QI BASICS:

*With Deming Dictums*

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4th Friday Series
• I have no conflicts of interest, financial or otherwise.
• I have nothing to disclose.
QI Basics

• QI v Performance v Research
• Required improvement components
• Aim statement components
• 3 types of measures
• Use of run chart
• PDSAs
• Types of changes that result in improvement
• Implementation
"Your system is perfectly designed to give you the results you’re getting."

- W.E. Deming
“85% of the reasons for failure to meet customer expectations are related to deficiencies in systems and processes… rather than the employee”
<table>
<thead>
<tr>
<th>Aspect</th>
<th>Improvement</th>
<th>Accountability</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aim</strong></td>
<td>Improvement of care (efficiency &amp; effectiveness)</td>
<td>Comparison, choice, reassurance, motivation for change</td>
<td>New knowledge (efficacy)</td>
</tr>
<tr>
<td><strong>Methods:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Test Observability</td>
<td>Test observable</td>
<td>No test, evaluate current performance</td>
<td>Test blinded or controlled</td>
</tr>
<tr>
<td>- Bias</td>
<td>Accept consistent bias</td>
<td>Measure and adjust to reduce bias</td>
<td>Design to eliminate bias</td>
</tr>
<tr>
<td>- Sample Size</td>
<td>“Just enough” data, small sequential samples</td>
<td>Obtain 100% of available, relevant data</td>
<td>“Just in case” data</td>
</tr>
<tr>
<td>- Flexibility of Hypothesis</td>
<td>Flexible hypotheses, changes as learning takes place</td>
<td>No hypothesis</td>
<td>Fixed hypothesis (null hypothesis)</td>
</tr>
<tr>
<td>- Testing Strategy</td>
<td>Sequential tests</td>
<td>No tests</td>
<td>One large test</td>
</tr>
<tr>
<td>- Determining if a change is an improvement</td>
<td>Run charts or Shewhart control charts (statistical process control)</td>
<td>No change focus (maybe compute a percent change or rank order the results)</td>
<td>Hypothesis, statistical tests (t-test, F-test, chi square), p-values</td>
</tr>
<tr>
<td>- Confidentiality of the data</td>
<td>Data used only by those involved with improvement</td>
<td>Data available for public consumption and review</td>
<td>Research subjects’ identities protected</td>
</tr>
</tbody>
</table>

Improvement Components
MODEL FOR IMPROVEMENT

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?
What to Accomplish? = Aim Statement

- Describes what team is trying to do
- Creates shared vision
- Provides basis for developing the rest of the project
- Empowers individuals to change systems
- Clarifies magnitude and timeframe for improvement
Take Home - S.M.A.R.T Aim

• SPECIFIC The aim is well-defined and clear, and has a better chance of being reached than a general aim.
  – Who are the target population and the persons doing the activity?
  – What is the action or activity?
• MEASURABLE Objectives should have a benchmark and target, to help determine when objectives are achieved.
  – How much change are you expecting to see?
  – Will there be an increase or decrease?
  – How can you measure it?
• ACHIEVABLE The aim is something that can actually be reached.
  – Can it be done?
  – Is your measure realistic?
  – Can you accomplish it in the timeframe identified?
  – Do you have the resources?
• RELEVANT The aim is relevant to your program’s mission, vision, and goals, and is agreed-upon by stakeholders.
  – Does the action relate to what you want to accomplish?
  – Is it important and meaningful?
  – Does it relate to broader program or organizational goals?
• TIMELY The aim has a set time-frame to be met.
  – What is the timeline for change?
  – When will this be accomplished? Months? Days? Years?
Adolescent Depression

- Lifetime prevalence of MDE among adolescents is 20%. MDE is associated with increased risk of death by suicide, as well as with early pregnancy and decreased school performance.

- The Primary Care Clinic (PCC) is a pediatric resident clinic and, although recommended by the American Academy of Pediatrics, does not currently screen or treat adolescent depression.

- Primary care preventive care visits for adolescents present an opportunity to screen for depression and, if positive, develop a follow up plan.
Aim statement

• **What** do you want to happen
• For **whom**: target population
• By **when**: deadline when aim achieved
• How **much**: measurable goals

We will increase the percentage of clinic patients 12-18 years of age appropriately screened for adolescent depression* at well child visits from 0% to 90% by June 1, 2017

 Appropriately screened depression:
 1. Screen tool completed and scored
 2. If positive, follow up documented
Decrease infant mortality by educating pregnant women about safe sleep by December 2017

• **What**
  – Decrease infant mortality by educating about safe sleep

• **Whom**
  – pregnant women

• **By When**
  – December 2017

• **How Much**
  – ?
By December 2018, increase by 20% over 2016 levels the proportion of children age 5 or under receiving vision screening in Alabama

• **What**
  – increase the proportion of children receiving vision screening

• **Whom**
  – children age 5 or under

• **How much**
  – increase by 20% over 2016 levels

• **When**
  – By December 2018
How will we know if change is improvement? = Data
“Without data you’re just another person with an opinion”

- W. Edwards Deming
Just because you can measure everything doesn't mean that you should.

- W. Edwards Deming
How will we know if change is improvement? = Data

• Measures
  – Guidelines
  – Operational Definition
  – Measure Types

• Run Charts
  – Shifts/trends
  – Take Home Run Chart

• Interpreting Data
  – Variation
Guidelines for Measure Development

• Mix of measures types
• Useful
• Easy collection
• Collect frequently
• Operational definition
• Need useful variation to guide improvement
• Use existing measures
NIPN Measures

• Adolescent and Young Adult Health
• Healthy Weight (Obesity)
• Asthma

http://www.med.uvm.edu/nipn/resources
Operational Definition

MEASUREMENT:
• Description, Rationale and Evidence
• Population - Inclusions/Exclusions
• Data - Source, Frequency, Format – manual or EHR
• Reporting – chart type, how often, where - especially after ‘project’
• Revision History
Measure Types

- Outcome – the ‘what’
- Process – the ‘how’
- Balancing – improvement in one area doesn’t impact another
- All or None – all steps must be present to get ‘credit’
WE SHOULD WORK ON OUR PROCESS, NOT THE OUTCOME OF OUR PROCESSES.

W. Edwards Deming
American Consultant
How will we know if change is improvement = Data

- Measures
  - Guidelines
  - Take Home Operational Definition
  - Measure Types

- Run Charts
  - Shifts/trends
  - Take Home Run Chart

- Interpreting Data
  - Variation
Run charts

• Understand data over time
• Understand variation
• See if improvements are maintained
A Sample Run Chart

1) Median Performance level

A variable (y)

2) Range (Precision)

3) Variation Type

Time (x)
Run Chart - Shift - 8
Run Chart - Trend - 6
Percentage of Adolescents 13-17 years Appropriately Screened* for Depression at Well Child Visits

* Appropriately screened depression:
  1. Screen tool completed, scored, interpretation documented
  2. If positive, follow up plan documented

Week

% of Adolescent Patients Screened for Depression

% of Adolescent Patients Screened for Depression

Median

Goal
Take Home – Run Chart

Run Chart Template
Developed by Richard Scoville, PhD. (richard@rscoville.net)

Graph Title
Y Axis Label
X Axis Label

<table>
<thead>
<tr>
<th>Date / Observation</th>
<th>Value</th>
<th>Median</th>
<th>Goal</th>
<th>End Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>10</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>12</td>
<td>10</td>
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<td>3</td>
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<td>4</td>
<td>13</td>
<td>10</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>X</td>
</tr>
</tbody>
</table>

Enter dates or observation numbers into the green cells at right. (clear the sample data before you begin)
Enter your data values into the blue cells. Goal values are optional.
Don’t leave any blank cells in the Date/Observation column.
Enter an ‘X’ into the End Median column to mark the last row to be included in the median
Enter your graph title, x axis, and y axis label into the cells provided.
Use the boxes below the graph to annotate where interventions were introduced. Drag the box to the data point on the graph. (Note: This may require some formatting adjustments.)
Use regular Excel commands to configure the graph.
See sheet ‘Rules for Interpreting Charts’ for information about interpreting charts

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http://www.ihi.org/resources/Pages/Tools/RunChart.aspx
How will we know if change is improvement = Data

• Measures
  – Guidelines
  – Take Home Operational Definition
  – Measure Types

• Run Charts
  – Shifts/trends
  – Take Home Run Chart

• Interpreting Data
  – Variation
Variation

• “If I had to reduce my message for management to just a few words, I’d say it all had to do with reducing variation.”
  – W. Edwards Deming
Customers: Variation is the Enemy
Who is better archer?

Tina

Cason
1) Median Performance level

A Sample Run Chart

2) Range (Precision)

3) Variation Type
Variation:
How do results vary from time to time?

**Common cause variation**

- Due to factors inherent in the system (the noise in the system)
- Accounts for most of the variation
- Predictable
Variation: How do results vary from time to time?

**Common cause variation**

- Due to factors inherent in the system (the noise in the system)
- Accounts for most of the variation
- Predictable
Variation (continued)

Special cause variation

• Due to unexpected factors outside the system
• Accounts for little of the variation
• Unpredictable
Variation (continued)

**Special cause variation**

- Due to unexpected factors outside the system
- Accounts for little of the variation
- Unpredictable
Why do we care about differentiating between these causes of variation?

• Understand the pattern before making changes in order to address the problems inherent to the system.

• Analyze the data to be sure that the change resulted in improvement and is part of the (new) system.
What change can we make that results in improvement = PDSA

- PDSA and PDSA Ramps
- Understand system
  - sFMEA and Post It Flow diagrams
  - Driver diagrams
- Integrate experience/creativity
  - Patients
  - 4 corners
- Use change concepts
Plan Do Study Act

- Plan - choose an intervention to test and predict the change
- Do – carry out the test
- Study – did your ‘Do’ = ‘Plan’ prediction
- Act - Adapt - Adopt - Abandon
PDSA Ramp

- Iterative
- 1 patient/1 day/ 1 provider
- Multiple patients/ providers
- Variety Conditions
  - other languages
- Moving from testing to implementing
  - job description/policies/data tracking
Test 1 Dr. Jones schedule only 3 pts

Test 2 All of Dr. Jones patients

Test 3 Add Dr. Smith’s patients

Test 4 all physicians

PDSA

Improvement Ramp

Achieving improved health outcomes through a focus on primary care improvement.
# PDSA WORKSHEET

**Team Name:**

**Date of test:**

**Test Completion Date:**

**Overall team/project aim:**

**What is the objective of the test?**

**What 90 day goal does the change impact?**

## PLAN:

Briefly describe the test:

How will you know that the change is an improvement?

What driver does the change impact?

What do you predict will happen?

### PLAN

<table>
<thead>
<tr>
<th>List the tasks necessary to complete this test (what)</th>
<th>Person responsible (who)</th>
<th>When</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
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<td>2.</td>
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<tr>
<td>4.</td>
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<tr>
<td>5.</td>
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</tbody>
</table>

Plan for collection of data:

## DO:

Test the changes.

- Was the cycle carried out as planned?  □ Yes  □ No
- Record data and observations.
- What did you observe that was not part of our plan?

## STUDY:

Did the results match your predictions?  □ Yes  □ No

Compare the result of your test to your previous performance:

- What did you learn?

## ACT:

Decide to Adopt, Adapt, or Abandon.

- Adapt: Improve the change and continue testing plan. Plans/changes for next test:
- Adopt: Select changes to implement on a larger scale and develop an implementation plan and plan for sustainability
- Abandon: Discard this change idea and try a different one
What change can we make that results in improvement?

• Don’t reinvent wheel
• PDSA and PDSA Ramps
• Integrate experience/creativity
  – Patients
  – 4 corners
• Understand system
  – sFMEA and Post It Flow diagrams
  – Driver diagrams
• Use change concepts
Integrate Experience/Creativity-Patients
Consider your challenge from multiple perspectives. How do these different perspectives impact the way you think?
First, write your challenge in the center of the page, then write a stakeholder in each blue box. Finally, try writing your challenge from the perspective of these other stakeholders.

Describe their perspective on the challenge:
________________________________________
________________________________________
________________________________________

Describe their perspective on the challenge:
________________________________________
________________________________________
________________________________________

Describe their perspective on the challenge:
________________________________________
________________________________________
________________________________________

Describe their perspective on the challenge:
________________________________________
________________________________________
________________________________________
Integrate Experience

QI Teams

ACHIA
Alabama Child Health Improvement Alliance
What change can we make that results in improvement?

- Don’t reinvent wheel
- PDSA and PDSA Ramps
- Integrate experience/creativity
  - Patients
  - 4 corners
- Understand system
  - sFMEA and Post It Flow diagrams
  - Driver diagrams
- Use change concepts
If you can’t describe what you are doing as a process, you don’t know what you’re doing.

William Edwards Deming
Simplified Failure Mode Effect Analysis

INTERVENTION

CURRENT PROCESS

FAILURE MODES
Process Name: STANDARDIZE PROCESS FOR SCREEN AND FOLLOW UP

**Current Process**

- **Scheduling and Reminder calls**
  - Parent and patient not prepared for confidential visit
  - Phone calls not made
  - Unable to reach patient or parent by phone
  - Why: Staff not aware of need to prepare patient/parent
  - Short staffed
  - Phone # incorrect

- **Chart Prep and Registration**
  - Screen not provided.
  - Screen completed by Parent
  - Screen completed by teen but not with confidentiality
  - Why: Staff not aware which patients need forms or how to have patient start visit without parent

- **Triage and Room patient**
  - Parents decline teen starting visit alone
  - Triage staff don’t explain confidentiality
  - Why: Staff not aware which patients need to complete screens or what to say

- **Patient Completes Screens**
  - Form not completed b/c
    - Low Literacy-language and health
    - Form in wrong language
  - To many screens to complete:
    - Sports SE
    - Pre-visit
    - PHQ-9
  - Why: Correct language not available

- **Pilot in English add other languages as pilot expands per Chart prep standards**
  - Condense forms
  - Parking lot
    - Online forms
  - Why: Staff not aware which patients need forms or how to have patient start visit without parent

- **Assess resident competency and comfort with clinical post-tests after educational intervention**
  - Feedback re: screen review

- **Develop clinical algorithm with MI included**
  - Track attending awareness and assess agreement with algorithm
  - Review cases w Psych weekly

- **Follow Up**
  - Patient not adherent to med or counseling recommendations
  - Why: Patient lack of agreement with Plan
  - Inability to secure timely counseling appointment
  - Inability to get to Appointment
  - Medication SE
  - MH stigma
**Global Aim**

*Achieve depression remission.*

**SMART Aim**

*We will increase the percentage of clinic patients 12-18 years of age appropriately screened for adolescent depression* at well child visits from 0% to 90% by June 30, 2017.

**Key Drivers**

- Establish Confidential Screening
- Standardize process for screen, management and follow-up
- Staff and MD engaged in depression screen and follow up
- Provider Accountability for Screening
- Patients/Families engaged in screen and follow up
- Reduce mental illness stigma for patients/families/staff/providers
- Adequate Clinic and Referral Resources

**Interventions (LOR #)**

- Select standardized depression screen (LOR 1)
- Revise workflow to complete screen confidentially (LOR 1)
- Establish evidence informed depression management pathway (LOR 1)
- Educate attendings, staff, residents on pathway and evidence behind pathway (LOR 1)
- Provider Performance Feedback (LOR 1)
- Strengthen counseling and psychiatric referrals (LOR 1)
- Secure Patient Resources – handouts, shared plans and referral partners (LOR 1)

**Key**

- Gray shaded box = completed intervention
- Green shaded box = what we’re working on right now
- LOR # = Level of Reliability Number, e.g., LOR 1

---

*Appropriately screened depression:
1. Screen tool completed, scored, interpretation documented
2. If positive, follow up plan documented*
What change can we make that results in improvement?

- Don’t reinvent wheel
- PDSA and PDSA Ramps
- Integrate experience/creativity
  - Patients
  - 4 corners
- Understand system
  - sFMEA and Post It Flow diagrams
  - Driver diagrams
- Use change concepts
Change concepts

- Eliminate waste
- Improve flow
- Optimize inventory
- Change work environment
- Customer interface
- Focus on time
- Focus on variation
- Mistake proofing
- Focus on product/service
- Source: improvement guide
## Change Concepts

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANAGE VARIATION</td>
<td>Standardization (formal process)</td>
</tr>
<tr>
<td>ELIMINATE WASTE</td>
<td>Remove steps needed to complete task</td>
</tr>
<tr>
<td>IMPROVE WORKFLOW</td>
<td>Reduce duplication</td>
</tr>
<tr>
<td>ENHANCE CUSTOMER RELATIONSHIP</td>
<td>Reduce Wait Time</td>
</tr>
</tbody>
</table>
Appendix A Change Concepts

Eliminate Waste
- Eliminate things that are not used
- Eliminate duplicate entries
- Reduce or eliminate overkill
- Reduce controls on the system
- Recycle or reuse
- Use substitution
- Reduce classifications
- Remove intermediaries
- Match the amount to the need
- Use sampling
- Change targets or set points

Improve Work Flow
- Synchronize
- Schedule into multiple processes
- Minimize handoffs
- Move steps in the process close together
- Find and remove bottlenecks
- Use automation
- Smooth workflow
- Do tasks in parallel
- Consider people as in the same system
- Use multiple processing units
- Adjust to peak demand

Optimize Inventory
- Match inventory to predicted demand
- Use pull systems
- Reduce choice of features
- Reduce multiple brands of same item

Change the Work Environment
- Give people access to information
- Use proper measurements
- Take care of basics
- Reduce demotivating aspects of pay system
- Conduct training
- Implement cross-training
- Invest more resources in improvement

Focus on core processes and purpose
- Share risks

- Emphasize natural and logical consequences
- Develop alliance/cooperative relationships

Enhance the Producer/Customer Relationship
- Listen to customers
- Coach customers to use product/service
- Focus on the outcome to a customer
- Use a coordinator
- Reach agreement on expectations
- Outsource for “free”
- Optimize level of inspection
- Work with suppliers

Manage Time
- Reduce setup or startup time
- Set up timing to use discounts
- Optimize maintenance
- Extend specialist’s time
- Reduce wait time

Manage Variation
- Standardization (create a formal process)
- Stop tampering
- Develop operational definitions
- Improve predictions
- Develop contingency plans
- Sort product into grades
- Desensitize
- Exploit variation
- Design Systems to Avoid Mistakes
- Use reminders
- Use differentiation
- Use constraints
- Use affordances

Focus on the Product or Service
- Mass customize
- Offer product/service anytime
- Offer product/service anywhere
- Emphasize intangibles
- Take advantage of fashion trends
- Reduce the number of components
- Disguise defects of problems
- Differentiate product using quality dimensions
Implement when......

- Increased belief change results in improvement
- PDSA predictions are accurate
- Data improving
- Tested under variety of conditions
- Costs and side effects (balancing) understood
SHIFT HAPPENS
Selected Resources


• **Understanding Variation: The Key to Managing Chaos** 2 Revised Edition by [Donald J. Wheeler](https://www.c良好.com/donald-j-wheeler)
More QI

• NICHQ QI 101  http://nichq.org/QI_101/story_html5.html?lms=1
• Institute for Healthcare Improvement
  – Online (Department has account)
• UAB Healthcare Quality and Safety
  – Executive Masters and Certificate
MOC Part 4

• AAP
  – Individual projects
  – Resident ‘bank’ MOC
  – Online Modules (individual or group)
  – Posters/Presentations/Publications

• ACHIA
  – Participate in collaborative
  – Faculty expert