Improvement Tool Box

Prepared for Improvement Coach Program
Toolbox

Quality Improvement
Two Traditional Groupings…

The Seven Basic Tools
- Flowchart
- Cause & effect diagram
- Pareto chart
- Check sheet
- Run
- Frequency Plots or Histograms
- Scatter Plots

The Seven Management Tools
- Affinity diagrams
- Tree diagrams
- Matrix diagram
- Priorities matrix
- Interrelationship digraphs
- Activity network diagrams
- Process decision program charts
IHI Functional Groupings of Tools & Methods

I. Viewing Systems & Processes
II. Gathering Information
III. Organizing Information
IV. Understanding Variation
V. Understanding Relationships
VI. Planning and Managing Projects and Teams
VII. Change Concepts and Ideas
# Table of Contents

**Viewing Systems and Processes**
- Block Diagram
- Flow Diagram
- SIPOC

**Gathering Information**
- Form & Method for Collecting Data
- Surveys
- User analysis
- Benchmarking
- Creativity Methods
- Affinity Diagram

**Organizing Information**
- Force Field Analysis
- Cause and Effect Diagram
- 5 Why
- Matrix Diagram
- Tree Diagram
- Radar Chart
- FMEA

**Understanding Variation**
- Run Chart
- Control Chart
- Pareto Chart
- Frequency Plot/ Histogram

**Understanding Relationships**
- Scatter Plot

**Team Decision Making Tools**
- Brainstorming
- Nominal Group Technique
- Multi-Vote
- Rank Order
- Structured Discussion

**Planning**
- PDSA Planning Sheet
- Team Member Planning Matrix
- Communications Plan
- Seven Step Mtg Agenda

**Project Management**
- Project set-up checklist
- Work plan template
- Project progress assessment
- “We would” worksheet
- Stakeholder analysis

**Change Concepts and Ideas**
- Using change concepts
- List of Change Concepts
- Change concepts tips
- Change concepts vs. change ideas
- Change idea
- Worksheet: Developing ideas for change

**Six Thinking Hats**
<table>
<thead>
<tr>
<th>Category</th>
<th>Method or Tool</th>
<th>Typical Use of Method or Tool</th>
<th>Q1 Aim &amp; Assessment</th>
<th>Q2 Measures</th>
<th>Q3 Understand &amp; Change Ideas</th>
<th>PDSA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Viewing Systems &amp; Processes</strong></td>
<td>Block Diagram</td>
<td>Simplest picture of process/system.</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
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<tr>
<td></td>
<td>Flow Diagram</td>
<td>Develop a picture of a process. Communicate and standardize processes.</td>
<td>★</td>
<td>★</td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>SIPOC</td>
<td>Develop a picture of a system/process components.</td>
<td>★</td>
<td>★</td>
<td></td>
<td>★</td>
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<tr>
<td><strong>Gathering Information</strong></td>
<td>Data Collection</td>
<td>Plan and organize data collection effort &amp; forms. Recording data to ID patterns.</td>
<td>★</td>
<td>★</td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Surveys</td>
<td>Obtain information from people.</td>
<td>★</td>
<td>★</td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Benchmarking</td>
<td>Obtain information on approaches from other organizations (be aware of copying).</td>
<td>★</td>
<td>★</td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Creativity Methods</td>
<td>Develop new ideas and fresh thinking. (Includes Brainstorming and Nominal Grp).</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Affinity Diagram</td>
<td>Organize and summarize qualitative information.</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td><strong>Organizing Information</strong></td>
<td>Force Field Analysis</td>
<td>Summarize forces supporting and hindering change.</td>
<td>★</td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Cause and Effect</td>
<td>Collect and organize knowledge about potential causes of problems or variation</td>
<td>★</td>
<td>★</td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>5 Why</td>
<td>Used to uncover understanding of reasons behind intractable problems.</td>
<td>★</td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Matrix Diagram</td>
<td>Arrange information to understand relationships and make decisions.</td>
<td>★</td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Tree Diagram</td>
<td>Visualize the structure of a problem, plan, or any other opportunity of interest.</td>
<td>★</td>
<td>★</td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Radar Chart</td>
<td>Evaluate Alternatives or compare against targets with 3 or more variables.</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>FMEA</td>
<td>Used by process designers to identify and address potential failures.</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td><strong>Understanding Variation</strong></td>
<td>Run Chart</td>
<td>Study variation in data over time; understand the impact of changes on measures.</td>
<td>★</td>
<td>★</td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Control Chart</td>
<td>Distinguish between special and common causes of variation.</td>
<td>★</td>
<td>★</td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Pareto Chart</td>
<td>Focus on areas of improvement with greatest impact in stable process.</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Frequency Plot</td>
<td>Understand location, spread, shape, and patterns of data. Also called Histogram</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td><strong>Understanding Relationships</strong></td>
<td>Scatter Plot</td>
<td>Analyze the associations or relationship between two variables.</td>
<td>★</td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Two-Way Table</td>
<td>Understand relationships for qualitative variables.</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Planned Experiment</td>
<td>Design studies to evaluate relationships and test changes.</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td><strong>Team Decision Making Tools</strong></td>
<td>Brainstorming</td>
<td>Used to generate a large number of alternative ideas.</td>
<td>★</td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Nominal Group</td>
<td>Generate large number of ideas, gives silent time to list ideas, can use sticky notes.</td>
<td>★</td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Multi-Vote</td>
<td>Reduce large list of ideas to a list of 10 or less.</td>
<td>★</td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Rank Order</td>
<td>Use to reduce a list of 10 or less, to the vital few ideas for further discussion.</td>
<td>★</td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Structured Discussion</td>
<td>Used to discuss the vital few ideas to arrive at a consensus decision.</td>
<td>★</td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td><strong>Planning</strong></td>
<td>PDSA Forms</td>
<td>Used to plan, organize and keep track of testing, implementation and spread cycles.</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Team Member Matrix</td>
<td>Identify range of talent, knowledge and skill needed for improvement team.</td>
<td></td>
<td></td>
<td></td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Communications Plan</td>
<td>Identify key stakeholders and communications needs for each.</td>
<td>★</td>
<td></td>
<td>★</td>
<td>★</td>
</tr>
<tr>
<td></td>
<td>Seven Step Agenda</td>
<td>Use to plan and run effective meetings.</td>
<td>★</td>
<td></td>
<td>★</td>
<td>★</td>
</tr>
</tbody>
</table>

Adapted from The Improvement Guide, pages 411-413. for the IHI Improvement Coach Professional Development Program, April 2016
Viewing Systems and Processes
Simplest form of system / process description.

- Identify major “chunks”
- Write them in the order they occur.
- If there are more than 8 chunks to the picture might be too complex and/or too detailed. (simplify or redefine boundaries.)
- In improvement work it is best to narrow project boundaries to focus on a manageable slice, typically 2-4 blocks

Assessing Boundaries with a Block Diagram

In improvement work it is best to narrow project boundaries to focus on a manageable slice, typically 2-4 blocks. To narrow boundaries, it can be useful to:

1. List where barriers to flow or problems happen
2. Assign to various process segments.
3. If barriers tend to locate in some small number of segments, consider narrowing boundaries to those segments.

Flow Diagram

Flowcharting

Types of Flowcharts

- High Level Block Diagram
- Top down
- Detailed
- Supplier-Customer
- Swim-lane (matrix or functional deployment)
- Cost Added-Value Added
- SIPOC
Flowcharting Exercise

Types of Flowcharts

- High Level Block Diagram
- Top down
- Detailed
- Supplier-Customer
- Swim-lane (matrix or functional deployment)
- Cost Added-Value Added
Source: East London Foundation Trust
Detailed Flowchart

Source: East London Foundation Trust
Top Down Flowchart
Current Process

Source: East London Foundation Trust
Top Down Flowchart
Desired Process

Source: East London Foundation Trust
Detailed Flowchart

Source: East London Foundation Trust
Flowcharting Exercise

Flowcharting

- High Level Block Diagram
- Top down
- Detailed
- Supplier-Customer
- Swim-lane (matrix or functional deployment)
- Cost Added-Value Added
Video Part II

https://www.youtube.com/watch?v=Ys537do7rds
A SIPOC diagram is a tool used by a team to identify all relevant elements of an improvement project, often before the detailed improvement work begins including:

- Suppliers
- Inputs
- Processes
- Outputs
- Customers

In some cases, requirements of the customers are appended to the end of the SIPOC for further detail.

Requirements = OUTCOME (key aspect wanted by customer)
SIPOC Diagram ---- Hobbs Coffee Shop, Swarthmore, PA

**Suppliers**
- Coffee supplier
- Water company
- Coffee machine supplier
- Solo supplier
- Employees

**Inputs**
- Coffee
- Water
- Solo Cups
- Solo lids
- Milk

**Process**
- Barista prepares order

**Outputs**
- Cup of Coffee made to customer specifications

**Customers**
- Local Students
- Train Commuter
- Regulars

**Requirements**
- Tasteful
- Hot
- Timely

**Flowchart**
- Take Customer Order
- Give order to Barista
- Barista prepares order
- Order placed on Coffee Pick up counter
- Customer picks up morning cup of Joe

Source: Template = [www.6Sigma.com](http://www.6Sigma.com)  Example = Phyllis M. Virgil  Photo = Hobbs, Swarthmore PA, used with permission, 02-08-16
SIPOC Diagram ---- Insert Process Title Here

- **Suppliers**
  - List
  - Suppliers
  - Here

- **Inputs**
  - List
  - Inputs
  - Here

- **Process**

- **Outputs**
  - List
  - Outputs
  - Here

- **Customers**
  - List
  - Customers
  - Here

- **Requirements**
  - List
  - Requirements
  - Here

Source: www.iSixSigma.com
Gathering Information
Forms and Methods for Collecting Data

- **We design and create a data collection form to:**
  - Answer specific questions posed in the planning phase of the improvement cycle
  - Make the recording of observations easy, efficient, and accurate
  - Facilitate data analysis during the study phase of the improvement cycle

- **Two basic types of forms for collecting data:**
  - Check sheets: use when values/characteristics are known before the collection of data
  - Recording forms: use when values not defined before collection data
### Check Sheet: examples

<table>
<thead>
<tr>
<th>Problem</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out of paper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Out of toner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copies too light</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sorter not working</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Document feeder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transparency feed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copier just stopped</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panel won't clear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No power to copier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Figure 12-3: Defect Type Check Sheet for Expense Reports

<table>
<thead>
<tr>
<th>Type of Error</th>
<th>Sales</th>
<th>Personnel</th>
<th>Manufacturing</th>
<th>Engineering</th>
<th>Finance</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Employee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Dept. Mgr.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- V.P.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receipts Missing</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Taxi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Extra Meals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Parking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Vehicle Fuel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 12-2: Flow Diagram Used as a Simple Tally Check Sheet

1. Price Change Request Received
2. Salesperson Approves
3. Accounting Implements New Change
4. Price Master Updated
5. Salesperson Assigned?
6. Meets Guidelines?
7. Change in Policy?
8. Change Policy Guidelines
9. Cancel Request for Change
10. END
<table>
<thead>
<tr>
<th>Month</th>
<th>Percent 30 Day Same</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011/04</td>
<td>12.1%</td>
</tr>
<tr>
<td>2011/05</td>
<td>12.5%</td>
</tr>
<tr>
<td>2011/06</td>
<td>15.3%</td>
</tr>
<tr>
<td>2011/07</td>
<td>14.9%</td>
</tr>
<tr>
<td>2011/08</td>
<td>14.9%</td>
</tr>
<tr>
<td>2011/09</td>
<td>16.0%</td>
</tr>
<tr>
<td>2011/10</td>
<td>17.3%</td>
</tr>
<tr>
<td>2011/11</td>
<td>13.3%</td>
</tr>
<tr>
<td>2011/12</td>
<td>12.9%</td>
</tr>
<tr>
<td>2012/01</td>
<td>12.8%</td>
</tr>
<tr>
<td>2012/02</td>
<td>10.6%</td>
</tr>
<tr>
<td>2012/03</td>
<td>13.6%</td>
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<td>2012/04</td>
<td>10.4%</td>
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<td>2012/05</td>
<td>8.7%</td>
</tr>
<tr>
<td>2012/06</td>
<td>11.3%</td>
</tr>
<tr>
<td>2012/07</td>
<td>11.5%</td>
</tr>
<tr>
<td>2012/08</td>
<td>9.6%</td>
</tr>
<tr>
<td>2012/09</td>
<td>11.3%</td>
</tr>
<tr>
<td>2012/10</td>
<td>10.8%</td>
</tr>
</tbody>
</table>

**Percent 30 Day Readmit to Canton Hospital**

- 2011/04: 12.1%
- 2011/05: 12.5%
- 2011/06: 15.3%
- 2011/07: 14.9%
- 2011/08: 14.9%
- 2011/09: 16.0%
- 2011/10: 17.3%
- 2011/11: 13.3%
- 2011/12: 12.9%
- 2012/01: 12.8%
- 2012/02: 10.6%
- 2012/03: 13.6%
- 2012/04: 10.4%
- 2012/05: 8.7%
- 2012/06: 11.3%
- 2012/07: 11.5%
- 2012/08: 9.6%
- 2012/09: 11.3%
- 2012/10: 10.8%
Tips on data forms …

For both Check Sheets and Recording Forms:

- operational define …
- simulate use before going live
- gather plenty of feedback from SMEs
- move to computer ASAP
- assign names to responsibilities
- naming conventions and version control
  - Super easy way to a broken heart …
  - “org_project_name_yyyymmdd”
  - “abc_xyz_yyyymmdd”
- leave names alone, software may be linked to file
Tips on data forms …

For Recording Forms:
- think about what questions need to be answered
- what charts need to be seen?
- think about stratification
- move data to either Excel or Access to create charts
- store data in one central file, follow naming conventions
- take time to think hard about variable to collect, again, stratification, easy to add in the beginning!
Surveys (as we’ll define it here)

- A method of collecting information directly from people about their feelings, motivations, plans, beliefs, experiences, and backgrounds

- In relation to the Model for Improvement and PDSA cycles, a survey is a type of data collection process to answer a question(s) posed in Question 2 and the planning phase of the cycle

Adapted from: *The Improvement Handbook: Model, Methods, and Tools for Improvement*
Reasons to survey

- To build the knowledge of those obtaining the information (duh!)
- To obtain a desired effect on the relationship between those obtaining the information and those providing the information

Adapted from: The Improvement Handbook: Model, Methods, and Tools for Improvement
Methods for obtaining information

- Informal conversation
- Written surveys
- Personal interviews
- Group interviews
- Observations
- Trading places

Considerations:
- Purpose
- Reliability and validity
- Usefulness and credibility of results
- Cost
- Anonymity
- Convenience
- Complexity of information
- Time – to administer and respond
- What you will do with the information
Written Survey Example

*Thank you for participating in our workshop today. Please help us improve our service to you by completing this survey.*

Please list three ways we can improve our service to you.

1. ____________________________________________
2. ____________________________________________
3. ____________________________________________

Please rate your experience with our services today (circle one)

- Poor
- Fair
- Good
- Very Good
- Excellent

Other suggestions:

_________________________________________________________________________________________

_________________________________________________________________________________________
Written surveys

- Delivery: intentional or opportunistic?
- Design considerations:
  - Order of the questions
  - Selection of response options
  - Wording

Adapted from: The Improvement Handbook: Model, Methods, and Tools for Improvement
# Written surveys

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beneficial for those who are better at written than verbal communication</td>
<td>Respondent has no say about what is covered</td>
</tr>
<tr>
<td>Can be administered to preserve confidentiality</td>
<td>Usually a large percent do not complete</td>
</tr>
<tr>
<td>Less expensive than interviews</td>
<td>Questioner cannot build on answers</td>
</tr>
<tr>
<td>Useful in reaching a geographically diverse group of people</td>
<td>Respondents have to interpret the questions</td>
</tr>
<tr>
<td></td>
<td>Respondent assumes most of the work</td>
</tr>
</tbody>
</table>

Adapted from: *The Improvement Handbook: Model, Methods, and Tools for Improvement*
Steps for conducting a survey

1. Clarify the purpose of the survey
2. Consider why a survey is the best method for obtaining the desired information
3. What questions are to be answered by the survey?
4. Decide on the type of survey (e.g., written, phone, interview)
5. Select the survey design, content, questions, and test the form
6. Decide who should participate and when (will sampling be used?)
7. Will there be follow-up surveys?
8. Attend to the survey administer (e.g., collecting forms, conducting interviews)
9. Analyze, interpret, and report results
10. Act (if appropriate) on the results

Adapted from: The Improvement Handbook: Model, Methods, and Tools for Improvement
Survey questions

- Consider the respondents’ point of view – how complicated should the questions be and at what level should they be written?

- Open-ended
  - Offers insight as to why people believe what they do
  - Interpretation can be difficult

- Closed-ended
  - Easy to use, score, and code
  - Reliable to the extent they provide uniform data
  - Validity usually requires extensive testing

Adapted from: The Improvement Handbook: Model, Methods, and Tools for Improvement
Closed-ended questions

- Each question should be meaningful to the respondents
- Use standard, simple language
- Make questions concrete
- Avoid biased words and phrases
- Check your own biases
- Don’t get too personal
- Each question should have just one thought (no double-barreled questions)
- Make sure the response options match the question
- Tip: State questions/statements in the extreme

Adapted from: The Improvement Handbook: Model, Methods, and Tools for Improvement
### CMS Learning System Fellows Program, Workshop 4

#### End-of-Event Evaluation

Please complete and place in the folder by the door.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Not Sure</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

1. Participating in this event will improve my ability to lead change in my organization.  
   - [ ] Yes  
   - [ ] No  

2. The overall quality of this event was excellent.  
   - [ ] Yes  
   - [ ] No  

3. The service offered by IHI's staff and faculty at this event was exceptional.  
   - [ ] Yes  
   - [ ] No  

4. How many new ideas did you learn as a result of participating in this workshop?  
   a. No ideas  
   b. One idea  
   c. Two or four ideas  
   d. Five ideas or more

5. If you responded that you learned one or more new ideas during this workshop, will you be testing these ideas within your organization during the next month?  
   a. Yes (I will definitely be testing the ideas I learned during the next month)  
   b. Maybe (I would like to test the new ideas I learned during the next month but doubt that I will have time)  
   c. Probably not (I seriously doubt if we will have a chance to test the new ideas I learned)

6. Did this event have the right mix of presentations, discussion, and exercises?  
   Please circle your response for each category below:  
   - Presentations:  
     - Too Much  
     - Right Amount  
     - Not Enough  
   - Discussion:  
     - Too Much  
     - Right Amount  
     - Not Enough  
   - Exercises:  
     - Too Much  
     - Right Amount  
     - Not Enough
Learning in Real Time

Methods for analyzing survey data

- Depends on the type of questions asked
- Closed-ended questions:
  - Frequency plots (possibly with stratification)
  - If collected over time, run and control charts
- Open-ended questions:
  - Clustering techniques with written summaries of the clusters/themes – e.g., affinity diagram or Pareto chart

Adapted from: The Improvement Handbook: Model, Methods, and Tools for Improvement
Kano survey method

- Useful for testing new ideas and innovations with customers to determine if the ideas might change their expectations (future needs and wants)
- Incorporates the concept of “attractive” and “must-be” quality elements

Adapted from: The Improvement Handbook: Model, Methods, and Tools for Improvement
Kano two-dimensional recognition mode

Three classifications of quality-characteristics of a produce or service:
- One-dimensional Element – gives satisfaction when fulfilled and results in dissatisfaction when not fulfilled
- Attractive Quality Element – give satisfaction when fulfilled but is acceptable when not fulfilled
- Must-be Quality Element – take for granted when fulfilled but results in dissatisfaction when not fulfilled

Adapted from: The Improvement Handbook: Model, Methods, and Tools for Improvement
Method

- Ask questions in pairs
  - How would you feel if you had coffee at the workshop?
    - Delighted, I expect it and like it, No feeling, Live with it, Do not like, Other
  - How do you feel when you do not have coffee at the workshop?
    - Delighted, I expect it and like it, No feeling, Live with it, Do not like, Other

Adapted from: The Improvement Handbook: Model, Methods, and Tools for Improvement
Two-dimensional chart of survey results for each quality element

<table>
<thead>
<tr>
<th>Response to “Positive Wording” of Question</th>
<th>Delighted</th>
<th>I expect and like it</th>
<th>No feeling</th>
<th>Live with it</th>
<th>Do not like</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delighted</td>
<td>Skeptical</td>
<td>Attractive</td>
<td>Attractive</td>
<td>Attractive</td>
<td>One-dimensional</td>
<td>Other</td>
</tr>
<tr>
<td>I expect and like it</td>
<td>Reverse</td>
<td>Indifferent</td>
<td>Indifferent</td>
<td>Indifferent</td>
<td>Must-be</td>
<td>Other</td>
</tr>
<tr>
<td>No feeling</td>
<td>Reverse</td>
<td>Indifferent</td>
<td>Indifferent</td>
<td>Indifferent</td>
<td>Must-be</td>
<td>Other</td>
</tr>
<tr>
<td>Live with it</td>
<td>Reverse</td>
<td>Indifferent</td>
<td>Indifferent</td>
<td>Indifferent</td>
<td>Must-be</td>
<td>Other</td>
</tr>
<tr>
<td>Do not like</td>
<td>Reverse</td>
<td>Reverse</td>
<td>Reverse</td>
<td>Reverse</td>
<td>Skeptical</td>
<td>Other</td>
</tr>
<tr>
<td>Other</td>
<td>Other</td>
<td>Other</td>
<td>Other</td>
<td>Other</td>
<td>Other</td>
<td>Other</td>
</tr>
</tbody>
</table>

- **One-dimensional**: Satisfied when fulfilled, dissatisfied when not fulfilled
- **Attractive**: Satisfied when fulfilled, no feeling when not fulfilled
- **Must-be**: No feeling when fulfilled, dissatisfied when not fulfilled
- **Indifferent**: No feeling of satisfaction or dissatisfaction regardless of fulfillment
- **Reverse**: Not expected, dissatisfied when fulfilled or satisfied when not fulfilled
- **Skeptical**: Doubtful if question is understood; difficult question, poor expression
- **Other**: None of the responses apply; other consideration
Please Let Us Know What You Think! - Circle the phrase that best describes your feelings.

1a. How would you feel if you had a VCR in your room?
   Delighted I expect it and like it No feeling Live with it Do not like Other

1b. How do you feel when you do not have a VCR in your room?
   Delighted I expect it and like it No feeling Live with it Do not like Other

2a. How would you feel if you had a work desk in your room?
   Delighted I expect it and like it No feeling Live with it Do not like Other

2b. How do you feel when you do not have a work desk in your room?
   Delighted I expect it and like it No feeling Live with it Do not like Other

3a. How would you feel if a coffee maker was in your room?
   Delighted I expect it and like it No feeling Live with it Do not like Other

3b. How do you feel when there is no coffee maker in your room?
   Delighted I expect it and like it No feeling Live with it Do not like Other

4a. How would you feel if you had a speaker phone in your room?
   Delighted I expect it and like it No feeling Live with it Do not like Other

4b. How do you feel when a speaker phone is not available in your room?
   Delighted I expect it and like it No feeling Live with it Do not like Other

5a. How would you feel if shampoo and conditioner were available in your room?
   Delighted I expect it and like it No feeling Live with it Do not like Other

5b. How do you feel when shampoo and conditioner are not available in your room?
   Delighted I expect it and like it No feeling Live with it Do not like Other

6a. How would you feel if you could check-in while riding in the airport van?
   Delighted I expect it and like it No feeling Live with it Do not like Other

6b. How do you feel when you have to check in at the front desk?
   Delighted I expect it and like it No feeling Live with it Do not like Other

7a. How would you feel if you had a FAX in your room?
   Delighted I expect it and like it No feeling Live with it Do not like Other

7b. How do you feel when you have a FAX service available at the front desk?
   Delighted I expect it and like it No feeling Live with it Do not like Other

8. What delightful surprises did you have during your stay with us?

9. What disappointing surprises did you have during your stay with us?

Thank you for your help in making our Hotel a great place to stay!

---

Summary Survey Results Example: Trends in Quality Elements

<table>
<thead>
<tr>
<th>Quality Element</th>
<th>Attractive</th>
<th>One Dimensional</th>
<th>Must Be</th>
<th>Indifferent</th>
<th>Reverse</th>
<th>Skeptical</th>
<th>Other</th>
<th>Total</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. VCR in room</td>
<td>88</td>
<td>11</td>
<td>4</td>
<td>123</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>234</td>
<td>Indifferent</td>
</tr>
<tr>
<td>2. Work desk</td>
<td>33</td>
<td>17</td>
<td>128</td>
<td>48</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>230</td>
<td>Must-be</td>
</tr>
<tr>
<td>3. Coffee in room</td>
<td>47</td>
<td>82</td>
<td>15</td>
<td>67</td>
<td>8</td>
<td>1</td>
<td>5</td>
<td>225</td>
<td>1-dimensional</td>
</tr>
<tr>
<td>4. Speaker phone</td>
<td>86</td>
<td>11</td>
<td>4</td>
<td>113</td>
<td>12</td>
<td>2</td>
<td>1</td>
<td>227</td>
<td>Indifferent</td>
</tr>
<tr>
<td>5. Shampoo/Cond.</td>
<td>17</td>
<td>27</td>
<td>137</td>
<td>17</td>
<td>8</td>
<td></td>
<td></td>
<td>210</td>
<td>Must-be</td>
</tr>
<tr>
<td>6. Check in van</td>
<td>129</td>
<td>13</td>
<td>5</td>
<td>74</td>
<td>12</td>
<td>2</td>
<td>6</td>
<td>231</td>
<td>Attractive</td>
</tr>
<tr>
<td>7. FAX in room</td>
<td>130</td>
<td>3</td>
<td>2</td>
<td>70</td>
<td>38</td>
<td>17</td>
<td></td>
<td>220</td>
<td>Attractive</td>
</tr>
</tbody>
</table>
User analysis: Who are our customers?

Brainstorm as many customers or customer groups as you can

User analysis

- **Who** are the top three customer or user groups for your work?
  1. 
  2. 
  3. 

- What processes can you use to understand what they care about? (Observation? Interviews? Ethnography? Sponsor user?)

- What might a “wow” experience look like for each group? How would you measure it? Do you need to update your aim?
<table>
<thead>
<tr>
<th>Who?</th>
<th>What?</th>
<th>Wow?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Benchmarking

- **Benchmarking** is a name given to the various approaches used to obtain information on performance and approaches from other organizations.
- Benchmarking in its simplest form is merely looking around at how others are doing things and trying to learn new approaches and possibilities.
- A formal benchmarking process furnishes a method with some structure for making these observations and then using this information for improvement.
- Benchmarking can compare how things are done differently (practices), or it can compare measurements taken from processes (metrics).
Benchmarking Examples

- Benchmarking might look at a process such as accounting, compare some key measures from the accounting processes of several organizations, and try to learn from these differences.

- Benchmarking might also look at how the accounting processes in organizations are carried out and try to learn from these differences.
Creativity within the Lens of Profound Knowledge

Dr. W. Edwards Deming stressed the importance of studying four areas to become more effective in leading improvement:

- Appreciation of a system
- Understanding variation
- Theory of knowledge
- Psychology

Classic example of reactionary thinking in healthcare

Reactive response to a plotting of Med Errors

“last month we only had 5 and this month we had 7! What are YOU going to DO about it! We’re getting WORSE!!!”

Rational response to a plotting of Med Errors

“our processes are perfectly designed to generates around 5 med errors a month and will continue to do so until will make changes to the entire process”

Comparing the previous data point (5) to the current data point (7) is like viewing the chart like this. The two points will almost ALWAYS be different. “The sky is falling!”
Rational Thinking vs. Reactive Thinking

The “rational mind” is already far from rational …
… so …
How can we avoid reactive thinking?

How can we become better at rational thinking?

Is there a way to help us see rational from reactive thinking in our WORK LIVES?
Origins of reaction …

Bottom Line: Humans are unparalleled at improving their situation BUT problems are becoming more complex

Information Age: early 1970s

Hunter/Gatherer: ~5.5 million years ago, 200,000 in current form

Agricultural: ~12,000 years ago

Industrial: ~1760

Rational

Complexity of Problem

Reactive
Origins of reaction …

That SOB gets in the way

Bottom Line: we are perfectly adapted for a world long gone so being vigilant about whether we are responding rationally is critical for success, and in the long run, even our survival!

- Hunter/Gatherer: ~5.5 million years ago, 200,000 in current form
- Agricultural: ~12,000 years ago
- Industrial: ~1760
- Information Age: early 1970s

Rational

Reactive

based on facts or reason and not on emotions or feelings

“fight or flight”
Generating the Next Set of Changes Using Lateral Thinking of Edward de Bono

**Dr. Edward de Bono**
- M.D., Ph.D., (philosophy, medicine & psychology), Rhodes scholar
- World-renowned consultant to business, governments, schools and industry
- Author of 62 books in 35 languages
- Originator of Six Thinking Hats, Lateral Thinking and Direct Attention Thinking Tools

**Reference Material**
- Chapter 16: *Creativity Methods* from Improvement Handbook
- Serious Creativity (1992), Edward de Bono
- Personal communication with Mike Sproul, Certified de Bono instructor
At the heart of Edward de Bono

We are born without pre-conceived ideas about the world. With experience, we come to recognize patterns and categorize the things and situations we see. With experience, we become able to find a category or pigeonhole into which to put many situations. This is great because it allows us to react rapidly to these situations. The disadvantage is that our thinking becomes limited. If we do not have a pigeonhole into which to put something we are looking at, sometimes just don't see it. We carry many assumptions around in our minds, and these assumptions make us blind to new possibilities.

“If we do not have a pigeonhole into which to put something we are looking at, sometimes just don't see it.”
Conceptual view of “perceptual ruts”

JUST LIKE a dried motorcycle rut in a field!
Lateral thinking, (literally, sideways thinking) uses various acts of "provocation" to escape perceptual ruts free us from previously locked assumptions and come up with fresh NEW ideas.

Conceptual view of “perceptual ruts”

Lateral thinking

your

perceptual

ruts

can work against you

Provocation!

Escape

Reversal

Exaggeration

Distortion

Wishful thinking

The World

NEW WAY OF THINKING
Lateral thinking, (literally, sideways thinking) uses various acts of “provocation” to escape perceptual ruts free us from previously locked assumptions and come up with fresh NEW ideas.
Lateral thinking, (literally, sideways thinking) uses various acts of “provocation” to escape perceptual ruts free us from previously locked assumptions and come up with fresh NEW ideas

Falls Reduction viewed through this model…

Provocation!

Wishful Thinking
We could use all these non-clinical Staff as our extra set of ears, eyes and hands!

Falls in hospital

We do an assessment

Short staffed

Can’t be everywhere

Clinical problem

Use a no pass policy for all employees
Six Thinking Hats: The Basics

- There are six different imaginary hats that you can put on or take off.
- Think of the “hats” as thinking icons.
- Each hat is a different color and represents a different type or mode of thinking.
- We all wear the same hat (do the same type of thinking) at the same time.
- When we change hats - we change our thinking.
### Characteristics of the hats

<table>
<thead>
<tr>
<th>What is the current information on the issue or problem?</th>
<th>How does everyone feel about the current situation, issue or problem?</th>
<th>What are the positive aspects of the current situation, issue or problem?</th>
<th>What are the negative aspects of the current situation, issue or problem?</th>
<th>What are new creative ideas or alternatives in solving the issue or problem?</th>
<th>What conclusions or summaries can we make in moving forward on the issue or problem?</th>
</tr>
</thead>
</table>
Affinity Diagram

Used to organize ideas into categories that seem to form natural groupings.

1. Generate at least 20 ideas using brainstorming or NGT. Each idea should be on a separate sticky note.

2. Place the ideas randomly on the wall, a window or flipchart pages.

3. **Without talking** start sorting the ideas into related groups. This is usually done by having the team stand around all the notes and read them.

4. The facilitator invites someone to start putting common ideas together. Others will quickly join in this process. But remember it is done silently!

5. It is okay to take a note from one grouping and place it in another. New groupings may emerge, groups might be split, a few may not fit with any others.

6. Finally create a label or header for each grouping.

A talking alternative is to post and clump like ideas as they are offered.

Adapted From Seven Step Meeting Process and Tools, Executive Learning Inc. Team Training Materials.
AIM: To reduce inpatient physical violence at Tower Hamlets Centre for Mental Health by 30% by Dec 2015

Social therapists, nurses, Drs, pharmacist, OT, psychologists, police, patients, carers

Generate the ideas
Generated Ideas

- Pre-ward round activities to identify needs and anxieties
  - Respecting each other's opinions
  - Openness and fairness
  - Daily reviews and no WR
  - Respect and dignity
  - More accessible

- Provide an opportunity for patients to express their needs
- Patients feel they have more ownership over choice of activities, WR
- Advocate in ward rounds
# Ideas arranged into categories

<table>
<thead>
<tr>
<th>Staff attitude</th>
<th>Ward Round</th>
<th>Patient choice and empowerment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respecting each others opinions</td>
<td>pre-ward round activities to identify needs and anxieties</td>
<td>A mechanism by which patients are able to express unhappiness</td>
</tr>
<tr>
<td>Openness and fairness</td>
<td>Daily reviews and no weekly WR</td>
<td>Patients feel they have more ownership over choice of activities, WR</td>
</tr>
<tr>
<td>More accessible</td>
<td>Advocate in ward rounds</td>
<td>Provide an opportunity for patients to express their needs</td>
</tr>
<tr>
<td>Respect and dignity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Staff attitude:
  - Respecting each others opinions
  - Openness and fairness
  - More accessible
  - Respect and dignity

- Ward Round:
  - pre-ward round activities to identify needs and anxieties
  - Daily reviews and no weekly WR
  - Advocate in ward rounds

- Patient choice and empowerment:
  - A mechanism by which patients are able to express unhappiness
  - Patients feel they have more ownership over choice of activities, WR
  - Provide an opportunity for patients to express their needs
Organizing Information
**Force Field Analysis**

**What is it?**
Force Field Analysis is a QI tool designed to identify driving (positive) and restraining (negative) forces that support or work against the solution of an issue or problem.

Once forces are identified, steps can be taken to reinforce the driving forces and reduce the restraining forces.

**What does the Force Field do?**
- Allows comparisons of the “positives” and “negatives” of a situation
- Encourages people to agree about the relative priority of factors on each side of an issue
- Supports the honest and open reflection on the underlying root causes of a problem and ways to break down barriers
- Forces people to think together about all the aspects of making the desired change a permanent one

Kurt Lewin, Social Psychologist, 1890 - 1947
### Force Field Analysis Worksheet

**Issue or Project:** ______________________________________

<table>
<thead>
<tr>
<th>Driving Forces (+)</th>
<th>Restraining Forces (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

**Actions to reduce the Restraining Forces:**

- 
- 
-
## Force Field Analysis Worksheet

**Issue or Project:** To increase % CPA completed in time

<table>
<thead>
<tr>
<th><strong>Driving Forces (+)</strong></th>
<th><strong>Restraining Forces (-)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivated by concern about completion rates</td>
<td>Team culture</td>
</tr>
<tr>
<td>Trust priority</td>
<td>Lack of will to change</td>
</tr>
<tr>
<td>Senior support</td>
<td>Introduction of new IT system</td>
</tr>
<tr>
<td>Clear aims</td>
<td>Concern about top down approach</td>
</tr>
<tr>
<td>Engaged project team</td>
<td>Need to impact across whole team</td>
</tr>
<tr>
<td>Creative change ideas</td>
<td></td>
</tr>
</tbody>
</table>

**Actions to reduce the Restraining Forces:**
- "Building the will" launch event
- Start with change ideas that improve team morale
Cause and effect diagram
(Why would I use it and what does it do?)

- It is used to identify, explore, and graphically display the variables that “cause” a particular problem or condition to occur.
- The “effect” is the problem or undesirable outcome, issue, or event being studied.
- The branches (i.e., the fish bones) lead to functions or categories of causes that can be broken down further when conducting a root cause analysis.
- Brainstorming or nominal group technique can be used to help the team generate the causes of the problem.
- The team discussion related to building the diagrams is the most important outcome of process; this is a tool to be used by the team not an individual.
- Forces people to think explicitly about the specifics of the process as well as their theories as to why something has happened.
Cause and effect diagram
(How do I organize the causes?)

There are several ways to organize the categories. The traditional category labels for the main bones of the diagram are:

- **People** (the individuals involved such as physicians, nurses, patients, family members, support staff)
- **Methods** (how work is done including procedures and policies)
- **Materials** (inputs to the process such as tubing, needles, cleaning agents, medications, forms, supplies, etc.)
- **Equipment** (machines)
- **Environment** (physical environment as well as social environment, weather conditions and human interactions)
Another approach is to use functions or steps in a process as the main category labels and then within each function use the People, Methods, Materials, Equipment and Environment as the sub-headings. Consider a medication error and the role that ordering the medication plays.
Getting to the Root Cause of a Bad Journey to Work

Time with family
- Early start
- Wife working
- Daughter fast asleep

Train
- Train cancelled
- Train packed!
- Laptop dead
- Standing

Cycle to station
- Bike has puncture
- Lots of traffic
- It’s raining
- It’s dark
- It’s windy

A Bad journey to work
- Signal failure
- Can’t get on!
- Exit to station
- Leg room!
- Forgot headphones

Underground
Interpreting a cause and effect diagram

- Focus on theories not symptoms or facts
- Develop questions not answers
- Look for biases and areas of shallow knowledge
- Minimize anecdotes, personal opinions, and biases
- Clarify the complexity of the problem
- Develop and organize theories as to why this happened
- Develop a flowchart of the process next

**A caution:**
A cause and effect diagram does not PROVE that the identified variables cause the effect that has been observed; the diagram merely provides a convenient way to organize potential relationships and causes for further dialogue and analysis.
5 whys

- Important to solve the root cause of a problem and not the symptoms
- Ask “why” five times to get to the root cause – a very simple tool!

1. Write down the specific problem
2. Ask why the problem happens; write the answer below
3. If answer is not the root cause of the problem in step 1, ask “why” again and write that answer down
4. Repeat step 3 until all agree that you have identified the root cause

Adapted from: www.isixsigma.com
If you don’t ask the right questions, you don’t get the right answers…Only the inquiring mind solves problems.

Edward Hodnett
Problem: Team members do not fill out PDSA forms

- No single form exists
- Multiple attempts created multiple forms
- Forms not successful in past
- Forms perceived as vague, ridged, confusing, complicated, not useful
- No training, coaching or revision of forms using customer feedback

Change idea to test: New PowerPoint form and guide – send it out with an email from coach

Source: Phyllis Virgil
Problem: MAs are not consistently collecting BMIs

Barrier to Problem: Heights are not collected

Why? Height scales are broken/missing.

Why? Facilities hasn’t fixed them.

Why? Facilities didn’t know scales were broken.

Why? No one notified Facilities about broken scales.

Why? No staff are designated to notify Facilities about scales.

Root Cause #1: Clarify to all MAs their role in notifying Facilities about all broken equipment and to fix in 2 days with supervisor if unrepaired.

Source: Sonia Panigrahy, MPH, CPHQ, Director, Clinical Quality Improvement Program, Community Health Care Association of New York State (CHCANYs). Used with permission.
Matrix diagram

- A tool used to arrange and display information to help understand important relationships and make decisions.
- Can be used in many ways, but particularly helpful in selecting change ideas to test (because we only have so much time and resources!) and want to be thoughtful.
- It displays the relationship between two groupings (e.g., steps in a process and departments that conduct that step, vendors and section criteria).
Example for selecting change ideas

1. List the ideas in the row, and the criteria for selection in the columns
2. Rate each idea on a scale of 1-5 (1 being low confidence and 5 being high confidence) for each criterion
3. Analyze which idea has the highest confidence

<table>
<thead>
<tr>
<th>Idea</th>
<th>Can be accomplished in 90 days?</th>
<th>There’s will to fix this problem?</th>
<th>Is within our control?</th>
<th>Is a sponsor for this work?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idea 1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Idea 2</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Idea 3</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>
Impact-effort matrix

Impact of the solution

Low

High

Effort required to implement solution

Low

High
Impact-effort matrix

- Idea B
- Idea C
- Idea D
- Idea E
- Idea A

**Impact** of the solution:
- Low
- High

**Effort** required to implement solution:
- Low
- High
What makes something high or low?

- **Impact:**
  - Evidence: Is there global or local evidence this change makes a difference?
  - Contribution: How much does this change contribute to our overall aim?

- **Effort:**
  - Speed: How quickly can we do this?
  - Resources: How many resources does it take to implement?
  - Acceptability: Is this change likely to be adopted by the users of the system?
What is a tree diagram?

Tool can be used to organize and understand the structure and content of any problem, issue or objective.

Diagram resembles a tree when completed.

Helps teams think systematically, logically and comprehensively.

Each branch is exploded and explained.

Allows an easy to see graphic view of increasing detail.

Moves thinking step by step from the general to the specific.

Can be developed horizontally or vertically.

Also called: systematic diagram, tree analysis, analytical tree, or hierarchy diagram.

Adapted from: The Improvement Handbook: Model, Methods, and Tools for Improvement, API
Types of Tree Diagrams

1. Problem Solving Tree (Why)
2. Planning Tree (How)
3. Analysis Tree (What)
4. Mixed

Readmissions Problem Solving (Why)

High Readmission Rate

Why

Lax Reentry System
Lack of Vetting Process

Why

Social Admit (no place to go)

Lack of Medication Compliance

Why

Inadequate Post Discharge Care

Lack of Insurance

No public Transportation

Why

No Access to Follow-up Care

Lack of Transportation

No caretaker availability

Behavioral Complications

Premature Discharge

Care Mis-management

Problems with Hospital Care

Why

Source: Phyllis M. Virgil
Strategic Planning for Healthy Weight (How)

**Measures**
- % recall Survey
- % documented in EHR
- % documented in EHR

**Actions**
- Create Message
- Integrate into Clinic Environ.
- Disseminate to Community
- Select Template
- Build into IS
- Train Staff
- Select Template
- Patient Work Flow Redesign
- Train Staff

**Strategies**
- Positive HW Messaging
- Patient HW Assessment
- Personalized HW Plan

**Goal**
- Reduce Obesity by 50% Good Sam Clinic

Source: Phyllis M. Virgil, NICHQ HW Collaborative Team Training
Work Breakdown Structure Tree (How)

Used Extensively by Project Management Professionals

Source: http://www.criticaltools.com/wbschartprosoftware.htm
Quality Characteristic Analysis Tree (What)

Customer Requirement (VOC)

What does that mean?

Good Cup of Coffee

Hot

Tasteful

What does that mean?

Temp between 91° and 96°

Not Bitter

Flavorful

What does that mean?

PH of 5

Perfect Brew Strength

What does that mean?

Golden Ratio 17.42 units of water to 1 unit of coffee

Six Sigma’s DMAIC
Critical To Quality Tree (What)

Source: http://isoconsultantpune.com/voc-data-collecting-tools/
Driver Diagram is a Tree that Maps Out Your Theory

SEE: http://www.ihi.org/resources/Pages/Publications/WhatsYourTheoryDriverDiagrams.aspx
Benefits of Tree Diagrams

- Makes it less likely essential items will be left out
- Encourages discussion and dialogue
- Improves communication and presentations
- Versatile and easy to use

Adapted from: The Improvement Handbook: Model, Methods, and Tools for Improvement
Use of Tree Diagrams

A tree diagram can be used in all phases of improvement work:

- Break project down into sub-objectives
- Uncover the causes of problems
- Understand customers needs
- Develop our measure of change
- Identify change ideas
- Detail out action plans

Adapted from: *The Improvement Handbook: Model, Methods, and Tools for Improvement*
How to Develop a Tree Diagram

1. Clearly state the problem, opportunity, objective or issue of interest. Place this as the first box at the far right/left or top of your work space (page, flip chart, white board)

2. Ask questions of Why, What or How to develop the next level of detail. Place each answer in a box (or on a line) at next level and link them by drawing a line.

   - Problem Solving -- Why
   - Planning -- How
   - Analysis -- What

3. Repeat step 2 process until a useful level of detail is achieved.

Adapted from Minnesota Department of Health QI Tool Box
Questions to Ask

- **Planning Tree**: “How can this be accomplished?” or “What Tasks must be done to accomplish this?”
- **Problem Solving Tree**: “Why does this happen?” or “What causes this?”
- **Analysis Tree**: “What are the components?” “What goes into it?” “What drives this?” “What comes next?”
- **For unclassified** tree diagrams ask whatever question is appropriate, What, Why, How...

Tips for Constructing Tree Diagrams

- Sticky notes are often useful to use when developing tree diagrams.
- Best when done by a small team who has detailed knowledge.
- Develop by brainstorming, clumping, labeling and sequencing ideas.
- Another way is to logically and sequentially move from level to level.
- Measures, dates and responsibility can also be added to diagrams.
- Typically taken to third level of detail.
- Use nested diagrams for more detail.
- Do a “necessary, valid and sufficient” check.

Adapted from ASQ and Minnesota Department of Health.
Use SmartArt to Create in MS Word or PowerPoint

- Go to Insert Tab > SmartArt > Hierarchy
- Use Design and Format tabs to create and format.
Summary

- Tree Diagrams are versatile and easy to use.
- They help you to think systematically, logically and comprehensively about any problem, issue or objective.
- They can be used in any phase of improvement work.
Radar charts: Overview

• Also called spider, web, or star charts
• Displays multiple quantitative variables on axes from the same starting point
• When used to present the measures in an improvement project, it graphically shows:
  – Areas of relative strength and relative weakness
  – Overall performance
• Can be used to:
  – Evaluate alternatives
  – Compare against targets with three or more variables or characteristics
  – Identify potential opportunities for improvement
How to create a radar chart

1. Identify the categories or variables under investigation
2. Standardize categories or variable definitions
3. Collect data that indicate the strength or weakness of each variable
4. Plot the data values for each variable of the appropriate “spoke” of the chart
5. Interpret and use the data

Adapted from http://asq.org/service/body-of-knowledge/tools-radar-chart
Example: ACIC Self-Assessment

ACIC Self-assessments

- Final 27
- Midpoint 29
- Kickoff 28

Org. of health care system

Community linkages

Self-management

Clinical information system

Delivery system design

Decision support

Integration
Example: Personal Value Compass

Outer ring = Ideal state/goal

Shading = Current state
What is FMEA?

Failure Mode Effects Analysis, or FMEA:
• is a **systematic, proactive** method for evaluating a process to identify where and how it might fail and to assess the relative impact of different failures, in order to identify the parts of the process that are most in need of change.

**FMEA includes review of the following:**
• steps the process
• Failure modes (What could go wrong?)
• Failure causes (Why would the failure happen?)
  Failure effects (What would be the consequences of each failure?)
PROACTIVE!

- Teams use FMEA to evaluate processes for possible failures and to prevent them by correcting the processes proactively rather than reacting to adverse events after failures have occurred. This emphasis on prevention may reduce risk of harm to both patients and staff. FMEA is particularly useful in evaluating a new process prior to implementation and in assessing the impact of a proposed change to an existing process.
The core steps in FMEA …

Step 1: Select a process to evaluate
- Avoid picking a large process with many sub-processes
  Example: medication management, to many sub-components
  Subcomponents to focus on: ordering, fulfilling, administration

Step 2: Select multidisciplinary team
- Be sure to cover the range of the process with SMEs
- Consider a set of "fresh eyes"

Step 3: List all of the steps of the process
- May take several meetings
- Flow chart will help
- Gaining consensus is critical, team should be able to agree all the steps are represented.
The core steps in FMEA …

**Step 4:** For each step in the process, list all possible “failure modes”—that is, anything that could go wrong, including minor and rare problems. Then, for each failure mode listed, identify all possible causes.

A tool is typically used, the IHI has their own great version

<table>
<thead>
<tr>
<th></th>
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</tbody>
</table>

**Step 5:** The **RPN**, or “Risk Profile Number” is calculated by (Likelihood of Occurrence * Likelihood of Detection * Severity) (range 1 to 1000)
The core steps in FMEA …

Step 6: Set work priorities based on the RPN scores

**Remember:**

IF **Likelihood to Occur** = high
AND **Likelihood of detection** = high (10 = won’t detect)
AND **Severity** = high

Then: we have a process point likely to fail, probably won’t be detected AND will be severe (could cause harm!)

<table>
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<td></td>
</tr>
</tbody>
</table>
## Potential Failures

<table>
<thead>
<tr>
<th>Step</th>
<th>Preparation</th>
<th>A (Likelihood it will happen)</th>
<th>B (Likelihood we will not recognize problem)</th>
<th>C (likelihood it will adversely affect the event)</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>Agenda and format of day is finalized</td>
<td>Agenda and format of day is final, but submitted too late for appropriate logistical and training preparation (i.e., people creating agenda add in interactives that may require additional training for participants and/or faculty).</td>
<td>2</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>2)</td>
<td>Host registers all WebEx sessions</td>
<td>Host forgets to register a session(s)</td>
<td>1</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>3)</td>
<td>Host sets session preferences</td>
<td>Host chooses the display wrong display (i.e., Listed, Private, or Unlisted).</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Host does not select mute on entry</td>
<td>Host does not select mute on entry</td>
<td>3</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Host does not select correct teleconference service</td>
<td>Host does not select correct teleconference service</td>
<td>3</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>4)</td>
<td>Host sets time and date of each session</td>
<td>Host incorrectly sets date and time</td>
<td>3</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>WebEx sends host phone and passcode information for each session</td>
<td>E-mail from WebEx contains incorrect information</td>
<td>1</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>5)</td>
<td>Schedule with passcodes is crafted</td>
<td>Passcodes are listed incorrectly</td>
<td>3</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Dates/times are listed incorrectly</td>
<td>Dates/times are listed incorrectly</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Session numbers are listed incorrectly</td>
<td>Session numbers are listed incorrectly</td>
<td>3</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>6)</td>
<td>WebEx recorder begins recording session</td>
<td>WebEx recorder begins recording session</td>
<td>3</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

### 1) Schedule (with passcodes, technology requirements, connectivity testing, etc.) is posted to website

Information is posted incorrectly

A: 3, B: 5, C: 8, Total: 16

### 2) Schedule (with passcodes, technology requirements, connectivity testing, etc.) is sent to Campaign participants via blast e-mail

Information is posted incorrectly

A: 3, B: 5, C: 8, Total: 16

### 3) Reminders are sent out regarding connectivity testing, requirements, etc.

People delete emails, do not realize tech requirements until June 20

A: 4, B: 8, C: 2, Total: 14

### 4) Participants join connectivity testing

Information is incorrect

A: 3, B: 6, C: 3, Total: 12

### 5) Participants receive a confirmation screen that they have connected successfully

IHI staff hosting connectivity testing is late joining or forgets

A: 1, B: 1, C: 6, Total: 8

### 6) Any issues or problems at testing are resolved with WebEx

WebEx support isn't able to resolve their issue

A: 2, B: 7, C: 8, Total: 17

### 7) Any last minute information is posted to the web

Information is incorrect

A: 2, B: 4, C: 7, Total: 13
Tips on FMEA …

• Are you in root cause mode or FMEA mode?
• Make sure full SME representation at meetings.
• Aim for consensus on scores, not perfection
• Use a pre-existing tool such as the IHI one
• Be ready to act
• If the failure mode is likely to occur, work on the causes
• If the failure mode is unlikely to be detected, Identify other events that may occur prior to the failure mode and can serve as “flags” that the failure mode might happen.
• If the failure more is severe, Identify early warning signs that a failure mode has occurred, and train staff to recognize them for early intervention.
Understanding Variation
Tools to Understand Variation in Data

- Run Chart
  - Waiting Time for Clinic Visit
  - Distribution of Wait Times
  - Frequency Plot
  - Pareto Chart
- Shewhart Chart
  - Waiting Time for Clinic Visit
- Scatterplot
  - Relationship Between Long Waits and Capacity
The Run Chart is “the hammer” of the Improvement Coach

A Run Chart can be used to:

1. Make process performance visible

2. Determine if change an improvement

3. Determine if holding grain
We need data over time to show improvement on a measure that matters to the organization.

1. Improvement is the result of a change in the process.

2. Result is positive, relevant, meaningful ...

3. And gains are held ...

4. Cycle time
Run Chart: the tool we use to make sense of variation

**Benefits**

- Get those closet to the process to measure it in real time, to take ownership of the data
- Can use to test changes against
- Used to prove improvement, to prove success, to strengthen theory
- We provide you with a template to use, to save time
- They can also be a quick low tech solution, paper + ruler + pencil
- If you are a clinician … then “you got this”

**Steps**

1. Pick measure, grab graph paper, ruler and pencil (and SME!)
2. Draw X axis
3. Draw Y axis
4. Plot data
5. Find median
6. Apply the four run chart rules to test for non-random patterns
Let’s talk more about the median line and flipping coins …

And let’s also talk about the unit of time used on the x axis

The centerline (CL) on a Run Chart is the Median
The four rules to apply to a run chart

Four rules that indicate non-random pattern in a run chart

1. Shift
2. Trend
3. Too many or too few runs
4. Astronomical data point

Murray and Provost, 3 (11-15)
Rule one: the shift

Six or more consecutive POINTS either all above or all below the median. Skip values on the median and continue counting points. Values on the median DO NOT make or break a shift.
Rule two: the trend

5-7 points all going up or all going down. If the value of two or more successive points is the same, ignore one of the points when counting; like values do not make or break a trend.

Median = 11
To determine the number of runs: A run is a series of points in a row on one side of the median.

Are there too many, or too few, runs? Too little, or too much, variation?

Rule three: runs

- 10 Data points not on median
- Data line crosses once
- Too few runs: total 2 runs
<table>
<thead>
<tr>
<th>Total number of data points on the run chart that do not fall on the median</th>
<th>Lower limit for the number of runs (&lt; than this number of runs is “too few”)</th>
<th>Upper limit for the number of runs (&gt; than this number of runs is “too many”)</th>
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</table>

Table is based on about a 5% risk of failing the run test for random patterns of data.
21 points, 1 on median, 20 useful observations
Data line crosses median 18 times. 18 + 1 = 19. 19 runs.

20 useful observations and 19 runs

Rule three: too many runs
<table>
<thead>
<tr>
<th>Total number of data points on the run chart that do not fall on the median</th>
<th>Lower limit for the number of runs (&lt; than this number of runs is “too few”)</th>
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<tr>
<td>25</td>
<td>8</td>
<td>18</td>
</tr>
</tbody>
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Rule four: “the astro”

Blatantly obvious that value is unusual. SMEs mostly agree.
What Are Control Charts?

Control Charts

- Most sensitive tools for detecting special causes including successful change
Shewhart Control Chart

3-sigma control limits
Center line
Subgroup

Percent of Patients with Pressure Ulcers

Week
There are many types of control charts, which are appropriate for different types of data. Calculation methods are specific to the type of chart, but interpretation is the same for most chart types. You cannot create a valid control chart using a simple standard deviation calculation.
A Shewhart chart is a ‘special cause detector’ – a statistical display that helps you infer the presence of special causes in a process, beyond a reasonable doubt.

±3σ limits include 99.7% of common cause values!
**Special Cause**

±3σ limits include 99.7% of common cause values!

Upper control limit

Center: “best guess” value

Lower control limit

A single point outside the control limits is likely *NOT* generated by a stable process, but by some others set of causes.
A cluster of points far from the center line is relatively unlikely from a stable, normally-distributed process: Special Cause!
So are other non-random patterns. These too are evidence of special causes.
API Rules for Detecting Special Cause

- A single point outside the control limits
- Eight or more consecutive points above or below the centerline
- Six consecutive points increasing (trend up) or decreasing (trend down)
- Two out of three consecutive points near a control limit (outer one-third)
- Fifteen consecutive points close to the centerline (inner one-third)
Tests for Special Cause

- **Outside of limits:** A data point that falls outside the limits on the chart, either above the upper limit or below the lower limit.
- **Shift:** Eight or more consecutive POINTS either all above or all below the mean. Skip values on the mean and continue counting points. Values on the mean DO NOT make or break a shift.
- **Trend:** Six points all going up or all going down. If the value of two or more successive points is the same, ignore one of the points when counting; like values Do Not make or break a trend.
- **Two Out of Three:** Two out of three consecutive points in the outer third of the chart. The two out of three consecutive points can be on the same side, or on either side of the center line.
- **15 points Hugging the Centerline:** 15 consecutive points close to (within inner third of limits) centerline.
Testing a Change with a Shewhart Chart

1. Plot the baseline data & calculate limits

2. Extend the limits (centerline only for some charts)
Testing a Change with a Shewhart Chart

3. Plot new data using baseline limits (centerline)
   Apply decision rules for special cause

4. If change is confirmed, plot limits for new phase of process
Vilfredo Pareto (1848-1923) was an Italian engineer, sociologist, economist, political scientist and philosopher. He made important contributions to economics, particularly in the study of income distribution. He introduced the concept of Pareto efficiency and was the first to highlight that income often follows a distribution (now referred to as a Pareto distribution). The Pareto principle was named after him and built on observations that 80% of the land in Italy was owned by 20% of the people, used by Juran to demonstrate that 80% of the effects come from 20% of the causes.

2007: 1% of Americans own 35% of nation’s wealth; 20% owned 85%
**Pareto analysis**

**What is it?**
- A graphical display of the most important factors contributing to a problem
- Based on the Pareto principle: 80% of the effects come from 20% of the causes

**What can a Pareto chart do?**
- Allows identification of the elements contributing most to a problem (e.g., most common source of complaints, most common incidents of harm, aspects of care of most concern to service users)
- Identifies:
  - Frequency
  - Relative contribution to total problem
  - Which area to focus on for greatest impact
Reading the Pareto Diagram

- Frequency of occurrence
- Most frequently occurring reason for a med error
- This line indicates the cumulative percentage

Pareto Chart: Children taken to police cells under section 136

14/43 police forces accounted for 80% of cases

4567 incidents of children in police cells under 136

More than half children taken to cells under S136 last yr were in 4 police force areas
Vertical or Horizontal Pareto Charts?

CANTON HOSPITAL
Principle Diagnosis in Expired Patients

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Count</th>
<th>Percent</th>
</tr>
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<tbody>
<tr>
<td>PNEUMONIA, ORGANISM</td>
<td>486</td>
<td>12.57%</td>
</tr>
<tr>
<td>SEPTICEMIA NOS</td>
<td>038.9</td>
<td>12.04%</td>
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<tr>
<td>FOOD/VOMIT PNEUMONI</td>
<td>507.0</td>
<td>7.85%</td>
</tr>
<tr>
<td>CONGESTIVE HEART F</td>
<td>428.0</td>
<td>7.85%</td>
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<tr>
<td>ACUTE RESPIRATORY</td>
<td>518.81</td>
<td>5.24%</td>
</tr>
<tr>
<td>INTRACEREBRAL HEMORRH</td>
<td>431</td>
<td>4.19%</td>
</tr>
<tr>
<td>SECOND MALIG NEO L</td>
<td>197.7</td>
<td>3.66%</td>
</tr>
<tr>
<td>RUPT ABD AORTIC AN</td>
<td>441.3</td>
<td>3.66%</td>
</tr>
<tr>
<td>CEREBRAL ART OCCL</td>
<td>434.91</td>
<td>3.66%</td>
</tr>
<tr>
<td>CARDIAC ARREST</td>
<td>427.5</td>
<td>3.66%</td>
</tr>
<tr>
<td>SECOND MALIG NEO P</td>
<td>197.2</td>
<td>2.62%</td>
</tr>
<tr>
<td>INTESTINAL INFECT</td>
<td>008.45</td>
<td>2.62%</td>
</tr>
<tr>
<td>URIN TRACT INFECTI</td>
<td>599.0</td>
<td>2.09%</td>
</tr>
<tr>
<td>ACUTE RENAL FAILUR</td>
<td>584.9</td>
<td>2.09%</td>
</tr>
<tr>
<td>INTEST ADHES W OB</td>
<td>560.81</td>
<td>2.09%</td>
</tr>
<tr>
<td>AC VASC INSUFF INT</td>
<td>557.0</td>
<td>2.09%</td>
</tr>
<tr>
<td>SUBARBACHNOLD HEMORRH</td>
<td>430</td>
<td>2.09%</td>
</tr>
<tr>
<td>STAPHLOCOCCUS AUR</td>
<td>038.11</td>
<td>2.09%</td>
</tr>
<tr>
<td>SINGLE LIVEBORN</td>
<td>V30.00</td>
<td>1.57%</td>
</tr>
<tr>
<td>FX NECK OF FEMUR N</td>
<td>820.8</td>
<td>1.57%</td>
</tr>
<tr>
<td>INTERTROCHANTERIC</td>
<td>820.21</td>
<td>1.57%</td>
</tr>
<tr>
<td>FX FEMUR INTRACAPS</td>
<td>820.09</td>
<td>1.57%</td>
</tr>
<tr>
<td>ALCOHOL CIRRHOSIS</td>
<td>571.2</td>
<td>1.57%</td>
</tr>
<tr>
<td>OTHER PULMONARY I</td>
<td>518.82</td>
<td>1.57%</td>
</tr>
<tr>
<td>CORONARY AHEROSC</td>
<td>414.01</td>
<td>1.57%</td>
</tr>
</tbody>
</table>

Other: 12 (6.28%)
## Pareto Example:
### ADEs by Medication Type and Location

<table>
<thead>
<tr>
<th></th>
<th>Medication</th>
<th>Surgical</th>
<th>Medicine</th>
<th>ICU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>A</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Dig</td>
<td>228</td>
<td>143</td>
<td>200</td>
</tr>
<tr>
<td>3</td>
<td>Hep</td>
<td>203</td>
<td>324</td>
<td>284</td>
</tr>
<tr>
<td>4</td>
<td>MorS</td>
<td>165</td>
<td>103</td>
<td>144</td>
</tr>
<tr>
<td>5</td>
<td>PotC</td>
<td>83</td>
<td>53</td>
<td>73</td>
</tr>
<tr>
<td>6</td>
<td>Insulin</td>
<td>160</td>
<td>100</td>
<td>140</td>
</tr>
<tr>
<td>7</td>
<td>War</td>
<td>194</td>
<td>121</td>
<td>170</td>
</tr>
<tr>
<td>8</td>
<td>Lov</td>
<td>45</td>
<td>28</td>
<td>39</td>
</tr>
<tr>
<td>9</td>
<td>Amp/P</td>
<td>27</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>10</td>
<td>Con</td>
<td>22</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>11</td>
<td>Cycl</td>
<td>19</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>12</td>
<td>Albt</td>
<td>14</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>13</td>
<td>MorS</td>
<td>12</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>14</td>
<td>Cef/T</td>
<td>12</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>15</td>
<td>Ben/P</td>
<td>11</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>16</td>
<td>Roc</td>
<td>10</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>17</td>
<td>Other</td>
<td>364</td>
<td>228</td>
<td>319</td>
</tr>
</tbody>
</table>
Pareto of Total ADEs

Medications Associated with Harmful Adverse Drug Event (ADE)

Total Counts
4228.90

Percent
5%
10%
15%
20%

Other Hep Dig War MorS Insulin PotC Lov Amp/P Con Cycl Albt Cef/T Ben/P Roc
## Use of Stratification with Pareto

### Medications Associated with Harmful Adverse Drug Event (ADE)

#### Total Counts

- **Total ADEs**: 4228.90
- **Surgical ADEs**: 1569.60
- **Medicine ADEs**: 1179.50
- **ICU ADEs**: 1479.80

#### Percentages

<table>
<thead>
<tr>
<th>Medication</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>112.60</td>
<td>2.65%</td>
</tr>
<tr>
<td>Hep</td>
<td>112.60</td>
<td>2.65%</td>
</tr>
<tr>
<td>Dig</td>
<td>87.90</td>
<td>2.06%</td>
</tr>
<tr>
<td>War</td>
<td>45.00</td>
<td>1.07%</td>
</tr>
<tr>
<td>MorS</td>
<td>45.00</td>
<td>1.07%</td>
</tr>
<tr>
<td>Insulin</td>
<td>39.20</td>
<td>0.92%</td>
</tr>
<tr>
<td>PotC</td>
<td>28.00</td>
<td>0.66%</td>
</tr>
<tr>
<td>Lov</td>
<td>23.45</td>
<td>0.55%</td>
</tr>
<tr>
<td>Amp/P</td>
<td>19.25</td>
<td>0.45%</td>
</tr>
<tr>
<td>Con</td>
<td>16.80</td>
<td>0.39%</td>
</tr>
<tr>
<td>Cycl</td>
<td>12.60</td>
<td>0.29%</td>
</tr>
<tr>
<td>Albt</td>
<td>9.80</td>
<td>0.22%</td>
</tr>
<tr>
<td>Cef/T</td>
<td>9.80</td>
<td>0.22%</td>
</tr>
<tr>
<td>Ben/P</td>
<td>9.80</td>
<td>0.22%</td>
</tr>
<tr>
<td>Roc</td>
<td>9.80</td>
<td>0.22%</td>
</tr>
</tbody>
</table>

#### Other Medications

- **Other**: 910.00 (21.52%)
- **Hep**: 811.20 (19.18%)
- **Dig**: 570.50 (13.49%)
- **War**: 484.75 (11.46%)
- **MorS**: 441.85 (10.45%)
- **Insulin**: 399.65 (9.45%)
- **PotC**: 209.15 (4.95%)
- **Lov**: 112.20 (2.65%)
- **Amp/P**: 67.20 (1.59%)
- **Con**: 55.00 (1.30%)
- **Cycl**: 55.00 (1.30%)
- **Albt**: 47.80 (1.13%)
- **Cef/T**: 47.80 (1.13%)
- **Ben/P**: 35.60 (0.84%)
- **Roc**: 35.60 (0.84%)

### Charts

- **Total ADEs**
- **Surgical ADEs**
- **Medicine ADEs**
- **ICU ADEs**
Services with the highest number of falls between April 2014 – May 2015

Falls by Service MHCOP and CHN 2014 - 2015
Wikipedia: A **histogram** is a graphical representation of the **distribution** of numerical data. It is an estimate of the **probability distribution** of a **continuous variable** (quantitative variable) and was first introduced by **Karl Pearson**.

This tool allows me to see the shape, distribution and layout of the data.
Comparison of Averages and Histograms

Group A: % Monthly CABG Mortality (Ave 3.48%)

Group B: % Monthly CABG Mortality (Ave 3.48%)

Group C: % Monthly CABG Mortality (Ave 3.48%)

Based on these histograms and the average percent mortality (3.48% for each medical group) which one would you select to perform the procedure?
Comparison of Averages, Histograms and Run Charts

Group A: % Monthly CABG Mortality (Ave 3.48%)
- Histogram: Average = 3.48%
- Line graph: Average cost = $17,000

Group B: % Monthly CABG Mortality (Ave 3.48%)
- Histogram: Average = 3.48%
- Line graph: Average cost = $13,000

Group C: % Monthly CABG Mortality (Ave 3.48%)
- Histogram: Average = 3.48%
- Line graph: Average cost = $14,500
Understanding Relationships
What is a Scatter Plot?

- A scatter plot is a graphic representation of the association between two variables (X and Y)
- It is a dot plot of paired data
- Which helps to test the direction and strength of possible relationships
- Also known as Scatter Diagram, or X-Y Graph
When do you use a Scatter Plot?

- Use to test hunches and theories about relationships
- In improvement work they can help us
  1. Select and focus improvement projects
  2. Verify relationship of process and outcome measures
  3. Target areas for change
Direction of the Relationship
Positive or Negative

- Positive relationship > upward slope > as X increases Y increases
- Negative relationship > downward slope > as X increases Y decreases
- No relationship > no slope up or down

Independent Variable X ↔ Y Dependent Variable

- **Positive Relationship**
  - X = Ave. Temp.
  - Y = Electric Bill

- **Negative Relationship**
  - X = Weight of Car
  - Y = Miles per Gallon

- **No Relationship**
  - X = Shoe Size
  - Y = IQ Test Score
Strength of the Relationship
Strong or Weak

Strong relationship  > tight clustering of dots
Mild or Weak relationship  > loose clustering of dots
More Complex Non Linear Scatter Plots

Examples of Curvilinear & Quadratic (Parabola) Scatter Plots

Stopping Distance by Speed

Reading Score by Hours of Sleep

Fuel Used by Speed

Storing Distance by Speed: http://athometuition.com/modelling-bivariate.aspx
Anxiety and Performance: https://webcourses.ucf.edu/courses/950845/pages/the-correlational-research-strategy/
Fuel Used by Speed: http://bolt.mph.ufl.edu/6050-6052/unit-1/case-q-qlinear-relationships/
How to Construct a Scatter Plot

Gather paired data from the same observation unit (time, person, place, thing)

By hand = scale and label x and y axis, plot dot of intersection for each paired valued, circle duplicates

By Excel = Highlight data > Insert Tab > Select Scatter Plot

<table>
<thead>
<tr>
<th>Date</th>
<th>X # Patients Late</th>
<th>Y Ave. Waiting Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Apr</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>5-Apr</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>6-Apr</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>7-Apr</td>
<td>6</td>
<td>29</td>
</tr>
<tr>
<td>8-Apr</td>
<td>6</td>
<td>32</td>
</tr>
<tr>
<td>11-Apr</td>
<td>6</td>
<td>36</td>
</tr>
<tr>
<td>12-Apr</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>13-Apr</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>14-Apr</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>15-Apr</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>18-Apr</td>
<td>5</td>
<td>30</td>
</tr>
</tbody>
</table>
Trend lines can be added...

Eyeball Method = draw line in middle of dots (half above, half below)
Excel = Grab Graph > Layout Tab > Select Trendline.

Source: Phyllis M. Virgil
Finding: Fairly Strong negative relationship between wait time and patient satisfaction.

Conclusion: Working on decreasing wait time makes sense.

Source: Phyllis M. Virgil
Use after C/E Brainstorming
To Confirm Change Ideas Before Testing

Finding: Fairly Strong positive relationship between wait time and # of patient late.

Conclusion: Testing change ideas aimed reducing # late patients makes sense.

C/E Image Credit: https://www.nursingtimes.net/Journals/2013/04/12/k/x/z/Using-fishbone-analysis-to-investigate-problems-160413.pdf
Content Source: Phyllis M. Virgil
Beware of Spurious (false) Scatter Plots

Spurious scatter plot is often a result of a third factor that is not apparent at the time of examination. Spurious comes from the Latin word spurious, which means illegitimate or false.

Study shows killers love ice cream!

Conclusion: Think before you believe.
Scatter Plots are about relationships!

They help you:

Understand relationships

Understand the direction and strength of the relationships

Scatter plots do not prove anything!

Rather they provide “evidence”
Correlation Coefficient and Regression Lines

More advanced applications of the Scatter Plot include the use of correlation coefficients (R) and regression lines:

- **R** indicates how closely observed values fall around regression line – both the clustering about line & direction of association.
- **R** standardizes the degree of association, regardless of units of measurement.
- Ranges between -1 and 1.
- Direction of the relationship indicated by a + or -
  - Positive r = positive relationship
  - Negative r = negative relationship
  - 0 = no relationship
- General guide for interpreting strength of the relationship **R** (absolute value)
  - 0 - .2 = weak, slight
  - .2 - .4 = mild
  - .4 - .6 = moderate
  - .6 - .8 = strong
  - .8 - 1.0 = very strong
- In Excel select graph > Layout Tab > Trendline > More Options > Display R squared value on chart
Review of Scatter Plot Pattern Patterns

- **Strong Positive Relationship**
- **Weak Positive Relationship**
- **No Relationship Scattered**
- **Quadratic Relationship**
- **Strong Negative Relationship**
- **Weak Negative Relationship**
- **No Relationship Horizontal Cluster**
- **Curvilinear Relationship**

Team Decision Making Tools
Decision Making as a Process

No or Few ideas

Brainstorming

Nominal Group Technique

Divergent Thinking

Increasing Ideas

Affinity Diagram

Convergent Thinking

Reducing Ideas

Structured Discussion

Multi-voting

Rank ordering

Many Ideas

Few Ideas > One

Adapted from Executive Learning Inc. Team Training Materials.
Flip Charts for Decision Making

Creating the Chart:

1. Divide chart into three basic sections.
2. Write objective of decision process at the top.
3. Record Brainstorm or Nominal Group responses in the center section of the flipchart (here).
4. Leave room to place an identifying letter (A-Z) next to each idea.
5. On the Multi-Vote side leave enough room (6-7 inches) to tally individual votes.
6. On the Rank Order side, draw enough columns for each member of the team who will vote, plus 1 for totaling.

Source: Phyllis M. Virgil
Brainstorming

Structured
1. Agree on the topic and objective of brainstorming session.
2. Each team member in turn gives an idea without comment.
3. No ideas are criticized. Ever!
4. Write each idea on a flipchart.
5. Keep going around till all ideas are presented. Passing is permitted.
6. When everyone is passing the idea generating part is over.
7. Review list for clarity, differentiate similar ideas, eliminate only exact duplicates.
8. Individuals can clarify what their idea is but there is no rationalizing.

Unstructured— is the same process as the structured brainstorming but the ideas are given by all team members at any time. There is no need to pass because ideas are not recorded in any order.

Adapted From Seven Step Meeting Process and Tools, Executive Learning Inc. Team Training Materials, 2002
Nominal Group Technique (NGT)

1. Agree on the topic and objective of brainstorming session.

2. Each member of the team is given a pile of sticky notes and time to think about ideas and is asked to write one idea on per sticky note.

3. Usually about 5-10 minutes is sufficient to get their ideas down.

4. The sticky notes are placed on a flipchart when they are done. Or members can post and tell their ideas in turn until are all posted.

5. Alternatively, participants can list ideas on a piece of paper, and then call out ideas in turn to be recorded on a flip chart, similar to Brainstorming.

6. Review, clarify and differentiation similar ideas. Elimination only exact duplicates.

➢ The advantage to NGT over brainstorming is that members are given some time to think about and write down their idea.

➢ An advantage to the collective posting method is that persons do not feel pressured to have an idea, or embarrassed if they have to pass for lack of ideas.

Adapted From Seven Step Meeting Process and Tools, Executive Learning Inc. Team Training Materials.
Multi-Vote

Used to reduce a long list of ideas (11 and up) to a manageable number (5-10).

1. Agree on the criteria (1-3 guidelines) against which ideas are tested.

2. Identify each idea on the list with a letter of the alphabet.

3. Decide on how many ideas you want members to vote on. This is usually 20-25% of the list. For example pick 4 for a list of 20, 6 for a list of 30, etc.

4. Give the participants sticky dots. Members place dots on top ideas. Only one dot per idea. All dots must be used.

5. Alternatively hash marks can be placed next to ideas by the recorder as members identify votes in alphabetical order.

6. Look at the voting results. The 5-10 ideas with the most votes are the ones you can take to Rank Ordering.

7. If you still have a lot of ideas that get only a few votes (say 15-20) you can do another round of MV to reduce the initial set of ideas.

Adapted from Seven Step Meeting Process and Tools, Executive Learning Inc. Team Training Materials.
Rank Order

Use to reduce a list of 10 or less, to the vital few ideas for further discussion.

1. Assign a letter to each idea (not numbers).
2. Agree on the criteria (1-3 guidelines) against which ideas are tested.
3. Lay out a RO table. If necessary tape several flipchart pages together.
4. The rows are the letters assigned to each of the ideas.
5. The columns are the initials of the team members. The far right column is the “total” column.
6. Members individually list the identifying letters on paper and indicate the rank of each idea next to the letter, with “1” being the first choice, “2” the second choice, etc. Members must rank all of the ideas on the list.
7. Members take turns calling out their rankings in alphabetical order (B1, C3, A5, etc).
8. The rankings are recorded and summed for a total per item on a Rank Order chart.
9. The team analyzes the ranking, looking both at the total for each idea, as well as individual votes. If considerable disagreement among members exists, a second ranking may be carried out.

Adapted From Seven Step Meeting Process and Tools, Executive Learning Inc. Team Training Materials.
Structured Discussion

Used to discuss the vital few ideas to arrive at a consensus decision which all members can live with.

1. Agree on the criteria (1-3 guidelines) against which ideas are tested.
2. In a round robin fashion members state their position and rationale without interruption.
3. The recorder notes positions and key points on the flipchart.
4. This is not a debate so each person presents their views without rebuttal or debate.
5. When everyone has had a chance to present their views the notes are reviewed and questions or additional thoughts are discussed. Open discussion and debate is held. Points of agreement are summarized.
6. If consensus cannot be reached another round is held (steps 2-5).

Note: Structured Discussion can be used with only one topic as a means to flush out positions and rationales.

Adapted From Seven Step Meeting Process and Tools, Executive Learning Inc. Team Training Materials.
Planning
PDSA PLANNING AND TRACKING FORM

Cycle # ___ START DATE ______   END DATE ______
Owner: ______________________________
Change to be evaluated ______________________________
Objective for this PDSA Cycle: __________________________

What question(s) do we want to answer with this PDSA cycle? (Match with your predictions below!)
1. 
2. 
3. 

Plan:
Plan to answer questions (test the change or evaluate the idea): What, Who, When, Where

Plan for collection of data needed to answer questions: What, Who, When, Where

Predictions (For each question listed above, what will happen when plan is carried out? Discuss theories):

Do: Carry out the plan; document problems and unexpected observations; collect data and begin analysis.

Study: Complete analysis of data; what were the answers to the questions in the plan (compare to predictions)? Summarize what was learned.

Act: What changes are to be made? Plan for the next cycle.
### PDSA Planning Sheet

<table>
<thead>
<tr>
<th>Change Idea</th>
<th>May</th>
<th>June</th>
<th>July</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 11 18 25</td>
<td>1 8 15 22 29</td>
<td>6 13 20 27</td>
</tr>
</tbody>
</table>
## Team Member Planning Matrix

<table>
<thead>
<tr>
<th>Skills, Knowledge Function, Role</th>
<th>Bob</th>
<th>Sam</th>
<th>Pat</th>
<th>Tom</th>
<th>Sue</th>
<th>Bob</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Process Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>➢ QI Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>➢ Owner</td>
<td></td>
<td></td>
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<tr>
<td>➢ Technical Expertise</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>➢ Management</td>
<td></td>
<td></td>
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<tr>
<td>➢ Supplier ?</td>
<td></td>
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<tr>
<td>➢ Customer?</td>
<td></td>
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<tr>
<td>➢ Front Line/Point of Service</td>
<td></td>
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<tr>
<td>➢ etc...</td>
<td></td>
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</tr>
</tbody>
</table>
Plan for Dissemination of Knowledge

**PURPOSE:** Provide the information and resources to achieve effective and efficient communication relating to improvement initiatives.

<table>
<thead>
<tr>
<th>Who needs to get the message?</th>
<th>Content of Message</th>
<th>Proposed Format</th>
<th>Dissemination Method</th>
<th>Frequency</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
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Seven Step Meeting Process

- **Step 1- Clarify Objectives** Ensure that all understand and are in agreement

- **Step 2- Review Roles**

  Review who will be timekeeper, recorder, leader, and facilitator. Decide at what intervals feedback on time will be given.

- **Step 3- Review Agenda**

  Review details of agenda items listed under step 4. Ensure that all team members understand and are in agreement with the agenda items. Check if there are additional agenda items to add.

- **Step 4- Work Through Agenda Items**

  Content of Meeting (What, How, Who, When

- **Step 5- Review Meeting Record**

  Review the flipchart record on the walls but do not read all charts. Look for changes and additions. Decide which charts should be kept and which should be discarded.

- **Step 6- Plan Next Steps and Next Meeting Agenda**

  Decide who will do what before the next meeting. Decide what the objectives and agenda items will be for the next meeting.

- **Step 7- Evaluate Meeting**

  What did the team do well that it should continue doing? What could the team do differently to improve the meeting, group, and continual improvement process.

From Seven Step Meeting Process and Tools, Executive Learning Inc. Team Training Materials.
# Seven Step Meeting Agenda

1. Clarify Objective:  
2. Review Roles: Leader: Facilitator: Recorder: Timekeeper:  
3. Review Agenda  
4. Work through agenda  

<table>
<thead>
<tr>
<th>Topic (What/Why)</th>
<th>Tool or Method (How/Who)</th>
<th>Time (min.)</th>
</tr>
</thead>
<tbody>
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5. Review Meeting Record  
6. Plan Next Steps  
7. Evaluate

- **Total Time:** 10 Min.
Project Management
Frontload the work: Project set-up checklist

Aim
- Understand performance of current system
- Draft aim
- Create numeric theory for reaching aim

Measures
- Develop initial measures
- Test measurement strategy
- Collect baseline
- Finalize measurement strategy
- Create data collection plan
- Begin collecting data
- Set-up run charts to make plotting data easy

Testing
- Develop schedule for testing
- Run initial PDSAs
- Identify next PDSAs

Other
- Schedule retreat
- Set-up team meetings
- Set-up meetings with executive sponsor
- Develop system to track and record information
- Communicate about efforts with key stakeholders

Changes
- Understand how the current system works (e.g., observation, process flow)
- Conduct internal/external information gathering (e.g., interview key stakeholders)
- Develop driver diagram
- Identify high-leverage PDSA ramps
- Develop a set of change ideas to begin testing by 10/23
Create and Keep Pace: Work plan template

<table>
<thead>
<tr>
<th>Task</th>
<th>By When?</th>
<th>Description</th>
<th>Status*</th>
<th>Who?</th>
<th>Notes</th>
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</thead>
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</tbody>
</table>

* Status is: Not Started, Started, Underway, Complete
<table>
<thead>
<tr>
<th>Project Progress Score</th>
<th>Predicted Date / Actual Date</th>
<th>Operational Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 - Intent to participate</td>
<td></td>
<td>Project has been identified, but the charter* has not been completed nor team formed.</td>
</tr>
<tr>
<td>1.0 - Charter and team established</td>
<td></td>
<td>A charter has been completed and reviewed. Individuals or teams have been assigned, but no work has been accomplished.</td>
</tr>
<tr>
<td>1.5 - Planning for the project has begun</td>
<td></td>
<td>Organization of project structure has begun (e.g., identified what resources or other support will likely be needed, identified where we will focus first, gathered tools/materials, developed a meeting schedule).</td>
</tr>
<tr>
<td>2.0 - Activity, but no changes</td>
<td></td>
<td>Initial cycles for team learning have begun (e.g., project planning, measurement, data collection, obtaining baseline data, study of processes, surveys, etc.). At least one project measure has been defined and plans made to collect data to demonstrate improvement. Team has described how much improvement they expect by February 29, 2016.</td>
</tr>
<tr>
<td>2.5 - Changes tested, but no improvement</td>
<td></td>
<td>One or more PDSA cycles for testing changes have begun. Cycles must meet at minimum the 4 + Prediction** criteria for a PDSA. Data for at least one project measure is displayed in a graph or table with target included.</td>
</tr>
<tr>
<td>3.0 - Modest improvement</td>
<td></td>
<td>Successful tests of change have been completed for at least three changes. Some small scale implementation has been done. Anecdotal evidence of improvement exists. Expected results are 20% complete. See Note 1 below.</td>
</tr>
<tr>
<td>3.5 - Improvement</td>
<td></td>
<td>Testing and implementation continue and additional improvement in project measure(s) towards goal(s) is seen.</td>
</tr>
<tr>
<td>4.0 - Significant improvement</td>
<td></td>
<td>Expected results achieved for major subsystems. Implementation (e.g., training, communication, etc.) has begun for the project. Project goals are 50% or more complete. See Note 2 below.</td>
</tr>
<tr>
<td>4.5 - Sustainable improvement</td>
<td></td>
<td>Data on key measures begin to indicate sustainability of impact of changes implemented in system.</td>
</tr>
<tr>
<td>5.0 - Outstanding sustainable results</td>
<td></td>
<td>Implementation cycles have been completed and all project goals and expected results have been accomplished. Organizational changes have been made to accommodate improvements and to make the project changes permanent.</td>
</tr>
</tbody>
</table>
Make it easy: “We Would” worksheet

- We don’t/can’t ____________________________
  - Reframe: We would ____________________________ if...
    - …______________________________________
    - …______________________________________
    - …______________________________________
    - …______________________________________

- We don’t/can’t ____________________________
  - Reframe: We would ____________________________ if...
    - …______________________________________
    - …______________________________________
    - …______________________________________
## Build a big tent: Stakeholder analysis

<table>
<thead>
<tr>
<th>Group Name</th>
<th>Stop?</th>
<th>Let?</th>
<th>Help?</th>
<th>Make?</th>
<th>What Matters to Them Related to [Improvement]?</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAMPLE Night Nurses</td>
<td>X</td>
<td>O</td>
<td></td>
<td></td>
<td>Patients’ safety and ensuring they are able to quickly spot and address deterioration</td>
</tr>
</tbody>
</table>

X = Where I think they are now  
O = Where I need them to be for this work to be successful
Change Concepts and Ideas
Using change concepts

Change concept = A general notion or approach found to be helpful in developing specific change ideas that result in improvement

See:
- *The Improvement Guide*, page 132, for a list of 72 change concepts; Appendix A provides detail on each
- IHI Improvement App
Complete List of Change Concepts

Eliminate Waste
1. Eliminate things that are not used
2. Eliminate multiple entry
3. Reduce or eliminate overkill
4. Reduce controls on the system
5. Recycle or reuse
6. Use substitution
7. Reduce classifications
8. Remove intermediaries
9. Match the amount to the need
10. Use Sampling
11. Change targets or set points

Improve Work Flow
12. Synchronize
13. Schedule into multiple processes
14. Minimize handoffs
15. Move steps in the process close together
16. Find and remove bottlenecks
17. Use automation
18. Smooth workflow
19. Do tasks in parallel
20. Consider people as in the same system
21. Use multiple processing units
22. Adjust to peak demand

Optimize Inventory
23. Match inventory to predicted demand
24. Use pull systems
25. Reduce choice of features
26. Reduce multiple brands of the same item

Change the Work Environment
27. Give people access to information
28. Use proper measurements
29. Take care of basics
30. Reduce de-motivating aspects of pay system
31. Conduct training
32. Implement cross-training
33. Invest more resources in improvement
34. Focus on core process and purpose
35. Share risks
36. Emphasize natural and logical consequences
37. Develop alliances/cooperative relationships

Enhance the Producer/customer relationship
38. Listen to customers
39. Coach customer to use product/service
40. Focus on the outcome to a customer
41. Use a coordinator
42. Reach agreement on expectations
43. Outsource for “Free”
44. Optimize level of inspection
45. Work with suppliers

Manage Variation
51. Standardization (Create a Formal Process)
52. Stop tampering
53. Develop operation definitions
54. Improve predictions
55. Develop contingency plans
56. Sort product into grades
57. Desensitize
58. Exploit variation

Design Systems to avoid mistakes
59. Use reminders
60. Use differentiation
61. Use constraints
62. Use affordances

Focus on the product or service
63. Mass customize
64. Offer product/service anytime
65. Offer product/service anyplace
66. Emphasize intangibles
67. Influence or take advantage of fashion trends
68. Reduce the number of components
69. Disguise defects or problems
70. Differentiate product using quality dimensions

Manage Time
46. Reduce setup or startup time
47. Set up timing to use discounts
48. Optimize maintenance
49. Extend specialist’s time
50. Reduce wait time
Change concepts tips

• Concepts themselves are not ready to be directly applied to making improvements
  – Considered within a specific context and turned into a change idea

• Alternatively, you can:
  – Observe a specific idea in another context (e.g., when benchmarking)
  – Extract the concept behind the idea, and then
  – Apply the concept to your context and create a new idea that is potentially useful for improvement of your process or system

• You can use change concepts (purposefully or randomly chosen) to provoke new thinking – creative thinking!
Change concepts vs. change ideas

Vague, strategic, creative

Specific, actionable, results

Improve process to reduce anxiety

Give patients and families access to information (#27)

Use beepers for family and friends waiting

Make beepers available to families of all surgery patients for one day next week as first test of change

Taking a concept and getting to actionable (testable) ideas
Change idea

Something specific enough to test and implement in a particular situation – an actual change to the current process

- Properties of a useful change idea:
  - **Specific**: Can you describe what will happen when the idea is used? Can you describe who, what, when, where, why, and how the idea will be put into practice?
  - **Actionable/Feasible**: Can you envision using the idea with current technology, resources, and authority?

- You learn about specifics and feasibility of change ideas through Plan-Do-Study-Act (PDSA) test cycles
Worksheet: Developing ideas for change

Work Area or Project: ________________________________

<table>
<thead>
<tr>
<th>Change concept (w/#)/ root cause/ opportunity</th>
<th>Specific ideas to test</th>
<th>Theories and predictions as to how or why this idea will achieve the aim</th>
</tr>
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<tbody>
<tr>
<td>Example: Minimize interruptions – use visual cues</td>
<td>Wear scarf on Tuesday</td>
<td>By using the visual cue of a scarf, other staff will know not to interrupt Susan during medication delivery…</td>
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Six Thinking Hats
Simple Rules

1. Think with the **same hat at same time**
2. Keep your thinking on the hat in use
3. Use short bursts of thinking (3-5 minute rounds)
4. Extend the time if the thinking is flowing and on one color, do so explicitly and in small increments.
5. No in-depth discussion, use rapid round robin
6. Use a focused and simple sequence of hats (I will do this for you today)
7. View thinking as a skill
Blue Hat Thinking

- Controls the thinking process
- Organizes the thinking
- Sets the focus and agenda
- Calls for a different hat
- Ensures the rules are followed
- Summarizes & concludes

Blue Hat: Process Control and Focus
White Hat Thinking

DATA AND INFORMATION

- What information do we have?
- What information is missing?
- What information would we like?
- How are we going to get the information?

White Hat: Information and Facts
Green Hat Thinking

CREATIVE ASPECTS

- What new ideas do we have?
- Are there alternatives?
- Could we do this in a different way?
- Could there be another explanation?

(no rationale needed, wild ideas ok)

Green Hat: Ideas, Possibilities, Alternatives
Yellow Hat Thinking

POSITIVE ASPECTS
- What are the benefits?
- What are positive things?
- What is the value in the idea?

(Reasons must be given: logic, experience, data)

Yellow Hat: Logical, Positive, Benefits
NEGATIVE ASPECTS

- What are the risks, faults, problems of the idea?
- What are weaknesses?
- Why can we not do that?
- What does not fit the facts?
- Why will it not work

(Reasons must be given: logic, experience, data)
EMOTIONAL ASPECTS

- How do you feel about this project?
- What is your gut telling you?
- Why are you uneasy about the way it is being done?
- What does your hunch, intuition or sense tell you?

(No reasons or justifications)

Red Hat: Feelings, Intuition, Emotions