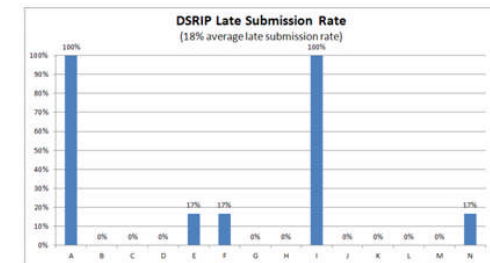## Graphical Before and After Comparisons

- **DSRIP Defect Rate - Before**
  - 24% defect rate
 - Certain departments had statistically higher defect rates

DSRIP Defect Rate
(24% average defect rate)

- **DSRIP Late Submission Rate- Before**
  - 18% defect rate
  - Certain departments had higher defect rates

DSRIP Late Submission Rate
(18% average late submission rate)

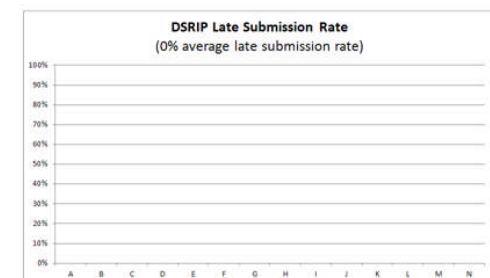- **DSRIP Defect Rate - After**
  - 0% defect rate
  - All questions were answered with appropriate detail
  - Increased spelling errors were found; however, those do not impact the overall defect rate

DSRIP Defect Rate
(0% average defect rate)
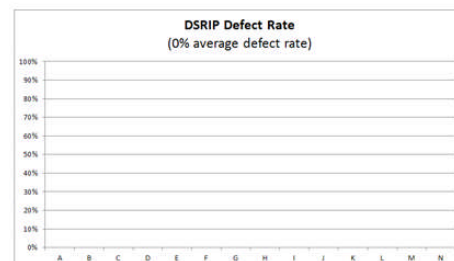
- **DSRIP Defect Rate - After**
  - 0% defect rate
  - All templates were submitted timely

DSRIP Late Submission Rate
(0% average late submission rate)

TCH's Lean Six Sigma Project: Control

- **An excel based dashboard was created to ensure each department is pacing towards goal and successfully meeting all internal initiatives**
  - Dashboard is shared with project stakeholder and senior leaders every month
  - Focused on monthly volume progress
  - Error rates and submission rates will be updated monthly to monitor department compliance and performance

- **The dashboard provided the following benefits:**
  - Risk mitigation
  - Visibility across departments
  - Error Rate and Timely Submission Rate transparency

- **Overall project benefits:**
  - Improved reporting – TCH never received feedback on reporting content from HHSC and has been timely with all Performance Logic submissions
  - Risk mitigation
  - Accountability
  - Improved and sustainable reporting process
  - Financial Benefit

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Questions