Session Objectives

- Differentiate measurement for improvement from measurement for research
- Use a driver diagram to identify key interventions for improvement and measurement
- Discuss the relationship between process and outcome measures
- Distinguish between population measures, current care measures and PDSA measures
- Identify critical measures needed to track improvement
About Your Presenter

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  - National Initiative for Children’s Healthcare Quality
  - Center for Medicare and Medicaid Services
  - Cincinnati Children’s Hospital and Improving Performance in Practice
  - Dentaquest Institute

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Acknowledgements

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- Special thanks to
  - Robert Lloyd, PhD, Executive Director of Quality Improvement, IHI
  - Lloyd Provost, MS, Associates in Process Improvement
  - Sandy Murray, MS, Improvement Advisor, IHI
Measurement for Whom?
- Three faces of measurement
- Burden of measurement
- Balancing stakeholder values

3 Faces of Performance Measurement

<table>
<thead>
<tr>
<th></th>
<th>Improvement</th>
<th>Accountability</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aim</strong></td>
<td>Improvement of care</td>
<td>Comparison, choice, reassurance, spur for change</td>
<td>New knowledge</td>
</tr>
<tr>
<td><strong>Test Observability</strong></td>
<td>Test observable</td>
<td>No test, evaluate current performance</td>
<td>Test blinded or controlled</td>
</tr>
<tr>
<td><strong>Bias</strong></td>
<td>Accept consistent bias</td>
<td>Measure and adjust to reduce bias</td>
<td>Design to eliminate bias</td>
</tr>
<tr>
<td><strong>What to Measure</strong></td>
<td>&quot;Just enough&quot; data, small sequential samples</td>
<td>Obtain 100% of available, relevant data</td>
<td>&quot;Just in case&quot; data</td>
</tr>
<tr>
<td><strong>Flexibility of Hypothesis</strong></td>
<td>Hypothesis flexible, changes as learning takes place</td>
<td>No hypothesis</td>
<td>Fixed hypothesis</td>
</tr>
<tr>
<td><strong>Testing Strategy</strong></td>
<td>Sequential tests</td>
<td>No tests</td>
<td>One large test</td>
</tr>
<tr>
<td><strong>Determining if a Change is an Improvement</strong></td>
<td>Run charts or Shewhart control charts</td>
<td>No change focus</td>
<td>Hypothesis, statistical tests (t-test, F-test, chi square), p-values</td>
</tr>
<tr>
<td><strong>Response to Context Variation</strong></td>
<td>Utilize to test resilience of process design</td>
<td>Ignore, acknowledge, or use risk adjustment</td>
<td>Control or eliminate effects of confounding variables</td>
</tr>
<tr>
<td><strong>Confidentiality of the Data</strong></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>

Translational Research

Quality Improvement is a T3 enterprise


The Model for Improvement

AIM: What are we trying to accomplish?

MEASURES: How will we know if a change is an improvement?

CHANGE: What changes can we make that will result in improvement?

© Associates for Process Improvement
The Burden of Measurement

Each measure is another brick in your backpack.

How Do We Know if a Change is an Improvement?10

“You can’t fatten a cow by weighing it”

- Palestinian Proverb

An improvement measurement plan should be as lean as possible!
Systems of Care

A: Experience of Patients
B: Microsystems
C: Organizations that support Microsystems
D: The environment (policy, payment, accreditation, etc.)

Unintended Consequences

*If each part of a system, considered separately, is made to operate as efficiently as possible, then the system as a whole will not operate as effectively as possible.*

Listen to the “Yeah, but’s…”

- “… what’s it gonna cost?”
- “… will it really make a difference for my patients?”
- “… we’re already working too hard!”
- “… we don’t need to improve. We already do it every time!”

Beware of Unintended Consequences!

IOM Report Dimensions of Healthcare Quality

- Safe - as safe in healthcare as in our homes
- Effective - matching care to science; avoiding overuse of ineffective care and underuse of effective care
- Patient-centered - honoring the individual and respecting choice
- Timely - less waiting for both patients and those who give care
- Efficient - reducing waste
- Equitable - closing racial and ethnic gaps in access and health status

Balanced Measures Examples

Safe
✓ Adverse drug events per 1000 doses
✓ Workdays lost per 100 employees per year

Effective
✓ Hospital Standardized Mortality Rate
✓ Functional outcomes

Patient-centered
✓ Patient willingness to recommend
✓ Percent of population dying in hospital within a region

Timely
✓ Time to 3rd next available appointment

Efficient
✓ Average total cost per THA
✓ Hospital specific standardized reimbursements

Balanced Scorecard

Three Types of Measures

- **Outcome Measures**
  - Voice of the stakeholders.
  - How is this system meeting the needs of those who care about its operation? Is it delivering value?

- **Process Measures**
  - Voice of the process.
  - Are the parts/steps in the system performing as planned? Are processes reliable? Efficient? Patient-Centered?

- **Balancing Measures**
  - Are we producing perverse consequences in our efforts to improve? What other factors may be affecting results?

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Measures for ED Improvement

<table>
<thead>
<tr>
<th>Topic</th>
<th>Outcome Measures</th>
<th>Process Measures</th>
<th>Balancing Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve waiting time and patient satisfaction in the Emergency Department</td>
<td>Total Length of Stay (LOS)</td>
<td>Time to registration</td>
<td>Volumes</td>
</tr>
<tr>
<td></td>
<td>Patient Satisfaction Scores</td>
<td>Patient / staff comments on flow</td>
<td>“Left without being seen”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% patient receiving discharge materials</td>
<td>(LWBS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Staff satisfaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Financials</td>
</tr>
</tbody>
</table>
Improving Systems of Care

- Theory of Improvement
- Drivers and measures
- Selecting Improvement Measures

The Question of the Day

How can we design a set of measures that will guide our improvement work and show meaningful results without wasting everyone’s time?
3 Questions for Measuring Improvement

- Is the system of care predictable? Can we anticipate future performance in order to plan ahead?
- Over time, where are the gaps in performance that indicate a need for system change (i.e. improvement)?
- In our efforts to improve, are we on track to meet our aims? (‘How will we know that a change is an improvement?’)

The Model for Improvement

AIM: What are we trying to accomplish?

MEASURES: How will we know if a change is an improvement?

CHANGE: What changes can we make that will result in improvement?

Act  |  Plan
---  |  ---
Study  |  Do

© Associates for Process Improvement
What Changes Can We Make?

- **Understand the system.**
  - Front-line expertise & knowledge about drivers generate insights for useful changes

- **Use change concepts & directed creativity to generate additional change ideas**
  - Techniques for prompting fresh ideas for change

- **Copy from successful colleagues.**
  - Who does this best? Who has successfully improved? How did they do it?
  - Is there a change package available?

Theory Drives Improvement

“Without theory, there are no questions; without questions, there is no learning.”

*W. Edwards Deming*
A Theory of How to Improve a System

A Theory for Weight Loss

"Every system is perfectly designed to achieve the results that it gets"
By August 2013, we will increase by X%* over baseline the proportion of patients that have achieved a mutually planned disease-managed state that incorporates timely treatment and patient self-management.

*Goals will be set by each practice

Prioritizing the Drivers

Limitations of resources, attention or will usually mean we cannot work on (or measure!) everything.

Priorities:
- Where is the ‘Bang for Buck?’ Which drivers do we believe will deliver the biggest impact?
- Which ones will be easiest to work on? Are some ‘beyond our control’?
- What is our current level of performance on these drivers?
### What's The Status of This Driver/Process?

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>DEFINITION</th>
<th>APPROXIMATE RELIABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Driver is not defined or status is unknown</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>There is an informal understanding about the driver by some of the people who do the work. No widely recognized or formal written description of the driver.</td>
<td>50%</td>
</tr>
<tr>
<td>2</td>
<td>Driver is documented, driver description includes all required participants (including families where appropriate). The driver is understood by all.</td>
<td>80%</td>
</tr>
<tr>
<td>3</td>
<td>The driver is well-defined, and enacted reliably. Quality measures are identified to monitor outcomes of the driver and may be in use by few/some.</td>
<td>90%</td>
</tr>
<tr>
<td>4</td>
<td>Ongoing measures of the driver are monitored routinely by key stakeholders and used to improve the driver. Documentation is revised as the driver is improved.</td>
<td>95%</td>
</tr>
<tr>
<td>5</td>
<td>Driver outcomes are predictable, drivers are fully embedded in operational systems. The driver consistently meets the needs and expectations of all families and/or providers.</td>
<td>99%</td>
</tr>
</tbody>
</table>

### What Is It’s Predicted Impact on Your Aim?

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>This driver has no impact or does not apply to our system of care</td>
</tr>
<tr>
<td>1</td>
<td>This driver has only minimal or indirect impact on patient services and outcomes</td>
</tr>
<tr>
<td>2</td>
<td>This driver will improve services for our patients, but other drivers are more important</td>
</tr>
<tr>
<td>3</td>
<td>This driver has significant impact on outcomes for our patients</td>
</tr>
<tr>
<td>4</td>
<td>This driver is necessary for delivering patient services It has a major, direct impact on the outcomes.</td>
</tr>
<tr>
<td>5</td>
<td>This driver is absolutely essential for achieving results. Improvement in this driver alone will have a direct, immediate impact on outcomes</td>
</tr>
</tbody>
</table>
Prioritization Worksheet

Project team ranks drivers for predicted impact and current status.

Prioritizing Oral Health Drivers

Oral Health Driver Ranking
Measuring Improvement

- Decreased mortality
- Decreased utilization

Outcomes (measured at the follow-up)

A fundamental assumption of clinical QI:
Reliable execution of clinical driver processes improves outcomes (measured at the population level)

Drivers for Improving Sickle-cell Care

Improved outcomes and quality of life for individuals affected by SCD
- Decreased mortality
- Decreased morbidity
- Pain
- Stroke
- Acute chest syndrome
- Decreased utilization
- Improved function
- Reduced hospital stays
- Reduced hospitalization
- Reduced mortality

P4 PCPHEM: care for persons with SCD is seamlessly co-managed

P5 ACUTE: Appropriate individualized treatment for acute episodes

S10 Reliable annual health and healthcare assessment
S11 Planning for annual transition to adult system of care
S12 Care coordination based on individual care plan
S13 Timely triage and appropriate treatment in ED
S14 Practice- and community-level IT & decision support for planned and acute care
Measures Linked to Drivers

Outcomes
- Improved outcomes and quality of life for individuals affected by SCD
- Decreased mortality
- Decreased morbidities, e.g.
  - Pain
  - Stroke
  - Acute chest syndrome
- Decreased utilization
- Improved function
- Humane patient experience

Primary Drivers
- P5 ACUTE: Appropriate individualized treatment for acute episodes
- EDP1a: Average time to analgesic admin
- EDP1b: % with analgesics w/in 30 min
- EDP4: Average time to triage
- EDP1c: % with pain reassessed within 30 min of analgesic admin
- PS ACUTE: Appropriate and timely pain medication at ED

Secondary Drivers

Measuring Processes
- Measures of process reliability
- Compliance measures
- PDSA measures
- Examples
Reliability

\[
\text{Reliability} = \frac{\text{Number of Actions That Achieve The Intended Result}}{\text{Total Number of Opportunities for Action}}
\]

= ‘Percent Conforming’

---

Measuring Process: Total Joint Arthroplasty

- **Aim:** Pre-screen all total hip or knee replacement patients for nasal Staph; those who test positive will complete a course of mupirocin.
- **Population:** All patients undergoing TKA or HKA in our hospital (with exclusions)
- **Process:** Screening and decolonization
- **Measurement interval:** monthly
- **Process reliability measure:** Percent of patients who screened positive for SA who report they had completed a course of mupirocin prior to day or surgery.
Decolonization PDSA Measures

Overall Process Reliability: Percent of patients who screened positive for SA who report they had completed a course of mupirocin prior to day or surgery.

<table>
<thead>
<tr>
<th>Process Step</th>
<th>% Conforming ('Yield')</th>
<th>Average</th>
<th>Individual (PDSA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab request for SA culture</td>
<td>Percent of TKA patients with lab order</td>
<td>...</td>
<td>Test ordered (Y/N)?</td>
</tr>
<tr>
<td>Time to process specimen</td>
<td>Percent of patients with specimen obtained within 8 days prior to surgery</td>
<td>Average time to obtain specimen</td>
<td>Time to obtain specimen</td>
</tr>
<tr>
<td>Contact patient</td>
<td>Percent of patients with positive test result who were contacted</td>
<td>...</td>
<td>Patient contacted (Y/N)?</td>
</tr>
</tbody>
</table>
Sickle Cell Pain in the ED

How reliably can we enact this algorithm?

Bundle Measures

Percent of SCD clients presenting with pain last month with initial assessment in <=30 min

Percent of SCD clients presenting with pain who received parenteral analgesic within 60 minutes of initial contact.

Percent of SCD clients presenting with pain who had pain reassessed within 30 minutes of analgesic

Overall Reliability: Percentage of SCD clients who had all recommended elements of care

Diagnosing Process

- Time to initial assessment
- Time to initial analgesic administration
- Time from analgesic to reassessment

PDSA Tracking: Daily Data in the ED

Source: James Moses, MD, MPH

PDSA Tracking: Daily Data in the ED

Time to 1st Pain Med

* Oral dose if not within 4h. SQ alternative. Reasons for Delay

Source: James Moses, MD, MPH
Current Care Measure Tracks Improvement

% of SCD patients presenting with pain at the ED who had initial analgesics within 30 min*

*Simulated data

Sickle Cell ED Process Measures

<table>
<thead>
<tr>
<th>Process Step</th>
<th>Current Care Compliance</th>
<th>Average</th>
<th>Individual (PDSA)</th>
</tr>
</thead>
</table>
| Initial Assessment | % of SCD patients presenting with pain at the ED last month with initial assessment w/in 15 min of triage. | Average time from triage to initial assessment | • Individual time from triage to initial assessment  
• RCA for patients who were delayed |
| Initial Analgesics | % of SCD patients presenting with pain at the ED last month with initial analgesic w/in 30 min of triage. | Average time from triage to initial analgesics | • Individual time from triage to initial analgesics  
• RCA for patients who were delayed |
| Reassessment | % of SCD patients presenting with pain at the ED last month with reassessment w/in 30 min of analgesic admin | Average time from initial analgesic to reassessment | • Individual time from initial Tx to reassessment  
• RCA for patients who were delayed |
Setting Goals

- A significant change from current performance
  - Make people anxious with goals—then give them change ideas that create hope
- When information is available, use absolute values to describe the performance of an excellent system of care
  - “Percent of diabetic patients screened for nephropathy = 95”
  - “Percent of diabetic patients with A1C < 7 = 65”
- When information on best performance or current performance is not available, use percentage or relative goals
  - “Improve wait time in the ED by 50%”
  - Close the gap between current performance and perfection by 50%

Time and Measurement

- Time and prediction
- Levels of measurement
- Types of improvement measures
- Operational definitions
The Manager’s Dilemma

Every act of management is an exercise in predicting the future

Why Time Is Important for Measurement

- Improvement is temporal
- Displaying data over time (using run charts or control charts) allows us to make informed predictions, and thus manage effectively
“Managing a company by means of the quarterly reports is like trying to drive a car by watching the yellow line in the rearview mirror.”

Myron Tribus

Did We Improve?

Percent of ER patients with Chest Pain Seen by a Cardiologist within 10 min

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3 Oct</td>
<td>88%</td>
</tr>
<tr>
<td>2</td>
<td>10 Oct</td>
<td>88%</td>
</tr>
<tr>
<td>3</td>
<td>17 Oct</td>
<td>94%</td>
</tr>
<tr>
<td>4</td>
<td>24 Oct</td>
<td>71%</td>
</tr>
<tr>
<td>5</td>
<td>1 Nov</td>
<td>88%</td>
</tr>
<tr>
<td>6</td>
<td>8 Nov</td>
<td>73%</td>
</tr>
<tr>
<td>7</td>
<td>15 Nov</td>
<td>78%</td>
</tr>
<tr>
<td>8</td>
<td>22 Nov</td>
<td>67%</td>
</tr>
<tr>
<td>9</td>
<td>29 Nov</td>
<td>69%</td>
</tr>
<tr>
<td>10</td>
<td>6 Dec</td>
<td>81%</td>
</tr>
<tr>
<td>11</td>
<td>13 Dec</td>
<td>83%</td>
</tr>
<tr>
<td>12</td>
<td>20 Dec</td>
<td>68%</td>
</tr>
<tr>
<td>13</td>
<td>3 Jan</td>
<td>95%</td>
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<td>17</td>
<td>31 Jan</td>
<td>78%</td>
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<tr>
<td>18</td>
<td>7 Feb</td>
<td>79%</td>
</tr>
<tr>
<td>19</td>
<td>14 Feb</td>
<td>84%</td>
</tr>
<tr>
<td>20</td>
<td>21 Feb</td>
<td>89%</td>
</tr>
<tr>
<td>21</td>
<td>28 Feb</td>
<td>95%</td>
</tr>
<tr>
<td>22</td>
<td>6 Mar</td>
<td>95%</td>
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<tr>
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</table>

Source: R. Lloyd

Did we improve?
What will happen next?
Should we do something?
Did We Improve?

Percent of ER patients with Chest Pain Seen by a Cardiologist within 10 min

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</tr>
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<td>94%</td>
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<tr>
<td>4</td>
<td>24-Oct</td>
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</tr>
<tr>
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<td>1-Nov</td>
<td>86%</td>
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<td>28-Feb</td>
<td>95%</td>
</tr>
<tr>
<td>22</td>
<td>6-Mar</td>
<td>95%</td>
</tr>
<tr>
<td>23</td>
<td>13-Mar</td>
<td>91%</td>
</tr>
<tr>
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<td>20-Mar</td>
<td>96%</td>
</tr>
</tbody>
</table>

Did we improve?
What will happen next?
Should we do something?

How Many Different Processes?

Cycle time results for units 1, 2 and 3

Source: R. Lloyd
**Average Performance: Good Enough?**

- Recommended time to antibiotics for severe sepsis and septic shock patients in the ED: 60 min
- In our ED, our average is 58 min! We’ve met the target!

![Chart showing time to antibiotic administration](chart)

**Importance of Timely Data**

![Energy Monitor](image)
Many key drivers are care processes

Slow to change  Rapid change

Less frequent measurement  More frequent measurement

Outcome, Key Processes

- Denominator = total population
- Assess the state of key care processes and outcomes
- Track improvement of the system
- Surveys, risk-adjusted measures, institutional databases
- Control Charts, ANOVA
Measuring Improvement

<table>
<thead>
<tr>
<th>Outcome, Key Processes</th>
<th>‘Current Care’</th>
<th>‘PDSA’</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Denominator = total population</td>
<td>• Denominator = patients seen in most recent measurement period, in areas targeted for improvement</td>
<td>• Single patients &amp; events</td>
</tr>
<tr>
<td>• Assess the state of key care processes and outcomes</td>
<td>• Track progress in improving processes &amp; outcomes</td>
<td>• Study process changes</td>
</tr>
<tr>
<td>• Track improvement of the system</td>
<td>• Assess reliability and efficiency of processes</td>
<td>• Identify opportunities for further testing</td>
</tr>
<tr>
<td>• Surveys, risk-adjusted measures, institutional databases</td>
<td>• Registries, institutional databases, chart reviews, team-level databases</td>
<td>• Team databases, paper flow sheets, clipboard</td>
</tr>
<tr>
<td>• Control Charts, ANOVA</td>
<td>• P, U, XbarS Charts</td>
<td>• XMR charts, RCA</td>
</tr>
</tbody>
</table>

Current Care Measures

Throughput...

...daily care...

...aggregated over a month...

...yields a measure of process reliability (’% conformance’)...

...viewed over time.

Algorithm provides criteria for process quality.
Typical Current Care Questions

- Did we do the right thing for patients last month (week, quarter)? Did anything unusual take place?
- Did patients suffer harm? What were their outcomes?
- What can we expect next month? What can we tell our patients? Leadership? Payers?
- Are our ongoing efforts to improve care processes having the desired impact? Should we change course or push ahead?

Population Measures

Throughput = visits...
...with reliable care process...
...have an incremental impact on population.

Population: who's health are we responsible for?

Percent of Diabetes Patients with LDL <100

DM pts with LDL<100
Active DM pts in practice panel
Measuring Improvement in Outpatient Populations

Typical Population Questions

- What is the current state of the population for whom we are responsible (even those we haven’t seen for awhile?) re: Health status? Satisfaction? Cost of care?
- How do our population’s risk factors and outcomes compare with those of other provider organizations?
- How should we plan for the long term?
- What has the impact of our improvement work been on the population? Are there other factors affecting changes in outcomes?
Outpatient ‘Look-Back’ Measures

Percent of population with current self-management plan as of most recent visit within the past 12 months.

- Current test
- No current test

Each measurement contains mostly the same patients as the previous month. These measures are slow to show improvement, but reflect the state of care for the population!

“Current Care” Measures

Percent of patients seen last month who lacked an up-to-date A1C and who got the test during the visit or were referred.

- Current test
- No current test

Each subgroup contains different patients & represents current work. These measures are great for tracking process changes!

Etc...
Patients Come and Go

- Patients enter a population by birth or immigration, or because they age-in.
- They exit by death, emigration, or because they age-out.
- That means that different patients are measured at different points in time.
- This can interfere with measures of improvement.
- This is a severe issue when measuring outcomes in pediatric populations.

The faster the turnover, the more severe the problem.

Did We Improve?

New patients entering the population dilute the population measure with ‘unimproved’ patients.

- HbA1c = 11.0
- HbA1c = 9.0
- HbA1c = 7.0

<table>
<thead>
<tr>
<th>Time</th>
<th>HbA1c</th>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 – Project begins!</td>
<td>11.0</td>
<td>11 Patients</td>
</tr>
<tr>
<td>11 + 6 months</td>
<td>10.2</td>
<td>11 Patients</td>
</tr>
<tr>
<td>11 + 12 months</td>
<td>9.45</td>
<td>11 Patients</td>
</tr>
</tbody>
</table>

These patients have had NO exposure to improvement interventions.

These patients have had FULL exposure to our improvement interventions.
Cohorts

A cohort measures a group of patients as they move through the population. The impact of the intervention is clearer.

11 – Project begins/
Cohort Avg = 11.0

11 + 6 months
Cohort Avg = 9.0

11 + 12 months
Cohort Avg = 7.0

These patients have had NO exposure to improvement interventions.

These patients have had FULL exposure to our improvement interventions.

PDSA Measures

Algorithm provides the ‘should’

Patient in process:

Measure: What happened? How long did it take?...
Time from T₀ to Antibiotics (min)

PDSA measures assess process concurrently: ‘one patient at a time’

Clinical team strives for ‘how’?

Was this change an improvement?
Typical PDSA Questions

- Are we consistent in providing care? Do we need to standardize?
- Why are some patients cared for differently from others? Or have different outcomes? Can we reduce the variation?
- For patients whose care did not conform to algorithm, why not? Does the algorithm need modification? How can we improve the process?
- Was our latest test of change successful? Are we getting better?

Operational Definitions

A procedural description of what to measure and the steps to follow to measure it consistently.

- Gives communicable meaning to a concept
- Tells what you need to count or measure
- Specifies measurement methods and equipment
- Identifies criteria and exclusions

... is the basis for reliable measurement

Source: R. Lloyd
Denominator Operational Definition

- Count of active patients 18-75 years old who have a current diagnosis of diabetes (type 1 and type 2).
  An active patient is one who had two face-to-face encounters with different dates of service in an ambulatory setting or non-acute inpatient setting or one face-to-face encounter in an acute inpatient or emergency room setting within 24 months of the measurement month, with a diagnosis of diabetes. Diagnosis of diabetes includes the following ICD-9 codes: ..... etc.

Operational Definition Example

Measure: Percentage of patients undergoing hip and knee replacement surgery during the measurement period who have had preoperative nasal swabs to screen for Staphylococcus aureus carriage
Goal: 95%
Measurement Period Length: Monthly
CALCULATION DETAILS:
- Numerator Definition: Number of patients undergoing hip or knee replacement surgery who have had a nasal swab specimen processed to screen for Staphylococcus aureus carriage prior to surgery
- Denominator Definition: Number of patients undergoing elective hip or knee replacement surgery
- Numerator and Denominator Exclusions:
  - Patients who are less than 18 years of age
  - Patients who had a principal or admission diagnosis suggestive of preoperative infectious diseases
  - Patients with physician-documented infection prior to surgical procedures
  - Patients undergoing non-elective hip or knee replacement surgery
Definition of Terms:
Hip or knee replacement surgery includes operations involving placement of a nonhuman-derived device into the hip or knee joint space. ICD-9 Codes include 00.70-00.73, 00.85-00.87, 81.51-81.53, 00.80-00.84, 81.54, and 81.55.

Calculate as: \( \frac{\text{numerator}}{\text{denominator}} \); as a percentage
### Examples

<table>
<thead>
<tr>
<th>Level / Questions</th>
<th>Examples</th>
</tr>
</thead>
</table>
| **PDSA**          | • Lab test turnaround time  
|                   | • Number of bundle elements completed during rounds  
|                   | • Hands washed before and after patient contact (Y/N)  
|                   | • Handoff information complete (Y/N)  
|                   | • Pre-surgical MRSA screening completed  
|                   | • Door to balloon time  
|                   | • A1C test completed at patient visit |
| **Current Care**  | • Percent of patient visits where DM patients who needed A1C tests got them  
|                   | • Average time from triage to antibiotic administration for sepsis patients  
|                   | • Percent of ED sepsis patients with antibiotic administration within 180 minutes  
|                   | • Percent of patient rounds will all bundle elements completed  
|                   | • Patient falls per 1000 patient days  
|                   | • Percent of ED visits where appropriate flow sheet was utilized  
|                   | • Readmissions per 1000 discharges |
| **Population**    | • Percent of active diabetes patients with A1C less than 8  
|                   | • Percent of active DM patients with A1C tested within the past 12 months  
|                   | • Percent of sickle-cell adolescents with current transition plan  
|                   | • Percent of patients who would recommend us  
|                   | • HSMD (risk adjusted mortality)  
|                   | • Per-member cost of diabetes care  
|                   | • Provider panel size |

### Key Quality Characteristics of Measures

<table>
<thead>
<tr>
<th>Level / Questions</th>
<th>Audience</th>
<th>KQCs</th>
</tr>
</thead>
</table>
| **PDSA**          | • Front-line improvement teams  
|                   | • Initiative leaders (notable results)  
|                   | • Data are concurrent with care & testing  
|                   | • Rich context: patient and system conditions at time of measurement  
|                   | • Data collection methods are reliable  
|                   | • Time-series display with annotations  
|                   | • Data collection is easy, feasible – data are useful for care |
| **Current Care**  | • Front-line improvement teams  
|                   | • Improvement leaders  
|                   | • Senior leaders (key indicators)  
|                   | • Data are recent – last month  
|                   | • Measures match domain of QI work: site, unit, subpopulation, etc.  
|                   | • Time-series display with annotations  
|                   | • Sample size large enough for detection of change  
|                   | • Measures linked to key drivers, algorithm  
|                   | • Includes key balancing measures |
| **Population**    | • Improvement leaders  
|                   | • Senior leaders (key indicators)  
|                   | • Comparative data are risk adjusted  
|                   | • Triple aim, balanced family of measures: outcomes, experience, cost  
|                   | • Data are valid representation of population  
|                   | • Time-series display with annotations |
Documenting Improvement Measures

- Annotated driver diagram
- Measure structure diagram
- Measurement plan
- Database query flow

Elimination of Dental Disease Measures

Outcomes

- Patients get needed care when required
- Reliable execution of DM protocol
- Engaged patients / families, adequately manage their care
- Sustainable business model

By August 2013, we will increase by X% over baseline the proportion of patients that have achieved a mutually planned disease-managed status that incorporates timely treatment and patient self-management.

Primary Drivers

- M1 Percent of patients with treatment plan complete
- M2 Percent of patients with new measure

Secondary Drivers

- M1 Effective scheduling system
- M2 Balance supply and demand
- M3 Adequate provider mix
- M4 Effective no-show prevention, mitigation
- M5 Referral management & follow-up
- M6 Standard approach among all practice providers
- M7 Tx planning inc risk assess, disease management
- M8 IT systems support pt management
- M9 Continuity of care: same provider
- M10 Patient are knowledgeable about disease & Tx
- M11 Pt manages disease and Tx plan
- M12 Effective care coordination
- M13 Effective patient triage and engagement
- M14 Fundraising
- M15 Reliable fee collection

Changes / Interventions

- M16 Professional capacity
- M17 Manage appointment duration
- M18 Maximize app value
- M19 Retain patients
- M20 Allocate tasks to optimal role
- M21 Tracking tools installed
- M22 Patient panels
- M23 Self management contracts
- M24 Incentive for compliance
- M25 Understand pt behavior
- M26 Link medical & dental care

*Goals will be set by each practice
Measure Structure Diagram

**Denominators**
- D1 Patients active during the measurement month
- D2 Patients active during the measurement month with comprehensive oral exam or periodic recall exam performed within 6 months (e.g., for sample month August 2012, count patients who were active as of August 2012 but not active in September 2011)
- D3 Active patients with initial or recall exams in the measurement month if patient had >1 exam, lessens measurement bias
- D4 Active patients with initial or recall exams in the measurement month if patient had >1 exam, lessens measurement bias
- D5 Active patients with visits in the measurement month if patient had >1 visit, assesses more recent visit
- D6 Active patients with visits in the measurement month if patient had >1 visit, assesses more recent visit
- D7 Active patients with visits in the measurement month with Tx plans complete as of their most recent visit

**Numerator**
- N1 Active patients with comprehensive oral exam or periodic recall exams performed within 300 days prior to the last day of the measurement month (includes patients who received a COE at the visit)
- N2 Patients with X-ray initiated in the 6th month and completed by the last day of the measurement month
- N3 Active patients with initial or recall exams during the measurement month who had not assessed at the visit
- N4 Active patients with visits during the measurement month who are assessed at least once during the measurement month

**Measures**
- M1 Percent of patients with oral exam
- M2 Percent of patients with treatment plan complete within 12 mos
- M3 Percent of patients with recall assessment
- M4 Percent of patients with self-management plan assessed
- M5 Percent of patients with new visit

**Measurement Plan Example**

<table>
<thead>
<tr>
<th>Measure Name</th>
<th>Type</th>
<th>Driver</th>
<th>Addressed (R/A for Outcome)</th>
<th>Numerator/Denominator (or other operational definition)</th>
<th>Exclusions</th>
<th>Frequency</th>
<th>Goal</th>
<th>Data Collector &amp; Sampling Method</th>
<th>Chart for Display</th>
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**Definitions**
- Measurement month = month for which data are complete (e.g., August 2012, sampled after August 31, 2012)
- 6th month = month 6 months prior to the last day of measurement month (e.g., August 2011)
- Active patients = patients with a comprehensive oral exam (or treatment plan) within 24 months of the last day of the measurement month, unless otherwise specified.
Questions?
Thank You!

Richard Scoville

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