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Quality Improvement In Healthcare: A Practical Guide For Providers - Part 2

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This article represents the second installment of a 5-part series intended to simplify the main principles of quality improvement for the healthcare provider. As we noted in the first article, the knowledge shared in this series relies heavily on my own experiential learning, gained after more than a decade of direct involvement in quality improvement within healthcare. Ample resources are available in the literature and, while I will cite a few key resources, the reader is encouraged to seek out and review additional resources outside of this reading. One such resource includes the Institute for Healthcare Improvement, whose Plan-Do-Study-Act (PDSA) structure is this author's preferred quality improvement methodology and therefore is the primary strategy reviewed in this series[1]. For the sake of clarity, it warrants repeating that this 5-part series is broken down in the following fashion:

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

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The reader is again encouraged to review each part in chronological order, as the topics build upon each other and a more thorough understanding is achieved if reviewed in the proper sequence.

As the reader will recall, we began our quality improvement journey together 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 similarly non-contributory. As part of the work-up for this present headache, an MRI/MRA head and neck is ordered. This imaging ultimately reveals no acute findings. The patient is treated symptomatically for presumed migraine headache, recovers without additional issues, and is discharged from the hospital 24 hours later. Several weeks later, the patient files a grievance with the patient advocate department for concerns of unnecessary testing in regards to the imaging ordered for his headache. This grievance prompts administration to seek your leadership on a possible quality improvement project to prevent unnecessary testing in similar future cases.

With this target identified as a viable quality improvement project, and an effectively quality improvement team assembled, we are now ready to work toward a gap analysis and a process map.

Our first step will be to establish the best practices relevant to our target problem. We will accomplish this through a task called "benchmarking." Simply put, benchmarking aims to answer to describe how our system would appear if it were working perfectly[2,3]. That is, what would have been the ideal course of events that Mr. Smith from our target case should have experienced in terms of the work up and tests? To answer this question, you have three essential sources to utilize:

1. Society guidelines
2. Medical or healthcare journals
3. Other hospitals or healthcare entities

Pursuing a particular guideline from a professional society will be guided by the target issue at hand. For our case with Mr. Smith, we may find relevant information in professional specialist societies such as the American Headache Society[4] or the American College of Radiology[5]. Alternatively, more generalized internal medicine organizations such as the American College of Physicians[6] or the Society of Hospital Medicine[7] may be a good starting point. Often these societies maintain websites with robust search functions that can more readily direct you toward reviews and guidelines on relevant topics to your quality improvement project. As an example, a quick search through the American College of Radiology website reveals the ACR Appropriateness Criteria database. This database reviews available tests as initial imaging for an uncomplicated headache without neurological red flags, ranging from CT of the head without contrast through MRA and MRV of the brain. Per the professional guidelines endorsed by the American College of Radiology, none of these imaging modalities are appropriate in this setting5—thereby validating the best practice of no imaging needed for an otherwise uncomplicated headache.

For many quality improvement projects, additional benchmarking resources will be necessary. If so, we can turn to medical literature for a review of primary resources on our target topic. A variety of literature databases are available to even the novice researcher, but the three most used by this author include PubMed®, Ovid®, and Scopus®. PubMed® is a frequently utilized resource due to its robust foundation in literature organized by the National Library of Medicine, its ease of use, and its lack of a subscription cost. If the reader lacks experience in using any of these literature database tools, I would encourage you to consult with your local hospital librarian (if available) or view an online tutorial discussing the search limiter functions within your preferred tool. The effectiveness of using a service such as PubMed® is contingent upon constructing a robust search strategy that highlights the most relevant resources while filtering out the articles with limited or no relevance, which often number in the thousands.

Point-of-care tools such as UpToDate® (with a subscription cost) or natural language search engines such as Google Scholar™ (free to use) can also be powerful supplements to your medical literature searches. These services allow you to exploit the work of others who may have already gathered a large volume of key literature focused on your target problem. A search for "headache imaging guidelines" in Google Scholar™ returns not only the ACR Appropriateness Criteria[5] described above but also a systematic review from the American Headache Society and articles from the literature describing evidence-based guidelines for neuroimaging in non-acute headaches[8,9].

A third benchmarking resource for you to consider is the work already done within your own institution or at another hospital or office. It is likely that your proposed project is not entirely novel within the field of healthcare delivery, and others may have already attempted a quality improvement project that is at least partially relevant to your own endeavor. One healthcare entity this author has found particularly useful in the past is Intermountain Health[10], which supports its own Healthcare Delivery Institute and provides information on prior quality improvement efforts as well as general quality improvement principles. For our purposes, it is noteworthy that this healthcare institution has developed and published their own imaging criteria for patients presenting with headache[11].

As we assemble the relevant research, guidelines, and professional recommendations from our three available benchmarking resources, it becomes clear that we have a robust foundation to stand upon in the statement that patients presenting with uncomplicated headaches do not require neuroimaging. We have therefore set "no imaging necessary" as our relevant benchmark by which to judge the performance of our own system. As you might suspect, the next logical step then is to review the baseline data from our own institution to ascertain our local performance against this benchmark—that is, how often are we ordering neuroimaging for patients presenting with an uncomplicated headache?

When collecting baseline data relevant to our target problem, the most common challenge is not a paucity of data but, rather, too much data that is organized in a non-clinical manner that does not present a cohesive picture of the process. While modern electronic medical records provide ample opportunity for data collection, this data collection is not often organized with the clinician in mind. Much of the data is organized according to billing practices, with datapoints that are inextricably linked in the mind of the clinician being stored in separate flowsheets with labels more attuned to the computer engineer or coding specialist than the busy healthcare provider. Which data repositories available to you will be

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highly dependent upon your institution's electronic medical record vendor, third party applications linked to your institution's records, and the billing and coding priorities highlighted by your administrative leadership.

This author strongly encourages recruiting both IT and data analytics experts to your project early in the development process to help guide you through the attainment and deciphering of baseline data. A particularly common mistake that can be avoided by recruiting these experts early is to ignore data reports already constructed in favor of creating a brand-new reporting structure. Very often a data report is already in place that contains information highly relevant to your current effort, and it has been this author's experience that starting with reports already created saves time compared to relying entirely on newly constructed efforts.

For our case with Mr. Smith, we would aim to obtain baseline data on patients presenting to the hospital for headache, ideally being able to separate out those patients who do not present with concomitant neurological deficits, fevers, or other red flags pertaining to the headache. We clearly would want any orders for neuroimaging included in such a report and, in this fashion, we could determine how our system is performing at baseline compared to the benchmark established earlier. At this point, we can assess if a "gap" exists between our benchmark (where we want to be performing) and our baseline (where we are currently performing). In this author's experience, one of two outcomes is possible at this stage: (1) your system is already performing at a high level and only a small "gap" exists or (2) your system is not performing at the ideal state and a large "gap" exists. If you discover only a small "gap", this is wonderful news for your institution but indicates that a quality improvement project is unlikely to be a productive use of your time. If a large "gap" exists, however, we must determine why our system is underperforming—hence we perform a "gap analysis".

Four basic instruments are commonly available to assist you in performing a gap analysis: focus groups, direct observations, expert analysis, and database reviews. An in-depth discussion of these is beyond the scope of our series (and entire class on conducting an effective focus group is possible), but I will share a few highlights for each. Regardless of which of the gap analysis tools you select to utilize, your goal is to feed the lessons learned into a process map and a root cause analysis. The process map and root cause analysis are the ultimate expressions of your team's understanding of both your target process and its gap in performance compared to your benchmark. Let's first quickly review the four tools you will use to work toward this understanding.

A. Focus Groups[12]

Most focus groups will contain between 5 and 8 individuals who are identified as key stakeholders in your target process. Too few participants will not provide enough information, while too many participants in one focus group is often difficult to guide through the necessary discussion. For example, when reviewing the care of patients with headaches, it will be important to include a hospitalist, a neurologist, a radiologist, a bedside nurse, an emergency room provider, and various other individuals who interact with the patient. You will note from the brief list of individuals that we should attempt to recruit stakeholders likely to have varied opinions and perspectives for the common process of the patient's care. We do not want to recruit exclusively 8 neurologists to our focus group, as this will provide too narrow of a perspective and important lessons will be missed. As you guide the dialogue in a focus group with questions to highlight common misconceptions or perceived inefficiencies, it is important to balance the need to concentrate the group's efforts toward key points while not steering the dialogue too strictly and ignoring unexpected (albeit very useful) information revealed in the conversation. In short, your aim in a focus group is to learn from the varied perspectives of the frontline stakeholders and not simply confirm what you already thought to be true.

B. Direct Observations[13]

Direct observations are a particularly powerful tool to better understand the patient experience at your institution. As you have likely deduced, this tool involves directly observing the steps in patient care at the front lines that are relevant to your target problem. For our quality improvement project, for instance, we may want to shadow patients presenting to the emergency room with headache and watch step-by-step how and when they undergo imaging. As you follow patients, it will quickly become apparent that some degree of variation is the rule, with each patient's experience being unique to their circumstances and needs. Instead, as you observe, take note of key themes such as redundancies in workflows, common time pressures, bottlenecks where the entire process is delayed by a particular factor, or excessive paperwork. The most common mistake when performing direct observations is to observe too few patient encounters. As you are seeking a

better understanding of the average experience for your patients, you must perform many direct observations to determine which steps are common to most patient encounters and which aspects represent uncommon variances.

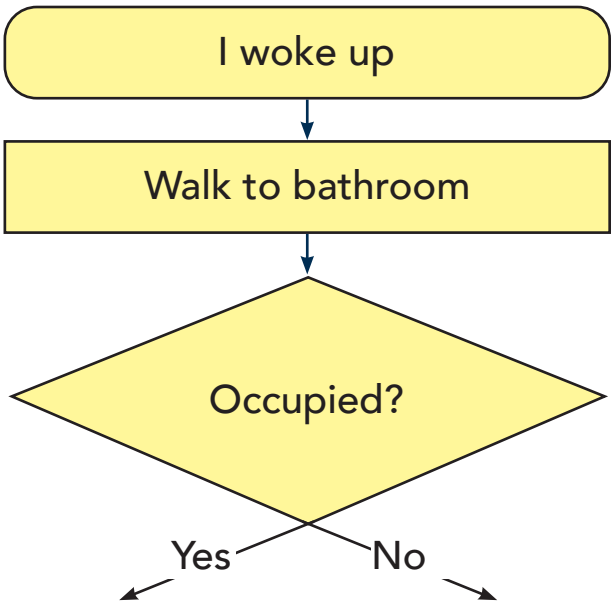
C, D. Expert Analysis and Database Review

We will spend less time on these remaining two tools, as they are largely self-explanatory or less commonly available, and inclusion of these two strategies is based upon this author's personal experiences with performing a gap analysis. Utilizing expert analysis will involve hiring an external expert pertaining to your quality improvement target or a professional service with expertise in quality improvement deployment in healthcare. Innumerable such services and experts exist but, as you may have guessed, the availability of these services to your project may be limited by financial constraints. In short, expertise is not cheap. However, when available, exploiting the expertise of others who may have attempted a similar project or who have experienced the common pitfalls that hinder many quality improvement projects within the healthcare setting can be invaluable.

Database review, as the name suggests, is an extension of the activity you performed when analyzing your baseline data. When taking that data and utilizing it within a gap analysis, it is important to focus on the "failures" of your target process. For example, when we obtain baseline data for our headache patients, we will want to focus on the cases where unnecessary neuroimaging was ordered. When we gather a series of these "failures", we can begin to look for common themes that link them together. Are the patients typically presenting to the hospital at a particular time of day? Or day of the week? Are they admitted to a particular floor? Or seen by a particular provider? Do the patients tend to be a certain age? Is there some other feature of their presentation that commonly compels a provider to order imaging? In your database review, you are looking for some aspect of the patient experience that commonly leads to neuroimaging being ordered and, therefore, may be driving some of the "gap" seen between your institution and your established benchmark.

Your quality improvement team has now learned a great deal about the target process, with a thorough understanding of both how your system is currently functioning and why it is not achieving the ideal state defined by your benchmark. The culmination of these efforts is to create a summative representation of these lessons learned in the form of both a process map and an Ishikawa diagram (often called a fishbone diagram)[14]. We will finish this second installment in our quality improvement primer with a brief discussion of both of these tools.

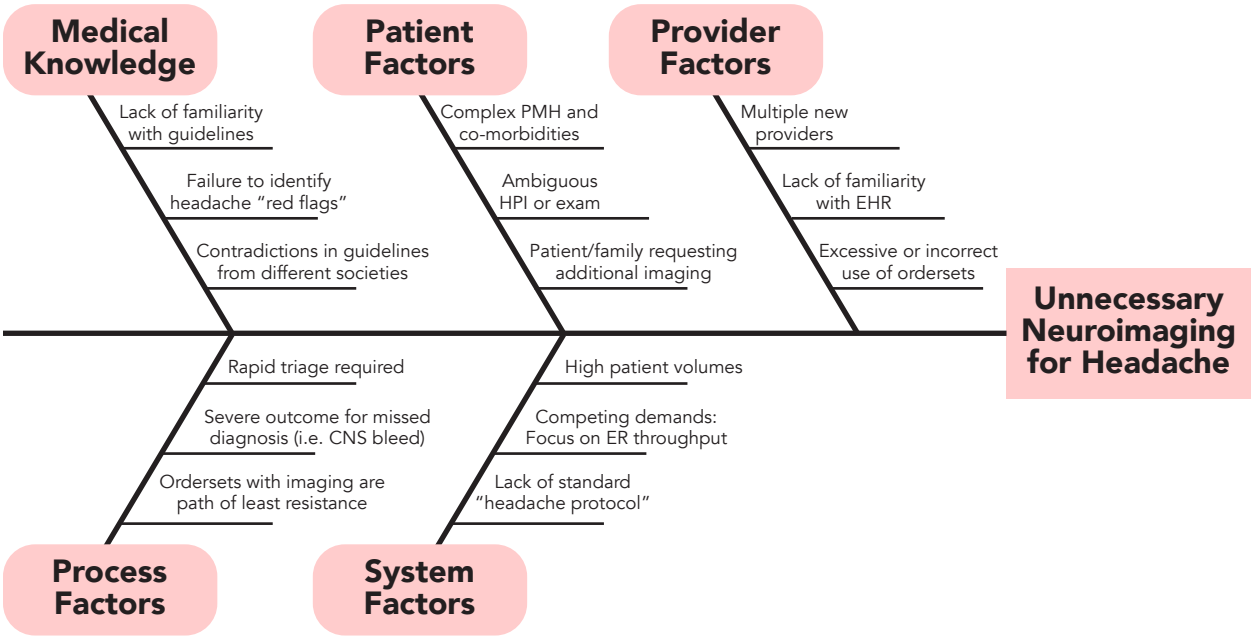
FIGURE 1. Process map



A process map is a visual representation of the steps experienced by a patient going through your targeted process[12]. In our example case, a process map would organize all of the steps Mr. Smith goes through starting with onset of the headache through neuroimaging and finally finishing with discharge from the hospital. Importantly, the process map should reflect what ACTUALLY happens for Mr. Smith, not the ideal series of steps. Detailed notes from a series of direct observations are often vital to effectively creating a robust process map. Even with detailed notes, however, it is very common that first drafts of a process map are rudimentary by comparison to later versions updated with newly discovered complexities. In this sense, the process map itself is never truly complete but, rather, is a living document that changes as often as the processes you are analyzing. The goal in engaging with this often tedious task is to create a shared vision of the real-world process amongst your key stakeholders. To achieve this shared vision, it is necessary to revisit this diagram with stakeholders frequently.

To provide a degree of standardized structure, it is important to realize that a process map (*Figure 1*) contains certain shapes that indicate different information. In its simplest form, a process map will contain ovals, rectangles, and diamonds. Ovals repre-

FIGURE 2. Ishikawa (fishbone) Diagram



sent the beginning and ending steps in the diagram. Meanwhile, rectangles indicate an intermediate step and diamonds indicate a decision point, typically in the form of a yes/no or either/or question[12]. In the example shown, the process starts with waking, progresses to the intermediate step of walking to the bathroom, and then reaches a decision point where the process could go in one of two directions—that is, either the bathroom is occupied or it is not

The act of creating and perpetually updating a process map often reveals yet undiscovered intricacies to the patient experience and may generate further questions requiring clarification. As your team's understanding continues to expand, it will be important to capture key lessons by performing a root cause analysis and recording these findings in an Ishikawa Diagram (*Figure 2*)[15].

In many ways, your team has been performing the steps of a root cause analysis already and the diagram is merely to capture these root causes in a concise manner. Wachter and Gupta16 provide us with a succinct definition when describing a root cause analysis as a "deliberate, comprehensive dissection of an error, laying bare all of the relevant facts and searching assiduously for underlying causes rather than being satisfied by superficial explanations." As you are dissecting your target issue of unnecessary neuroimaging for uncomplicated headaches, it may be tempting to settle for a superficial explanation such as "the doctors do not know the guidelines for headache diagnostic imaging." The purpose of all the work you have done thus far is to dig past that initial explanation to realize deeper underlying causes exist. In your analysis, you may note that the guidelines change often and are not readily available at point-of-care for the provider. Perhaps you note that the commonly used admission orderset automatically includes orders for imaging. Your direct observations may reveal that the volume in your emergency room compels ordering providers to order imaging out of fear of missing a serious pathology while rushing.

A useful technique to aid in a deeper explanation is known as the 5-whys technique[17]. As the name implies, this involves asking "why" at least 5 times before settling on the deeper answer. For instance, consider the following:

You were late for work today.
1. Why?

Because you overslept.
2. Why?

Because your alarm clock did not go off.
3. Why?

Because the batteries were dead.
4. Why?

Because I have not recently changed the batteries.
5. Why?

Because there is no "low battery" indicator on my alarm clock.

In this example, we can see the deeper "root" causes as we continue to ask the question "why". It is clear to see how the problem remains the same (you were late for work), but the strategy you use to combat this in the future changes as we get to the deeper issue. We have learned that we need to set a reminder to change the batteries at a certain interval or perhaps purchase a new alarm clock with a low battery indicator. In healthcare, the superficial answer is often some version of "try harder" or "be more careful." A deeper understanding, through the identification of root causes, allows us to generate solutions that are more sustainable, more practical, and more likely to generate a positive influence on the outcomes for our patients.

As we conclude our second installment in this quality improvement primer, reflect on the journey your quality improvement team has already completed. Your project began as an idea that required vetting before proceeding. After identifying unecessary neuroimaging for uncomplicated headaches as a viable quality improvement target, you assembled an effective team and began working toward a gap analysis. This analysis began with first establishing a benchmark, or the "ideal" state, and then comparing your institution's own baseline data to this ideal. After determining that a "gap" exists, meaning your institution has room for improvement, you began to analyze why that gap exists with four primary tools: focus groups, direct observations, expert analysis, and an extension of your baseline data review to identify common links between cases where unnecessary imaging was ordered. Finally, with a more thorough understanding of the target process achieved, your analysis efforts culminated in the construction of a process map to represent the steps in your target process and an Ishikawa (Fishbone) Diagram to display identified root causes driving failures in the process. In our next installment in this areas, we will begin taking active steps toward driving improvement by drafting an effective aim statement and reviewing types of interventions.

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