Quality Improvement Methods & Tools

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Senior Quality Advisor
Public Health Foundation

NPHII Grantee Meeting
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Quality Improvement Methods and Tools

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Public Health Foundation
Introductory Session

This introductory session on Quality Improvement Methods and Tools will provide participants with a basic understanding of the following topics:

- Overview of Quality Improvement (QI)
- Understand the difference between Big QI and little qi
- Describe the use of the Plan-Do-Check-Act approach to QI
- Understand the concept of Rapid Cycle PDCA
- Understand how to use the basic QI tools in a defined sequence to identify areas needing improvement
- Review the 7 basic QI tools with a focus on Flow Charting and Cause and Effect Diagrams
- Understand how and why to identify “root causes” of problems
- How QI is accomplished in Teams
- Top Ten Reasons QI fails and how to overcome them
…PHF Mission:

We improve the public’s health by strengthening the quality and performance of public health practice.

www.phf.org

Innovative Solutions. Measurable Results.
Introduction To QI
"Quality improvement in public health is the use of a deliberate and defined improvement process, such as Plan-Do-Check-Act, which is focused on activities that are responsive to community needs and improving population health.

It refers to a continuous and ongoing effort to achieve measurable improvements in the efficiency, effectiveness, performance, accountability, outcomes, and other indicators of quality in services or processes which achieve equity and improve the health of the community.”

This definition was developed by the Accreditation Coalition Workgroup (Les Beitsch, Ron Bialek, Abby Cofsky, Liza Corso, Jack Moran, William Riley, and Pamela Russo) and approved by the Accreditation Coalition on June 2009.
Continuous Improvement

Act

Plan

Check/Study

Do

The continuous improvement phase of a process is how you make a change in direction. The change usually is because the process output is deteriorating or customer needs have changed.
Well, we certainly have never seen such a unique application of PDCA.

It seems that you do a great job with Plan, Do and Check.

I think Deming meant “A” to stand for “Act” – not “Avoid.” Hey – where are they going?
Knowledge & Experience

Hold the Gains

Rapid Cycle

Project Difficulty
Quick Check of Your

Enthusiasm Level
&
Mathematical Skills
Enthusiasm Level

High

Low

Mathematical Skills

Low/Low

High/Low

Low/High

High/High

Low

High
What Is Different About Public Health?

• Limited Control

• Many disparate parts – not tied together

• Sometimes conflicting missions

• Need to be a good influencer
### Contrasting Big “QI”, Little “qi”, and Individual “qi”

<table>
<thead>
<tr>
<th>Topic</th>
<th>Big ‘QI’ – organization-wide</th>
<th>Little ‘qi’ – program/unit</th>
<th>Individual ‘qi’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement</td>
<td>System focus</td>
<td>Specific project focus</td>
<td>Daily work level focus</td>
</tr>
<tr>
<td>Quality Improvement Planning</td>
<td>Tied to the Strategic Plan</td>
<td>Program/unit level</td>
<td>Tied to yearly individual performance</td>
</tr>
<tr>
<td>Evaluation of Quality Processes</td>
<td>Responsiveness to a community need</td>
<td>Performance of a process over time</td>
<td>Performance of daily work</td>
</tr>
<tr>
<td>Quality Improvement Goals</td>
<td>Cut across all programs and activities</td>
<td>Delivery of a service</td>
<td>Daily work</td>
</tr>
<tr>
<td></td>
<td>Strategic Plan</td>
<td>Individual program/unit level plans</td>
<td>Individual performance plans</td>
</tr>
</tbody>
</table>
Little q

Sales
Functional Goals
Calls/sale

Marketing
Functional Goals
Number of Marketing Events

Operations
Functional Goals
Units Processed

Customer Service
Functional Goals
Call Time

Problems – functional (silos) goals result in process gaps, overlaps, rework, etc.

Customer wants may not be in sync with what each department wants
Customer wants may not be in sync with what each department wants.

Now the focus is on providing the customer with product knowledge, right cars for their needs, easy access, multiple locations, insurances, and safe vehicles.
Continuous Quality Improvement System in Public Health

Turning Point/ Baldrige

Big ‘QI’

MACRO

QI Teams

MAPP

Basic Tools of QI

Rapid Cycle

Individual ‘qi’

INDIVIDUAL

Advance Tools of QI

QFD

Daily Management

LSS

MICRO

Little ‘qi’

APCD

APCD

APCD
General Approach On How To Use The Basic Tools Of Quality Improvement

“AIM”
Issue To Consider

Brainstorm & Consolidate Data

Brainstorming Force and Effect

Flow Chart Existing Process

“As Is” State

Cause & Effect Diagram – Greatest Concern

Use 5 Whys To Drill Down To Root Causes

Gather Data On Pain Points

Data Management Strategy

Monitor New Process & Hold The Gains

• Run Charts
• Control Charts

Flow Chart New Process

“As Is” State to “Should Be” State

Analyze Information and Develop Solutions

Solution and Effect Diagram

Translate Data Into Information

• Pie Charts
• Pareto Charts
• Histograms
• Scatter Plots, etc.

General Approach On How To Use The Advanced Tools Of Quality Improvement

Large Issue, Cross Functional Problem, or Sensitive Situation

Explore

Brainstorming

Affinity Diagram

Interrelationship DiGraph

Prioritization Matrix

Sort & Prioritize

Understand & Baseline

Develop Actions & Tasks

Monitor

SMART Chart

PDPC

Problem Prevention

Develop Project Plans

Prioritize Actions & Tasks

Control & Influence Plots

Prioritization Matrix

Know & Don’t Know Matrix

Develop

Tree Diagram

Actions & Tasks

What Is Quality?

Today the most progressive view of quality is that it is defined entirely by the customer or end user and is based upon that person's evaluation of his or her entire customer experience.

The customer experience is the aggregate of all the Touch Points that customers have with the organization's product and services, and is by definition a combination of these.
Deming Cycle – PDCA or PDSA

PDCA was made popular by Dr. Deming who is considered by many to be the father of modern quality control; however it was always referred to by him as the "Shewhart cycle."
Continuous Improvement

The continuous improvement phase of a process is how you make a change in direction. The change usually is because the process output is deteriorating or customer needs have changed.
The ABC’s of PDCA, G. Gorenflo and J. Moran

Plan
1. Identify and Prioritize Opportunities
2. Develop AIM Statement
3. Describe the Current Process
4. Collect Data on Current Process
5. Identify All Possible Causes
6. Identify Potential Improvements
7. Develop Improvement Theory
8. Develop Action Plan

Check/Study
1. Reflect on the Analysis
2. Document Problems, Observation, and Lessons learned

Do
1. Implement the Improvement
2. Collect and Document The data
3. Document Problems, Observations, and Lessons learned

Act
Adopt
Standardize
Adapt
Do
Abandon
Plan
The Maintenance and Standardization phase of a process is how we hold the gains. If our process is producing the desired results we standardize what we are doing.
Integrated Cycle

The SDCA and PDCA cycles are separate but rather integrated. Once we have made a successful change we standardize and hold the gain. When the process is not performing correctly we go from SDCA to PDCA and once we have the process performing correctly we standardize again. This switching back and forth between SDCA and PDCA provides us with the opportunity to keep our process customer focused.
General Approach On How To Use The Basic Tools Of Quality Improvement

Issue To Consider

Brainstorming & Consolidate Data

Flow Chart Existing Process

Cause & Effect Diagram – Greatest Concern

Brainstorming Force and Effect

“As Is” State

Gather Data On Pain Points

Use 5 Whys To Drill Down To Root Causes

Monitor New Process & Hold The Gains

Run Charts

Control Charts

Flow Chart New Process

“As Is” State to “Should Be” State

Analyze Information and Develop Solutions

Solution and Effect Diagram

Translate Data Into Information

Data Management Strategy

• Pie Charts

• Pareto Charts

• Histograms

• Scatter Plots, etc.

The Basic Tools of QI

- Flow Chart
- Cause and Effect Diagrams
- Pareto Chart
- Check Sheet
- Histogram
- Scatter Diagram
- Control Chart
OSTDS Construction Permit: Site Evaluation Submitted subprocess

Mary

- Site Evaluation Submitted?
  - Yes: Perform Application Review
  - No: Application Approved?
    - Yes: Request Additional Information
      - Include comment form
    - No: Denial Letter to Applicant
      - Stop

Clerical

- To Line Locate
  - Yes: Set up tracking process (outgoing and incoming) TBD
  - No: Additional Info Received?
    - Yes: Contractor Provide Information
    - No: Application with Site Eval Approved
      - Issue Permit
Cause and Effect Diagram

Test Location

Inconvenient
To Public

Not Client Centered
Not Offered

Counseling

Client

Don’t see benefit
Fearful

Don’t Want Test

Poor HIV Testing

Not Respectful
Poor Experience

Staff
Pareto Principle: 20% of sources cause 80% of any problem

Why do fewer clients in clinic B receive HIV tests?

<table>
<thead>
<tr>
<th>Reasons</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too much time</td>
<td>3</td>
</tr>
<tr>
<td>Client does not want</td>
<td>5</td>
</tr>
<tr>
<td>Not offered</td>
<td>39</td>
</tr>
<tr>
<td>Unable to return</td>
<td>1</td>
</tr>
<tr>
<td>Language barriers</td>
<td>2</td>
</tr>
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</table>

NC Accreditation Collaborative
## DCHD Immunization Checklist for the Clinics

<table>
<thead>
<tr>
<th>Front Desk</th>
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</thead>
<tbody>
<tr>
<td>✓ Register patient in HMS</td>
</tr>
<tr>
<td>✓ Cross Check for duplicate patients</td>
</tr>
<tr>
<td>✓ Access FL Shots for Patient Information “Search FL Shots”</td>
</tr>
<tr>
<td>✓ Ask for address, phone number, and email address (change information if necessary)</td>
</tr>
<tr>
<td>✓ Import updates to HMS</td>
</tr>
<tr>
<td>✓ Make sure you have selected the proper Current Immunization Provider (CIP) status is correct in FL Shots</td>
</tr>
<tr>
<td>✓ Print Immunization History from FL Shots attach to Superbill/Chart along with Insurance verification</td>
</tr>
<tr>
<td><strong>Staff Signature</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RN/LPN/MA/HST</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Greet patient</td>
</tr>
<tr>
<td>✓ Assess for needed vaccines</td>
</tr>
<tr>
<td>✓ Explain vaccines to be given today</td>
</tr>
<tr>
<td>✓ Give VIS to patient/parent</td>
</tr>
<tr>
<td>✓ Ask for any questions</td>
</tr>
<tr>
<td>✓ Give Injections</td>
</tr>
<tr>
<td>✓ Explain after care instructions, invite questions</td>
</tr>
<tr>
<td>✓ Document immunization in Florida Shots</td>
</tr>
<tr>
<td>✓ Give patient an updated record of shots w/new due date</td>
</tr>
<tr>
<td>✓ Tell patient when to return for next vaccinations</td>
</tr>
<tr>
<td>✓ Document in medical records</td>
</tr>
<tr>
<td><strong>Staff Signature</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Billing Clerk</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Process Superbill</td>
</tr>
<tr>
<td>✓ Process any collections</td>
</tr>
<tr>
<td>✓ Ask did you get your updated record of shots?</td>
</tr>
<tr>
<td>✓ Release Client</td>
</tr>
<tr>
<td><strong>Staff Signature</strong></td>
</tr>
</tbody>
</table>

**Patient Label**
Histogram

<table>
<thead>
<tr>
<th>Measured In Inches</th>
<th>Tally</th>
<th>Absolute Frequency</th>
<th>Absolute Cumulative Frequency</th>
<th>Relative Frequency</th>
<th>Cumulative Relative Frequency</th>
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<tbody>
<tr>
<td>.506</td>
<td>I</td>
<td>1</td>
<td>100</td>
<td>0.01</td>
<td>1.00</td>
</tr>
<tr>
<td>.505</td>
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<td>2</td>
<td>99</td>
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<td>0.99</td>
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<td>29</td>
<td>0.14</td>
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<tr>
<td>.498</td>
<td>IIIII III</td>
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<td>15</td>
<td>0.09</td>
<td>0.15</td>
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<tr>
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<td>0.04</td>
<td>0.06</td>
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<tr>
<td>.496</td>
<td>IIII</td>
<td>1</td>
<td>2</td>
<td>0.01</td>
<td>0.02</td>
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<tr>
<td>.495</td>
<td>I</td>
<td>1</td>
<td>1</td>
<td>0.01</td>
<td>0.01</td>
</tr>
</tbody>
</table>
Frequency Polygon & Histogram – Grouped Data
Scatter Plot

Obese Children

BMI – kg/m²

Age in Years
Mr. Pareto Head
BY MIKE CROSEN

This data doesn't look so good. We better get this to the boss right away.

Slide it under the door quietly.

I always wondered why they call it a "Run Chart"!
Run Chart

Time

Measurement

Median Line
Control Chart

Jones County WIC Lobby Wait Time
XMR Chart

X Chart
- Wait Time (Minutes)
- UCL = 23.2
- CL = 12.4
- LCL = 1.6

MR Chart
- Moving Range
- UCL = 13.2
- CL = 4.0
- LCL = 0.0

Observation
The Kano Model
Bose

Shopping at our store should be enjoyable, exciting and designed for you.
L.L. Bean – Customer Delight

- Unexpected service and attention
  - More than the customer expected

- More than satisfying the customer

- Deliver the unexpected

- Deliver it with enthusiasm and sincerity

- Surprise the customer

- Create a memory
Next Door To L.L. Bean is J. L. Coombs - The Oldest Shoe Company in the United States - 1830

“If You Do Not Like My Shoes the Hell with you!”
Customer Touch Points

When your customer (internal/external) comes in touch with your process what do they:

- See? (Initial reaction?)
- Feel?
- Sense?
- Hear?
- Experience?
Understanding Your Customer

Need to obtain the Voice of Your Customer:

- Wants
- Needs
- Satisfiers
- Dis-satisfiers
- Future needs and wants
Levels of Customer Satisfaction

Satisfied

Wows

Wants

Need is met

Expected

Dissatisfied

Need not met
Who is Your Customer for Your Issue?

- What are their/your wants and needs?
- What will satisfy them?
- What will satisfy You??
- How can we align our needs??
Flow Charting
“If you can't describe what you are doing as a process, you don't know what you're doing.”

W. Edwards Deming
Flow Charting

- Flow charting is the first step we take in understanding a process
- Organized combination of shapes, lines, and text
- Flow charts provide a visual illustration, a picture of the steps the process undergoes to complete its assigned task
- From this graphic picture we can see a process and the elements comprising it
- Shows how interactions occur
- Makes the invisible visible
Flow Chart Benefits

- Creates a common vision
- Establishes the “AS IS” baseline – Current State
- Baseline to measure improvements
- Identifies wasteful steps – activities/waits
- Uncovers variations
- Shows where improvements could be made and potential impacts
- Training tool
Flow Chart People Benefits

People involved in constructing a flow chart begin to:

- Better understand the process
- Understand the process in the same terms
- Realize how the process and all the people involved, including them, fit into the overall process or business
- Identify areas for improving the process
- Become enthusiastic supporters to quality and process improvement
Types of Flow Charts

- As Is – current state - baseline
- Could Be – improved state – transition
- Should Be – optimal state
Olmsted County, MN
Performance Appraisal Process
Flow Charting Construction

- Clearly define the process boundaries to be studied
- Define the first and last steps – start and end points
- Get the right people in the room
- Decide on the level of detail
  - Complete the big picture first – macro view
  - Fill in the details – micro view
- Gather information of how the process flows:
  - Experience
  - Observation
  - Conversation
  - Interviews
  - Research
- Clearly define each step in the process
  - Be accurate and honest
Flow Charting Steps

- Use the simplest symbols possible – Post-Its
- Make sure every loop has an escape
- There is usually only one output arrow out of a process box. Otherwise, it may require a decision diamond.
- Trial process flow – walk through people involved in the process to get their comments
- Make changes if necessary
- Identify time lags and non-value-adding steps.
Flow Chart Symbols

- **Start/End**
- **Bookends**

- **Activity:**
  - **Operation/Inspection**

- **Decision**

- **Input/Output Data**

- **Document**

- **Forms**

- **Manual Operation**
- **Data Base**
- **Wait/Delay**
- **Storage**
- **Transport**
- **Input**
- **Output**

- **Flow Lines**
- **Connector**
- **Comment Collector**
- **Display**
- **Manual Input**
- **Preparation**
- **Unfamiliar/Research**
Flow Chart Construction

- Use a form of Post-It Notes – easier to rearrange

- Realize everyone is not doing it the same way – there will be disagreements

- It will take multiple passes to get to the “As Is” State
High Level SIPOC+CM Collection Form

Begins With:

Constraints:

Ends With:

Process/Activities:

Measures

Inputs:

Outputs:

Suppliers:

Customers:
Constructing a Flow Chart

- Asking questions is the key to flow charting a process

For this process:
- Who is the customer(s)?
- Who is the supplier(s)?
- What is the first thing that happens?
- What is the next thing that happens?
- Where does the input(s) to the process come from?
- How does the input(s) get to the process?
- Where does the output(s) of this operation go?
- Is their anything else that must be done at this point?
Adding Time Lines

As Is Flow Chart

Could Be Flow Chart

Should Be Flow Chart
Analyzing A Flow Chart

Examine each:

- Activity symbol – value/cost?
- Decision point – necessary/redundant?
- Choke Points – bottlenecks?
- Rework loop – time/cost?
- Handoff – is it seamless?
- Document or data point – useful?
- Wait or delay symbol – why?/reduce/eliminate
- Transport Symbol – time/cost/location?
- Data Input Symbol – right format/timely?
- Document/Form Symbol – needed/cost/value?
# Flow Chart Summary Matrix


<table>
<thead>
<tr>
<th>Flow Chart Step Number</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>Actual</th>
<th>Proposed</th>
<th>Delta +/-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Step</td>
<td>P</td>
<td>D</td>
<td>P</td>
<td>T</td>
<td>W</td>
<td>P</td>
<td>D</td>
<td>S</td>
<td>∑</td>
<td>∑</td>
<td></td>
</tr>
<tr>
<td>1. Touch Point (√)</td>
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<td>2. Cost</td>
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<td>3. FTEs/Person Hrs</td>
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<td>4. Supplies Required</td>
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<td>5. Equipment Required</td>
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<td>6. Space Required</td>
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<td>7. Time</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>8. Cost of Quality</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>8. Partnerships Needed</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>9. Etc</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>10. Value added</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Type of Step: P – process, D – decision, T – transport, W – wait, S – storage

Delta = Proposed – Actual – the more negative the subtraction the better – more savings
Flow Charting Exercise
Cause and Effect Diagrams
Cause and Effect Diagrams

Moving from Treating Symptoms

To

Treating Causes
Problem Solving – What we usually see is the tip of iceberg – “The Symptom”

The Symptom →

The Root Causes →

Invisible

Hidden
Problem Solving

- When confronted with a problem most people like to tackle the obvious symptom and fix it

- This often results in more problems

- Using a systematic approach to analysis the problem and find the root cause is more efficient and effective

- Symptom – sign or indication

- Cause – whatever makes something happen
Cause and Effect Diagrams

- Organizes group knowledge about causes of a problem and display the information graphically.

- Resemble a fish skeleton and sometimes called a Fishbone Diagram.
Write the issue as a problem statement on the right hand side of the page and draw a box around it with an arrow running to it.

This issue is now the effect.
Cause and Effect Diagrams - Construction

- Generate ideas as to what are the main causes of the effect
- Label these as the main branch headers
Cause and Effect Diagrams - Construction

Typical Main Headers are:

- 4 M’s – Manpower, Materials, Methods, Machinery
- People
- Policies
- Materials
- Equipment
- Life style
- Environment
- Etc
Cause and Effect Diagrams - Construction

- For each main cause category brainstorm ideas as to what are the related sub-causes that might effect our issue
- Use the 5 Why’s technique when a cause is identified
- Keep repeating the question until no other causes can be identified
- List the sub-cause using arrows
Selecting Items to Investigate

When the Cause and Effect Diagram is finished it is time to decide what few areas should be focused on to develop solutions to solve the effect.

Some are obvious – low hanging fruit.

Some require some research using the other QI tools such as:
- Pareto Diagrams
- Run Charts
- Surveys
- Histograms
- Etc.
5 Why’s Technique

Problem (Effect)

Highest-level Cause: ROOT CAUSE

Higher-level Cause

First-level Cause

Visible Problem

Symptoms
Root Cause Analysis Rating Form

<table>
<thead>
<tr>
<th>Potential Root Cause</th>
<th>Impact on the Problem</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Improved Quality</td>
<td>Reduced Costs</td>
<td>Improved Customer Satisfaction</td>
<td>Others</td>
<td>Total Score</td>
<td>Ranking</td>
</tr>
</tbody>
</table>

Impact Scoring Scale: Low = 1, Medium = 3, High = 5
Cause and Effect Exercise
Three Step Process for Healthy Teams

1. Teaming Process
2. Coaching and Facilitation Process
3. Planning and Problem Solving Process
Top Ten Reasons Teams Fail

1. AIM Statement
2. Team Charter
3. Team Members
4. Problem Solving Process
5. Rapid Cycle
6. Team Maturity
7. Base Line Data
8. Training
9. Root Cause Analysis (RCA)
10. Pilot Testing
Stages Of Team Development

- Forming
- Performing
- Norming
- Storming

Adjourning

Bruce Tuckman, 1965
Q&A

Thank You for your time and attention