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A new way to drive performance: Planning and managing quality and cost improvement initiatives in healthcare

This white paper explores how Biome leverages its unique combination of cutting-edge technology and clinical expertise in cardiovascular care to help hospitals execute evidence-based interventions to accelerate the quality improvement lifecycle.

Planning and managing quality and cost improvement initiatives in healthcare systems has never been more difficult. Administrators and clinicians are faced with inconclusive and disorganized information, as well as siloed clinical, financial, and operational data. All too often, data is aggregated for reimbursement and compliance, rather than performance, and thus rarely leads to actionable insight. Resource constraints and competing priorities make improvement projects daunting, and hospitals often struggle to maintain hard-won gains without falling behind on other measures.

Biome changes all this. We offer a unique combination of cutting-edge technology and clinical expertise in the cardiovascular service line (CVSL). Our artificial intelligence (AI) identifies the root causes of clinical and financial shortfalls and prioritizes the highest impact opportunities. We then help hospitals execute evidence-based interventions and carefully monitor cost savings and outcomes, accelerating the quality improvement lifecycle.

Biome's Performance Improvement Process: A Case Study

Jennifer, the VP of the CV service line at a large healthcare system, was facing a difficult series of decisions. With a new contracting period beginning soon, she needed to identify quality metrics for the new co-management agreement.

Four years ago, with Biome's help, Jennifer's healthcare system created a pay-for-performance co-management

arrangement with clinicians across the system's twelve hospitals. In the early years of the agreements, Biome identified relatively low effort, high-impact QI initiatives, which rapidly delivered on both quality goals and cost reduction. In their initial eighteen months they reduced direct cost by more than $8 million, opened up more than 2,300 bed days, and their CV service line is now a top performer among similar institutions. Over time, however, it became more difficult for them to identify new quality improvement opportunities. It seemed that the remaining opportunities had complex root causes, requiring a high degree of analytical nuance to identify, and expert planning to ameliorate.

Biome's expert client services team sat down with Jennifer to help her chart a new performance improvement plan.

As retold by Rakan Khaki, MPH, Biome's senior vice president for analytic services:

We accessed Biome's Opportunity Engine™, browsing her system's "top opportunities." Quality was the focus of the agreement, while cost containment and standardization of care were strategic priorities for the healthcare system. We easily sorted and filtered opportunities, identifying a total of ten measures, including several for specific patient sub-cohorts, targeting quality, cost, and standardization across multiple hospital sites.

Then we worked with Jennifer to leverage the Biome Analytic Engine™, which helped us craft a data story that

would resonate with key clinical stakeholders. We were also able to help Jennifer field questions from her care teams, profile defects and fall-out cases, and generate real-time responses. At the end of the day, Jennifer was able to obtain full buy-in and succeeded in charting the system's path toward their ambitious goals.

We were also able to assist Jennifer with the difficult legwork of implementing the system's new initiatives. We curated content that detailed successful strategies for improving and standardizing care across the twelve sites. She then formalized these commitments through the Biome Performance Manager™ and linked her care teams with Roadmaps for Success, which are stored in our extensive Biome Knowledge Network™. She also used our framework to set systemwide performance targets and stretch goals for each facility, plan milestone events, establish stakeholder roles, and define site-specific baselines to accurately measure future gains.

For most hospitals, this work consumes hundreds of hours of the best employees' attention. With Biome's assistance, Jennifer was able to do more with less, vastly improving the system's odds of success for each project. At the end of the measurement period, every one of Jennifer's initiatives hit its target, delivering millions of dollars in savings and thousands of bed day reductions. Most importantly, over two thousand patients experienced improved care because of the team's efforts.

Biome's Products

The previous example demonstrates two of the most important dimensions of Biome's approach to QI— real humans with robust clinical expertise, wielding the world's most insightful analytic technology. This human-centered approach to high performance medicine is reflected in our unique product offerings:

Biome Opportunity Engine™

Hospital administrators grapple with many intractable questions. One of the most pressing is: "Where should we focus our limited resources and time?"

The answer to this question is hidden within masses of data, spanning clinical and financial databases, registries, electronic health records (EHRs), patient surveys, and public reporting. Today, most IT departments utilize a variety of dashboards to represent this information. Every new problem that arises seems to necessitate a new dashboard, few of which contain actionable insights. We have found that this proliferation of data and dashboards frustrates many clinicians and administrators.

The Biome Opportunity Engine™ plainly presents the information hospitals need to make informed decisions about where to focus their energies. It shows them where they are with a high degree of accuracy, and where they could be in comparison to a variety of benchmarks. Biome helps hospitals identify high value propositions— projects that will, with a minimal amount of money and effort, increase patient safety and quality while driving down costs.

The power of this tool lies, first, in is its ability to reconcile misaligned datasets, allowing clinical, operational, and financial information to be reviewed and analyzed together. When information from multiple sources is synthesized, a more nuanced and meaningful portrait of the current state of care emerges. Second, the Biome Opportunity Engine™ taps into the power of advanced machine learning (ML) to analyze this picture from a variety of metric perspectives, stratifying and sub-stratifying defects in order to identify root causes. It then uses this information to rank opportunities based on a range of potential positive outcomes, including number of bed hours opened, cost savings, revenue potential, and increases to patient safety.

Biome Performance Manager™

The Biome Performance Manager™ helps hospitals implement and oversee QI projects, increasing teams' odds of success right from the start.

When configuring initiatives, users are guided through the process of inputting goals for any number of discrete

measures and are then able to instantly view the probable impact of any given intervention. The Biome Performance Manager™ embeds access to curated reference protocols, publications, and strategies for improvement from the Biome Knowledge Network™, offering critical guidance for implementation teams and ensuring alignment. It also facilitates collaboration by guiding users through the process of identifying stakeholders and suggesting appropriate roles and responsibilities. Finally, during the measurement period, it delivers targeted analysis that ensures hospitals remain current on the latest relevant performance data.

Once an initiative is configured, the system generates statistical process control charts and other visuals that clearly highlight meaningful change. Hospital leaders can quickly quantify and share positive impact in terms of patients benefitted as well as cost and bed days saved. Regular automated updates of this nature further bolster institutional alignment and help keep care teams from backsliding.[1] For initiatives that are not on track, the system uses ML/AI to automatically flag possible intervention points (key patient cohorts, process measures, and lagging indicators) and guide targeted engagement on the measure. All the information leaders need is centralized in one place, making it possible to run multiple improvement projects without getting overloaded with work.

Biome Knowledge Network™

When launching a performance improvement project, a detailed literature review is critical to defining foundational strategies that will gain clinician buy-in and ensure success. This process usually requires weeks of painstaking research and implementing corresponding analysis can take even longer. Biome short circuits this process with the Biome Knowledge Network™.

The Biome Knowledge Network™ stores detailed definitions, process measures, relevant patient sub-cohorts, and Roadmaps for Success, for each of its QI metrics. This shared fact base is rooted in the newest medical research, including Biome supported clinical research, as well as Biome's extensive documentation and analysis of clients' clinical experiences and hypotheses. This structured content is ever expanding and evolving thanks to Biome's large network of users. Finally, it is easily accessible through each of Biome's applications, and CV line experts are ready to work with both clinicians and administrators to help drive this content into the hospital.

Biome Analytic Engine™

Biome has the most expansive, fastest evolving collection of CV-focused dashboards in the world, all collected within the Biome Analytic Engine™. This powerful tool generates visualizations to serve reporting requirements and allows users to conduct freeform data investigations, providing an avenue for rapid inquiry and response.

Top line slide summaries are currently the norm during stakeholder meetings. As teams engage with new metrics, numerous questions and hypotheses emerge, some of which necessitate additional research or analysis. This information requires time to access, analyze, and configure, and often cannot be presented until the next meeting often scheduled weeks away. Momentum and engagement inevitably plummet.

The Biome Analytic Engine™ fixes this problem. It establishes a library of visuals that users can reference and share, providing easy access to answers about quality and finances. It also allows stakeholders to instantaneously configure data in any number of visual patterns, access customized views of the hospital's current performance, and modify embedded dimensions and filters relevant to a given target metric. For example, if a stakeholder wants to view contribution margins by procedure type or clinician, she can do so with just a few clicks. If a clinician wants to see AKI rates filtered by risk or body mass index, that's just as easy. In all these ways, team members can access and interrogate data without delay or frustration and will find themselves collaborating with one another more fluently and effectively.

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Clinical Performance Solutions for Ambitious Cardiovascular Centers

These proprietary solutions have helped hundreds of industry-leading enterprise health systems, hospitals, and physicians save millions by engaging care teams, improving outcomes, attracting new patients and payers, and allowing CV teams to perform at the top of national rankings. Biome combines unique machine learning technologies with deep clinical expertise, working closely with clinicians and administrators throughout the improvement cycle. We're dedicated to helping health systems deliver the best care, to the most patients, at the lowest cost. Let us help you — so you can focus on what you do best.

[1] Mannion R, Davies H. Understanding organisational culture for healthcare quality improvement. *BMJ.* 2018:k4907

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.

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