Health Information Technology
Electronic Clinical Quality Improvement (eCQI) Toolkit

Version 6: February 2021

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Introduction

Quality improvement (QI) consists of systematic and continuous actions that lead to measurable improvement in health care services and the health status of targeted patient groups (this definition supplied by Health Resources and Services Administration [HRSA]).

Electronic clinical quality improvement (eCQI) is the use of health information technology (HIT), the functionality and data in your electronic health record (EHR) and the clinical best practices to support, leverage and advance your QI initiatives.

This eCQI toolkit was created as a practical guide to assist organizations with leveraging HIT and the plan-do-study-act (PDSA) process improvement methodology to support and advance health QI initiatives. This toolkit is:

- Designed to provide eCQI tools and resources that may be used by organizations to help manage their eCQI priorities in an organized, efficient and repeatable manner
- Developed for use by inpatient and outpatient organizations who are currently utilizing certified EHR software to manage their patient encounters (See Appendix K of this toolkit for more information on certified EHRs.)
- Meant to help identify, align and manage quality initiatives for both internal and external QI goals
- Focused on use of standardized clinical quality measures (CQMs) and tracking and monitoring this data in their EHRs when possible
- Encourages physical, electronic and data workflow review as part of each eCQI project to insure consistent, reliable and quality data and improvement

Development of this document was completed by Mountain-Pacific Quality Health and funded by the Montana Department of Public Health and Human Services (DPHHS).

eCQI Methodology Overview

Using HIT does not automatically translate to improved outcomes. Using HIT for quality improvement requires purposeful and thoughtful planning, effort and allocation of resources.

This toolkit combines aspects of the Institute for Healthcare Improvement (IHI) Model for Improvement, which includes the PDSA quality improvement cycle methodology and the agile/scrum delivery cycle (created for the IT industry). The goal of this combined approach is to help produce valuable, quality results in a quick and streamlined manner.

Quality Improvement Model

This toolkit will use aspects of the agile/scrum delivery cycle, which focuses on achieving value-added changes quickly and efficiently, one change (or one group of changes) at a time. These systematic improvement cycles are called “sprints.” The goal of each sprint is to provide value-added results for an organization approximately every two to six weeks. Sprints also enable an organization to balance improvement initiatives with current workloads. Each sprint should focus on one change (or logical group of changes) and may include one PDSA iterative cycle (multiple times through the cycle).

The PDSA quality improvement methodology is an iterative, four-stage, problem-solving model used for improving a process. PDSA is a simple but powerful tool for accelerating change. (See Appendix G of this toolkit for more information about PDSA.) To ensure stabilization of the implemented changes and to spread improvements or best practices once they are defined and proven, we recommend adding phases to stabilize and spread changes at the end of the final PDSA cycle, once goals are met.

The foundation of the PDSA methodology is the recognition that quality improvement is an ongoing cycle, with strong emphasis on the use of data for decision-making and to verify performance. (See Appendix H for more information on the effective use of data and Appendix I for a review of seven basic data collection tools.) This methodology will also incorporate the use of SMART (specific, measurable, attainable, relevant, time-based) goal setting as the foundation for planning and evaluating QI project success. (See Appendix B for more information on SMART goals.)

Project Management

This toolkit is based on a "lightweight" project management approach, incorporating aspects of the agile/scrum delivery cycle for QI initiatives, which focuses on a minimum of structure and documentation and any value-added requirements necessary to ensure success. It includes a process for helping monitor and control responsibilities, activities, changes and data for a QI project.

Tools are included in the appendices to assist with project management and implementation of QI initiatives.

Electronic Clinical Quality Measures

As noted by the Centers for Medicare & Medicaid Services (CMS) in their online eCQI Resource Center, clinical quality measures (CQMs) allow for performance tracking as improvements are made, and progress toward national shared goals of better care, smarter spending and healthier people to be quantified.

Electronic clinical quality measures (eCQMs) are used to quantify and track health care quality performance in a standard way. eCQMs are derived from information stored in and shared by HIT systems, such as EHRs and patient registries. They convert information about care processes or outcomes into a rate or percentage that allows providers, facilities and patients to measure and evaluate aspects of care, including

- clinical management,
- intervention effectiveness,
- patient safety,
- efficient use of health care resources,
- care coordination,
- patient and family engagement,
- population and public health.

eCQM reporting, including population health indicators, is required for several federal incentive programs.

Measuring quality provides tangible feedback to clinicians and other health care team members on their improvement efforts. Quality measures also drive provider and facility reimbursement

now that federal and private insurers are shifting to value-based payment programs. Measurement is thus a key engine for optimizing healthcare. Learn more at https://ecqi.healthit.gov/.

Since the ability for EHRs to report standard CQMs is part of the process for EHR vendors to obtain CMS/Office of National Coordinator for Health Information Technology (ONC) certification for their products, and since the reports should be available in all certified EHRs, this eCQI toolkit and process encourage the use of standardized CQMs whenever possible and appropriate for outcome and process evaluation metrics for eCQI projects.

How to Use this eCQI Toolkit

Based on the scale of the electronic clinical quality improvement (eCQI) project, the desired changes, the availability of resources or the quality improvement (QI) culture of the organization, eCQI support needs may be unique for each organization or project.

This toolkit and its resources provide a step-by-step walk-through of the entire process, or individual components can be used. We have included a high-level project plan for those already comfortable with the process, and a more detailed plan for others.

The templates and information in the appendices are to provide basic tools and additional information on some of the concepts discussed in this process. Organizations are welcome to use the information and tools as they are or as templates or starting points that can be customized to best benefit the organization or project. Here are some key elements to keep in mind for a successful eCQI project:

- Make sure teams are represented with the needed subject matter experts. eCQI involves the whole organization, not just IT, quality, etc.
- Create QI initiatives that make sense and/or align with other business or QI priorities.
- Use SMART goals (specific, measurable, attainable, relevant, time-based).
- Standardize your data goals (outcome measures); Use nationally recognized (e.g., CMS, National Quality Forum [NQF], Uniform Data System [UDS], Inpatient Quality Reporting [IQR], Merit-based Incentive Payment System [MIPS]) goals when possible.
- Identify data goals that are easily measured and consistently obtained, with data available from the organization's electronic health record (EHR) or other system. Do not make the data tracking/reporting a difficult or manual task.
- Establishing baseline data and identifying the correct electronic/data entry workflow of the chosen measure should be the project's first step.
- Use and incorporate EHR functionality to support eCQI efforts.
- Identify and use existing clinical or workflow best practices when possible. Solutions may have already been identified for the issue to be improved or changed.
- Use one plan-do-study-act (PDSA) process (may have many iterative cycles) for each process measure/change (or logical group of changes).
- Use data for decision-making and to validate change.

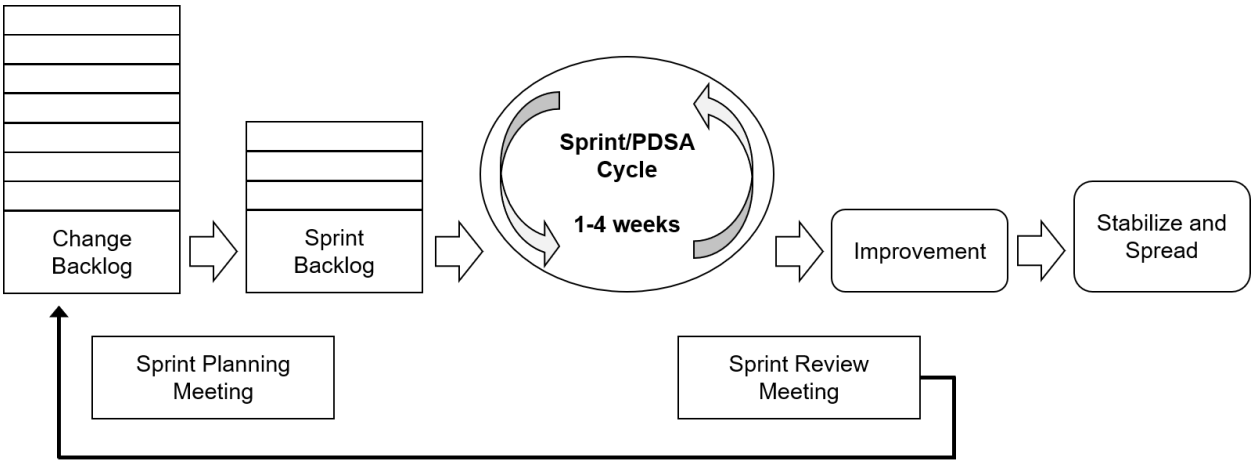
- Provide necessary communication and training to staff on the eCQI process and changes being implemented.
- Fully test theories before full implementation.
- Once changes are in place, continue to monitor these changes to ensure performance continues as expected.

eCQI High-Level Generic Project Plan

1. Identify project scope (outcome measure - top level item to change).
2. Choose a project team.
3. Create change backlog (a list of possible changes/process measures that will help improve the outcome measure).
4. Prioritize change backlog based on “value” of each change.
5. Create sprint backlog (identify item[s] to be included in first “sprint” or plan-do-study-act [PDSA] cycle).
6. Plan “sprint”/PDSA cycle.
7. Complete PDSA cycle.
8. Perform a sprint review.
9. Review, update and reprioritize change backlog.
10. Begin new sprint.

See Appendix L for an eCQI Project Management Checklist.

eCQI Process Cycle Diagram



eCQI Generic Detailed Plan

The following eCQI project plan focuses on using HIT functionality and data, along with clinical best practices to advance quality improvement projects. Sprints or PDSA cycles will be used for

each planned change. Following is a detailed generic project plan that can be used for most eCQI projects, focusing on the use of HIT to advance QI goals. (See appendix L for an eCQI Project Management Checklist.)

Step 1: Identify project scope.

1. Choose project goal.
    a. Answer this question: “What are we trying to accomplish?” Below are some possible ways to identify possible goals.
        i. Identify quality reporting requirements evaluated and used for payment reform/reimbursement or ranking, e.g., Accountable Care Organization (ACO), CMS Quality Payment Program (QPP) Advanced Payment Models (APMs) and MIPS, Patient Centered Medical Home (PCMH), HRSA UDS reporting, Government Performance and Results Act (GPRA), IQR
        ii. Internal quality improvement goals already established or mandated
        iii. Quality improvement requirements from funding opportunities/grants
        iv. Data analysis determinations (biggest quality issue, quality issue with the highest cost, issue affecting the most patients, etc.)
        v. Use data obtained by completing Organization eCQI Assessment Survey (Appendix J)
    b. When applicable, the project goal should be an outcome measure. (See Appendix A for more information on outcome and process measures.)
    c. Use SMART criteria. (See appendix B for more information on choosing SMART goals.)
    d. Use standardized or nationally recognized measures when possible (e.g., CMS, NQF, IQR, MIPS UDS, GPRA, measures) easily and consistently obtained from the organization’s EHR. (Do not make the data tracking/reporting a difficult task. Save resources for the change process.)
    e. Align the QI project with other quality reporting requirements and programs (e.g., Meaningful Use, PCMH, MIPS, IQR, Comprehensive Primary Care Plus [CPC+], UDS).
2. Identify the evaluation measure(s) that will be used to monitor performance to the project goal. Establish and document the baseline data (starting point) for the evaluation measure.
3. Identify boundaries for project (guidelines). Boundaries include what should be included in the project and what should not be included, what is the expected timeframe, budget and use of resources.

4. Document the project scope. (See appendix C for sample eCQI Project Scope and Change Backlog Template and a completed example.)

Step 2: Choose a project team.

Assemble a team that has knowledge of the problem or opportunity for improvement. Including the right people on a process improvement team is critical to a successful improvement effort.

Step 3: Create change backlog.

1. Answer this question: “What changes can we make that will result in an improvement to the project goal selected?”

2. Choose the evaluation measures. If the evaluation measure(s) for the project needs data validation, or if there are questions on the correct workflow or data entry for the measure, or if staff needs training on the correct workflow/data entry for the evaluation measure, this should be the first item included on the Change Backlog and should be prioritized as the first sprint or PDSA/cycle.

3. Brainstorm ideas for possible changes that will ultimately improve the project goal/outcome measure. (See Appendix F for an eCQI worksheet to help identify possible changes). Other items to review for possible ideas for improvement:

    a. Identify possible physical or electronic workflows that need to be reviewed for possible improvement or streamlining. (See Appendix M to learn more about the process of workflow mapping.)

    b. Identify possible EHR functionality changes. (See Appendix E to learn more about EHR functionality that can impact QI.)

        i. Review staff use and workflows (based on clinical best practices for QI topic)

            1. Computer provider order entry (CPOE)

            2. Care coordination and transition of care

        ii. Determine available options, decide on applicability (based on clinical best practices for QI topic)

            1. Clinical decision support (CDS)

            2. Patient portal/eSecure messaging

            3. Patient education materials

            4. Care Coordination

            5. Interfaces

            6. Etc.

iii. Determine how to optimize point of care documentation to ensure accurate and streamlined data entry (based on clinical best practices for QI topic)

c. Ideas for change may come from the insights of those who work in the system, from previous PDSA cycles, from change concepts or other creative thinking techniques or by borrowing from the experience of others who have successfully improved.

d. Document the list of possible changes/improvements. Changes could include process or workflow changes, EHR changes, education/outreach to patients, data entry changes, etc. (See Appendix C for sample eCQI Project Scope and Change Backlog Template and a completed example.)

Step 4: Prioritize the change backlog based on "value" of each change.

1. Prioritize or order the list of possible changes. Determine the order based on organization priorities. Priorities can be based on cost, resources, timeframes, most return on investment (ROI), alignment with other quality initiatives, etc.

2. Document the list of changes. (See Appendix C for a sample eCQI Project Scope and Change Backlog Template and completed example.)

Step 5: Create sprint backlog. (Identify item[s] to be included in first "sprint" or PDSA cycle.)

Based on the priority identified on the change backlog, choose one change (or one group of changes) for the first sprint/PDSA. (Each sprint should be able to be completed in approximately 2 to 6 weeks.)

Step 6: Plan "sprint"/PDSA cycle.

1. Plan.

    a. Based on the chosen change for this sprint, answer this question: "How will we know a change is an improvement?"

    b. Choose evaluation measures for this change. Choose SMART evaluation measures, with standardized data easily obtained from EHR or other system. Do not make the data tracking/reporting a difficult task. Save resources for the change process. (See Appendix B for more information on SMART goals.)

    c. Establish and document baseline data points for the evaluation measure(s).

        i. Create standard/customized reports and verify accuracy.

        ii. Create documentation (chart, graph, etc.) for baseline data and for tracking.

    d. If the evaluation measure(s) for this change needs data validation, or if there are questions on the correct workflow or data entry for the measure, or if staff needs

training on the correct workflow/data entry for the evaluation measure, this should be the first task of the PDSA cycle.

e. Create PDSA worksheet. (See Appendix D for a sample PDSA Worksheet Template and completed example.) Use one PDSA worksheet for each proposed change.

Step 7: Complete PDSA Cycle

1. Do.
    a. Communicate plans to all staff/stakeholders involved in change.
    b. Implement changes as identified on PDSA worksheet.
    c. Provide training for staff on changes.
        i. EHR functionality
        ii. New workflows
        iii. Clinical best practices
        iv. Reports and use of data
        v. Other
2. Study.
    a. Monitor progress/collect data. (See Appendix I for info on standard data collection methodologies and tools.)
    b. Analyze data. (See Appendix H for more information on data validation and use.)
    c. Identify areas of needed improvement.
3. Act.
    a. If goal(s) identified in “plan” step are met, continue with the stabilize/improve steps.
    b. If goal(s) are not met, create new PDSA cycle using data analysis and revise as necessary until goal(s) identified in “plan” step are met. (Go to Step 8.)
4. Stabilize/spread.
    a. Stabilize new processes. Verify changes have been implemented, staff are performing new tasks and train or coach staff as needed.
    b. Create ongoing data collection, tracking and reporting to ensure changes continue to meet original goals.
    c. Identify areas to improve the newly established standard process.

d. Propose new QI project based on new possible improvements.

Step 8: Perform a sprint review.

1. Identify best practices from sprint.
2. Identify lessons learned to be applied to next or future sprints.
3. Identify recommended updates to change backlog (add, remove or change items).

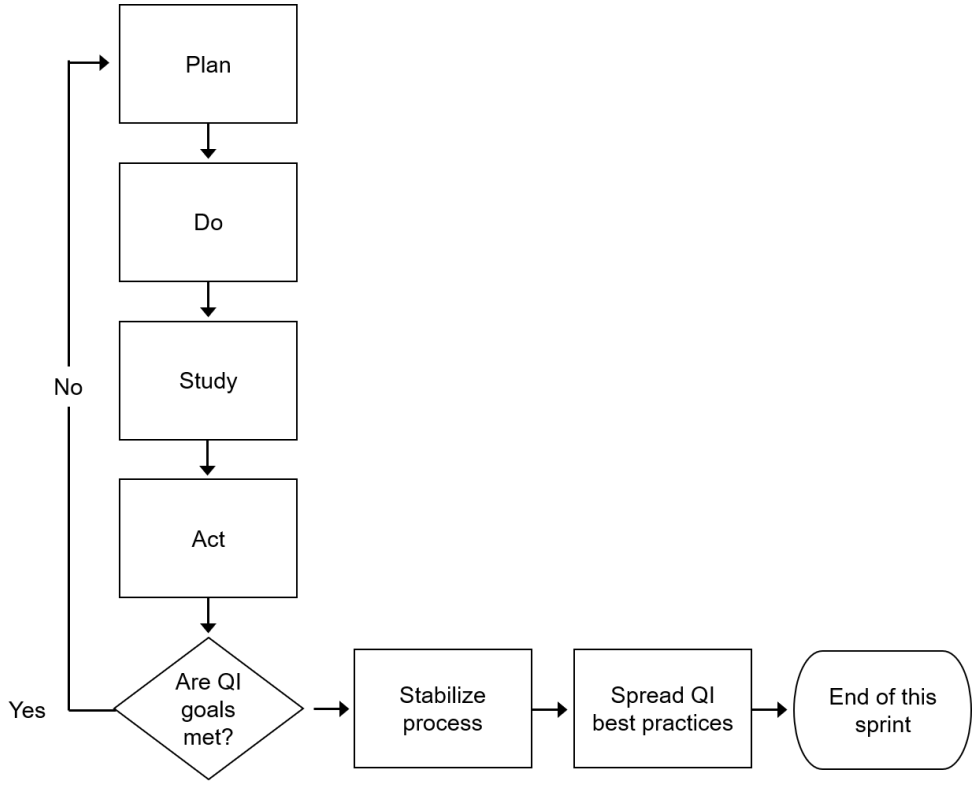
Step 9: Review, update and reprioritize change backlog and prepare for new sprint.

Step 10: Begin next sprint/PDSA cycle.

1. Choose next change from list (to support overall project goal/outcome measure).
2. Continue cycle again starting with Step 5: Create sprint backlog.
3. Keep creating new sprints/PDSA cycles for this QI project until the high-level goal/outcome measure is met, the project scope is revised or the project is canceled.

Remember to celebrate improvement success and document lessons learned for use in future eCQI projects.

PDSA Quality Improvement Cycle Diagram



Conclusion

This toolkit is meant to provide some structure and information to help support eCQI initiatives. The appendices that follow provide additional detailed information and tools that might assist in improving processes and outcomes.

For any technical assistance or with comments or questions about this toolkit, please contact Mountain-Pacific Quality Health or Montana Department of Public Health and Human Services.

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Appendix A: Outcome and Process Measures

Outcome measures: The high-level outcome targets chosen to improve. Outcome measures should represent a true effect or outcome. An improvement in an outcome measure should represent unquestionable improvement and value for an organization and its patients.

- Improvement to outcome measures may take longer to see, and it may take change to many process measures to see improvement.
- When choosing outcome measures, try to choose a standardized, nationality recognized data point that is easily and readily obtainable. Do not choose measures that take a lot of resources to obtain and track or that cannot be validated for accuracy.
- For eCQI projects, it may be useful to consider outcome measures associated with reimbursement programs such as value-based payment initiatives (MIPS), Meaningful Use, Patient Centered Medical Home (PCMH) or other quality reporting programs to capitalize on improvement efforts.

Process measures: These measures are the specific steps in a process that lead, either positively or negatively, to a particular outcome measure.

- It may take improvement on more than one process measure to affect an outcome measure.
- Improvement in process measures should happen more quickly than outcome measures and should show value to the organization/patients in a shorter timeframe.
- Choose process measures that have reliable evaluation measures to confirm performance.
- It may be useful to identify process measure/changes applicable to an outcome measure by completing the brainstorming form in Appendix F and available with more detail on the Health IT.gov website: https://www.healthit.gov/providers-professionals/planning-and-implementing-improved-care-processes and on measuring care processes: https://www.healthit.gov/providers-professionals/measuring-care-processes-and-outcomes.
    - Direct link to the inpatient form: https://www.healthit.gov/sites/default/files/cds/eCQI-Worksheet-Inpatient-Essential-05-15.pdf.
    - Direct link to the outpatient form: https://www.healthit.gov/sites/default/files/cds/eCQI-Worksheet-Ambulatory-Enhanced-05-15.pdf

Appendix B: SMART Goals

The benefits of using SMART criteria when determining goals is that being SMART means goals are not vague, progress is easy to monitor, it is easy to identify missed targets, and they help create action plans. Below describes each SMART criterion.

Specific
This criterion stresses the need for a specific goal rather than a more general one. This means the goal is clear and unambiguous, easy to determine if goal is met or not met.

A specific goal usually answers the five “W” questions:

- What: What do I want to accomplish?
- Why: Specific reasons, purpose or benefits of accomplishing the goal
- Who: Who is involved?
- Where: Identify a location.
- Which: Identify requirements and constraints.

Measurable
This criterion stresses the need for concrete criteria for measuring progress toward the attainment of the goal. If a goal is not measurable, the project team members will not know whether they are making progress toward a successful completion.

- A measurable goal will usually answer questions such as:
- How much?
- How many?
- How will I know when it is accomplished?
- Indicators should be quantifiable

Attainable (or achievable, agreed upon, action-oriented)
This criterion stresses the importance of realistic and attainable goals. While an attainable goal may stretch a team to achieve it, the goal should not be extreme.

An achievable goal will usually answer a “how” question:

- How can the goal be accomplished?
- How realistic is the goal based on other constraints?

Relevant (or realistic, results-oriented)
This criterion stresses the importance of choosing goals that matter. Relevant goals (when met) drive the team, department and organization forward. A goal that supports or is in alignment with other goals would be considered a relevant goal.

A relevant goal can answer yes to these questions:

- Does this seem worthwhile?
- Is this the right time?
- Does this match our other efforts/needs?
- Are you the right person?
- Is it applicable in the current socio-economic environment?

Time-based (or time-bound)

This criterion stresses the importance of setting goals within a timeframe, giving them a target date. A commitment to a deadline helps a team focus efforts on completion of the goal on or before the due date.

A time-based goal will usually answer the questions:

- When?
- What can I do six months from now?
- What can I do six weeks from now?
- What can I do today?

Appendix C: Project Scope and Change Backlog – Template

eCQI PROJECT SCOPE/CHANGE BACKLOG Template
Location Name:

Project Aim: (What are we trying to accomplish?)
Goal: (Make sure goal is SMART.)

Project Constraints: (What are the boundaries for this project?)
Budget: Schedule: Quality: Other: (Policies, regulations, management decisions)

Evaluation Measure: (Use standardized data, easily obtainable if possible. Examples include CMS, NQF, MIPS, IQR and/or UDS measures.)					
Measure	**Description**	**Data Source**	**Target Performance**	**Current Performance/ Date**	**Final Performance Date**

Project Team:			
Name	**Title/Department**	**Role**	**Responsibilities**

Possible Changes - Backlog

Possible Change (Process measures)	**Priority Ranking (Low, medium, high)**	**Estimated Sprint Assignment**	**Notes**

Appendix C: Project Scope and Change Backlog – Completed Example

eCQI PROJECT SCOPE/CHANGE BACKLOG
Location: Northwest Pediatric Clinic

Project Aim: Achieve and maintain control for asthma patients
Goal: Improve the % of active patients with asthma diagnosis with an ACT score >/= 20 by 20% by Dec 31, 2017

Project Constraints: (What are the boundaries for this project?)
Budget: Schedule: Quality Reporting for this measure is due by Feb 28, 2018 Quality: Focus on Northwest Clinic location only Other: (Policies, regulations, senior management requirements)

Evaluation Measure (Use standardized data, easily obtainable if possible. Examples include MIPS, NQF, CMS, IQR and/or UDS measures.)					
Measure	**Description**	**Data Source**	**Target Performance**	**Current Performance**	**Current Performance Date**
Custom (NIH Asthma guidelines)	% of active patients with any asthma diagnosis with ACT score greater than or equal to 20	EHR/EPIC Asthma flow sheet	67%	47%	3/1/17

Project Team			
Name	**Title/Department**	**Role**	**Responsibilities**
Jane Doe	Clinic Administrator	Project Leader	Work with EHR Vendor for data reports. Assist with communication to staff
John Doe	PCMH Coordinator	Clinical Leader	EHR expertise, workflow and process development, training and communication
Mary Smith	Quality Coordinator	Project Manager	Provide eCQI resources and templates, provide project management structure and reporting

Possible Changes - Backlog

Possible Change (Process measures)	**Priority Ranking (Low, medium, high)**	**Estimated Sprint Assignment**	**Notes**
Improve workflow for documenting ACT score and other assessment info in EPIC	High	In process	

Possible Change (Process measures)	**Priority Ranking (Low, medium, high)**	**Estimated Sprint Assignment**	**Notes**
Improve follow up appts for active asthma patients with prescription for daily inhaled steroid medication	High	3	FU appts every 6 months – check into EHR functionality for patient reminders and best practice alerts
Improve follow up appts for active asthma patients with ACT score less than 20			FU appts every 2-6 weeks until ACT score is over 19
Improve % of active asthma patients who have a care plan established and documented in EHR			
Improve % of active patients diagnosed with persistent asthma who are on appropriate medication	High	2	CMS 126 Percentage of patients 5-64 years of age who were identified as having persistent asthma and were appropriately ordered medication during the measurement period

Appendix D: PDSA Worksheet – Template

Current Date:	Location Name:	Sprint Start Date:	Sprint/PDSA Cycle #

Outcome Measure: (Project Goal – from Project Scope/Change Backlog Template)

Sprint/PDSA Cycle Aim: (Make a SMART goal)

Evaluation Measure(s) for this Aim: (Use standardized data, easily obtainable if possible)					
Measure	**Description**	**Data Source**	**Target Performance**	**Current Performance/ Date**	**Final Performance/ Date**

Sprint/PDSA Cycle Team			
Name	**Title/Department**	**Role**	**Responsibilities**

Current Status:

Plan

List the tasks needed to set up test of change	Person Responsible	Due Date	Notes
Task 1:			
Task 2:			
Task 3:			
Task 4:			
Task 5:			
Task 6:			
Task 7: (add more rows if needed)			

Do **Describe the results, successes and barriers of the PDSA activities.**

Study **Describe the measured results and how they compare to the predictions.**

Act **Identify the next PDSA cycle needed based on what was learned or plans to sustain changes or improvements.**

Appendix D: PDSA Worksheet – Completed Example

Current Date:	Location Name:	Sprint Start Date:	Sprint/PDSA Cycle #
3/15/2021	Northwest Clinic	3/1/2021	2

Outcome Measure: Achieve and maintain asthma control; Improve the % of active patients with asthma diagnosis with an ACT score >/= 20 by 10% by Dec 31, 2021.

Sprint/PDSA Cycle Aim: Improve performance by 20% for percentage of patients 5-64 years of age who were identified as having persistent asthma and were appropriately ordered medication during the measurement period (CMS 126) by June 1, 2021

Evaluation Measure(s) for this Aim: (Use standardized data, easily obtainable if possible)					
Measure	**Description**	**Data Source**	**Target Performance**	**Current Performance/ Date**	**Final Performance/ Date**
CMS 126	**Denominator**: Patients 5-64 years of age with persistent asthma and a visit during the measurement period **Numerator:** Patients who were ordered at least one prescription for a preferred therapy during the measurement period	EHR CQM report	60%	40% 3/5/2021	

Sprint/PDSA Cycle Team			
Name	**Title/Department**	**Role**	**Responsibilities**
Jane Doe	Clinic Administrator	Project Leader	Work with EHR vendor for data reports. Assist with communication to staff
John Doe	PCMH Coordinator	Clinical Leader	EHR expertise, workflow and process development, training and communication
Mary Smith	Clinical Staff	Medical Assistant	Provide clinical best practices and guidelines for asthma, help train staff and develop workflows

Current Status:
Team established baseline data for evaluation measure on 3/5 and confirmed correct workflow in EHR for CQM 126. Team is in process of training staff on correct electronic workflow. Jane working with EHR vendor to identify process for using EHR functionality for clinical reminder/ alert to support measure. Mary is working on creating workflow to include chart prep procedure.

Plan

List the tasks needed to set up test of change	Person Responsible	Due Date	Notes
Task 1: Establish baseline measure criteria for cycle/sprint (see above)	Jane	Complete	
Task 2: Confirm correct electronic data entry workflow to populate CMS 126	Jane	Complete	
Task 3: Work with EHR vendor to identify any clinical decision support (CDS) rules or alerts that can be set up to support measure and include in new workflow	Jane	3/15	
Task 4: Create workflow for chart prep to include asthma patient encounters	Mary	3/15	
Task 5: Train staff on new workflows: electronic data entry, chart prep and using reminders/alerts	Mary	3/20	
Task 6: Create and perform audit to confirm adherence to new workflow adjust workflows/ training as needed	Jane	3/27	
Task 7: Run updated evaluation measure report for current performance information	Jane	3/30	Run each week to confirm improvement/ process
Task 8: Make changes in workflow or training as needed based on updated data	Mary	4/15	
Task 9: Continue cycle until performance target is achieved	Team	5/30	
Task 10: Create plan to sustain or continue to improve measure	Team	6/5	
Task 11: Perform sprint/cycle review meeting and discuss this sprint, update change backlog and identify next sprint	Team	6/5	

Do **Describe the results, successes and barriers of the PDSA activities.**

Study **Describe the measured results and how they compare to the predictions.**

Act **Identify the next PDSA cycle needed based on what was learned or plans to sustain changes or improvements.**

Appendix E: eCQI EHR Functionality

1. Computerized Provider Order Entry (CPOE)

The basic functionality and purpose of CPOE is to encourage the direct entry of orders into the EHR by providers, or someone licensed that is close to the provider, who understands the purpose of the order and can determine whether it is clinically relevant and safe for the patient. This is a standard component to certified electronic health record technology (CEHRT). However, the workflow differs greatly between software systems.

It is important to understand system securities should be in effect with CPOE allowing or not allowing certain "job roles" to enter, edit or view provider orders. This is typically determined by the facility, not just the software company, when a system is initially implemented.

What does using CPOE mean to quality improvement efforts?

There are a multitude of data points that can be retrieved from CPOE to effect care improvement. Examples of data collected through order entry models are antibiotic usage, narcotic prescription monitoring and lab and diagnostic test usage. Using CPOE also provides the organization the opportunity to implement clinical decision support rules or guidelines at the point of care, which will be discussed later.

2. Patient Portals

The basic functionality and purpose of the patient portal is to provide patients and beneficiaries electronic access to **some** health information and ultimately promote active engagement of a patient in their care.

In 2014, all CEHRT had to be upgraded to a version that had some form of patient portal to meet Meaningful Use. Again, while the requirement is standard, the workflow and approach to implementation differs by software and facility. The requirement is that a patient must have the ability to "view, download and transmit" their electronic health information. Functionality that is available with most portals is to:

- Allow the patient to view/edit demographic and insurance information
- View lab test results
- View imaging reports
- Review clinical visit summary
- Review medication list
- Review/edit allergy list
- Request an appointment
- Request a refill
- Pay a bill
- Send a secure email to a provider/nurse

Use the patient portal to engage patients in monitoring blood or blood sugar as well as to direct them to credible patient education resources.

While most portals have the above functions available, it is ultimately decided by the organization/provider what functions are "active" or "turned on" for the patient to be able to use. For example, clinic A may choose not to show any lab test results, where clinic B may choose to show all lab test results after they are reviewed by a provider.

In addition, portals are sometimes a standalone or third-party application and may be a different vendor than the primary EHR. This will be an important consideration when we discuss what data is available from a patient portal.

What does having a patient portal mean for quality improvement efforts?

A patient portal can provide direct, "outside-the-office" access to patients. Use it for patient education. Most patients are searching the Internet regarding their medical condition, so why not have patients search using a patient portal or a provider-supplied credible source? Engaging patients in reporting their own measurements for blood pressure or blood glucose online could be an effective way to collect data as well as improve patient care with real-time monitoring.

3. Health Information Exchange Overview

Health information exchange = Continuity of care for patients

The basic concept of health information exchange (HIE) is to allow health care professionals and patients to appropriately access and securely share vital medical information electronically. HIE is sometimes used as a noun or a verb. With Meaningful Use, there were HIEs created to act as central repositories for patient information, while at the same time a facility/provider can exchange health information with another individual facility/provider (Office of National Coordinator, 2014).

Participating in and using the functionality of HIE can be a key factor in successful transitions of care between providers and facilities as well as communicate information to data registries.

The process to successful information exchange at the facility/provider level (also known as directed exchange) is:

1. Outline how you see the process working.
2. Start small. Test with one other provider/organization willing to help.
3. Pilot the process with involvement from those who will be doing it on a day-to-day basis.
4. Take the time to review the process.
5. Try again.
6. When successful, move on to performing the task more frequently, i.e., all transfers to "x" facility/provider will have a clinical summary sent electronically.
7. Review the process as a continuous improvement indicator, monitoring successful and failed exchanges until the process is hardwired.

What does using health information exchange mean for quality improvement?

HIE is all about improving communication between providers and/or facilities. This is potentially one of the areas where patients stand to gain through the continuity of care delivery. Moving through the steps noted above to improve the ability to communicate with one another can only be a benefit to the patient.

4. Clinical Decision Support (CDS): More than just alerts!

"CDS is an interactive part of an application that assists clinicians with decision-making tasks—it is a hallmark of any clinical information system. Its primary objectives are to prevent errors of commission (the wrong thing was done) and of omission (something was not done that should have been), through alerts and templates with required data entry elements; and improve quality of care, through reminders and other forms of guidance." (Stratis Health, 2009)

To improve targeted health care decisions/outcomes with well developed and deployed CDS interventions, the interventions must provide

- the ***right information***,
- to the ***right people***,
- in the ***right intervention formats***,
- through the ***right channels***,
- at the ***right points in workflow***.

Think beyond pop-ups when using CDS!

CDS functionality differs by software in the level of sophistication that is available.

The different levels of sophistication are:

- **Data Display:** Data review tools such as flow sheets, patient data reports and graphic displays, search tools
- **Workflow Assistance:** Task lists, patient status lists, integrated clinical and financial tools and instant messaging/internal communication tools
- **Data Entry:** Templates to guide documentation and structured data collection
- **Decision Making:** Access to resources on a topic from within the EHR, rule-based alerts, clinical guidelines or pathways, patient/family preferences and diagnostic decision support

CDS rules can be **active**, require user action, or **passive**, and do not require user action.

Using CDS to target conditions and standardize treatments

Most CEHRT software will have a "starter set" of clinical decision support rules to coincide with the clinical quality measures (CQMs) in addition to being able to set up some individual facility specific rules.

The following considerations need to be given to evaluate the usefulness of a CDS function when setting up CDS to improve quality of care delivery and patient safety:

- Specificity
  - Relevance to the patient
  - Accurate information
  - Consistent with standard of care
  - Promote action or alternative actions
- Sensitivity and workflow
  - Directed to the right person/role based user

    - Directed to the right situation
- Safe/efficient handling
    - Overrides should not be easy or frequent in use
    - Reasons for noncompliance should be requested
    - Consider screen design, size
    - Minimize scrolling, keystrokes, typing, clicks, steps and screen changes

Taking the time to map the process associated with the quality improvement goal and identify exactly where in the workflow data exists to support the quality improvement goal is a worthwhile exercise. Then establish CDS interventions at those points to support data collection and achieve goals.

Some specific examples of CDS functionality being used to support specific conditions:

- Tdap reminder/screening tool
- Coumadin regimen documentation templates
- Links to clinical guidelines/pathways within the EHR
- Chlamydia screening tools
- Tobacco cessation counseling triggers and templates
- Weight counseling for elevated body mass index (BMI)
- Documented use of aspirin or anti-thrombolytic in emergency department patients
- Standing orders for admission of a pneumonia patient
- Chronic disease self-management education materials and documentation templates

What does using CDS mean for quality improvement?

A key part of implementing CDS and using it effectively for quality improvement is responsibility for the ongoing management of the functionality. It is highly recommended that management of CDS rules and activities is done in alignment with quality reporting and data collection and not a silo function of any one department or individual. It may even be suggested the task of managing CDS is done by an existing quality improvement committee. This may also mean that information technology (IT) staff will need to be part of the committee to effectively monitor and implement what is needed.

The responsibilities associated with managing the CDS functionality for effective quality improvement collection and reporting are:

- Evaluation of current CDS rules (see Appendix A). A review or compilation of what rules/templates/guidelines currently in use at the practice/in our workflow? Do you have rules set up that do not apply?

- Review and approval process for adding or dropping rules with a formal change management request and IT involvement

- Communicate the change in the CDS

- Follow up on changes made with reviewing alert usage/overrides, monitoring for template usage, chart reviews

- Ensure resources used in CDS are kept up-to-date. Not all systems are connected to a

service that updates reference materials. This would also include review and upkeep of internal or customized documents.

5. Patient Level Alerts

The basic functionality and purpose of the patient level alert is to provide an option other than, or in conjunction with CDS alerts, to target a specific patient. Unlike CDS alerts, which have a “global” affect, different alerts can be set for the same condition, for different patients, based on individual needs, timeframes or provider preference. (Not all EHRs may have this functionality.) Also, unlike CDS, these alerts do not “automatically fire” based on criteria and existing data in the HER. Instead, they are manually created individually and customized for each patient.

What does using patient level alerts mean for quality improvement?

Use patient level alerts to act as a note, alert or reminder to providers and staff on specific needs of an individual patient or to address a specific aspect of care for a specific patient. For example, set up a patient level alert for a prehypertensive patient to provide reminders or notes on care specific to that patient’s condition and based on information from the previous encounter.

Appendix F: eCQI Brainstorm Worksheet Template

HIT-enabled Quality Improvement [eCQI] Worksheet (Ambulatory, Essential Version)

This tool can help users document and analyze current approaches to specific quality improvement targets and plan enhancements.

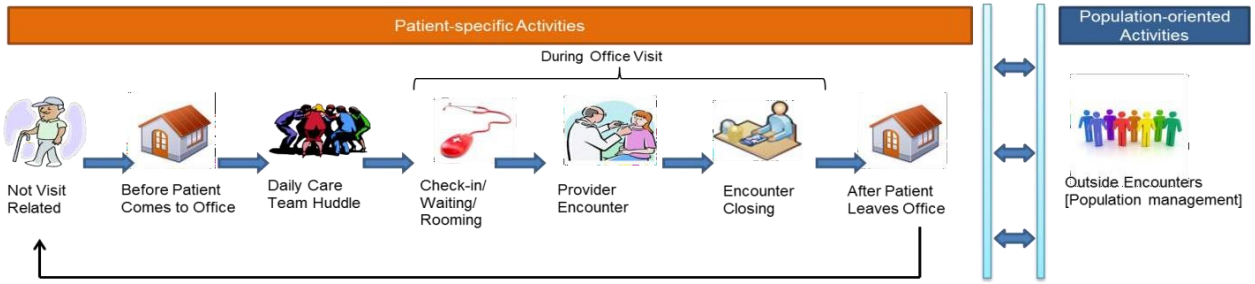
Instructions for using this worksheet:
Step 1: Document the improvement target and current performance.
Step 2: Think about pertinent information flows and workflows driving performance.
Step 3: After discussion with pertinent stakeholders, document current state information flows and workflows for the target. Brainstorm potential enhancements to the current state with the QI team and document these in the pertinent boxes beneath the current state.
Step 4: Review all entries and summarize them in the overview table.
Step 5: Use this completed worksheet with the quality improvement (QI) team to help prioritize and implement high-yield enhancements to current workflows and information flows; consider beginning with those that will yield the greatest benefits with the least effort and resources (see ONC eCQI Process Improvement page for further details).

Worksheet Provided By:
Jerome A. Osheroff, MD, TMIT Consulting, LLC
This tool has been refined based on experience using the eCQI worksheets in quality improvement (QI) projects. It builds on QI tools sponsored by the Office of the National Coordinator for Health IT (ONC). Those ONC tools were based on work of the CDS/PI Collaborative (supported by the California Healthcare Foundation), which builds, in turn, on the HIMSS CDS Guidebook Series. The information in this document is not intended to serve as legal advice nor should it substitute for legal counsel. Users are encouraged to seek additional detailed technical guidance to supplement the information contained within.
Version 2.0; May 22, 2015

More information on this worksheet and completed sample worksheets for both ambulatory and inpatient QI initiatives can be found at https://www.healthit.gov/providers-professionals/planning-and-implementing-improved-care-processes.

Ambulatory QI Worksheet (Simplified Version)

Target	
Current Performance on Target	



	Not Visit Related	Before Patient Comes to Office	Daily Care Team Huddle	Check-in/ Waiting/ Rooming	Provider Encounter	Encounter Closing	After Patient Leaves Office	Outside Encounters (Population Management)
Current Information Flow								
Planned Enhancements								

Section 1: Activities that occur with specific patients
(Note: population management activities, e.g., Registry use, belong in Section 2)

A. These activities occur when the patient is not in the office (see C. below for activities "After Patient Leaves Office").

Not Visit-Related	**Description:** Not related to a patient's visit to the office/clinic or just before or after that visit
Current Information Flow	•
Planned Enhancements	•

Before Patient Comes to Office	**Description:** After a patient has an office visit scheduled but before they arrive for that appointment
Current Information Flow	•
Planned Enhancements	•

B. These activities occur when the patient is in the office.

	**Daily Care Team Huddle**	**Description:** Provider team preparations for all patient visits scheduled for the day
	Current Information Flow	•
	Planned Enhancements	•
	**Check-in/ Waiting Room**	**Description:** After patient checks in, before encounter with clinical team
	Current Information Flow	•
	Planned Enhancements	•
	**Provider Encounter**	**Description:** Main encounter with provider
	Current Information Flow	•
	Planned Enhancements	•
	**Encounter Closing**	**Description:** After main provider encounter, but before patient leaves the office
	Current Information Flow	•
	Planned Enhancements	•

C. These activities occur after the patient leaves the office.

	**After Patient Leaves Office**	**Description:** After main provider encounter, but before patient leaves the office
	Current Information Flow	•
	Planned Enhancements	•
	**Outside Encounters**	**Description:** Activities focused on the entire patient portal
	Current Information Flow	•
	Planned Enhancements	•

Appendix G: PDSA Cycle

The PDSA cycle is a systematic series of steps for gaining valuable learning and knowledge for the continual improvement of a product or process. Also known as the Deming Wheel, or Deming Cycle, the concept and application was first introduced to Dr. Deming by his mentor, Walter Shewhart of the famous Bell Laboratories in New York.

The cycle begins with the **plan** step. This involves identifying a goal or purpose, formulating a theory, defining success metrics and putting a plan into action.

These activities are followed by the **do** step, in which the components of the plan are implemented, such as making a product.

Next comes the **study** step, where outcomes are monitored to test the validity of the plan for signs of progress and success, or problems and areas for improvement.

The **act** step closes the cycle, integrating the learning generated by the entire process, which can be used to adjust the goal, change methods or even reformulate a theory altogether. These four steps are repeated over and over as part of a never-ending cycle of continual improvement.

Reference: The Deming Institute: https://www.deming.org/theman/theories/pdsacycle

The Institute for Healthcare Improvement (IHI) Model for Improvement
The IHI Model for Improvement is a simple strategy that many organizations currently use to accelerate their improvement strategies. A clinical quality improvement (CQI) initiative based on the IHI Model for Improvement focuses on setting aims and teambuilding to achieve change. It promotes improvement by seeking answers to three questions:

- What are we trying to accomplish?
- How will we know that a change is an improvement?
- What changes can we make that will result in improvement?

Principles
To answer these questions, a CQI initiative uses a plan-do-study-act (PDSA) cycle to test a proposed change or CQI initiative in the actual work setting so changes are rapidly deployed and disseminated. The cycle involves the following seven steps:

1. **Form the team**. Including the appropriate people on a process improvement team is critical to a successful effort. The practice (or provider) must determine the team's size and members. Practice staff persons are the experts at what works well in the practice and what needs to be improved. Include them in identifying and planning the implementation of any eCQI initiative.

2. **Set aims**. This step answers the question: What are we trying to accomplish? Aims should be specific, have a defined time period and be measurable. Aims should also include a definition of who will be affected: patient population, staff members, etc. For practice transformation, the aims should ideally be consistent with achieving one or more of the triple aims previously discussed.

3. **Establish measures**. This step answers the question: How will we know that a change is an improvement? Outcome measures should be identified to evaluate if aims are met. Practices should select measures using data they are able to collect.

4. **Select changes**. This step answers the question: What changes can we make that will result in improvement? The team should consider ideas from multiple sources and select changes that make sense.

5. **Test changes**. First, the changes must be planned and downstream impacts analyzed to assess whether they had the desired outcome or output. Once the changes are implemented, the results should be observed so that lessons learned, and best practices can be used to drive future changes.

6. **Implement changes**. After testing a change on a small scale, learning from each tes, and refining the change through several PDSA cycles, the team may implement the change on a broader scale, for example, for a pilot population or on an entire unit.

7. **Spread changes**. After successful implementation of a change(s) for a pilot population or an entire unit, the team can disseminate the changes to other parts of the organization.

Reference:
http://www.ihi.org/resources/Pages/HowtoImprove/ScienceofImprovementHowtoImprove.aspx

Identifying and Selecting Changes
While all changes do not lead to improvement, all improvement requires change. The ability to develop, test and implement changes is essential for any individual, group or organization that wants to continuously improve. There are many kinds of changes that will lead to improvement, but these specific changes are developed from a limited number of change concepts.

A change concept is a general notion or approach to change that has been found to be useful in developing specific ideas for changes that lead to improvement.

Creatively combining these change concepts with knowledge about specific subjects can help generate ideas for tests of change.

After generating ideas, run PDSA cycles to test a change or group of changes on a small scale to see if they result in improvement. If they do, expand the tests and gradually incorporate larger and larger samples until you are confident that the changes should be adopted more widely.

- **Eliminate waste** – Look for ways of eliminating any activity or resource in the organization that does not add value to an external customer.

- **Improve workflow** – Improving the flow of work in processes is an important way to

improve the quality of the goods and services produced by those processes.

- **Optimize inventory –** Inventory of all types is a possible source of waste in organizations. Understanding where inventory is stored in a system is the first step in finding opportunities for improvement.

- **Change the work environment** – Changing the work environment itself can be a high-leverage opportunity for making all other process changes more effective.

- **Producer/customer interface** – To benefit from improvements in quality of products and services, the customer must recognize and appreciate the improvements.

- **Manage time** – An organization can gain a competitive advantage by reducing the time to develop new products, waiting times for services, lead times for orders and deliveries and cycle times for all functions in the organization.

- **Focus on variation** – Reducing variation improves the predictability of outcomes and helps reduce the frequency of poor results.

- **Error proofing** – Organizations can reduce errors by redesigning the system to make it less likely for people in the system to make errors. One way to error proof a system is to make the information necessary to perform a task available in the external world, and not just in one's memory, by writing it down or by actually making it inherent in the product or process.

Reference: Institute for Healthcare Improvement: http://www.reachoutandread.org/FileRepository/QI_ImprovementMethods_0311_FINAL_POST.pdf

Appendix H: Use of Data

Overview: Have the Right Data and Use the Data Well

For all electronic clinical quality improvement (eCQI) projects, a practice must use quality data. Therefore, every effort should be made to ensure data are timely, accurate and measure what they are intended to measure.

- **Consider the source of the data for each metric needed to assess performance**. The electronic health record (EHR) cannot collect every kind of data needed for clinical quality improvement (CQI). Some data may have to be collected by someone watching and tracking activities in real time or through surveys of staff and patients.

- **Ensure the EHR collects the data needed to support eCQI efforts as structured data in the EHR.** Data stored in free text fields or document images will not automate data collection. Ideally, it is best to know this before an EHR is purchased or upgraded.

- **Establish targets and benchmarks**. The results of an eCQI analysis are meaningless if no data exist for comparison. Many clinical measures have national and regional benchmarks (e.g., Healthcare Effectiveness Data and Information Set [HEDIS] for process of care measures). The best benchmark, however, is generated within the practice through the collection of baseline data which the practice uses to set a reasonable target for improvement over a specified period. Improvement is tracked by periodic comparison of pre- and post-data.

- **Establish a broad set of measures—structure, process and outcomes.** Although quality (outcome) measurement is a prime concern, on its own, it tells nothing about why outcomes occur. Collecting structure and process measures will help uncover and address the underlying causes of poor performance.

- **Aggregate data to assess the practice population.** One of the most efficient ways to carry out eCQI initiatives focused on quality of care is to aggregate the data for patients with similar conditions into a registry. These patients often experience similar issues with treatments, medication adherence and coordination with specialists, so it makes sense to view them as a distinct population that a practice monitors and tracks over time. In addition, a disease registry allows the practice to identify patients who are outliers and may need even more attention and follow-up.

- **Conduct periodic data quality audits**. Most measures are captured as simple statistics (e.g., counts, percent, mean and mode) to ensure the EHR is producing accurate and complete denominator and numerator data.

Reference:
http://www.healthit.gov/sites/default/files/continuousqualityimprovementprimer_feb2014.pdf

Specific steps you can take to understand, use and validate your data:

1. *First, understand your reporting capability.*

The following factors can affect what level of reporting functionality you have at your facility:

- Reporting functionality differs between software companies.
- Even with the same software, functionality may vary between facilities based on what was purchased by the facility.
- Functionality at the facility level can vary between individuals based on permissions and security access levels. You may need to obtain permission from your system administrator for the access to run or create reports.

Standard or Canned Reports

Most facilities will have purchased a basic level of reporting that allows for the creation of required reports such as Meaningful Use, Clinical Quality Measures and Physician Quality Reporting. These may be referred to by your software as "canned" or "standard" report options.

Data validation is a key step to ensuring data credibility.

There may also be canned reports available to other departments, such as pharmacy or accounting, and executive level staff that may be surprisingly useful in QI projects. It would be a useful exercise to query other departments or get a list from the software company of the types of canned reports available. For example, the pharmacy may have access to a drug use evaluation report that could be used for monitoring an antibiotic stewardship program.

Standard reports used by a software company may be from third party software (e.g., Iatric Systems with Meditech) that may need to be accessed. It is important to learn which reports are standard.

Customized or Ad Hoc Reports

Some organizations can generate customized reports internally, while others cannot. If customized reports cannot be generated internally, they may need to be requested from the software company. However, only make this request if the first step above does not yield the needed reports, as there is often an associated cost with generating customized reports.

If customized reports can be generated internally, learn the following from the software company about the reports:

- What kind of operators or "query strings" are available (commands like AND, OR, EQUALS, LESS THAN, MORE THAN, etc.)?
- What fields are identified as "available" or "not available" from which to pull data, and where is this information found (e.g., software manual)?
- From what databases can reports be run? As noted in section one, if databases are separate for clinical and practice management information, separate reports may need to be run to gather all the necessary information.
- Can data be pulled from customized documentation templates?
- How can data be pulled and exported into another program (e.g., Microsoft Excel) for

effective analysis and use? For example, pulling data into an Adobe Acrobat (PDF) file does not allow for manipulation of the information.

However, we know that reporting alone does not equal improvement….

2. *Second, collect and use EHR data.*

Once an organization understands what reports are available, the next step is using the available data to make real improvements.

After defining a metric and identifying a data element on a report, validate the data being pulled into the report. This process involves working backward from the report all the way to the data field from which the data is pulled to **validate the accuracy of the information**. It is much like the process of a root cause analysis. Follow the data back to its "root" and then discover why it may not be entered or pulled to the report correctly.

Validating Data

The following are key factors promoted by the Healthcare Information and Management Systems Society (HIMSS) to ensure the useful and accurate collection of data from an EHR (Ellen Harper DNP, 2015):

- Promote/use standardized terminologies, e.g., American Nurses Association (ANA) terminology, Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT) and Logical Observation Identifiers Names and Codes (LOINC). Most of these terminologies are in place for CEHRT, as they are part of the certification process for Meaningful Use.

- Use research-based, nationally recognized assessment scales or tools, because they are evidence-based, can be more cost effective than designing unique tools and allow for quality improvement purposes as an opportunity for care delivery comparison with potential national benchmarking capability.

- Consistently use discrete data, which equates to little to no free text in important fields. Free text entry has its purpose, but not in fields from where organizations are trying to collect accurate, useful data. Entries of "within normal limits" also do not provide useful data.

Streamlining clinicians' workflow, as opposed to making them chart one more thing, is a significant contributor to user success. The following strategies can be used to optimize documenting with an EHR:

- Directly observing how staff uses the EHR

- Evaluating for a need for additional training on EHR software or computer skills, taking advantage of user "favorites" for ease of use, sensitivity of clinical decision support (CDS), etc.

- Mapping process and workflows, including EHR processes and workflows, with frontline staff to identify where they are performing workarounds, avoiding alerts, running into issues

- Evaluating the effect of the physical environment – Is the layout and placement of computers/laptops/tablets conducive to productivity and accurate charting? Do clinicians have to walk a long distance from the patient's room to chart? Are there enough devices? How many staff can be logged into a patient's chart at the same time?

- Evaluating what information is being collected and how often it is duplicated by another role or the same user – This should be done on an ongoing basis before any "new" item/assessment tool, etc., is added to the EHR. Be sure the information is not already captured elsewhere.

- Determining alternative sources for data entry, e.g., previous admission information, demographics, office visit information, emergency department visit information, etc. – There is the potential for the patient/family to enter some information into the record on a device at the bedside or in the waiting room.

- Supplying value for and feedback on the data being collected to the clinicians – Involvement in choosing QI metrics and information flowing back to the clinicians provide value for time spent on data entry.

Appendix I: Basic QI Data Collection Tools

Introduction

Most organizations use quality tools for various purposes to improve, control and assure quality.

Although several quality tools are available for certain domains, fields and practices, some of the quality tools can be used across industries. The quality tools included in this guide are intended to be generic for use in any setting for various disease conditions, workflow improvement or any other outcome.

There are primarily seven, basic quality tools. When used appropriately, these tools can provide objective insight to problems in the organization and assist with developing solutions. Typically, brief training, mostly self-training, is sufficient for someone to start using the tools.

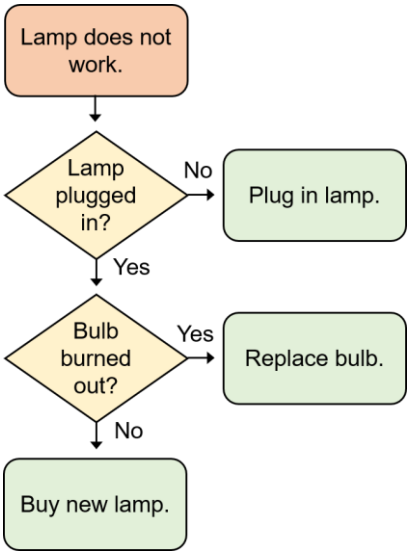
We will briefly review each of the seven tools.

1. Flow Charts

A flow chart is a basic quality tool that can be used for visual analysis regarding the sequence of events.

Flow charts map a series of events that take place sequentially or in parallel. A flow chart can be used to understand relationships and dependencies between events of a complex process and/or to determine the critical path of the process and the events pertinent to the critical path.

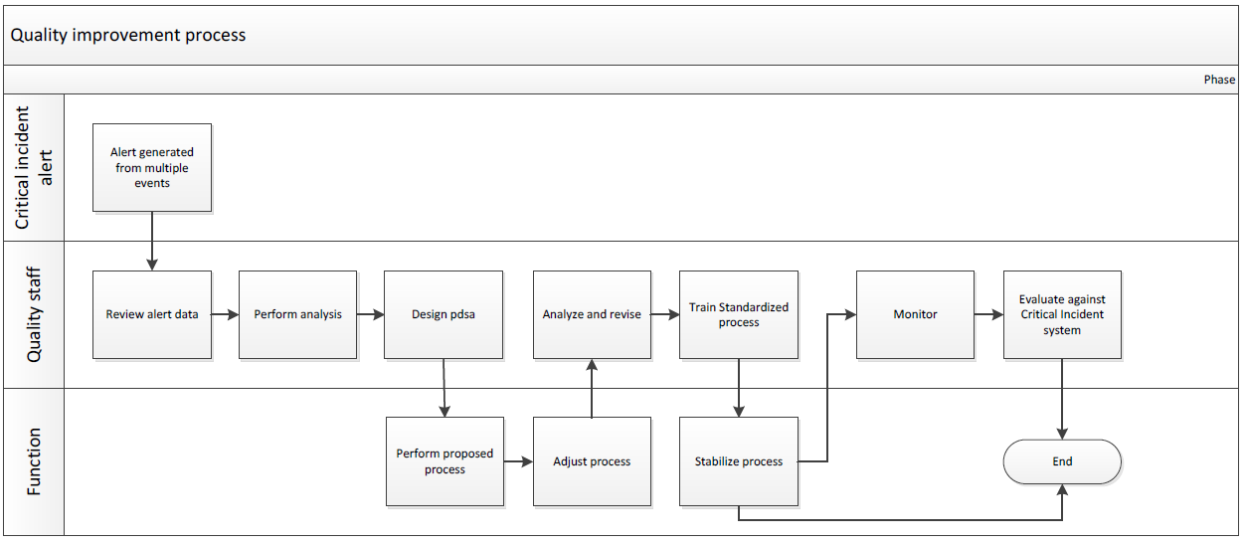
Specific software tools have been developed for drawing flow charts, e.g., Microsoft Visio, and some flow chart tools are available in Microsoft Excel. Downloadable, open-source flow chart tools are also available for free online.



A swim lane diagram is a type of flow chart. The swim lane flow chart differs from other flow charts in that processes and decisions are grouped visually by placing them in lanes. A swim lane (or swim lane diagram) is a visual element used in process flow diagrams, or flow charts, that visually distinguish job sharing and responsibilities for sub-processes of a business process. Swim lanes may be arranged either horizontally or vertically.

See the following page for an example of a swim lane diagram.

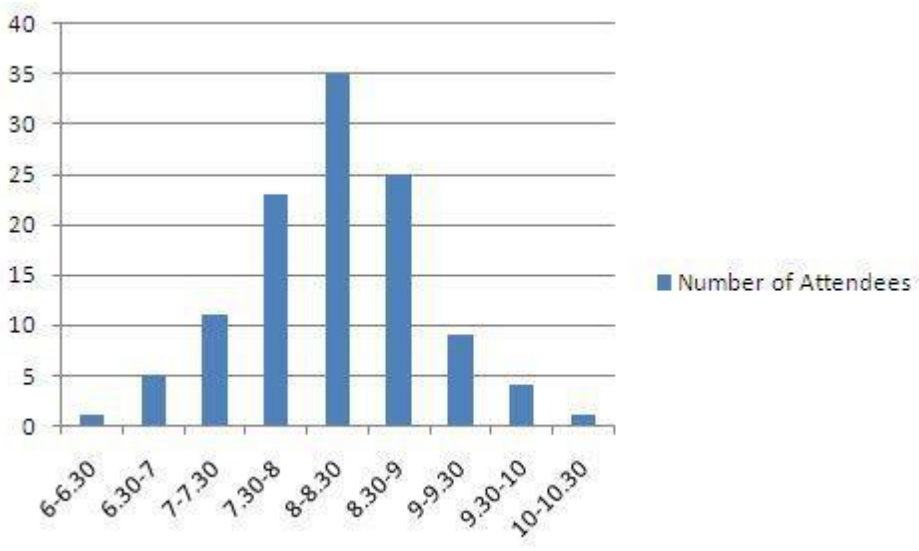
Reference: Wikipedia (Swim lane only) http://en.wikipedia.org/wiki/Swim_lane



2. Histogram

A histogram is used for illustrating the frequency and extent in the context of two variables. The histogram is a chart with columns that represent distribution by mean. If the histogram is normal, the graph takes the shape of a bell curve. If it is not normal, it may take different shapes based on the condition of the distribution. A histogram should always be two variables measured against each other.

Consider the following example. This histogram shows morning attendance of a class. The X-axis is the number of students, and the Y-axis is the time of day.



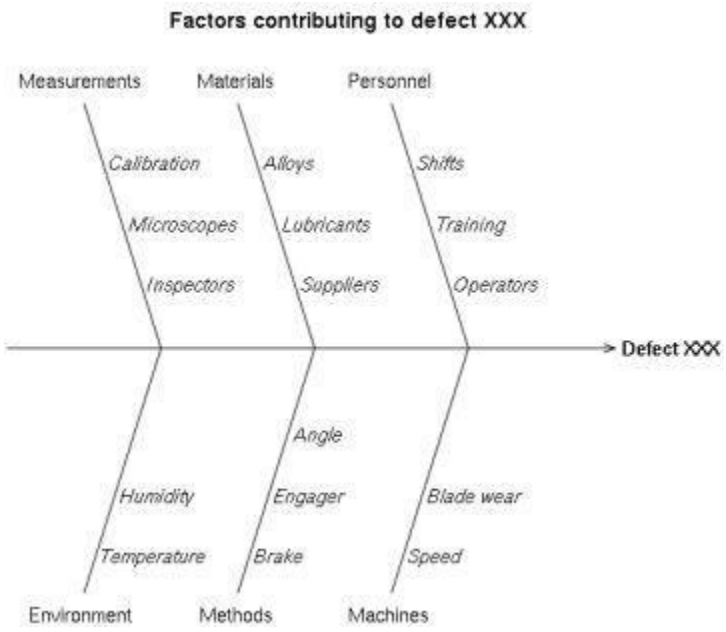
3. Cause-and-Effect Diagram

Organizations face problems every day, and it is important to understand the causes of these

problems to solve them effectively. Cause-and-effect diagrams, or Ishikawa diagrams, are used for understanding organizational or business problem causes. Developing a cause-and-effect diagram should be a teamwork exercise and consists of the following steps:

1. A brainstorming session is required to come up with the components of the cause-and-effect diagram.
2. All the main components of a problem area are listed, as are possible causes from each area.
3. Then, the most likely causes of the problems are identified for further analysis.

Here is an example of a completed cause and effect diagram:



4. Check Sheet

A check sheet can be introduced as the most basic tool for quality. A check sheet is basically used for gathering and organizing data and for standardizing processes.

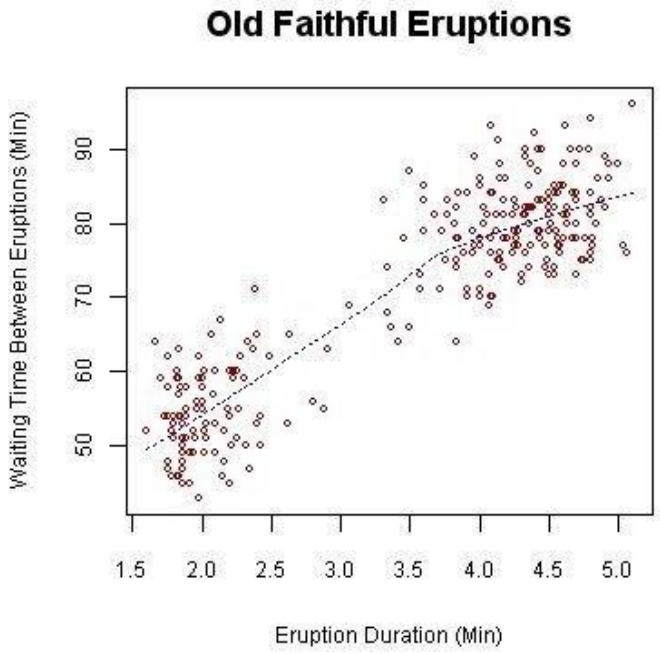
When a check sheet is done with the help of software packages such as Microsoft Excel, organizations can derive further analysis graphs and automate through available macros. Therefore, it is a good idea to use a software check sheet for information gathering and organizing needs.

Organizations can always use a paper-based check sheet when the information gathered is only used for backup or storing purposes other than further processing.

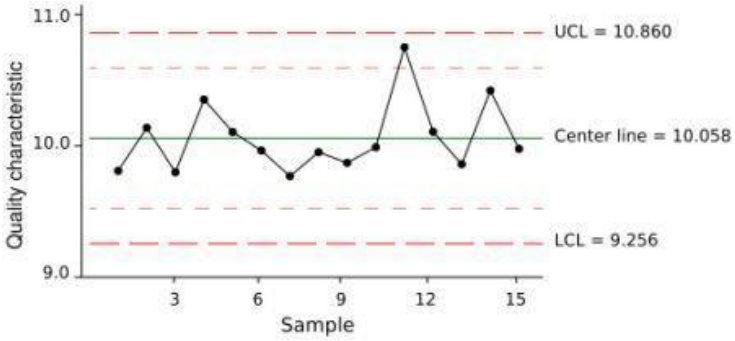
5. Scatter Diagram

When it comes to the values of two variables, scatter diagrams are the best presentation. Scatter diagrams depict the relationship between two variables and illustrate the results on a

Cartesian plane. Then, further analysis, e.g., trend analysis, can be performed on the values. In these diagrams, one variable denotes one axis, and another variable denotes the other axis.



6. Control Charts



A control chart is the best tool for monitoring the performance of a process. These types of charts can be used for monitoring any processes related to function of the organization.

These charts identify the following conditions related to the monitored process:

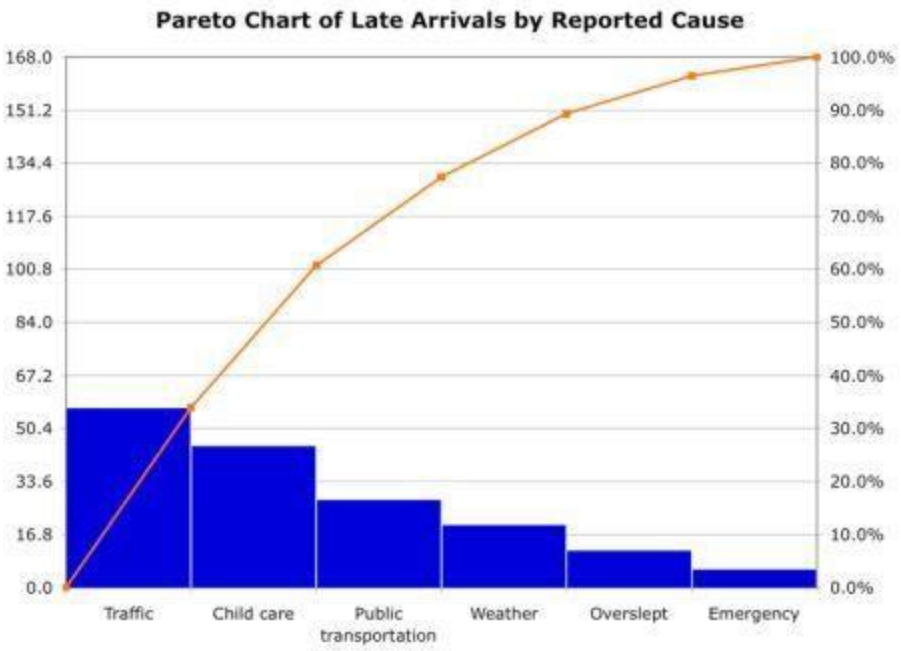
- Stability of the process
- Predictability of the process
- Identification of common cause of variation
- Special conditions where the monitoring party needs to react

7. Pareto Charts

Pareto charts are used for identifying a set of priorities. Organizations can chart any number of issues/variables related to a specific concern to record the number of occurrences.

This tool assists in determining the parameters that have the highest impact on the specific concern to prioritize issues and work more focused and effectively on controlling the process.

An example of a pareto chart is on the following page.



Conclusion

These seven basic quality tools can assist with addressing different concerns. Widespread and standardized use of such tools in improvement activities could enhance the efficiency of quality improvement projects and the organization as a whole.

Reference: http://www.tutorialspoint.com/management_concepts/basic_quality_tools.htm (all except swim lane diagram)

Appendix J: Organization eCQI Assessment Survey Sample

Date completed: _____

Organization Name: _____

Organization City: _____ Organization State: _____

Organization Type (Clinic/RHC/FQHC/Hospital/PPS/CAH): _____

System Assessment	Facility Response
EHR Vendor	
EHR System and Version	
Is this system/version CHPL Certified to 2014 or later standards?	
Is this system hosted or off site? If so, by whom?	
Finance system and version (if different from EHR)	
Report writing system and version (if different from EHR)	
Do you have onsite EHR technical support? If not, who provides this for you?	
Who currently has access to running standard reports (Meaningful Use, MIPS, IQR, etc.)?	
Who currently has access to creating and running custom reporting?	
Is your organization comfortable and experienced creating customized reports?	
Additional information/notes/questions	

EHR Use Assessment	Facility Response
Number of locations included in EHR database	
Patient population using EHR (all, main clinic only partial population, ER only, inpatient only)	
What clinical decision support (CDS) rules are currently in place?	
Can you create new or customize existing CDS rules?	
Is patient portal functionality activated?	
Are patients actively using patient portal?	
What information is currently available to patients via the portal?	
Do you use patient level alerts?	
Can you create new or customize existing patient alerts?	
Are reports available that monitor the use/override of CDS alerts?	

EHR Use Assessment	Facility Response
Are reports available that identify all CDS rules currently active?	
Are reports available that identify all patient level alerts currently active?	
Do you submit information to any chronic condition registry? If so, which one?	
Do you submit immunization or lab information to the state registry?	
Do you electronically submit transition of care documents to other facilities?	
Do you have a meaningful use dashboard?	
Do you have a chronic care management dashboard?	
Additional information/notes/questions	

Quality Reporting Assessment	Facility Response
Did you attest Meaningful Use (MU) last year? If so, what stage?	
Are you currently or did you ever report to the EHR Incentive program (MU)?	
Who is currently monitoring your MU performance and in charge of success?	
Did you report Physician Quality Reporting System (PQRS) last year?	
If so, what method (claims, registry, EHR GPRO Web Interface)?	
Will you be reporting Merit-based Incentive Payment System (MIPS) this year?	
If so, what method (claims, registry, EHR GPRO Web Interface)?	
Who is currently monitoring your MIPS performance and in charge of success?	
What efforts have you taken to validate the quality performance data?	
Please identify any other external initiatives you are participating in (UDS, PCMH, APM, IQR, DPHHS, QIO, etc.). What measures are you tracking for these initiatives?	
Who is currently monitoring performance and in charge of success?	
Please identify any internal QI indicators currently monitored and to whom they are reported.	
Who is currently monitoring performance and in charge of success?	
What efforts have you taken to validate this quality performance data?	
How many clinical quality measures (CQMs) are you tracking and reporting on in your EHR?	
Can you run quality reports (CQM) on demand?	
Can you customize your quality (CQM) reports (fields, date ranges, payer, diagnosis, etc.)?	
What other quality reporting options (other than CQMs) or functionality is available in your EHR (dashboards, IQR/PCMH or other quality program tracking)?	
Are you confident in the quality of data in your CQM or other reports?	

Quality Reporting Assessment	Facility Response
Are you confident the correct workflows are being used to populate the EHR with data needed to populate the quality reports?	
Does your EHR vendor provide documented workflows to support the CQM reports?	
Are you able to export your CQM reports in QRDS type 1 or 3 format?	
Additional information/notes/questions	

Quality Improvement (QI) Culture Assessment	Facility Response
Do you have a QI committee?	
Do you have a QI team?	
Do you have a clear process for the flow of data and reporting through your facility to outside entities?	
Do staff/providers receive feedback reports regarding QI initiatives/reporting?	
Is QI performance tracked/graphed regularly and reported to staff or displayed?	
Additional information/notes/questions	

Technical Assistance (TA) Assessment	Facility Response
What type of TA would you like?	
Additional information/notes/questions	

Appendix K: Certified EHR & EHR Adoption

Definition of a Certified EHR

Certification does not mean standardization of EHR software!

What does it mean to have a certified electronic health record (EHR)?

The Office of the National Coordinator (ONC) has established standards and certification criteria by which vendors (software companies are referred to as vendors) can become accredited to indicate their software has met the functional requirements necessary to assist a facility or provider in meeting Meaningful Use. To attest to Meaningful Use, providers/organizations must have implemented certified electronic health record technology (CEHRT) and used this technology to meet the Meaningful Use criteria.

What does it NOT mean to have a certified EHR?

Certification does not mean standardization. Certification simply indicates that software has met the basic necessary criteria for achieving Meaningful Use. The outcome is that software systems differ greatly in their workflow. This has resulted in some confusion and frustration among providers and organizations.

There are some consistent components to an EHR.

EHRs are consistently composed of "like" basic parts:

1. The **Practice Management System (PMS)** is often a separate database from the EHR, but typically includes the following parts:
    - Scheduling and billing module
    - Registration/check in
    - Demographics
    - Claims
    - Business report generation

The components of an EHR may be built from different databases, which could impact how QI data is collected.

2. The **Electronic Health Record (EHR)** is the clinical documentation and results system that generally includes:
    - Health information and data
    - Clinical decision support (CDS)
    - Computer Provider Order Entry (CPOE) – procedures, tests, med, imaging, etc.
    - Medication management (drug formulary, allergy, reconciliation)
    - eRX – electronic prescribing (usually a third-party application, integrated with EHR, e.g., Surescripts)
    - Population Health Management – data collection and transmission tools/interface

Achieving Widespread Use/Adoption of the EHR

There is no "magic bullet" to successfully achieve widespread use, and achieving widespread use is far different from being successful at widespread user satisfaction. What does exist now that did not exist 10 years ago is mainstream use that provides us experience to do a better job

at adopting EHRs. Briefly, the factors consistent with the most successful organizations (success meaning, widespread use with general user acceptance):

- Active leadership involvement at all levels, to include the board, executive, management and supervisors
- Active provider and frontline staff input in the selection process
- Use of decision-making tools (to provide documentation)
- Narrowing the field early to vendors that make sense for the organization (Do not spend time on a vendor that is unaffordable in the end.)
- Due diligence in understanding the contract and maintenance agreements
- Ongoing communication and discussion after implementation!
- Dedication to continuing to make improvements for increased user satisfaction and adoption

What does achieving widespread use mean for quality improvement?

The basic foundations for quality improvement can be addressed if providers and staff are using the same tool for data collection, i.e., the EHR. It can allow for more well defined processes to reduce variation, monitor a process and to collect the data from charting without creating another data collection tool. (Stratis Health, 2009)

Appendix L: eCQI Project Management Checklist

Top Level Tasks	Sub Tasks	Date Complete	Comments
Identify Project Scope			
	Identify outcome measure(s)		
	Establish baseline data/ confirm EHR workflow to support outcome measure		
	Document project scope		
Select Project Team			
	Document roles and responsibilities on project scope		
Create Change Log			
	Brainstorm list of possible changes		
	Review possible EHR functionality and clinical workflow changes		
	Prioritize change backlog		
	Document change backlog on project scope document		
Create Sprint Backlog			
	Identify changed to be included in sprint		
	Create plan-do-study-act (PDSA) document		
Perform PDSA Cycle			
	Document PDSA findings (update PDSA document)		
Perform Sprint Review			
	Review and update change backlog		
Continue Sprint/PDSA Cycle (as needed)			
	Project goals are met		
Stabilize/Spread			
	Identify ongoing tracking of improvement		
	Create implementation plan		
Close Project	Document lessons learned and best practices to be used on future eCQI projects		

Appendix M: Workflow/Process Mapping Info and Template

When to use workflow mapping for an existing process:

- Process is wasteful
- Root cause analysis/known to be problem/error prone area
- Bad data – garbage in garbage out is in full force
- New device/product/supply is being added to a current process
- Significant EHR documentation change
- Patient/staff dissatisfied with current process
- Examples:
  - Patient scheduling takes too long
  - Increase in Med errors with bedside bar code scanning
  - **Validate/review data entry and collection for clinical quality measures (CQMs)**

When to use workflow mapping for a new process:

- Significant change in flow of care delivery
- Significant change in documentation of care delivery
- Addition of or change in a device or product
- New regulatory requirements
- Examples:
  - Moving into a new unit or building – process of the move in addition to utilization of new space
  - Adding bedside bar code scanning
  - Additional documentation required for new sepsis protocol

Who to involve in a workflow mapping exercise:

- **Frontline staff is a MUST**! If frontline staff cannot get to a meeting, simply shadow them and document their steps. If evaluating an EHR workflow, do screenshots at each step. An entire process can be put together after a file of screenshots have been assembled.

- Managers and supervisors should provide policies, protocols, guidelines or training materials that display how the process is supposed to look.

Layers of workflow to be evaluated:

- Physical
  - Includes environmental layout of patient room, equipment, devices, supplies, etc.
- Electronic
  - How is the work documented? What screens and fields are used?
- Data
  - Where does the information documented go?
  - Why does it go there (triggers or reports)?
  - How does it get there (interfaces, uploads, etc.)?

Steps to workflow mapping:

1. Map the “as is” process.
2. Analyze the “as is” process.
3. Create the “to be” process.
    a. Identify points of change and what the change will look like.
4. Map the part of the process that is:
    a. Measurable
    b. Most directly affects the overall outcome

Workflow Scope Template

1. Process to be analyzed: Basic overview/title	
2. Why is this process chosen to analyze? What brought up the desire to map the process?	
3. Improvement SMART goal/target: (Specific, measurable, action-oriented, realistic, time-based)	
4. Scope of workflow to be analyzed: (Clearly define start and end point.)	
5. EHR/documentation system, module and/or applications involved:	
6. Items/equipment/devices involved in process:	
7. Physical locations involved in process:	
8. Staff/people involved in process:	
9. How will the process be mapped (swim lane, basic workflow, etc.) **and using what method** (discussion or observation)**?**	
10. Who will own the map once complete?	
11. Planned start date/target end date: (of mapping exercise)	

Materials Checklist:

- ☐ Flipchart
- ☐ Marker board
- ☐ Erasable markers
- ☐ Smart board
- ☐ Sticky notes
- ☐ Electronic documentation tool – Microsoft Visio, Microsoft Excel, Gliffy.com
- ☐ Map of workflow project area, blueprints or a simple sketch, several copies or blown up on projector screen, Smart board or marker board
- ☐ EHR access to systems, screens, fields used during workflow
- ☐ Printer
- ☐ New product, device, equipment or supply item (if applicable)

Appendix N: References, Resources and Acronyms

References and Resources:

- Ellen Harper DNP, R.-B. M.-B. (2015, February 23). Guiding Principles for Big Data in Nursing.
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- Stratis Health. (n.d.). *Quality Improvement.* Retrieved March 12, 2015, from stratishealth.org: http://www.stratishealth.org/expertise/quality/QIBasics.html
- Stratis Health. (2009, April 27). Quality Improvment Basics: From QA to QI.
- Office of National Coordinator Healthit.gov; eCQI: What it is, and it can help you
- Office of National Coordinator, National Learning Consortium (2013, April 30) healthit.gov; Continuous Quality Improvement Strategies to Optimize your Practice
- Institute for Healthcare Improvement: www.ihi.org. How to improve: http://www.ihi.org/resources/Pages/HowtoImprove/default.aspx
- Health IT.gov eCQI resources: https://www.healthit.gov/providers-professionals/planning- and-implementing-improved-care-processes , https://ecqi.healthit.gov/, https://www.healthit.gov/providers-professionals/measuring-care-processes-and-outcomes,
- Institute for Healthcare Improvement: Quality Improvement Basics: http://www.ihi.org/resources/pages/howtoimprove/scienceofimprovementhowtoimprove.aspx
- Agile/Scrum Methodology: https://www.cprime.com/resources/what-is-agile-what-is-scrum/

Acronyms:

- ANA – American Nurses Association
- APM – Advanced Alternative Payment Models
- CDS – Clinical Decision Support
- CMS – Centers for Medicare & Medicaid Services
- CPOE – Computer Provider Order Entry
- CQM – Clinical Quality Measures
- eCQI – Health IT Enabled (or electronic) Clinical Quality Improvement
- eCQM – electronically reporting Clinical Quality Measures
- EHR – Electronic Health Record
- EMR – Electronic Medical Record
- eAccess – Electronic access to health records – Patient Portal

- EH – Eligible Hospital
- EP – Eligible Provider
- eRX – Electronic prescribing
- HIE – Health Information Exchange
- HIT – Health Information Technology
- LOINC – Logical Observation Identifiers Names & Codes
- MU – Meaningful Use
- MACRA – Medicare Access and CHIP Reauthorization Act
- MIPS – Merit-based Incentive Payment System
- NQF – National Quality Forum
- ONC –The Office of the National Coordinator for Health Information Technology
- PCMH – Patient Centered Medical Home
- PDSA – Plan Do Study Act
- PM – Project Management
- PMS – Practice Management System
- PQRS – Physician Quality Reporting System
- QI – Quality Improvement
- SNOMED CT - Systematized Nomenclature of Medicine -- Clinical Terms
- SRA – Security Risk Assessment
- VDT – View, Download and Transfer