



# DMAIC: Improve & Control

## Module 9

### Basic Structure for Managing Process Improvements

Online or single module version

Approximate time to complete: 30 minutes

Updated: May 2016

# COURSE INFORMATION

**Title:** DMAIC: Improve & Control – Module 9: Basic Structure for Managing Process Improvements

**Target Audience:** Sharp HealthCare affiliated physicians, pharmacists, and other healthcare providers interested in continuous process improvement

**Educational Objectives:** Following this activity, learners should be able to:

- Explain the importance of addressing the root cause as part of the proposed solution to a problem
- Demonstrate the ability to select the best solution from a broad set of potential solutions
- Implement tools that will help sustain the improvements implemented
- Apply the DMAIC structure for all improvement objectives

**Principal Faculty:** *Kathy Summers*  
Director, Six Sigma Black Belt  
Sharp HealthCare

**Accreditation:** Sharp HealthCare is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

**CME Credit:** Sharp Healthcare designates this internet enduring activity for a maximum of **.5 AMA PRA Category 1 Credits™** after successful completion of the module with a minimum passing score of **100%**. Physicians should only claim credit commensurate with the extent of their participation in the activity.

**CA Nurse Credit:** The California Board of Registered Nursing recognizes the use of Category I Continuing Medical Education credit toward credit contact hours. Report "ACCME Category 1 Credit" as the BRN Number. No BRN slip will be given.

**Accreditation:** Sharp Healthcare is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.

**CPE Credit:** Sharp HealthCare designates this live **knowledge** activity for a maximum of **.5** contact hours . Partial credit will not be awarded.  
**UAN:** 0571-0000-016-026-H04-P or 0571-0000-016-026-H04-P

**Cultural and Linguistic Competency:** This activity is in compliance with California Assembly Bill 1195 which requires that all CME activities comprising a patient care element include curriculum addressing the topic of cultural and linguistic competency. The intent of this bill is to ensure that health care professionals are able to meet the cultural and linguistic concerns of diverse patient population through effective and appropriate professional development. Cultural and linguistic competency was incorporated into the planning of this activity.

**Type of Activity:** Internet Enduring Material with learning assessment and evaluation

**Release Date:** June 1, 2016

**Termination Date:** June 1, 2017



**Requirements:** Must pass learning assessment with 100% and complete evaluation to receive CME/CPE credit. **Estimated completion time:** 30 minutes

**Hardware/Software Requirements:** OS that supports modern web browser; Browser: IE 11; Google Chrome version 4 or higher; Safari version 10.8 or higher

**Contact Information:** Sharp HealthCare CME at [cme@sharp.com](mailto:cme@sharp.com)

**Tuition:** None

**Commercial Support:** None

# DISCLOSURE



**DISCLOSURE:** As an organization accredited by the ACCME, Sharp HealthCare requires everyone who is in a position to control the content of an education activity to disclose all relevant financial relationships with any commercial interest. The ACCME defines "relevant financial relationships" as financial relationships in any amount, occurring within the past 12 months, including financial relationships of a spouse or life partner, that could create a conflict of interest. Any individual who refuses to disclose relevant financial relationships will be disqualified from being a planning committee member, a teacher, or an author of CME, and cannot have control of, or responsibility for, the development, management, presentation or evaluation of the CME activity.

Sharp HealthCare, encourages faculty to identify investigational products or off-label uses of products regulated by the US Food and Drug Administration, at first mention and where appropriate in the content.

***Kathy Summers and the members of the planning committee have no relevant financial relationships to disclose.***

**ASSEMBLY BILL 1195:** As an accredited provider, Sharp HealthCare is required to comply with California Assembly Bill 1195, which states that all CME activities must address cultural or linguistic competency. At a minimum, cultural competency is recommended to include:

- Applying linguistic skills to communicate effectively with the target population.
- Utilizing cultural information to establish therapeutic relationships.
- Eliciting and incorporating pertinent cultural data in diagnosis and treatment.
- Understanding and applying cultural and ethnic data to the process of clinical care.

## Interested in receiving Continuing Education Credits?

**Nurses and Pharmacists – Use  
Learning Center**

**CME Portal** is for  
**Physicians ONLY**

Nurses will be awarded  
credits via the Learning  
Center.

Pharmacist credit will be  
addressed by the CME  
Department.

## Physicians– Use **CME Portal**

1. Complete the Test/Quiz
2. Complete the Course Evaluation
3. CME Portal will generate a certificate for you – save for your records
4. CME credits will also be noted on your transcript

### **QUESTIONS?**

Contact Heather Clemons, CME Department  
(858) 499-3518

[heather.clemons@sharp.com](mailto:heather.clemons@sharp.com)

# Leading Performance Excellence

## Lean Six Sigma basics for every leader



### White Belt

#### #1 Introduction

LSS awareness, roles and responsibilities

#### #2 LEAN Basics

How we eliminate waste in our work

#### #3 A3 Daily Problem Solving

Reporting tool for resolving daily issues / defects

#### #4 Team and Meeting Facilitation

How we collaborate and engage talent



### Yellow Belt

#### #5 Change Management

Assuring acceptance and accountability

#### #6 Project Management

Managing time and resources for continuous improvement

#### #7,8,9 DMAIC

'Six Sigma' How we reduce variation and Defects

#### #10 LEAN Thinking and Intermediate A3 Skills

How we eliminate waste and create flow

#### Yellow Belt Workshop

Hands on use of the tools and concepts



# Systematic Approach for Continuous Improvement



Reflection:

Without change there is no innovation, creativity, or incentive for improvement. Those who initiate change will have a better opportunity to manage the change that is inevitable.

[William Pollard](#)



# Course Objectives



At the conclusion of this module, participants should be able to:

- Explain the importance of addressing the root cause as part of the proposed solution to a problem
- Demonstrate the ability to select the best solution from a broad set of potential solutions
- Implement tools that will help sustain the improvements implemented
- Apply the DMAIC structure for all improvement objectives

# Step 4 Improve



Improve

- How do we remove the causes of the defects?
- How do we measure the significance of the improvements?

## Deliverables

Generate alternatives

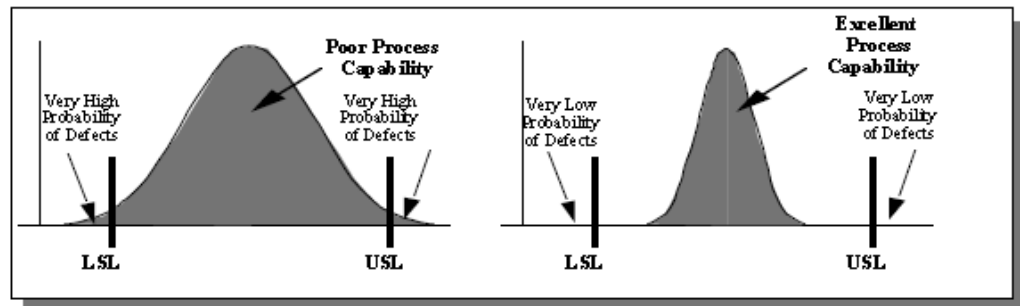
Assess the risks

Test the alternatives

Select the best alternative

Full scale Implementation

Re-measure and determine statistical significance



Before

After

**“We implemented solutions that addressed the root cause. Then re-measured and found an improvement in both the mean and standard deviation. Fewer Defects!”**



**A Green Belt would say:**

**“Using the 2T test the improvement is statistically significant with a P value < .05”**



# 4<sup>th</sup> Phase Improve



Improve

- How do we remove the causes of the defects?
- How do we measure the significance of the improvements?

How will you fix the problem?

Once the project team is satisfied with the data and determined that additional analysis will not add to the understanding of the problem, it's time to move on to solution development.

The team is most likely collecting improvement ideas throughout the project, but a structured improvement effort can lead to innovative and elegant solutions.

# Guide for Improvements



Stay focused on the top root causes identified in the Analyze phase. The objective is to target solutions that will resolve the root causes, versus popular solutions that only treat the symptoms.

## Expert opinion:

Tap into your cross-functional team, especially those who do the work to brainstorm and select solutions. Reference the tools in 'Team and Meeting Facilitation' module 2.

### Brainstorming / Idea Generation

- Gallery Walk
- Walk the process and look for ideas
- Make an ideal process map: As if there are no restrictions

- Research like organizations
- Research other industries
- Use exercises that promote innovation

Reference 'Innovation at Sharp'  
tools Link [HERE](#)

### Select your strategy / solutions

- Voting
- Priority Payoff Matrix
- Decision Making Matrix
- Pilot or test the solutions

# Innovation



Challenge the team to think outside the box. There are great exercises that will help you think about the issue and solutions from a different perspective.

Reference the Sharp Net site: 'Innovation at Sharp' to learn about techniques you can use to harness innovative ideas that just might get you the astronomical results you are looking for.



Innovation at Sharp  
tools Link [HERE](#)

# LEAN Strategies



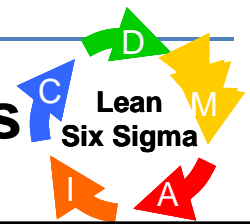
The next module in this series is about a continuous improvement philosophy called LEAN.

The study of Lean will enhance the improvement strategies you and your team develop.

Some of the concepts are:

- 7 Ways: Think of 7 ways to solve the same issue.
- 5S: Organize the work space so that work is easier to do.
- Start with the ideal work flow as the goal.
- Eliminate waste: Waiting, rework, movement, plus 4 more.
- Try Storming: Experiment and trial in real time.

# Update the process map with the improvements

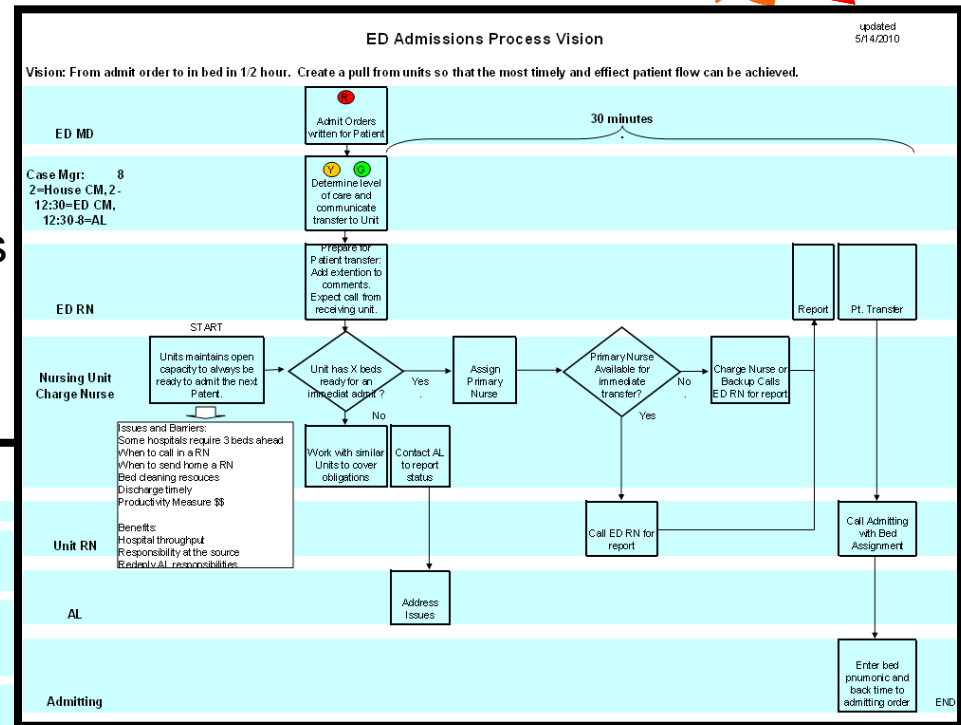
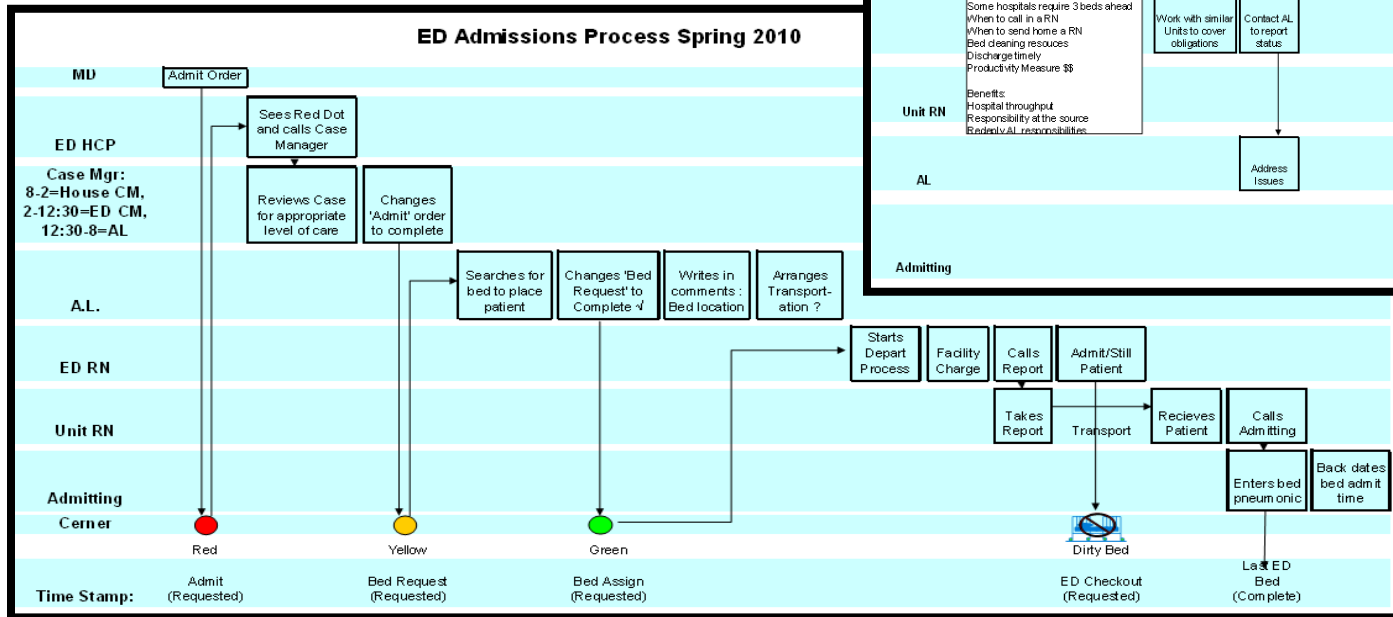


Document the new process

Helps to see how the changes fit

Visual for training and communications

Use to compare solution options



**After**



**Before**





# Implementation

Revisit your CAP tools and CAP GAP Analysis. Managing change is critical to successful outcomes. Now that you have a high **Q**uality solution, do you have the **A**cceptance and **A**ccountability needed to achieve **E**ffective results?

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

Quality of the  
solution

Acceptance of the  
solution and  
Accountability  
for the change

Effective  
Results

# Implementation



The most underestimated step in any implementation is communication.

Communication is a two-way street.  
Do all stakeholders and users have an adequate understanding of the expectations?



Has the project team really listened to address the issues and misconceptions?

For additional help, review the communication section of the Project Management module 4.



"The two words *information* and *communication* are often used interchangeably, but they signify quite different things. Information is giving out; communication is getting through." - **Sydney Harris**



# Re-Measure



Congratulations, you have implemented your targeted solutions! What makes it a Six Sigma project is the use of data to validate that an improvement was achieved.

Compare your baseline with a re-measure of the data after the solutions have been implemented.

- Has the defect rate been reduced?
- Are you closer to your target / goal?
- Is the data trending in the right direction? GRAPH IT!
- Is there a statistical difference in your data?
  - Important? Contact a Green or Black Belt for assistance.

# Continuous Improvement



We do not always achieve our goal with the first solution implemented. Often it takes several cycles of improvement. This can be part of the plan in order to:

Validate solutions

Learn and develop more robust solutions

Establish early wins that will get the attention of staff.

With this in mind:

Set incremental goals appropriate to the improvement.

Graph your progress and post it!

Monitor participants' feedback

Make adjustments and learn

Revisit assumptions made when validating the root cause of your problem

# 5<sup>th</sup> Phase: Control



## Control

- How do we maintain the improvements?
- How can we spread the new knowledge?

### Deliverables

Hardwire changes and establish Standard Work

Are you able to sustain the gains?

Project Closure, recognition and celebration?

What are the opportunities for spread?



# 5<sup>th</sup> Phase Control



## Control

- How do we maintain the improvements?
- How can we spread the new knowledge?

How do you sustain the newly achieved improvement?

This phase is a mini version of process management.

The team has been building a form of infrastructure throughout the life of the project, and during the Control Phase they begin to document exactly how they want to pass that structure on to the employees who work within the process.

# Sustain the Change



Remember that communication plan? How are you going to continue to communicate after you have moved on? If the new process is not documented and presentable for new staff and as a reference for existing staff, all may soon be forgotten and the old state will return. Consider the following:

Documentation: Training material and Standard Work

Ongoing measure: Will the Process owner follow up with rounding?

Is it feasible to include the changes in performance goals?

Can key measures be included in a dashboard for regular review?

Acceptance: Do the right people want to sustain the change?

Remember your change management tools

# Standard Work



All critical processes should have a written account of how the work should be done and include the expectation for what good work looks like. Too often, departments rely on ‘tribal knowledge’ or random on-the-job training. Improvement is therefore difficult because everyone has their own way of doing the work.

**Without Standard Work there can be  
No Standard Process and No Standard Output**

Often the improvement is to establish a consistent process.

# Project Closure



A good project end helps the start of the next effort! Resources appreciate the structure and tools presented in these modules. You are building your reputation as a reliable practitioner of process improvement techniques.

1) Celebrate your achievements, whether it is meeting your goal or an incremental improvement.

Recognize the team and contributors:

- Send thank you cards or Sharp e-cards.

- Nominate the effort for a CORE award.

- Recognition in department huddles and newsletters.

- Utilize existing 'systems and structures' to give recognition.

# Project Closure



- 2) Conduct a lessons learned brainstorm with the team. Use the Plus/Deltas format for the team to reflect on what they did right and what they would do differently next time.
- 3) Officially hand off the new process to the process owner. This is made much easier when starting early by confirming ownership during development and approval to move forward with the solutions.
- 4) Don't forget to summarize your accomplishments for your own performance review. Build upon the project charter to record your efforts and accomplishments.



# Project Spread



Chances are there are other areas at Sharp that experience similar issues that your project addressed. Sharing your work with others that could benefit is what is needed to support our journey to be the best place in the universe.

Seek opportunities to share your work

- Unit Practice Councils

- Leadership meetings

- Work with your quality department

- Pick up the phone and call other Sharp facilities

# DMAIC Roadmap Quick Reference Guide

Please contact the LSS Department or your Black Belt mentor for assistance.

Define	Measure	Analyze	Improve	Control
<p><b>Tasks</b></p> <ol style="list-style-type: none"> <li>1. Create a project charter</li> <li>2. Assemble a project team</li> <li>3. Develop a SIPOC or high-level process map</li> <li>4. Capture Voice of the Customer</li> </ol> <p><b>Tools</b></p> <ul style="list-style-type: none"> <li>• Project Charter</li> <li>• SIPOC / Process Mapping</li> <li>• Requirements (CTQs)</li> <li>• Communication Plan</li> <li>• Stakeholder Analysis</li> <li>• Project Benefits Workbook</li> <li>• Change Acceleration Profile</li> </ul> <p><b>Questions to Answer</b></p> <ul style="list-style-type: none"> <li>• What is the problem?</li> <li>• What is the primary metric (Y)?</li> <li>• What is the goal, relative to metric?</li> <li>• Who are the Project Leaders and Team members?</li> <li>• Are there any "Just-Do-It" (JDI) improvements?</li> <li>• Is there a financial benefit?</li> </ul> <p><b>Tollgate Deliverables</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Project Charter <ul style="list-style-type: none"> <li>- Problem &amp; Goal Statement</li> <li>- Project Leaders &amp; Team</li> </ul> </li> <li><input type="checkbox"/> SIPOC / Process Map</li> <li><input type="checkbox"/> Communication Plan</li> <li><input type="checkbox"/> Stakeholder Analysis</li> <li><input type="checkbox"/> Project Benefits Workbook</li> <li><input type="checkbox"/> Process Improvement Project Repository updates <a href="http://project.sharp.com/PWA">http://project.sharp.com/PWA</a></li> </ul> <p><b>Sign-off</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Sponsor and Process Owner</li> <li><input type="checkbox"/> Black Belt</li> </ul>	<p><b>Tasks</b></p> <ol style="list-style-type: none"> <li>1. Identify process inputs and outputs</li> <li>2. Identify potential causes (X's)</li> <li>3. Assess measurement systems</li> <li>4. Develop a data collection plan and collect process data</li> </ol> <p><b>Tools</b></p> <ul style="list-style-type: none"> <li>• Cause and Effect Diagram</li> <li>• Pareto Analysis</li> <li>• FMEA</li> <li>• Measurement System Analysis</li> <li>• Sampling Methodology</li> <li>• Statistical Process Control</li> <li>• Change Acceleration Profile</li> </ul> <p><b>Questions to Answer</b></p> <ul style="list-style-type: none"> <li>• What are the potential causes?</li> <li>• How will I measure important inputs and outputs?</li> <li>• Is there a existing measurement system and is it reliable?</li> <li>• Is the process in control?</li> <li>• What is the sigma level of the process? DPMO? % Yield?</li> </ul> <p><b>Tollgate Deliverables</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Data Collection Plan</li> <li><input type="checkbox"/> Cause and Effect Diagram</li> <li><input type="checkbox"/> Baseline process performance (DPMO, % Yield, Sigma Level)</li> <li><input type="checkbox"/> Update Communication Plan &amp; Stakeholder Analysis</li> <li><input type="checkbox"/> Measure Phase Summary</li> <li><input type="checkbox"/> Process Improvement Project Repository updates <a href="http://project.sharp.com/PWA">http://project.sharp.com/PWA</a></li> </ul> <p><b>Sign-off</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Sponsor and Process Owner</li> <li><input type="checkbox"/> Black Belt</li> </ul>	<p><b>Tasks</b></p> <ol style="list-style-type: none"> <li>1. Analyze Data</li> <li>2. Identify root cause(s) / risks</li> <li>3. Prioritize root cause(s) / risks</li> <li>4. Focus the problem statement</li> <li>5. Graphical and Statistical Summary</li> </ol> <p><b>Tools</b></p> <ul style="list-style-type: none"> <li>• Statistical Analysis</li> <li>• Pareto Analysis</li> <li>• FMEA</li> <li>• Graphical Analysis</li> <li>• Hypothesis Testing</li> <li>• Statistical Process Control</li> <li>• Change Acceleration Profile</li> </ul> <p><b>Questions to Answer</b></p> <ul style="list-style-type: none"> <li>• Did your data collection effort allow for proper data analysis?</li> <li>• What methods were used to analyze data?</li> <li>• What is the root cause(s)?</li> <li>• What are the most significant process risks?</li> <li>• What is your hypothesis?</li> </ul> <p><b>Tollgate Deliverables</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Root Cause / Risk Identification &amp; Prioritization</li> <li><input type="checkbox"/> Statistical Analysis</li> <li><input type="checkbox"/> Update Communication Plan, Stakeholder Analysis, &amp; Project Benefits Workbook</li> <li><input type="checkbox"/> Analyze Phase Summary</li> <li><input type="checkbox"/> Process Improvement Project Repository updates <a href="http://project.sharp.com/PWA">http://project.sharp.com/PWA</a></li> </ul> <p><b>Sign-off</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Sponsor and Process Owner</li> <li><input type="checkbox"/> Black Belt</li> </ul>	<p><b>Tasks</b></p> <ol style="list-style-type: none"> <li>1. Generate and prioritize solutions</li> <li>2. Future-state process map</li> <li>3. Develop implementation plan</li> <li>4. Implement solutions</li> <li>5. Validate</li> </ol> <p><b>Tools</b></p> <ul style="list-style-type: none"> <li>• Brainstorming Techniques</li> <li>• Prioritization Techniques</li> <li>• Process Mapping</li> <li>• FMEA</li> <li>• Regression Analysis</li> <li>• Hypothesis Testing</li> <li>• Change Acceleration Profile</li> </ul> <p><b>Questions to Answer</b></p> <ul style="list-style-type: none"> <li>• What are all the possible solutions to the problem?</li> <li>• Are all Change Acceleration elements in place?</li> <li>• What is the sigma level of the process? DPMO? % Yield?</li> <li>• Is there a statistically significant change?</li> </ul> <p><b>Tollgate Deliverables</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Future-state Process Map</li> <li><input type="checkbox"/> Implementation Plan</li> <li><input type="checkbox"/> Update Communication Plan, Stakeholder Analysis, &amp; Project Benefits Workbook</li> <li><input type="checkbox"/> Hypothesis Test</li> <li><input type="checkbox"/> Improve Phase Summary</li> <li><input type="checkbox"/> Process Improvement Project Repository updates <a href="http://project.sharp.com/PWA">http://project.sharp.com/PWA</a></li> </ul> <p><b>Sign-off</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Sponsor and Process Owner</li> <li><input type="checkbox"/> Black Belt</li> </ul>	<p><b>Tasks</b></p> <ol style="list-style-type: none"> <li>1. Develop process Control Plan</li> <li>2. Develop project Transition Plan</li> <li>3. Finalize Standard Work documents</li> <li>4. Identify replication opportunities</li> <li>5. Summarize and share project results</li> </ol> <p><b>Tools</b></p> <ul style="list-style-type: none"> <li>• Process Control Plan</li> <li>• Project Transition Plan</li> <li>• Visual Management System</li> <li>• Communication System</li> <li>• Performance Dashboard</li> <li>• Statistical Process Control</li> <li>• Change Acceleration Profile</li> </ul> <p><b>Questions to Answer</b></p> <ul style="list-style-type: none"> <li>• Are process controls in place?</li> <li>• How will we know if improvements are not sustained (measurement)?</li> <li>• How will we react to non-compliance (active daily management system)?</li> <li>• What are the estimated financial or mission benefits?</li> <li>• Are there any replication opportunities?</li> </ul> <p><b>Tollgate Deliverables</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Implement Control Plan</li> <li><input type="checkbox"/> Complete Project Benefits Workbook</li> <li><input type="checkbox"/> Complete Transition Plan</li> <li><input type="checkbox"/> Complete Project Summary</li> <li><input type="checkbox"/> Share Project Results</li> <li><input type="checkbox"/> Initiate replication opportunities</li> <li><input type="checkbox"/> Process Improvement Project Repository updates <a href="http://project.sharp.com/PWA">http://project.sharp.com/PWA</a></li> </ul> <p><b>Sign-off</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Sponsor and Process Owner</li> <li><input type="checkbox"/> Black Belt</li> <li><input type="checkbox"/> LSS Director</li> </ul>

# Next Steps:



- Complete the Module 9 Quiz.
- However large or small (best to start small) pick a project or help with a project to start using DMAIC and supporting tools.

**For Yellow belt certification:** Identify and document one solution that addresses a root cause. This can be from any past or future effort. Make the connection as to how the solution addresses the root cause. Discuss with your leader the use of the tools. Include your findings with your certification worksheet.

Certification Worksheet Link [HERE](#)