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BEST ADVICE

Advanced and Meaningful Use of EMRs

MODULE 1

Using EMRs for Quality Improvement and Research

NOVEMBER 2018

Increasingly, family physicians have the capacity to improve the quality of care they deliver using information contained in electronic medical records (EMRs). The measurement of key indicators and outcomes provides crucial insights into a clinical practice and can provide a solid evidence base for quality improvements (QI) to better meet the needs of patients and communities. This module describes QI, how physicians can use EMRs to improve care through QI methodologies, and outlines other advanced uses of EMR data for QI and research.

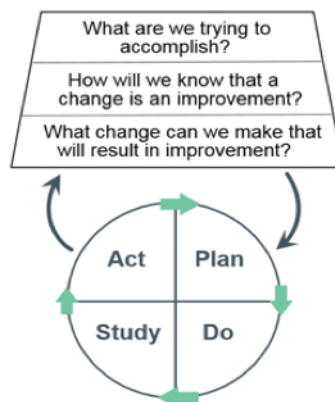## WHAT IS QUALITY IMPROVEMENT?

At its core, QI encompasses several formal approaches to understanding performance and systematically improving the processes of patient care delivery.[1] In the health care system, there are always opportunities to optimize, streamline, develop, and test processes to improve efficiency, patient safety, and clinical outcomes. QI is about continually making incremental changes to improve systems and thereby outcomes.

There is a variety of approaches that can be used to collect and analyze data, test changes, and implement improvements. The following section describes two approaches to QI in more detail: the model for improvement, and audit and feedback.

THE MODEL FOR IMPROVEMENT

The model for improvement consists of two basic components: answering three fundamental questions (before the QI initiative can take place), and conducting the rapid cycle improvement process, comprised of a series of Plan-Do-Study-Act (PDSA) cycles (Figure 1).[2] The PDSA cycle involves testing a change by developing a plan to test the change (plan), carrying out the test (do), observing and learning from the consequences (study), and determining what modifications should be made to the test (act).[3]

Figure 1: Model for Improvement

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

Act | Plan
Study | Do

Source: Langley GJ, Moen RD, Nolan KM, Nolan TW, Norman CL, Provost LP. *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance, 2nd Edition.* San Francisco, CA: Jossey-Bass, a Wiley Imprint; 2009. Reproduced with permission.

More specifically, conducting PDSA cycles involves the following steps:[4]

1. Forming a QI team
2. Setting aims
3. Establishing measures
4. Selecting changes
5. Testing changes
6. Implementing changes
7. Spreading changes

Source: Created by Håkan Forss. @hakanforss; hakanforss.wordpress.com. Reproduced with permission.

In a busy practice it is important to be realistic about what family physicians can reasonably accomplish with QI. For a typical family physician, the PDSA approach offers a highly adoptable model to consider using for small improvement cycles.

EXAMPLE OF QI PROCESS USING A PDSA CYCLE

Following are highlights of a case study in the Health Quality Ontario publication *Quality Improvement Guide*.[5]

The new director of a rehabilitation hospital noted that the hospital's falls rate was much higher than that of similar hospitals. Looking at the data, staff saw that the unit with the highest number of falls looked after relatively mobile residents who had mild to moderate dementia and were receiving stroke rehab.

Over several meetings, the team:

- Offered suggested changes to address the issue
- Set the project aim (a 40 per cent improvement of desired metric)
- Implemented a falls risk assessment using an existing tool
- Used assessment results to apply prevention protocols (balance training, medication review)

- Included the assessments in training for all new staff
- Measured the fall rate and noted trends that led to the 40 per cent reduction
- Shared the assessment methodology, and their success, with other units

A full description of this case study is available in the guide.[5]

AUDIT AND FEEDBACK APPROACH

Audit and feedback is defined as "any summary of clinical performance of health care over a specified period of time aimed at providing information to health professionals to allow them to assess and adjust their performance."[6] It is an overarching term that describes some of the measures used to improve professional practice. Health professionals can receive feedback about their performance based on data derived from their routine practice (and through EMRs). Physicians should not be concerned about the term "audit" as this process represents a reflective exercise that physicians can initiate in their own practices. Audit stages include:[7]

1. Choosing a topic
2. Defining aims and objectives
3. Choosing guidelines, stating criteria, and setting a standard
4. Collecting data (from the EMR)
5. Analyzing and interpreting data
6. Deciding what changes need to be made and implementing them

GENERAL QI RESOURCES

Table 1 provides additional practical resources that can help you get started with QI in your practice. Table 2 contains additional literature about QI.

Table 1: General QI resources

Resource	Description
Quality Improvement in Healthcare – Dr. Mike Evans	A short and engaging video about the basics of QI and its role in health care.
Quality Improvement Guide – Health Quality Ontario	A comprehensive guide about QI that includes the following sections: • Background of QI • Case examples • Implementing PDSA cycles • Sample worksheets
Practice Improvement Initiative (Pii) – College of Family Physicians of Canada	Pii uses quality improvement, practice-level data, and research to improve everyday practice, the patient experience, efficiences, and the work experience of health care providers (the Quadruple Aim). It enables family physicians, residents, and the teams they work in to undertake QI within their practices and to use practice-level data. To support practices, Pii has developed a Practice Improvement Essentials (PIE) Part 1 workshop, which introduces the concept of QI, explores practical models and tools. There will also be a follow-up workshop called PIE Part 2, which is a practical, case-based application of QI, data, and research readiness.
Data Boot Camp: How to Get Your Data Into Shape – Canadian Foundation for Healthcare Improvement	A webinar series that delves deeper into QI. The free one-hour webinars include information about: • How to assess the quality of data from various sources, including electronic data (e.g., EMRs) and manually-collected data (e.g., audits, time-and-motion studies) • Tools for improving data quality • How to use data effectively—measuring the right things the right way, performing necessary data preparation, and processing and disseminating data
CPD eCoach – University of British Columbia Continuing Professional Development in collaboration with the BC College of Family Physicians	An online self-directed assessment tool for QI that involves the following four steps and includes specific information about EMR data extraction for common EMRs: 1. Define your topic. 2. Conduct self-directed assessment. 3. Create a plan for improvement. 4. Evaluate the implementation.

Table 2: General QI literature

Resource	Description
Impact of a primary healthcare quality improvement program on diabetes in Canada: evaluation of the Quality Improvement and Innovation Partnership (QIIP)[8]	An evaluation of an Ontario primary care QI program about diabetes
Effective strategies for scaling up evidence-based practices in primary care: a systematic review[9]	Review of strategies to implement and scale up evidence-based practices in primary care
Systematic review of the application of the plan-do-study-act method to improve quality in healthcare[10]	Review of the plan-do-study-act cycle's impact in QI
Achieving change in primary care—effectiveness of strategies for improving implementation of complex interventions: systematic review of reviews[11]	Literature review of implementation strategies for changing professional practices
Reporting and design elements of audit and feedback interventions: a secondary review[12]	Describes key elements of the audit and feedback approach

USING EMRS FOR QI

The previous section provided a general background about QI and some common QI methodologies used in health care. The following section describes how to use EMRs for QI.

Improvements in EMRs have resulted in an expanded ability to use more comprehensive data to support QI initiatives. Because EMRs hold a wide variety of data, they can be quite useful for collecting information, measuring change, and collecting feedback.[13]

DATA QUALITY: CAN YOU MEASURE WHAT YOU WANT TO IMPROVE?

To perform QI using an EMR, you must have a good understanding of the data your system collects. Based on that assessment, you will have a better idea of the types of indicators you can use for QI. We cannot improve what we cannot measure, so consistently recording patient health data is crucial. Some examples of metrics you may be able to audit, depending on your EMR's capacity, include:[14,15]

- Appointment processes: Time from request to appointment, cancelled appointments/no shows, third next available appointment
- Patient encounters: Chief complaint
- Patient communication: Patient reminders, patient education
- Medication management: Medication list/reconciliation, drug interaction/allergy alterations

DATA QUALITY FOR QI

To perform a small-scale test of a PDSA cycle, consider the following questions:

- What are we trying to improve?
- How can it be measured?
- Is the EMR capable of capturing the data we want to measure?

Imagine that you want to improve specific aspects of care for diabetic patients in your practice. Using the questions above, you might identify the following:

- What are we trying to improve: Hypertension in type 2 diabetic patients
- How can it be measured: By consistently taking and recording patients' blood pressure (BP) and by identifying patients above the target BP level
- Is the EMR capable of capturing the data we want to measure: Yes

The first step might be to create a list of all diabetic patients in your practice, ensuring the list is accurate and desired data is captured consistently. If you are confident about the quality of your EMR data, you can start with a PDSA exercise using the questions suggested above. If not, consider refining your research question until you are able to collect the necessary EMR data. Improving (or simply assessing) the data quality in your EMR is often the most important place to start when pursuing QI in your practice.[16]

Once you identify the possibilities for QI projects based on available data from your EMR you can undertake a PDSA or an audit and feedback project. EMRs are the data source for these endeavours and can be used to pull patient lists, run queries, and track progress over time. A recent Cochrane review on this topic concluded that audit and feedback interventions, "generally lead to small but potentially important improvements in professional practice."

QI is enabled by high-quality data and physicians should ensure that their EMR data entry policies result in standardized and consistent records. Free text entry of information that introduces inconsistencies as the same condition can be described in many different terms (e.g., blood pressure can be entered as B/P, BP, Sys/Dias, or HT). These inconsistencies serve as obstacles for automated analysis of data that is often used in QI.

Here are a few tips to ensure higher quality EMR data:

- Use drop-down lists rather than free text where possible
- Use built-in EMR features, where possible, that allow filling in medical history fields with industry standard terms such as ICD9, ICD 10, or SNOMED-CT. A clinician may add any key elements that are not part of standardized nomenclature manually.
- Use the keyword search feature of your EMR to help test the quality of the data. Having to use different search words to identify all the patients in your practice with a certain diagnosis or issue is an indicator that there are quality gaps.

COMMUNICATING RESULTS OF QI PROJECTS AND MANAGING CHANGE

Communicating the results of QI projects is a critical aspect of all QI initiatives. Teams and organizations may resist change, so it is important to engage them in the process from the start, and think about approaches for communicating results of QI projects to ensure changes are implemented and sustained. The resources in Table 3 provide some useful information.

ADVANCED USES OF EMR DATA FOR PRACTICE IMPROVEMENT

PRACTICE BASED RESEARCH NETWORKS

Over the past decade practice based research networks (PBRNs) have been collecting primary care data for disease surveillance, research, and supporting QI efforts at a macro scale. Canada has one of the world's largest networks, the Canadian Primary Care Sentinel Surveillance Network (CPCSSN).[20]

The CPCSSN is Canada's multi-disease surveillance system based on primary care EMR data collected via regional networks in seven provinces and one territory. In total, the system includes data representing over 1.5 million patients associated with over 1,000 primary care providers.[21] The power of PBRNs, such as the CPCSSN, has been recognized by Canada Health Infoway and other international organizations.[22] The value for physicians to participate in PBRNs goes beyond the personal gratification of contributing to research. The direct benefit can be seen in both the opportunity to engage in research and to use CPCSSN's practice feedback reports. These reports allow physicians to compare their practice to others based on the data provided. To learn more about joining one of CPCSSN's regional networks and receiving regular reports on your practice, or about accessing data for research and QI projects, visit CPCSSN's website.

Table 3: Resources about communicating results of QI initiatives

Resource	Description
Practice Feedback Interventions: 15 Suggestions for Optimizing Effectiveness[17]	Learn how to best communicate the results and outcomes of QI initiatives. The article includes suggestions to improve the effectiveness of feedback and examples of associated implementation strategies, such as: • Recommend actions that are consistent with established goals • Recommend actions that are under the recipient's control • Recommend specific actions • Provide multiple instances of feedback • Address credibility of the information provided • Prevent defensive reactions to feedback
Advancing the literature on designing audit and feedback interventions: identifying theory-informed hypotheses[18]	Learn how to effectively provide feedback (based on QI projects) to clinicians. For example: • Use noun descriptors rather than verbs in messaging; for example, "do not be an over prescriber" versus "please prescribe less" • Involve recipients' feedback in the design of the QI initiative from the beginning
Ten challenges in improving quality in healthcare: lessons from the Health Foundation's programme evaluations and relevant literature[19]	Learn about 10 common challenges in QI and opportunities to overcome them; for example: • Convincing team members that there actually is a problem • Dealing with tribalism and lack of staff engagement • Ensuring the changes are sustainable

PATIENT'S MEDICAL HOME AND PRAGMATIC CLINICAL TRIALS

The concept of data collection, research, and ongoing QI is a crucial piece of the Patient's Medical Home (PMH)—the CFPC's vision of family practice in Canada. In family medicine, the laboratory that will drive research that is relevant to practice is the PMH, powered by EMR data. The CFPC has strongly endorsed the importance of convenient access to EMR data for QI and research purpose, encouraging vendors to make this information available.[23]

Pragmatic, or practical, clinical trials (PCTs) are defined as "trials for which the hypothesis and study design are based on the information needed to make a decision."[24] They are different than explanatory clinical trials, which try to better understand how and why an intervention works. PCTs, on the other hand, address practical questions about risks, benefits, and costs of an intervention as they would occur in a routine clinical practice. Table 4 lists some key PCT resources. PCTs can be conducted within PMH practices, using EMR data.

There are four key features of PCTs:[24]

• Compares clinically relevant alternative interventions, rather than a treatment with no treatment/placebo
• Enrols a diverse study population
• Recruits from a variety of practice settings
• Measures a broad range of relevant health outcomes

Table 4: Resources for pragmatic clinical trials

Resource	Description
Practical clinical trials: increasing the value of clinical research for decision making in clinical and health policy[24]	A seminal paper that contains information about the key characteristics of PCTs, and strategies for improving the supply of PCTs in the health system.
Practical clinical trials for translating research to practice: design and measurement recommendations[25]	Contains specific recommendations and examples for designing and conducting PCTs, selecting appropriate measures for the trials, and reporting the results.
The randomized registry trial—The next disruptive technology in clinical research?[26]	An article that discusses randomized registry trials that use large scale data sources (i.e., combined EMR data) to conduct randomized experiments at a much lower cost than traditional trials.
Atrial fibrillation anticoagulation care in a large urban family medicine practice[27]	An example of a PCT conducted in a family medical practice in Canada.

PRACTICE LINKED REPORTS

Several provinces are home to health quality councils (e.g., Ontario, Saskatchewan, Alberta, and British Columbia) that send reports linking practice data to administrative health data. These reports allow family physicians to see how practice populations interact with the health system beyond EMR-based data. To sign up for a report tailored to your practice, visit the relevant health quality organization's website (e.g., HQO My Practice Primary Care in Ontario).

SOCIAL DETERMINANTS OF HEALTH

Another example of how EMR data linkages could revolutionize care in Canada is managing social determinants of health in clinical practice. Statistics Canada's postal code data can be converted into accurate measures of income quintile and social deprivation for clinic populations. The potential to use this data more meaningfully with EMR-based clinical data offers many opportunities to reveal issues of poverty and marginalization in practice populations. To learn more about addressing social accountability in your practice refer to the Best Advice guide *Social Determinants of Health*.

CONCLUSION

Among their many benefits, EMRs can support family physicians in conducting QI and research to improve patient care. Family physicians shouldn't feel overwhelmed by QI. Even in a busy practice, physicians can start small by using EMRs to answer simple questions about the practice and patients, and then work to make incremental changes to improve patient care using PDSA cycles or audit and feedback approaches. On a broader scale, EMR data can be used for large-scale research through PBRNs and conducting PCTs. Harness the data collected through EMRs and take advantage of QI and research opportunities to improve your practice, patient outcomes, and the health system more broadly.

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