Lessons from the Field: Measuring Intermediate Progress

Prepared for the Agency for Healthcare Research and Quality by L&M Policy Research, LLC with guidance from the Pediatric Quality Measure Program (PQMP) Grantees

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List of Acronyms

AHRQ Agency for Healthcare Research and Quality

CEPQM Children's Hospital Boston/Center of Excellence for Pediatric Quality Measurement

DCAT Discharge Confidence Assessment Tool

HCAHPS Hospital Consumer Assessment of Healthcare Providers and Systems

IMPLEMENT University of California, San Francisco/IMPLEmenting MEasures NeTwork (IMPLEMENT)

for Child Health Network

KI Key Informant

KII Key Information Interviews

LBW Low Birth Weight

P-HIP Seattle Children's Hospital/Pediatric Hospital Care Improvement Project

PQMP Pediatric Quality Measure Program

PQMP-LC Pediatric Quality Measure Program Learning Collaborative

QI Quality Improvement

Q-METRIC University of Michigan/Quality Measurement, Evaluation, Testing, Review, and

Implementation Consortium

RF Research Foci

Lessons from the Field: Measuring Intermediate Progress

Introduction

This lesson from the field report examines one of the Research Foci (RF) central to the Pediatric Quality Measures Program (PQMP) grantees' work. This RF broadly focuses on how to measure intermediate progress at different levels to predict improvement at the state level, as depicted in Figure 1.

Implement changes to improve health outcomes

Observe improvement at state level

Track intermediate progress using process measures at different levels

Figure 1: Using Intermediate Measures to Observe Improvement

The specific question is:

 For those measures for which improvement is unlikely to be seen within the CMS annual reporting cycle (calendar year), how might "intermediate" progress be measured at other levels which would predict improvement at the state-level, with a high predictive value?

In examining this question across two distinct data sources—literature reviews and key informant interviews (conducted by the PQMP Learning Collaborative)—a set of key considerations emerged that relate to using intermediate measures to observe improvement. There is less information on how intermediate progress can be observed at one level and then used to predict changes or improvements at other levels. Findings from both the literature and key informants focus largely on whether intermediate progress measures related to longer term health outcomes can be identified. While improvement for many of these measures is frequently assessed at the state level, this is not always explicitly noted. Each of these key considerations and supporting findings from the literature and key informants are discussed below.

Strength of relationship between an intermediate indicator and a long-term outcome.

Clinical processes and intermediate outcomes are commonly used as surrogate indicators of distal outcomes, because they are more feasible (easier) to measure and more likely to respond to interventions in shorter timeframes. However, their value in driving overall performance on outcomes is directly tied to the strength of the relationship between the intermediate processes/outcomes and distal outcomes of interest. The adequacy of this relationship should be fully vetted before implementation as an indicator of intermediate progress.

The literature points to a number of considerations when evaluating the link between intermediate outcomes and distal outcomes, including biologic plausibility, proximity, adjustment for confounding, benefits for other outcomes, duration of studies, evidence from other interventions/exposures or populations, magnitude of association, and positive (but not statistically significant) direction of effects on health outcomes (Wolff et al. 2018). Following a review of USPSTF recommendations, authors suggested a series of approaches to standardizing the assessment of linkages between intermediate and distal outcomes, such as including relevant intermediate outcomes in analytic frameworks, describing plans *a priori* for evaluating intermediate-distal outcome links, and specifying and justifying evidence thresholds for sufficiency (Jonas et al. 2018). Overall, there was a call for more rigor in establishing strong relationships before measure implementation.

Often these long-term outcomes are measured at a higher level – at the health plan or state level rather than at the provider or practice level. For example, mortality is not usually assessed at the provider level, rather process measures are used to inform expectations at the health plan or state level. Although the following is an example from an adult setting, it illustrates how process measures can inform long-term outcome measures. While monitoring the number of mammograms provided to women age 50 and over may provide useful data to improving a state's mortality rate from breast cancer, states may also conduct or facilitate process activities thought to be related to breast cancer

mortality rates, such as requiring and monitoring the extent to which health plans include coverage for mammography or postoperative follow-up care from surgery. Additionally, states can use capacity indicators to identify particular service mechanisms that are present in their delivery systems, such as the number of (or the increase in the number of) facilities and trained staff offering mammography screenings in the state, which may impact the trend in the outcome measure of interest (National Research Council, 1999).

One state Medicaid Director described how the state was trying to lower its mortality rate from opioid use. The state uses two intermediate goals to assess progress—office-based opiate treatment in rural clinics and whether individuals continue treatment for at least 180 days.

The state Medicaid Director also discussed low birthweight (LBW) – a population health outcome measure on the Child Core Set used at the state level. He noted that one could use prescribing of long-acting reversible contraceptives or recommendations about inter pregnancy spacing, which can both be impacted and measured at the provider level, as intermediate measures of progress towards improvement in LBW at the state level.

Expected time interval for detecting observable change.

Selecting measures for tracking intermediate progress should consider the expected time interval for detecting observable change. There is typically a lag time between making an improvement in clinical

practice and observing change in outcome measures. Measures selected for tracking intermediate progress should be indicators that can be expected to produce a signal attributable to practice change in a short timeframe (real-time, monthly, quarterly).

The literature points to the important consideration of selecting time intervals between baseline and follow-up time points, particularly when assessing outcomes. The interval must be long enough that change can be expected, but short enough to increase the likelihood that observed change is a result of antecedent clinical practice (versus change due to natural progression or confounding factors) (IOM 2001; Mainz et al. 2003-1; Shaughnessy et al. 1994). Time interval needs can also vary by context of measure use. Measures being applied in rapid-cycle or continuous quality improvement settings should be capable of detecting signals in shorter time periods (e.g., weekly, monthly, quarterly) than measures used for accountability and/or reporting purposes (e.g., annually).

Data availability and lags.

Data availability and lags impact the feasibility of tracking intermediate progress. The availability of timely, valid data is a determining factor in evaluating whether tracking intermediate progress in shorter timeframes (e.g., quarterly, annually, etc.) for an outcome of interest is feasible. The frequency of clinical processes as well as the time needed for data quality assurance, such as chart audits or claims

processing, should be considered when specifying and selecting measures for tracking intermediate progress.

The literature discusses the various data sources used for quality measurement. Common data sources include administrative (claims) data, medical record data, and other primary data such as surveys. Each have their own limitations in terms of timeliness (collection and processing lags), overall completeness and/or consistency, and specificity to measure concepts (Mainz et al. 2003-2; Rubin et al. 2001; Shaughnessy et al. 1994). These characteristics can determine whether or not it is feasible to implement a performance measure, and they can drive selection of measures in certain contexts (IOM

Several of the key informants commented that the availability of timely data is one of the main challenges associated with measuring intermediate progress. One informant—a state director of quality improvement—emphasized the need to quickly collect information while also having confidence in the validity of the data. His state is focusing on urging providers to implement new approaches that streamline data quality assurance protocols and reduce time for activities such as chart audits by shifting toward electronic extraction and reporting.

2001). For example, utilization outcomes have been used more frequently than intermediate outcomes for tracking progress, because data are more readily available from secondary sources (Shaughnessy et al. 1994).

One informant working in quality improvement at the state level discussed one method they use to address data lags. As an intermediate measure, the state often reviews data for a 12-month period on a rolling basis; based on those data, measures are then calculated on a quarterly or a monthly basis. The problem with this approach is that the data carry the history forward, so it can take almost a year to see the true effects of an implemented change.

The remainder of this lessons from the field report provides examples of how the work conducted by three of the grantees relates to the considerations described above for one or more of the pediatric quality measures. As with the literature and key informants, the examples provided primarily address the issue of how to measure intermediate progress. For each key consideration, the grantees described:

(1) the challenges they faced during implementation, (2) the approach(es) they took to address the challenges, and (3) their team's specific findings and implications for measure implementation.

Challenges to Implementation

The grantees identified a number of challenges to measuring intermediate progress at multiple levels. While not all grantees faced the same set of challenges, multiple grantees experienced challenges in obtaining timely claims or survey data. To address data lags, grantees attempted to identify feasible measures for more rapid data collection that did not sacrifice completeness or association with longer term outcomes. Several specific examples are presented in Figure 2.

Figure 2. Examples of Grantee Implementation Challenges, by Key Consideration

Strength of the relationship between an intermediate indicator and a longtern outcome

- •**IMPLEMENT:** identifying a *single* process measure from primary care settings to predict change in asthma ED utilization.
- P-HIP: low frequency of related events made it difficult to identify an intermediate indicator that could link to suicidality care process measures.

Expected time interval for detecting observable change

- •IMPLEMENT: difficult to determine how long intermediate actions in the primary care setting would take to affect changes in asthma ED utilization.
- •CEPQM: multifactorial nature of patient experience requires many changes over time to affect scores.

Data availability and lags

• P-HIP: lack of timely metrics (monthly or otherwise) and number of incident-eligible events for QI collaboratives to target improvement activities.

Grantee Approaches

The grantees used a wide array of approaches to produce information that supported their efforts to explore the use of appropriate intermediate measures. Both quantitative and qualitative approaches were used, separately and in combination with each other. Selected examples of the grantee approaches that focused on data analysis, tool development and stakeholder interactions are shown in Figure 3.

Figure 3. Grantees used varied approaches to addressing implementation challenges

Data analysis

- •The **IMPLEMENT** team assessed whether intermediate process measures used at the practice level (e.g., use of asthma action plans, use of controller medications) impacted the asthmarelated emergency department visit rate at the hospital level.
- •The **P-HIP** team conducted a retrospective observational study to assess the strength of the associations between measures of inpatient suicidality care and 30-day emergency department return visits and inpatient readmissions.

Tool development

- •The **CEPQM** team piloted the discharge confidence assessment tool (DCAT) to use as an intermediate indicator for patient/family experience and readmissions.
- The **CEPQM** team tested administering the Child HCAHPS using tablets rather than the paper based survey at the time of discharge to provide near real-time performance measurement and to increase response rates.
- •The **P-HIP** team developed an Excel Macro medical record abstraction tool to facilitate timely data collection, data uploading, and measure scoring.
- Based on a small number of chart pulls by clinics each month, the **IMPLEMENT** team developed a simple data collection tool, using a RedCAP interface, to produce monthly reports for the clinics, showing their progress relative to goals.

Measure selection

•Among the many measures available for consideration, the **IMPLEMENT** team identified a key set of process measures for primary care QI collaboratives to monitor based on the recommendations of the NHLBI Guidelines Implementation Panel.

Grantee Key Findings and Implications

Based on their information gathering and analytic activities, grantees provided findings for each of the key considerations that can be used to expand evidence about the use of intermediate measures to track progress in performance. Across grantees and measures, the most pervasive challenges were data related, specifically lags in data availability for measurement and reporting. Generally, grantees found that creating their own tools for more rapid data collection and/or relying on electronic health records as a data source improved their ability to use intermediate measures. More of the key findings and their implications are presented in the following series of tables.

Figure 4: The strength of the relationship between an intermediate indicator and a long-term outcome should be considered before relying on an intermediate indicator to predict progress on achieving the long-term outcome of interest.

Key Findings

- The CEPQM team implemented the DCAT tool as a way to measure parental confidence in their ability to care for their children post-discharge.
 - o Implemented in surgical, medical, and neurology units of a single children's hospital.
 - Next steps include assessing whether DCAT is a strong predictor of readmission rates and patient/family experience with care.
- The IMPLEMENT team found that there were multiple intermediate process measures that could be used to inform clinics of potential changes in long term outcomes, i.e., ED utilization rate for children with persistent asthma, in the primary care setting.
- The P-HIP team was not able to establish statistically significant associations between process measures of inpatient suicidality care and 30-day ED return visits or inpatient readmissions.
 - The observed low reutilization event rate suggests that, although this outcome may be useful in other pediatric populations, such as those with medical complexity, its utility for assessing the effectiveness of care processes for hospitalized youth with mental illness may be limited.

Key Takeaways

- Developing tools to support more timely data collection can support assessing intermediate measures when they are incorporated into overall clinical workflow and legacy data systems.
- ⇒ When appropriate, using multiple process measures acknowledges the evidence base (i.e., that there is not one lead measure that predicts performance) and provides flexibility to clinical practices.
- ⇒ Given the many factors that affect pediatric ED utilization for chronic conditions, like asthma, primary care practitioners should rely on the evidence base on the strength of the relationship between process and outcome measures, but also allow flexibility to select the measures that are best suited to their practices.
- ⇒ Generally, associations between intermediate indicators and outcomes will be difficult to establish for most pediatric process of care measures because easily measured outcomes tend to be rare in pediatric populations.
- ⇒ Increased data sharing across different institutions may enhance the ability to establish links between intermediate process measures and desired outcomes.

Figure 5: Selecting measures for tracking intermediate progress should consider the expected time interval for detecting observable change.

Key Findings

- The IMPLEMENT team found no significant changes in ED visits in the intervention year, but reduced ED visits in the postintervention year.
 - The team attributed this lag time between process changes and asthma control to several possible reasons: need for patients to attend clinic to benefit from process changes; time for disease to respond to change; seasonality of condition; and longer times to observe change for lower-risk patients because of overall lower ED use.
- The P-HIP team's development of an Excel Macro tool made it feasible for all participating sites to collect data that previously required manual EHR abstraction on a monthly basis. Having access to updated statistical process control charts on a monthly basis proved to be important for the QI teams to understand which interventions were working (and which were not) during their PDSA cycles.
 - The length of time needed to observe improvements at the hospital-level was approximately 6 months whereas at the collaborative-level, it was 9-12 months. The longer time at the more aggregated level was due to both high and low performers among the participating hospitals and the variation in the pace of the improvement work among them.

Key Takeaways

- ⇒ Despite showing improvements in outcomes, investments in primary care quality improvement may take more than a year to return gains to practices and payers.
- ⇒ Time lags in data availability for performance assessments associated with using claims or survey data are often too great to provide useful short-term information to track progress.
- ⇒ Electronic health record data is likely the best source for tracking measures at shorter time intervals to inform QI work.
 - Because of the manual abstraction required to use EHR data, the development of open-source tools to facilitate more streamlined data collection/scoring may be important.

Figure 6: Data availability and lags impact the feasibility of tracking intermediate progress.

Key Findings

- The CEPQM team found that administering the Child HCAHPS measure on a tablet was administratively feasible and did not interfere with the discharge process.
 - The response rate for day of discharge tablet survey administration was 4-fold higher than with single wave mail-only administration, with greater participation of hard-to-reach groups.
- The CEPQM team learned that the adapted readmissions measure, modified for use with inpatient EHR data rather than claims, was highly feasible and straightforward to implement. It allowed near real-time measurement, supporting better comparisons across hospitals.
- The IMPLEMENT team was able to successfully gather data on key process measures related to asthma care using a simple data collection form and asking clinics to do a small number of chart pulls each month, rather than a full chart review of all eligible patients.
- The P-HIP team developed an Excel Macro that included a user-friendly data collection interface to execute the measures as specified. It was possible to obtain practice- and collaborative-level scores on a monthly basis that meaningfully informed PDSA cycles.

Key Takeaways

- ⇒ Tablet administration of survey measures shows great promise for real-time feedback and QI, with the potential to transform the field of inpatient survey administration.
- ⇒ Data lags and variability in the quality of data are inevitable, however, adapting measures for use with EHR data allows hospitals to calculate near-real-time performance measures for monitoring and QI.
- To simultaneously address both the issues of timelines of data availability and the ability to aggregate data at different levels (e.g., hospital, health plan, state, etc.), novel tools that allow for feasible and less resource intensive medical record data collection are needed.
- ⇒ Targeted chart review may inform clinical sites about progress while imposing less burden.

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