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Part I:
Measuring What Matters: Anatomy of a Healthcare Metric

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Contents

Overview

'Even when it is not clear how we might measure an attribute, the act of proposing such measures will open a debate that leads to greater understanding.' - **Fenton and Pfleeger, 1997.**

With the changing regulatory policies and healthcare models, the healthcare reform continues. Simply put, a metric is a quantifiable, standardized objective measure that is used to drive improvements and help businesses focus their people and resources on what is important. A healthcare metric is a type of performance measurement that helps you understand how your healthcare organization or department is performing [5]. The primary objectives behind tracking these metrics are to quantify the healthcare processes, patient outcomes, and organizational structures. The ultimate destination is to deliver high quality care leading to better patient outcomes. The path to get there is having the right metrics to guide quality improvements.

Today, healthcare professionals cannot only be patient-driven and data-driven, but they also need to focus on the management of a whole data spectrum on how to provide the best possible care, ensure sustainable hospital performance and effectively manage costs. The performance measurement is an important process for decision-makers in any type of organization and healthcare is no exception. However, it is not sufficient to just measure the performance, but the executives and the management team need to make decisions based on results and implement corrective actions.

With the rising demand for value-based personalized care, the quality metrics are becoming an essential part of care delivery. This paper aims at articulating the anatomy of the healthcare metric and the way you should think while designing a good metric in the healthcare domain. We will discuss how to design them in such a way as to drive behavior that will lead to the outcomes that you want.

About the Healthcare Metrics Landscape

The competition in the healthcare sector is pushing the organization to look for new ways and to improve the quality of care and patient satisfaction. For a multitude of reasons, improving healthcare quality is paramount. The range of metrics that organizations can implement vary from those that are mandatory—for legal, safety or contractual purposes—to those that track increase in operational efficiency, improved patient satisfaction, better quality of care, and greater profits.

Identifying the metrics that help to ensure that our healthcare system is delivering effective, safe, efficient, patient-centered, equitable, and timely care is the need of the hour. In identifying the appropriate analytic metrics, one should consider the population to be analyzed as well as the focus of the population analysis initiative. As said by **Frank Zappa**: *"One size does not fit all."*

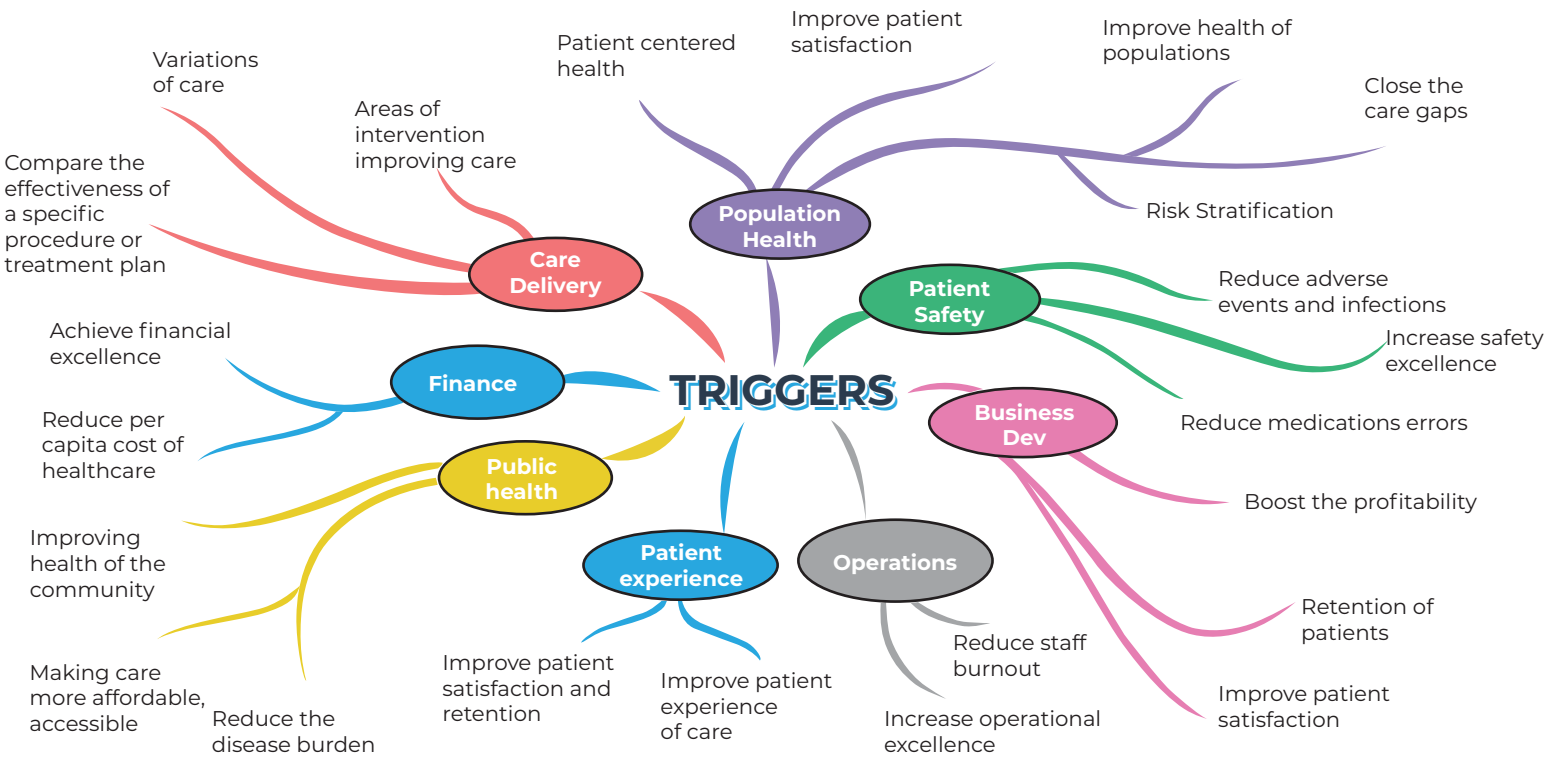
In a classic formulation, Donabedian asserted that quality of care includes (i) structure (characteristics of the resources in the healthcare system, including organization and system of care, accessibility of services, licensure, physical attributes, safety and policies procedures viewed as the capacity to provide high quality care), (ii) process (measures related to evaluating the process of care, including the management of disease, the existence of preventive care such as screening for disease, accuracy of diagnosis, the appropriateness of therapy, complications, and interpersonal aspects of care, such as service, timeliness, and coordination of care across settings and professional disciplines), and (iii) clinical outcomes.

"The best measures are the ones that drive action," **said Teutsch**. They provide the greatest health improvement and contribute to health equity for the total population. He also noted that the greatest opportunities to improve population health reside outside the traditional health sector as well as in systems and policy change, and that good measures are needed for those sectors too. Measures must be tied to interventions, he added, and they need to be part of collective action and quality improvement processes if they are to drive change.

We need to dive deeper into the practice for finding the appropriate metrics in the following areas of the healthcare system.

- Care Delivery
- Population Health
- Patient Safety
- Operations
- Experience
- Finance
- Public Health
- Business Development/Marketing

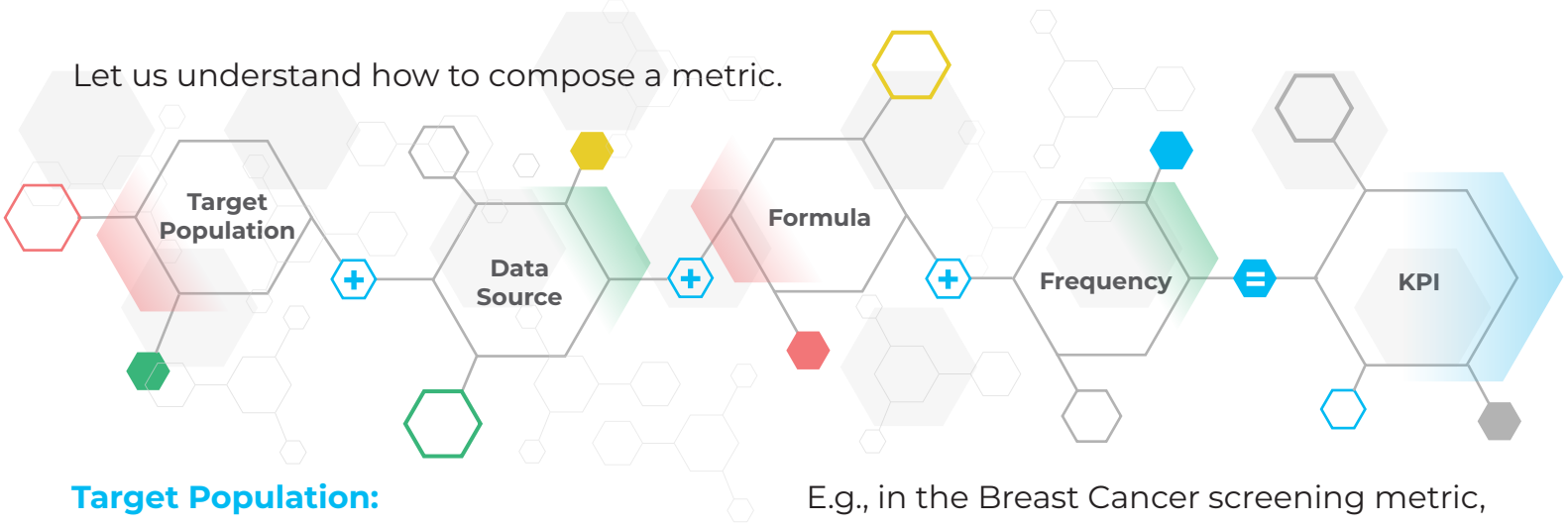
Triggers guide transitions along the continuum of care.
Following are the triggers for designing a healthcare metric:



The metrics drive the organization's strategy and performance. They help health program planners, policy makers, and evaluators analyze the situation and design a health program efficiently. We should have a clear understanding of what data is needed and how to collect it. The performance and outcome should be measured and shared with the stakeholders for continual improvement.

Anatomy of a Healthcare metric

Let us understand how to compose a metric.



Target Population:

Also coined as the Initial Population, the target population should be clearly defined for accurate calculation and results. The target population is called the denominator and includes all service users or events that qualify for inclusion in the measurement process. The subset of the target population that meets the criteria as defined in the indicator is called the numerator. More specific information regarding the target population can be given under the headings of inclusion criteria and exclusion criteria. Inclusion criteria outline specific parameters of the population for inclusion in the numerator and/or denominator that may not have been included in the KPI definitions. Exclusion criteria describe the specific criteria for excluding cases from both the numerator and denominator.

E.g., in the Breast Cancer screening metric, women in 51-74 years of age with a visit during the measurement period is the targeted population.

Data Source:

Before you design a metric, it is crucial to know what set of data is required to populate the scores for the measures. The data sources for the data collection should be clearly defined. The most efficient way to collect data is to incorporate the collection process into routine service-user care, which involves regulating documentation to ensure the required information is already being recorded for operational purposes. Depending on the measure, data can be collected from different sources, including administrative databases, medical records, patient surveys, and prospective.

Let us have a look at these sources and their benefits and challenges.

1. Administrative Databases -

The data is gathered from claims, encounters, enrollment, and provider systems.

▸ **Benefits:**

- Readily and electronically available
- Involves minimal expenditure for data collection

▸ **Challenges:**

- Completeness
- Reliability
- Imprecise information

2. Medical records -

They are a systematic documentation of the patient's complaints, history, clinical findings, diagnostics, diagnosis, treatment plan, and ultimately the outcomes.

▸ **Benefits:**

- Detail-oriented
- Rich in clinical information
- Viewed by providers as credible

▸ **Challenges:**

- Cost, complexity, and time to gather and compile data
- Mixed type of data availability due to paper-based records

3. Patient surveys -

Recording the self-reported patient assessments of multiple touchpoints during their medical care experience. Include reports on satisfaction of the care and the service received, attitude and behavior, and the outcomes of care.

▸ **Benefits:**

- Ease of administration
- Standardization
- Easy to interpret
- Personalization
- Scalability

▸ **Challenges:**

- Expensive due to the cost of the survey administration
- Sampling or response bias
- Data quality
- Not readily available

4. Prospective data collection -

Involves collecting data specifically for quality measurement purposes.

▸ **Benefits:**

- More precise and well-defined

▸ **Challenges:**

- Expensive to collect
- Not readily available

Formula

The calculation logic needs to be clearly specified. This should contain information on the numerator and denominator. This should also contain information on the inclusion and exclusion criteria.

Say, for the measure Diabetes: Medical Attention for Nephropathy- the formula is patients with a screening for nephropathy or evidence of nephropathy during the measurement period / patients 18 – 75 years of age with diabetes with a visit during the measurement period.

Many performance measures are rates, with the numerator indicating how many times the objective has been met and the denominator indicating the opportunities to meet the objectives. The denominator needs to be carefully determined as it impacts the understanding and the interpretation of the data. Defining the denominator is a complex activity. As stated by CMS, Numerator (also called the measure focus) describes the target process, condition, event, or outcome expected for the targeted population, while the Denominator defines the population being measured. It could be the whole population or a subset.

The exclusions and exceptions criteria should also be clearly defined while measuring a metric.

E.g., your organization intends to measure how well it is complying with the clinical recommendations of undergoing HbA1c screening every 90 days for diabetic patients.

Now here, the numerator should define the way you calculate that the expected outcome is achieved. So, the number of patients who undergo an HbA1c test every 90 days will address the numerator component. In specifying the denominator, the organization will need to establish what constitutes an opportunity to deliver the desired action. Failure in determining the right denominator would lead to overperformance or underperformance. The total number of diabetic patients who were eligible to undergo an HbA1c test within that specified period will be the denominator. Denominator exclusions are those cases that are removed immediately from the denominator, before numerator evaluation, whereas denominator exceptions are removed from the denominator only after the numerator is properly assessed as “no” [10]

Benchmarking

Benchmarking in healthcare is defined as the continual and collaborative discipline of measuring and comparing the results of key work processes with those of the best performers in evaluating organizational performance.

Benchmarking is a crucial aspect of any healthcare organization's operational strategy. Benchmarking should not just involve comparing your hospital with national averages; it should involve looking at best in class hospitals and finding out what they do. Once a benchmark for each metric is determined, analyzing data results becomes more meaningful.

Two types of benchmarking can be used to evaluate patient safety and quality performance: Internal and Competitive.

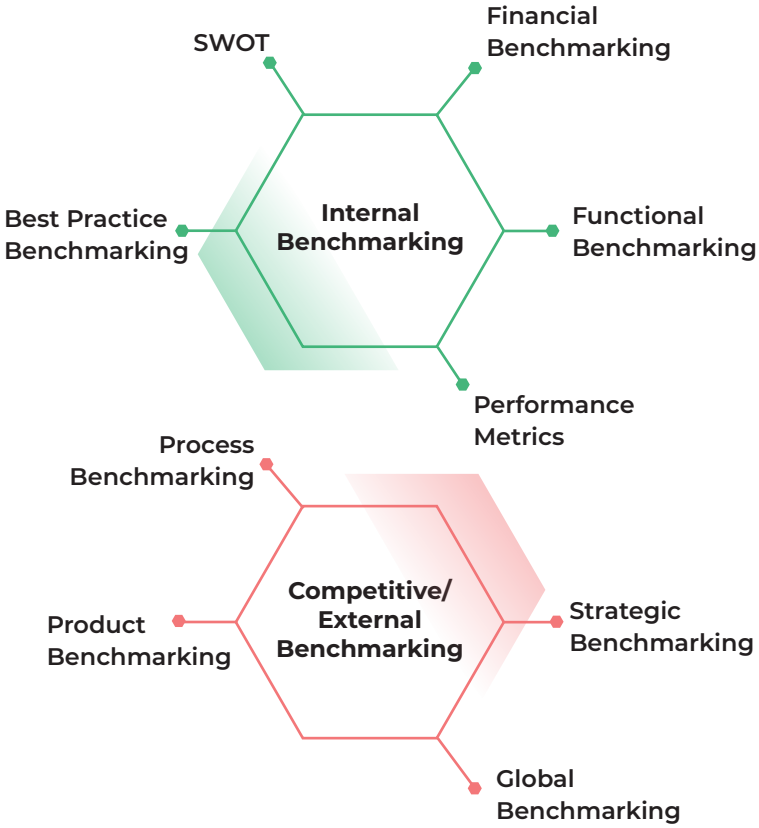
1. Internal benchmarking

It involves comparing the best practices within the healthcare organizations, determining the best practices, and eventually evaluating how it meets the best set standard and the defined goal.

2. Competitive or external benchmarking

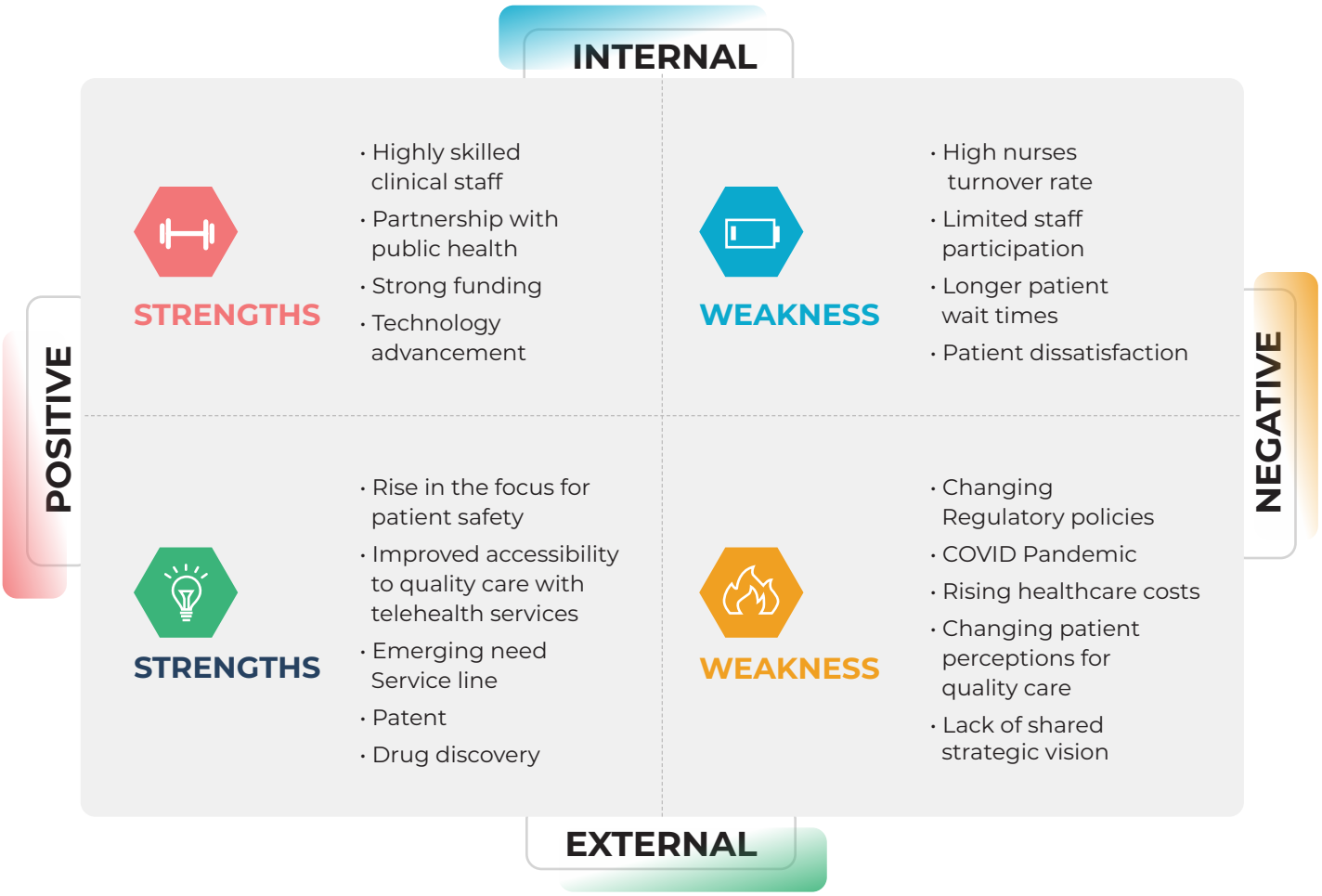
It involves leveraging the comparative data between the healthcare organizations to judge performance, compare the goals against its own healthcare organization and determine refinements that have proven to be successful in other organizations. It is like comparing your strengths, weakness, opportunities, and threats with your competitors or industry leaders.

Following are the various strategies falling under these types.



What does SWOT stand for?
S = Strength
W = Weakness
O = Opportunity
T = Threat

SWOT Analysis can help identify targets for a benchmarking study. This process helps you see what patterns emerge so you can gain insight into your strengths and discover the gap(s) or areas for improvement [10]. Benchmarking is a tracking system to determine improvement in mission-critical areas identified with SWOT analysis.



This SWOT analysis will guide the stakeholders to identify which benchmark study can be planned.

In accordance with the process recommended by Chang and Kelly in their book, *Improving Through Benchmarking* (1994) [11] : Identify which measures can be reused or newly created → Gather the data → Analyze the data (depending on the areas of competitive advantage, areas that need improvement) → Create an action plan to implement the recommended changes → Review the results → Recalibrate metrics as required.

Frequency of Data Collection or Monitoring: *How often should we measure?*

The frequency for your indicators highly depends on how often accurate measurement results are collected or are available. Measurements can be conducted daily, weekly, monthly, or yearly.

E.g., annual cervical screening, annual diabetic eye exam

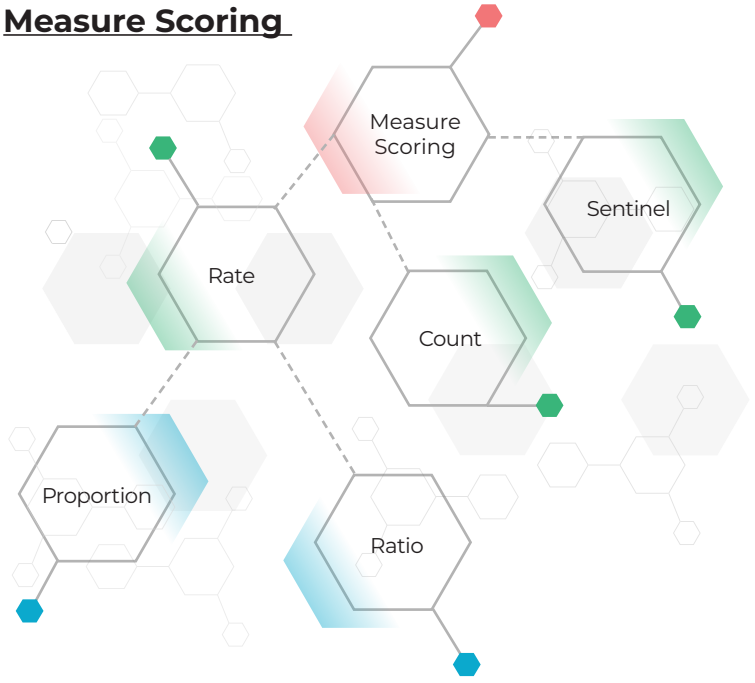
Domain: There are different domains of care.
The Healthcare Effectiveness Data and Information Set (HEDIS) includes more than 90 measures across 6 domains of care:

1. Effectiveness of Care
2. Access/Availability of Care
3. Experience of Care
4. Utilization and Risk Adjusted Utilization
5. Health Plan Descriptive Information
6. Measures Reported Using Electronic Clinical Data Systems

National Quality Strategy Domains define measures across 6 domains of care:

1. Patient and Family Engagement
2. Patient Safety
3. Care Coordination
4. Population/Public Health
5. Efficient Use of Healthcare Resources
6. Clinical Process/Effectiveness

Measure Scoring



1) Rate-based:
A rate is a measure of the frequency with which an event occurs in a defined population over a specified period.
The rate is a measure of risk as it compares disease frequency in different locations, at different times, or among different groups of persons with potentially different sized populations.
E.g., maternal mortality rate.

a) Proportion:
A proportion is the comparison of a part to the whole. It is a type of ratio in which the numerator is included in the denominator. A proportion can be expressed as a fraction, a decimal, or a percentage.

E.g., documentation of current medications in the medical record

b) Ratio:

A ratio is the relative magnitude of two quantities or a comparison of any two values. The numerators and denominators of a ratio can be related or unrelated.

E.g., nurse-patient ratio

2) Count:

Measures number of events without a denominator.

E.g., number of cases diagnosed with diabetes in a given year.

3) Sentinel:

The Joint Commission defines a sentinel event as an unexpected occurrence involving death, serious physical or psychological injury.

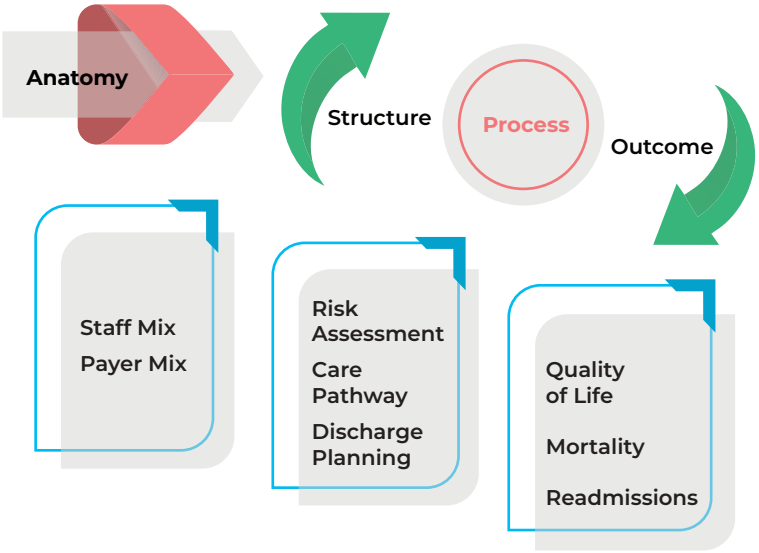
E.g., number of deaths due to medication errors.

Metric Types

There are several types of metrics. Listed below are a few common types:

1. Structural metrics Vs Process Metrics Vs Outcome metrics

According to Donabedian [8], healthcare quality can be assessed using a three-part model based on the structures, processes, and outcomes of the healthcare system.



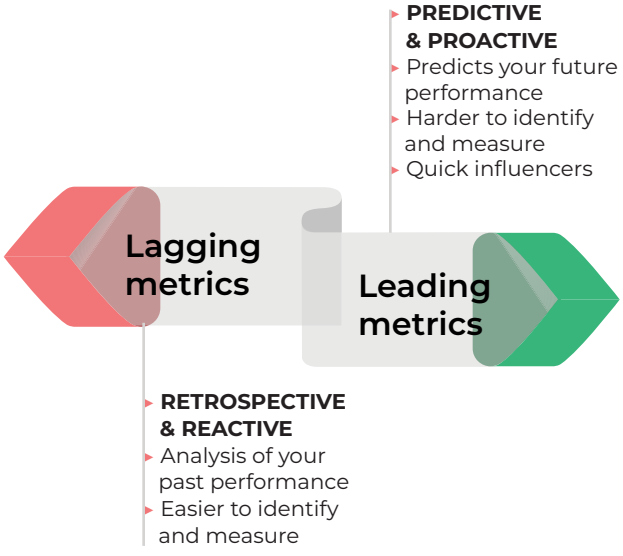
- Structural metrics give a gist of the healthcare provider's capacity, systems, and processes to provide high-quality care.
- On the other hand, Process metric focuses on an activity or aspect of a care-delivery process, while Outcome focuses on results and measures the effectiveness of the change in the care process.
- Process measures typically reflect generally accepted recommendations for clinical practice.
- E.g.,
  - Nurse-Patient Ratio is a structural metric.
  - Performing a fall risk assessment like Morse Scale on a patient at the time of admission (process measure) can reduce fall rates (outcome measure).
  - Chronic Care Visit provided every 90 days for patients enrolled in 1 or more Chronic Care Clinics can curb the complications and disease progression.
  - Healthcare quality measures used for public reporting are process measures.

2. Qualitative vs quantitative metrics

- Qualitative metrics are descriptive metrics whereas Quantitative metrics can be measured in a number with a formula.
- Qualitative metrics focus on perception and are subjective and Quantitative are quantification focused and objective.
- Patient feedback, Quality of care, and Perception of well-being are a few examples of qualitative metric while Patient Satisfaction score, Number of patients enrolled in chronic care clinic programs, and mortality rates are examples of quantitative metrics.

3. Leading vs lagging metrics

- Leading metrics are the action/process to achieve the measurable results, i.e., lagging metrics.
- Leading indicators help to understand what actions need to be taken to achieve the goal [WHAT YOU NEED TO DO...]



- Referring to COVID-19, hospitalization and unplanned absence are lagging indicators while social distancing and wearing masks are leading indicators.

4. Correlated vs causal metrics

- Correlation is when two factors (or variables) are related, but one does not necessarily cause the other. Causation is when one factor (or variable) causes another.
- Correlation does not imply causation.
- The correlation can be positive, negative or zero.
- For example, a high fat diet and heart disease show positive correlation. Smoking and Alcoholism are correlated but not causal. But increased alcoholism can lead to liver cirrhosis is causal.
- Similarly, obesity or physical inactivity can cause diabetes. This is a causal relationship.

Unwrapping the Myths

Myth 1: The more the metrics, the better!
Fact- Unnecessarily increasing the number of metrics can lead to confusion, lack of understanding, no outcomes, and poor prioritization.

Myth 2: We must measure everything.
Fact- We should keep it simple, self-explanatory, and one that meets the business goals.

Myth 3: We cannot do meaningful analytics because we do not have robust analytical solutions. [12]
Fact- The ability to do meaningful analytics work that can truly impact healthcare improvement does not necessarily depend on having robust analytic and BI platforms. With a growing trend for Healthcare Information Technology (HIT), vendors offer a set of analytics tools as part of, or in addition to, their "mainstream " clinical systems such as EHRs etc.

Myth 4: Frontline staff have lack of understanding and interest in the data. [12]
Fact- Although, the frontline healthcare staff are not statisticians, this does not mean they do not have interest in the analytics. Evidence-based medicine (EBM) and its approach to the practice of medicine has gained considerable acceptance among healthcare professionals. And without data, clinical evidence is impossible. Analysts have now started using effective visualization techniques to make sure that the information is well perceived and to grasp the significance of the metrics.

Myth 5: The metrics are intended only for the executives and leadership and for the frontline healthcare staff. [12]
Fact- Traditionally, it was meant for executives to strategize the financial and the operational processes. The executives can define a metric, set the targets, and chalk a path in achieving it.
But the technological advancements and use of healthcare information systems like clinical systems, hospital information systems, pharmacy information system, laboratory and radiology information system, operation theatre information management system, etc. have led the frontline healthcare staff to get involved at the ground level in recording all the data in their day-to-day work. Now, this data can be made available to analytics tools for providing real insight into healthcare operations and impart a real benefit to revolutionary initiatives. The analytics can provide the frontline staff the evidence they need to know that what they are doing is indeed the best for the patient. In addition, engaging the frontline staff in defining the metrics can lead to their acceptance and willingness to actively support and participate in this initiative.

Myth 6: Metrics always encourage the employees positively.
Fact- The metrics need to be set carefully, or they could damage the business. They can impact the employees in a negative manner.

Putting it all together

Transitioning from paper to paperless (digital) era, healthcare professionals are not only focused on the science behind their area of expertise, but also provide the best possible care, ensuring optimal hospital performance and effectively managing occupancy and costs.

Continued enhancement in the electronic health records would improve the design of performance metrics by providing more comprehensive data for outcome measurement. This has led to improved quantitative and qualitative analysis of the performance.

Leverage the technology as your competitive advantage and improve the healthcare outcomes. Without effective outcome measurement, outcome improvement can't happen. Measuring health outcomes is an essential part of quality and efficiency improvement and support transformation.

There is a long way to go...
Crafting the metrics that matter in an effective way is also equally important.
If you want to know more about how to design the effective metrics, please look at the next part named "*Crafting effective healthcare metrics*".

Make good choices today so you do not have to regret tomorrow.

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