

Leveraging quality improvement to drive high reliability in healthcare

Hospitals can more effectively drive value — better care at a lower cost — by addressing issues related to reliability, workplace culture, and data analysis. This white paper addresses how healthcare professionals can leverage quality improvement to build high performing teams.

By Amber Pawlikowski, RN, MSN, CPHQ
Director, Client Services & Quality Improvement Analytics

Performance Culture in Healthcare

“If you do not know how to ask the right questions,” said W. Edwards Deming, the great pioneer of quality improvement, “you discover nothing.”¹

Health system administrators have always asked questions about the state of care in their institutions:

“How can we improve patient care?”

“How can we deliver excellent outcomes to our patients at the lowest possible costs?”

“How do we decrease variation in care?”

But these questions do not always lead to actionable interventions or thorough solutions. Instead, hospitals can more effectively drive the value proposition — better care at a lower cost — by posing different questions, ones about reliability, workplace culture, and data analysis.

In recent years, healthcare professionals have pointed to a new model for quality improvement, the High Reliability Organization (HRO). HROs are based on Deming’s ideas about process management, which have transformed businesses in almost every industry, from Japanese car manufacturers to Silicon Valley startups. At the center of Deming’s philosophy is a belief that systems, rather than individuals, are responsible for inefficiency, and that the most successful businesses engage employees in a process of continuous learning to root out systemic inefficiencies and provide the

highest value care. In a HRO, people at all levels are continuously exploring ways to deliver patient care more safely and efficiently and working with leadership to implement improvement strategies. This positive feedback loop depends on the availability of accurate, up-to-date facts about what’s working in the organization and what’s falling short. “In God we trust,” Deming said. “All others must bring data.”²

What Does it Mean to Be Reliable?

In the coming years, healthcare systems will face unprecedented challenges. The COVID-19 pandemic created a backlog of patients who were unable to receive treatment at the optimal time of intervention.³ Now, as the virus becomes endemic, these patients are returning for treatment. To provide the complex, costly care these sicker patients need, hospitals will have to work more efficiently than ever before. Meanwhile, payers increasingly expect healthcare systems to provide high value care, putting pressure on administrators to improve outcomes while working within slim operating margins. Healthcare leadership teams are faced with the impossible task of turning a deluge of data into meaningful narratives about how to improve care outcomes. Reliable treatment and outcomes have never been more in demand, nor has it ever been more difficult to provide.

Here’s the good news — high reliability is within the reach of any healthcare system. The journey begins with a simple question: “What exactly does *reliability* mean?”

The answer concerns patient safety. Studies suggest that as many as one third of patients experience preventable harm when hospitalized, and that close to half a million people die every year from these injuries.⁴ Hospitals work tirelessly to improve patient safety, but preventable harm still occurs at alarming levels. In a keynote address in 2017, Don Berwick, MD, president emeritus and senior fellow at the Institute for Healthcare Improvement, pointed to the damaging “illusion that we’ve [already] worked on safety.” Many quality improvement initiatives fall short because interventions are implemented piecemeal, rather than as part of a coordinated program to improve workplace culture. Most hospitals are also hampered by inadequate data handling capabilities. To drive lasting change, they need the ability to blend clinical, financial, and operational data with patient safety data, and extract from that information actionable insights about how to efficiently improve outcomes.⁵

Reliability also means providing high value care. Hospitals must improve outcomes while also weighing the cost for both payers and patients. Recent studies indicate that to strike this balance, healthcare systems must identify and understand patient cohorts and subcohorts, especially those that require tailored care.⁶ There is also significant evidence that better quality care leads directly to lower cost, particularly in acute care settings. For example, readmissions to the hospital after coronary artery bypass have an average cost of \$13,000.⁷ An acute kidney injury (AKI) after percutaneous coronary intervention (PCI) can add up to \$10,000 in incremental costs.⁸ By providing quality care and avoiding complications, hospitals, payers, and — most importantly — patients can avoid unnecessary expenditures. Reductions in excess hospital days also increase patient satisfaction and lead to a lower incidence of iatrogenic disease.^{9,10} Finally, as hospitals provide highly reliable care, they achieve greater financial predictability.

HROs create a workplace culture centered around the customer’s needs (in the case of healthcare systems, patients are the customers) for high value, safe care. In order to do this, they use data analysis to help drive systems of continuous learning and quality improvement. The Cultural Maturity Model is a useful way of

conceptualizing the evolution toward high reliability. It tracks different levels of workplace ethos, beginning with “reactive” — a workplace in which problems are tackled *after* they happen. Employees scrambling to fix mistakes are prone to make more mistakes, meaning that in reactive institutions, failures compound themselves. Many hospitals are stuck in this stage, while others have rudimentary systems in place to manage hazards, such as protocols for preventing hospital infections and a basic feedback apparatus for patients and employees.

To move beyond the “systematic” workplace, to the “proactive” or “generative” workplace that defines HROs, health systems must reimagine their understanding of reliability away from a set of checkboxes and compliance measures, toward a *culture* of reliability. One HRO asked care teams to think of themselves as having two jobs: the job they were hired to do and the job of increasing value and safety.¹¹ Safety becomes a way of doing business, foremost in the minds of all employees, at all times. This goal is eminently achievable when institutions find concrete ways of encouraging employees to think and behave like a team to create superior outcomes for patients.

How Does a Hospital “Play like a Team?”

Proactive cultures move beyond compliance and toward improved performance by anticipating problems before they arise, thereby creating a “just culture” — a workplace environment in which employees feel comfortable speaking up when they see mistakes. Deming argued that management should make it clear to all employees that nobody will “lose their job” for striving to contribute to quality and productivity. “Eliminate fear from the workplace,” he wrote.¹²

“Generative cultures” are the highest level of maturity. Hospitals in this stage promote a just culture. They also ensure that clinical teams and administrators collaborate in a process of continuous learning. Generative culture is rooted in a process that Deming called the “Shewhart Cycle,” or the Plan-Do-Study-Act (PDSA). Psychological safety allows employees the freedom to express doubt, concerns, and new ideas. Based on this feedback, management can work closely with clinical teams to plan and then implement interventions. Reliable data helps

management evaluate the impact of these changes and revise accordingly. A range of other QI strategies have emerged from this basic framework, including DMAIC, which relies heavily on deep data analysis, and Lean Six Sigma, which emphasizes workplace collaboration to eliminate unwanted waste and variation.

In each of these models, transparency is essential. All members of the healthcare team must be empowered to call attention to potential safety issues. This can only happen when hospitals treat problems as the fault of the system rather than the individual, a philosophy powerfully articulated in the landmark report, "To Err is Human." "Errors are caused," the authors argue, "by faulty system processes, and conditions that lead people to make mistakes or fail to prevent them."¹³ But a 2018 survey of 630 US hospitals showed that non punitive response to error was one of the top patient safety issues, with more than half of staff respondents saying they worried that event reports would be held against them.¹⁴

All those unreported errors are wasted opportunities for clinical education and system process intervention. If a hospital wants to play like a team, it needs to build a culture of psychological safety for its employees, and key to this undertaking is a reliable means for locating faults in systems processes and conditions, and the confidence to implement projects that ameliorate those faults. When employees see that the administration is invested in fixing problems rather than penalizing individuals, they will form stronger, collaborative bonds with their coworkers and managers, and will willingly contribute to the project of quality improvement.

For employees to gain confidence in their institutions, healthcare teams need reliable data and stronger analytic capabilities — they need an accurate, up-to-date picture of variations in performance, and targeted insights about the root causes of inefficiencies and failures of patient safety. This means that patient safety and quality data must be integrated with financial and operational data to create accurate information about the current state of care. Only then will the leadership have the opportunity to engage clinicians and staff in the task of remedying defects in the value of care. Leaders must track the progress of multiple

interventions in real time, and adjust course based on information gleaned from new data and employee feedback.

When healthcare teams can review data demonstrating that quality improvement initiatives are improving outcomes for patients, they will begin to see that they are an essential part of the institution. Research suggests that pride in one's work, coupled with institutional engagement, can drastically increase employee productivity. These feelings can also significantly reduce employee burnout, a seemingly intractable problem for hospitals in the COVID-19 era.¹⁵ A sense of camaraderie is also invaluable as care teams collaborate to provide the complex care that an aging population increasingly demands. Finally, employees who work well together will perfect interventions and willingly tackle new opportunities.

How Can We Use All This Data?

To pinpoint inefficiencies, construct cost-efficient interventions, and track the impact of improvement strategies, hospitals need a way of organizing and interpreting unwieldy masses of data. Between EHRs, financial data, clinical registries, patient surveys, and public reporting, administrators already have more information than they can use. With innovative technologies, the depth and breadth of this data is rapidly increasing. New dashboards often complicate matters, inundating clinical teams with confusing or inconclusive data gleaned from flawed datasets. Resource-restricted hospitals, already overwhelmed with the demands of patient care, do not always have the analytical and clinical expertise — much less the artificial intelligence systems — necessary to turn this barrage of information into actionable narratives. It would cost a health system valuable resources and years of arduous development to build teams equipped to collect and analyze the institution's data, and plan effective, cost-efficient interventions.

Nevertheless, big data is a big opportunity, and if healthcare systems are to survive and thrive in these difficult times, they must take advantage of it. Biome is equipped to help hospitals extract actionable narratives from a range of data sources and show them how to use

those narratives to drive innovative solutions. We are experts in cardiovascular services, combining the most advanced machine learning technologies with deep clinical and analytical experience to help clinical teams deliver the best care at the lowest cost.

The Biome Opportunity Engine™ helps to identify metrics and rank them according to projected cost-savings and outcome improvement. This process reduces variation and encourages higher standards of care by allowing physicians access to precision benchmarking information. Our extensive Biome Knowledge Network™ illuminates interventions that have been successfully implemented at comparable institutions. It points care teams toward shared learning resources to help them efficiently improve patient safety. The Biome Performance Manager™ tracks multiple initiatives in real time, giving care teams an accurate picture of how their hard work leads directly to improved patient outcomes and helps to proactively manage data variance. These products are driven by the powerful Biome Analytic Engine™, which reconciles misaligned data sets, drills deeply into this newly organized information, and provides hospitals with a highly detailed understanding of their current state of care.

Biome grounds care teams in scientific QI, allowing hospitals to confidently embrace the Lean and DMAIC methodologies. These proven approaches to quality improvement are used successfully in a wide variety of sectors, including the airline industry, which is (like healthcare) both complex and high stakes. We believe that continuous learning and ongoing performance improvement are essential for hospitals that want to eliminate waste and improve patient safety. Our client services team, led by cardiovascular healthcare experts, actively participates in the quality improvement process. We use machine learning technologies to accelerate the learning and improvement cycles to deliver positive and timely results — often within months. These results are often compounded over time as the institution begins to shift toward a generative culture. The B-I-O-M-E acronym is useful for describing this unique approach to quality improvement:

B. Benchmark

Biome generates tailored benchmarking information to help a hospital understand its baseline performance compared to other, similarly sized institutions, with similar patient demographics, as well as leading national programs. In this way, healthcare teams gain a thorough understanding of how they stack up against other leading programs in key patient quality and safety indicators as well as operational and financial measures.

I. Identify

Biome's unique analytic platforms can identify hundreds of points of inefficiency with a high degree of accuracy and specificity. Biome's machine-enabled analytic offerings untangle the factors contributing to each of these points and helps to identify root causes.

O. Prioritize Opportunities

Biome helps hospitals rank opportunities for improvement, so they can focus on efforts that will save the most money and improve outcomes for the most patients. We understand that hospital administrators have limited resources and time, and we want to help you make the most of these valuable resources.

M. Modify

Biome points hospitals toward interventions that are proven to work. Our Biome Knowledge Network allows healthcare systems access to vast stores of information gleaned from years of experience and data collection. These insights allow hospitals to confidently implement improvement strategies.

E. Excel

Biome helps healthcare systems measure their success, tracking progress in real time so that fine tuning interventions become second nature. We help you create a long-term plan for success, including strategies to help you move up in national rankings, all while growing a culture of engagement and safety. Biome's highest ideal is a self-sustaining ecosystem, in which employees at all levels of the hospital contribute to institutional health and resilience.

- ¹ Deming E. *Interview With William W. Scherkenbach*,; 1984. <https://www.youtube.com/watch?v=0yGhR1ybmN8>.
- ² The quote is attributed to Deming by the Deming Institute et al, but the original source material is unknown.
- ³ Krumholz H. *Where Have All the Heart Attacks Gone?*. <https://www.nytimes.com/2020/04/06/well/live/coronavirus-doctors-hospitals-emergency-care-heart-attack-stroke.html>. Published 2022.
- ⁴ James J. A New, Evidence-based Estimate of Patient Harms Associated with Hospital Care. *J Patient Saf*. 2013;9(3):122-128.
- ⁵ Pestotnik S, Lemon V. How to Use Data to Improve Quality and Patient Safety. *Health Catalyst*. 2019. <https://www.healthcatalyst.com/insights/use-data-improve-patient-safety/>.
- ⁶ Teisberg E, Wallace S, O'Hara S. Defining and Implementing Value-Based Health Care: A Strategic Framework. *Academic Medicine*. 2020;95(5):682-685. doi:10.1097/acm.0000000000003122
- ⁷ Shah R, Zhang Q, Chatterjee S et al. Incidence, Cost, and Risk Factors for Readmission After Coronary Artery Bypass Grafting. *Ann Thorac Surg*. 2019;107(6):1782-1789. doi:10.1016/j.athoracsur.2018.10.077
- ⁸ McNeely C, Spertus J, Singh J et al. Incremental Cost of Acute Kidney Injury after Percutaneous Coronary Intervention in the United States. *J Am Coll Cardiol*. 2019;73(9):1133. doi:10.1016/s0735-1097(19)31740-1
- ⁹ Zhan C. Excess Length of Stay, Charges, and Mortality Attributable to Medical Injuries During Hospitalization. *JAMA*. 2003;290(14):1868. doi:10.1001/jama.290.14.1868
- ¹⁰ Centers for Medicare & Medicaid Services. *Excess Days In Acute Care (EDAC) Measures*. 2020. <https://qualitynet.cms.gov/inpatient/measures/edac>.
- ¹¹ Pronovost P, Urwin J, Beck E et al. Making a Dent in the Trillion-Dollar Problem: Toward Zero Defects. *NEJM Catal*. 2021;2(1). doi:10.1056/cat.19.1064
- ¹² Deming, W., 1986. *Out of the Crisis*. Cambridge, Massachusetts: MIT Press, p.26.
- ¹³ Committee on Quality of Health Care in America, 2000. *To Err is Human*. National Academies Press. <https://www.nap.edu/resource/9728/To-Err-is-Human-1999--report-brief.pdf>
- ¹⁴ Famolaro T, Yount N, Hare, R, et al. Rockville, MD: Agency for Healthcare Research and Quality; March 2018. AHRQ Publication No. 18-0025-EF.
- ¹⁵ Harvard Business Review Analytic Services. The impact of employee engagement on performance. Harvard Business Review. 2013. https://hbr.org/resources/pdfs/comm/achievers/hbr_achievers_report_sep13.pdf
- ¹⁶ Schaufeli WB, Salanova M, González-Romá V, Bakker AB. The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness Studies*. 2002;3(1):71-92. <https://link.springer.com/article/10.1023/A:1015630930326>

About Biome

Biome is the leading cardiovascular performance company dedicated to helping doctors and health systems deliver the best care, to the most patients, at the lowest cost. Biome partners with ambitious enterprise heart centers and cardiovascular teams looking to achieve superior clinical and financial performance.

Biome Analytics

1160 Battery Street East
Suite 100
San Francisco, CA 94111
info@biome.io
+ 888 246 6330