Transformative Medicine (T-Med)

Volume 3 | Number 2 Article 6

June 2024

Quality Improvement in Healthcare: A Practical Guide For Providers (part 4)

Jeremy Ellis
Tower Health

Recommended Citation

Ellis J. Quality Improvement in Healthcare: A Practical Guide For Providers (part 4). *Transformative Medicine (T-Med)*. 2024; 3(2):71-74. doi: https://doi.org/10.54299/tmed/bzbd8066.

Quality Improvement in Healthcare: A Practical Guide For Providers-Part 4

Jeremy Ellis[1]

1. Department of Internal Medicine, Reading Hospital, Tower Health, West Reading, PA 19611

References

Published June 2024

This article represents the 4th installment of a 5-part series intended to review the main principles of quality improvement for the healthcare provider. As we have noted in prior discussions, the insights shared in this series rely heavily on my own experiential learning, gained after more than a decade of working within the realm of quality improvement in healthcare. While I strive to provide a few key citations to critical resources, the reader is strongly encouraged to seek out additional reviews on this area of study for a greater understanding. For our purposes, the core concepts have been broken down into the following 5 topic areas:

1. Picking the right problem for a quality improvement project
2. Performing a gap analysis and constructing a process map
3. Building an aim statement and interventions
4. Defining measures and constructing a PDSA cycle
5. Assessing results in a run chart

Each topic will be discussed in its own dedicated installment in this 5-part series, which readers are encouraged to read in chronological order for improved comprehension. In our prior installments, topics 1 through 3 were reviewed and therefore in this article we will be discussing topic 4: defining measures and constructing a PDSA cycle.

Correspondence to Jeremy Ellis at Jeremy.ellis@towerhealth.org

Disclosure Statement: The authors have no conflicts of interest to declare.

As the reader will recall, our quality improvement journey began with the following case: Mr. Smith is a 45-year-old male who presents to the hospital with a unilateral throbbing headache of several hours duration. He reports a past medical history that includes migraines and admits that his current symptoms are similar to prior episodes. His examination does not reveal any focal neurological deficits and the remainder of his exam is non-contributory. As part of the work up for these presenting complaints, an MRI/MRA head and neck is ordered and the results show no acute findings. The patient receives conservative management, improves, and is discharged home after an otherwise uncomplicated hospitalization. Several weeks later, the patient files a grievance with the patient advocate department for concerns regarding unnecessary testing and associated costs. This grievance prompts administration to seek your leadership on a possible quality improvement project to prevent unnecessary testing in similar future cases.

In our time together thus far we have established that this issue is an appropriate target for a quality improvement project, that a sizeable "gap" exists between our benchmark goal and our current performance, and we have further analyzed this gap using a myriad of tools including a robust process map. This work has allowed us to draft a consensus aim statement and determine appropriate interventions in our last article. We are now ready to begin to enact change using a framework known as the Plan-Do-Study-Act (PDSA) cycle.

To build an effective PDSA cycle, however, we must begin with establishing our measures—that is, what do we plan to record as datapoints as we deploy our interventions for improvement? Measures for a quality improvement project generally fall into one of three categories: Outcome measures, process measures, and balancing measures.[1] For most projects, it will be important to have at least one of each type of measure included.

Outcome measures are often the most obvious to your quality improvement team. An outcome measure represents the "voice of the patient" within your project. It is typically the measure most directly referenced in your aim statement.[2] Our aim statement highlights a goal of reducing MRIs ordered unnecessarily within the headache patient population, and our outcome measure will correspond directly with the focus of the aim statement. However, I have found it to be a common mistake for teams to underestimate the degree of specificity that is required when constructing an appropriate measure that can cut through misperceptions or errors in interpretation. Therefore, your team should aim for a high degree of specificity that easily allows every team member to agree upon exactly what is included in the numerator and denominator as your measure is being collected. This concept may be best understood with an example.

Let's assume that your headache quality improvement team is ready to build its first outcome measure to be collected during an improvement cycle. As a first datapoint to be collected, your team proposes recording the "number of MRIs ordered for patients with headache." Everyone agrees this is sensible—this is, after all, precisely what you are trying to reduce as unnecessary testing. After reading this article, however, you know that this outcome measure should be divided into a numerator and denominator. Your denominator will need to include the entire population of potentially relevant patients and a team member suggests "all patients coming to the hospital with a headache should be included." Your numerator should reflect the manifestation of your measure in practice and a team member suggests "we should count the number of MRIs ordered with headache as the indication." Your proposed measure therefore is the following:

$$\frac{\text{The total \# of MRIs ordered for headache in patients presenting to the hospital for headache}}{\text{The total \# of patients presenting to the hospital for a chief complaint of headache}}$$

The team agrees this is excellent and prepares to conclude the quickest quality improvement meeting in history!

Unfortunately, you dash everyone's hopes for a quick trip to the cafeteria for an extra coffee by reminding them that you need to answer many questions about this measure first to ensure everyone has the same understanding. The bare minimum questions we need answered for this proposed measure including the following:[3]

- Who is collecting the data? Will they need special access to medical records? Is it one person or many?
- How often is the data collected? Weekly? Monthly? Where is it stored and aggregated?
- Is training required to collect this data? Is this a clinical metric that only a healthcare worker can properly interpret as relevant or irrelevant? Does this require manual chart review or can it be abstracted by a computer?
- What data should be excluded?
  - Are we including only adults with headaches? Are we including all diagnoses of headache or only migraines? Should we exclude patients going to a higher level of care, such as the ICU? Should we exclude patients undergoing a stroke work up? How are we defining and agreeing upon each of these exclusions?
- How much baseline data already exists? How much baseline data do we need?
- How is this data currently calculated or displayed in our databases? Is the data shown as an average? Frequency? Absolute count?

Each of these questions addresses potential pitfalls that may be revealed in the midst of your project if not mitigated beforehand. Data collected at the wrong time, either because it is only available at an unexpected interval or because the collector does not have access to the database, may suggest trends that are inaccurate or miss changes that were important for your project. Improperly collected data, either due to lack of training or because the collector lacks the clinical expertise to understand the data, similarly skews your results and hinders progress. A proposed measure without any baseline data may add difficulty to determining how much improvement your project drives, as there is no comparison available. To the contrary, a measure with extensive baseline data that is stored in multiple locations can be challenged by different parameters on the data for each unique database. In other words, headache data in location #1 may be different than the data in location #2, even if they purport to measure the same thing.

In this author's experience, one of the most important considerations is to determine exclusions to your measures. These factor directly into how you calculate the numerator and denominator for your measure and should be agreed upon and tested by your group prior to deploying your interventions. For our headache target, a few possible exclusions have been suggested above and should illustrate the importance of this concept. If part of your group

https://scholarcommons.towerhealth.org/t-med/vol3/iss2/6
DOI: https://doi.org/10.54299/tmed/bzbd8066

is measuring all patients presenting with headaches, while another part of your group is only considering adults not in the ICU—it is easy to see how large inaccuracies can be accidentally introduced into your efforts and, in many cases, result in a project that fails or needs to be started over.

The second common type of measure for quality improvement, the process measure, often focuses on data that is not directly reflected in your group's aim statement. These measures, instead, represent the "voice of the system" and correlate directly to interventions your group is considering to deploy.[2] In this sense, a full definition for a process measure may only be possible as your group progresses further into the planning process of intervention deployment. An example process measure for our headache improvement team will make this distinction clearer.

In ongoing discussions with your core team members, a proposed intervention is gaining popularity. A team member suggests building an orderset within the electronic medical record that includes clinical decision support for providers most likely to be seeing patients presenting to the hospital with headaches. As part of this orderset, the provider will answer a series of clinical questions to determine if the headache contains certain high-risk features that would make more advanced imaging appropriate. If no high-risk features are apparent, the clinical decision support could suggest to the provider that additional imaging (such as an MRI) is unlikely to be beneficial. The goal with this added support would be to guide ordering providers with the right information on the right patient at the right time, while not restricting available orders and ignoring clinical judgment from frontline providers.

The process measure for this intervention would need to record how often this new orderset is actually used by the relevant providers. Without this data, if the intervention fails to improve the outcome measure (i.e. the # of MRIs ordered), it will be impossible to determine if the orderset failed to change behavior or if it was simply never utilized. Though the end result of these two possibilities is the same, the remedies to improve future efforts are quite different. The proposed process measure may then look as follows:

# of times headache orderset was utilized while admitting a patient with headache

---

# of patients presenting to the hospital with headache (i.e. # of opportunities)

Lastly, we must consider balancing measures relevant to our project. These are admittedly often the most difficult measures to define and predict. A balancing measure is created to monitor for unintended consequences of a particular intervention.[3] That is, did we break "X" while fixing "Y"? For example, if we are adding an orderset into the workflow of frontline providers, we may want to track provider satisfaction, throughput in the emergency room, average time taken to evaluate and admit headache patients, or other metrics that may capture excess burden placed on providers by virtue of the modified workflow. Often, predicting possible unintended consequences effectively requires detailed conversations with your key stakeholders in an environment that allows honest and open dialogue. I have personally had the most success with simply asking early in the planning process for an intervention—"What are your concerns with this intervention?" or "What do you think will be biggest challenge for this to succeed?" With an honest answer to either or both of these questions from the key stakeholders in your targeted workflow, you will have a much clearer picture for possible balancing measures to gauge undesirable downstream effects of your intervention.

With an aim statement and measures underway, you have already started the "Plan" phase in your PDSA cycle. In my experience, the PDSA tool is not a fancy or magical formula for success. Instead, it is a straightforward and fairly obvious set of parameters to guide our strategy as we deploy an intervention. In the broadest sense, the PDSA format breaks down as follows:

Plan: How will your intervention be deployed and your data be collected? Be certain you have defined the question you are attempting to answer and solicit predictions about what you think will occur with your intervention.

Do: Deploy your intervention on a small scale. Record necessary data and any unexpected complications.

Study: Analyze the data you have collected and assess if your predictions were accurate. Draw conclusions from the data about the effectiveness of your intervention (a skill we will review with run charts in the final installment of this series) and review unintended consequences to provide context for future efforts.

Act: Learning from your data analysis, determine what modifications (if any) are appropriate for your intervention. Discuss as a group if the intervention should be halted, modified and re-tested, or spread to a larger sphere of impact.[4]

A key feature to keep in mind with the PDSA format is that initial cycles are intended to be small tests of change. Ideally, your team chooses a patient population or care location just large enough to detect if your intervention is effective. For instance, you may choose to roll out an intervention on one floor or one service in a hospital, or only on select provider patient panels in an office, etc. For our headache intervention, you could deploy your proposed new orderset for use with only admitting hospitalists, or a teaching service, or with a neurology team. You should not activate your new workflow for all admitting services or for every emergency room in your health system as a first PDSA cycle. Larger scale changes should instead be included in PDSA cycles that you build on top of early tests of change. In this fashion, you can learn what modifications to your early attempts are appropriate prior to creating a potentially larger disruption to workflows. If your interventions are successful and do not require significant modifications, you can progress from small "test of change" PDSA cycles to larger implementation and "spread the change" PDSA cycles.[2]

Though this start small strategy seems intuitive at first, it is important to note how much this contrasts to more traditional research that attempts to recruit large cohorts for study to minimize confounding factors. Starting small for a randomized controlled trial, for instance, may be detrimental as this type of research will need to be statistically powered to detect a change. Quality improvement research, meanwhile, is less concerned with statistical power and more focused on real-world impact. Therefore, initial PDSA cycles should choose the smallest unit of study possible that will still allow an assessment of the real-world impact of your intervention.[1]

As with most strategies that seem simplistic at first glance, it is easy to skip steps within the PDSA format and jump directly to the action portions. I would caution your quality improvement group against this pitfall. One effective tool to combat this tendency is to utilize a PDSA worksheet that requires preliminary questions to be answered prior to moving forward. The Institute for Healthcare Improvement (IHI) is one entity that has a very well-constructed worksheet for this exact purpose and is available to download from their website. For educational purposes, the IHI has also included an example completed PDSA worksheet for your review in this same document.[5]

In this 4th installment of our 5-part series on utilizing quality improvement science within the healthcare arena, we have discussed the primary types of measures used and how to provide a robust definition for our data collection activities. These measures are then put to use as your quality improvement team deploys an intervention within the PDSA framework. Depending on the results of these early small tests of change, your group is then armed with the data necessary to determine if the intervention drove improvement and is worthwhile to spread to a larger area of influence or, alternatively, if modifications are necessary to avoid undesirable downstream effects. Interpreting this data and effectively displaying it to various audiences can be simultaneously accomplished using the tool that will be the focus our next installment's discussion—the run chart. With that discussion of the run chart, and the statistical underpinning of its powerful assessments, we will have taken our headache improvement team from preliminary identification of a possible target for quality improvement all the way through a deployed intervention and assessment of results. Future directions after this early test of change will largely be a return to this same series of steps in order to deploy a new intervention or spread this new tool to a larger audience, utilizing the skills your team has already practiced and is beginning to master.

REFERENCES

1. Institute for Healthcare Improvement. Model for improvement: Establishing measures. Accessed June 12, 2024. https://www.ihi.org/resources/how-to-improve/model-for-improvement-establishing-measures
2. Norman CL, Nola TW, Moen R, Provost LP, Nolan KM, Langley GJ. The Improvement Guide: A Practical Approach to Enhancing Organizational Performance. Jossey-Bass; 2013.
3. Jazieh AR. Quality Measures: Types, Selection, and Application in Health Care Quality Improvement Projects. Glob J Qual Saf Healthc. 2020;3(4):144-146. https://doi.org/10.36401/JQSH-20-X6
4. Fondahn E, Lane M, Vannucci A, eds. The Washington Manual of Patient Safety and Quality Improvement. Wolters Kluwer; 2016.
5. Institute for Healthcare Improvement. QI Essentials Toolkit: PDSA Worksheet. Published online 2017. Accessed June 12, 2024. https://www.ihi.org/resources/tools/plan-do-study-act-pdsa-worksheet#downloads