# Successfully Sustaining Sepsis Outcomes


### HEALTHCARE ORGANIZATION

Integrated Delivery System

### PRODUCTS

- Health Catalyst® Analytics Platform, including the Late-Binding™ Data Warehouse and broad suite of analytics applications
- Sepsis improvement Application

### SERVICES

- Professional Services
- Installation Services

## EXECUTIVE SUMMARY

Increasingly, high-functioning healthcare organizations are recognizing the challenge of sustaining results following successful clinical improvement initiatives. Sepsis is a major driver of mortality in the U.S. In fact, it is estimated that up to half of all hospital deaths are linked to sepsis. After executing a successful strategy to improve outcomes for patients with sepsis, Piedmont Healthcare was determined to sustain those critical reductions in mortality, length of stay, and cost.

The health system "hardwired" process changes into the EHR, monitored performance compliance via a well-developed analytics application, and fostered strong leadership on the frontlines to champion a culture of continuous improvement. In the second year of its latest sepsis improvement effort, Piedmont was able to not only sustain, but also to further improve upon its first-year improvement results.

### Second-year results:

- 14.2 percent reduction in mortality for severe sepsis and septic shock translating to 68 lives saved in one year.
- 30.7 percent improvement in number of patients receiving calculated fluid target.
- $1.2 million saved in one year from decreased variable cost.

## SUSTAINING THE GAINS IN CLINICAL IMPROVEMENT

Nationally, organizations with reputations for clinical excellence are increasingly recognizing the importance of focusing on sustaining improvement—ensuring that, following improvement, care and support processes continue to perform at the new levels of quality and safety.[1] Too often organizations lose focus on an initiative after the original goal has been reached, finding their attention is drawn to more pressing clinical priorities, and as a result, the initial improvement in clinical outcomes is often lost.

Sepsis is a major driver of mortality in the U.S. and is linked to up to 50 percent of all hospital deaths.[2] One health system that has made great strides in both improving and sustaining sepsis outcomes is Piedmont Healthcare, a system of seven hospitals and over 100

physician and specialist offices across greater Atlanta and North Georgia. After Piedmont's employees united in an effort to standardize and improve clinical care for patients with sepsis, the health system achieved significant reductions in mortality, length of stay, and cost.

Following that initial improvement in sepsis outcomes, Piedmont faced the same challenges as other healthcare organizations in trying to sustain their results—yet it has been able to not only maintain, but also improve upon those initial results. The health system's strategy for sustaining improvements offers a blueprint for other hospitals seeking to keep and add to the gains of their improvement efforts.

## ANALYZING AND FACING THE BARRIERS

Piedmont knew that in order to best serve the needs of its patients, it needed to specifically plan for and address how to balance priorities, initiate new improvement efforts, and maintain enough focus on previous projects to sustain performance on clinical outcomes. To optimize the process for maintaining performance improvement, it needed to understand what caused improvement gains to be so frequently lost over time. Their analysis determined that to successfully sustain the gains they needed to ensure the following:

1. The process changes driving the outcomes must be scalable from both a financial and feasibility perspective across the organization.
2. There must be an efficient way to monitor performance on high-level clinical outcomes as well as process metrics in a way that allows managers to expend minimal effort and still ensure compliance with best clinical practice.
3. Key care process changes must be "hardwired" so that they will not be abandoned as attention shifts elsewhere and new employees join the organization.
4. The processes and applications must have a broad, engaged, and ongoing base of user support and adoption.

## SECURING THE KEYS TO SUCCESS FOR THE INITIAL IMPROVEMENT

### Supporting Best Practice

Piedmont's early success in sepsis outcomes improvement was due to the effective implementation of structured, standardized, nationally recognized best practices. The effort was driven by highly motivated and engaged clinical leaders, who used a "core and spread"

> Analytics allows us to drill down into the data and drive personal accountability.
>
> Shannon M. Daniel, MSN, APRN ACCNS-AG, CCRN
> Critical Care Program Manager

team structure that ultimately became Piedmont's gold standard implementation methodology. This core and spread approach accomplished two things: it ensured that standardized best practices were developed in an economical fashion, and then incorporated across the organization in a standard way, supported by engaged local leaders (i.e. scalable). This design also allowed for justified variation at different sites as required to make it work well in each of the different locations (i.e. feasible).

In this next phase of sustaining improvement, Piedmont sought to make these assets as efficient and scalable as possible. This meant recognizing resource constraints, controlling the need for variation, and supporting the prioritization of effort to other areas of higher need.

For example, initial improvements focused on changes in clinical practice which required a robust leadership team with representation from multiple disciplines. In a "maintain and sustain" phase of sepsis improvement, Piedmont saw the opportunity to scale down the leadership team, which in turn freed up resources for other priorities. Piedmont committed to continuing the role of a dedicated person to lead the initiative, realizing that in the long run this saved time and created other efficiencies.

Similarly, all entities and departments were represented in the original core and spread team structure. In this mature phase of the project, Piedmont established a much smaller core team with a local team at each facility. While the larger spread team is still in place, with representation across all entities, it meets less often and for shorter periods of time. Decreasing the team size and time commitment across the sepsis effort, has resulted in more efficient decision-making.

Although the spread team drives process implementation and standardization, it recognizes that modifications will periodically be required at the local level due to differences in geography and resources. Piedmont has noticed that well-performing entities have strong leadership on the frontlines who take ownership for sepsis improvement. It only takes one or two key people to drive change. At one of Piedmont's facilities, this role is filled by a nurse in the emergency department; at another facility, a physician takes the lead.

All in all, this revised team structure is more efficient, while staying true to Piedmont's original successful philosophy.

> The success of the program has always been early identification in sepsis screening and activation of the "bundle" for the best possible outcome. The dashboard highlights the success or opportunity in meeting the early identification benchmark.
>
> Cynthia Boatright, RN, CEN
> Supervisor, ED CV Accreditation

### Well-designed Analytics

Analytics was another major component of the initial success. Piedmont leveraged the Health Catalyst® Analytics Platform, which includes a Late-Binding™ Data Warehouse and an insightful sepsis improvement analytics application. The analytics application was easily accessible and designed to provide feedback on performance for sepsis outcomes and process measures at the system, facility, unit, and provider levels.

The need for planning ahead cannot be overstated: the groundwork for supporting sustained improvement must be established at the beginning stages of an improvement initiative. This cannot wait until the initial outcome goals are achieved; by that point, the analytics resources necessary to design an application to support sustained improvement will almost surely be needed elsewhere. It is also possible that the focus of clinical team members will have diminished.

Accordingly, Piedmont's sepsis analytics application was designed with this end in mind. It provides data visibility and performance feedback that minimizes the investment of time by frontline managers to keep the improvement process on track. Piedmont can use the analytics application to monitor performance on outcome measures and drill down to individual staff member compliance with the best practice interventions. This information enables managers to provide individual counseling and take timely action if performance slips. This ability proved to be key not only in initiating the changes in practice, but also in ensuring compliance after sepsis was no longer the major improvement focus of the organization.

These elements, a best practice system and an analytics system, are two of the three systems required for the successful transformation of healthcare. The third system, adoption, is the key to sustaining the gains.

## LEVERAGING ADOPTION TO SUSTAIN OUTCOMES

With its core and spread team structure, motivated leaders, and well-designed analytics application, Piedmont had a strong framework in place on which to build a culture of continuous process improvement that could sustain the gains of its improvement efforts. The next step was to fully integrate the practices and processes driving improvements into workflow across the organization by increasing the number of clinicians taking advantage of these best practice tools.

Piedmont focused on increasing the adoption of order sets, protocols, and best practice decision support tools. This effort was supported

by focused feedback on compliance, and the “hardwiring” of clinical practice changes into the electronic medical record to make it easy for caregivers to implement the correct practice process.

Further motivation for adoption was provided by making visible the improved clinical outcomes of the patients of those practitioners using these tools, and the relative improvement of patient outcomes with the addition of each intervention from the best practice bundle (see Figure 1).

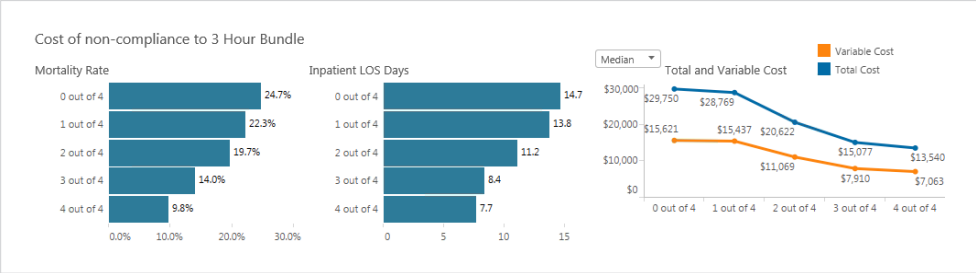


Figure 1. Data continues to show that mortality rate, inpatient LOS, total cost, and variable cost all improve when even just one of the bundle elements is present, but are the best for those patients receiving all four bundle elements

Piedmont has found little need to make modifications to clinical care practice changes after they were implemented. The early identification processes in the emergency department have remained the same, with only a few minor adjustments to the ranges used for identification of sepsis. Nurse-driven protocols have not changed either, but adoption is spreading as order set utilization and education efforts have increased.

## RESULTS

Insightful data, “hardwired” improvement processes, frontline champions, and widespread adoption enabled Piedmont to sustain improvement levels—and realize additional improvements in the subsequent year.

Comparing each year’s performance to the baseline year shows the following results:

- 14.2 percent (first improvement year showed 5.8 percent) reduction in mortality for severe sepsis and septic shock, translating to 68 lives saved in one year. Also, an even greater, 19 percent reduction in mortality rate for patients who received all four of the sepsis bundle elements.
- 30.7 percent (first improvement year showed 18.6 percent) improvement in the number of patients receiving calculated fluid target.

- Logic for calculating length of stay (LOS) was changed in the second improvement year. Using the new methodology, the second year's LOS is .5 percent less than the baseline year.
- 2.2 percent (first improvement year showed 8.2 percent) reduction in variable cost per case, equating to $1.2 million saved in the second improvement year.

## WHAT'S NEXT

Piedmont intends to continue to use its successful improvement methodology to obtain and sustain clinical outcome improvement across the organization. The approaches used for sepsis improvement are now being applied in other clinical improvement areas such as reducing infections related to urinary catheters (CAUTI), and central lines (CLABSI), and improving outcomes for patients with chronic obstructive pulmonary disease (COPD), heart failure, and pneumonia.

## REFERENCES


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## ABOUT HEALTH CATALYST®

Health Catalyst® is a next-generation data, analytics, and decision support company committed to being a catalyst for massive, sustained improvements in healthcare outcomes. We are the leaders in a new era of advanced predictive analytics for population health and value-based care. with a suite of machine learning-driven solutions, decades of outcomes-improvement expertise, and an unparalleled ability to integrate data from across the healthcare ecosystem. Our proven data warehousing and analytics platform helps improve quality, add efficiency and lower costs in support of more than 85 million patients and growing, ranging from the largest US health system to forward-thinking physician practices. Our technology and professional services can help you keep patients engaged and healthy in their homes and workplaces, and we can help you optimize care delivery to those patients when it becomes necessary. We are grateful to be recognized by Fortune, Gallup, Glassdoor, Modern Healthcare and a host of others as a Best Place to Work in technology and healthcare.

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