

Using Data and Analytics to Improve Neonatal Outcomes



HPH has **successfully decreased disruptions and unnecessary invasive tests** while maintaining **high-quality outcomes**, achieving **\$149K in savings**.

PRODUCTS

- ▶ Health Catalyst® Data Operating System (DOS™)

EXECUTIVE SUMMARY

Preterm infants often undergo painful and stressful procedures that can affect their growth and development. Reducing the amount of pain and stress neonates experience can improve infants' developmental outcomes, decrease costs, and reduce length of stay. Hawaii Pacific Health (HPH) recognized the need to decrease disruptions for patients in its neonatal intensive care unit (NICU), reducing pain-related stress and optimizing outcomes for infants born preterm. HPH leveraged its analytics platform and an analytics application to successfully identify and assess improvement opportunities.

IMPACT OF NEONATAL DISRUPTIONS AND INVASIVE TESTING

For infants born preterm, neonatal pain-related stress has been associated with changes in both early and later developmental outcomes. Decreasing disruptions and invasive testing can improve neonatal outcomes as well as reduce costs and length of stay.¹

IMPROVING NEONATAL OUTCOMES USING DATA AND ANALYTICS

HPH identified the opportunity to reduce stress and pain for infants born preterm by decreasing the frequency of testing. The organization was already practicing the bundling of care and recognized it could further decrease disruptions and reduce pain-related stress—improving neonatal outcomes for the infants in its NICUs.

The organization believed it could decrease the frequency of neonatal disruptions and invasive testing, but it didn't have ready access to the data required to evaluate the number of invasive tests performed on infants in the NICU. In addition, burdensome manual review processes made it difficult to assess the opportunity for and impact on outcomes of practice changes. HPH needed better data and analytics that would enable it to effectively determine opportunities to reduce disruptions and invasive testing while still maintaining high-quality patient outcomes.

ANALYTICS UNCOVERS OPPORTUNITIES FOR IMPROVEMENT

HPH leverages the Health Catalyst® Data Operating System (DOS™) platform and a robust suite of analytics applications for the necessary data and analytics. After engaging its clinicians in discussing the benefits of decreased disruptions and invasive tests, HPH developed an analytics application to identify specific opportunities for improvement, track the effectiveness of its efforts, and evaluate the impact of its actions on patient outcomes.

The organization used the analytics application to evaluate testing trends over time and identified three high-volume opportunities for improvement: umbilical cord draws for infants greater than 28 weeks gestational age, routine *Staphylococcus aureus* (*S. aureus*) surveillance cultures, and venous duplex studies following peripherally inserted central catheter (PICCs) placement.

1. Umbilical Cord Draws

Processes were already in place for registered nurses at HPH to obtain cord blood on all infants being admitted to the NICU. With the emergence of COVID-19, the organization recognized the need to re-evaluate practices related to blood draws, seeking to decrease potential exposure to COVID-19. The data indicated that often, the blood tests performed weren't useful for decision-making regarding treatment. There were frequent challenges in obtaining the sample, and many samples couldn't be used. As a result, HPH discontinued routine umbilical cord blood draws for patients greater than 28 weeks gestation.

2. *S. aureus* Surveillance Cultures

To decrease the incidence of severe infections, HPH had been performing weekly *S. aureus* surveillance of its NICU patients. HPH identified that there were very few positive *S. aureus* cultures. The surveillance program and other infection prevention efforts had reduced the rate of positive cultures and infections had decreased, so HPH made the data-informed decision to decrease the frequency of *S. aureus* cultures.



While we're able to use our EMR for some data, it doesn't meet our needs for performance improvement—you can't use the EMR to visualize performance globally or filter data and trend performance over time. The analytics platform is perfect for performance improvement. We're able to look at our data in real-time. We can implement changes and immediately evaluate the impact on outcomes.

Lynn Iwamoto, MD, Neonatologist, Hawaii Pacific Health



ABOUT HAWAII PACIFIC HEALTH

Hawaii Pacific Health (HPH), a not-for-profit health system, includes four medical centers and more than 70 clinics statewide. HPH invests in research, education, and training in addition to providing charity care for underserved people within Hawaii's island communities.

3. PICC Placement

The organization was using venous doppler ultrasounds to confirm accurate PICC placement for all infants, including those greater than 1,000 grams. While PICC placement is challenging in small infants, physical assessment is an effective method for confirming accurate placement. HPH reviewed its data, evaluating venous doppler results for PICC placement for all infants under 1,500 grams to identify if any were malpositioned. The organization found only one malpositioned PICC, and a physical assessment of the infant had already determined that to be the case. Armed with data that demonstrated patient safety would be maintained, HPH discontinued routine venous doppler ultrasounds to confirm PICC placement in infants greater than 1,000 grams.

HPH used the analytics application to evaluate the impact of practice changes on outcomes in real-time, assess the effectiveness of practice changes, and ensure the ongoing provision of high-quality patient care.

RESULTS

HPH has successfully decreased disruptions and invasive tests while maintaining high-quality outcomes. The organization has improved the growth and development of the infants in their care, and has achieved:

- **\$149K in savings**, the result of a **37 percent relative reduction** in the costs of *S. aureus* surveillance cultures per patient day, and a **42.2 percent relative reduction** in the costs of venous duplex studies per patient day following PICC placement for infants greater than 1,000 grams. The organization also eliminated cord blood draws for patients greater than 28 weeks gestation and observed a **50 percent reduction** in cord blood draws costs per patient day.



Decreasing the frequency of disruptions and invasive tests has enabled the organization to use its resources in a more optimal way, improving the care provided to the infants in its care.

WHAT'S NEXT

HPH plans to use its data to evaluate additional opportunities to reduce disruptions and invasive tests. It will also use its analytics platform and analytics application to support its effort to increase breast milk feeding rates, improve medication ordering practice, and improve respiratory management. 🌟



The analytics application made it easy for us to evaluate current practice and determine if it was useful. We're able to immediately evaluate the impact of the changes we make on outcomes. We don't have to wait for data and a report—we can adapt and improve every day.

Richard Jack, MD
Neonatologist
Hawaii Pacific Health

REFERENCES

1. Valeri, B. O., et al. (2015). Neonatal pain and developmental outcomes in children born preterm: a systematic review. *Clin J Pain*, 31(4):355-362. Retrieved from <https://pubmed.ncbi.nlm.nih.gov/24866853/>

ABOUT HEALTH CATALYST

Health Catalyst is a leading provider of data and analytics technology and services to healthcare organizations, committed to being the catalyst for massive, measurable, data-informed healthcare improvement. Our customers leverage our cloud-based data platform—powered by data from more than 100 million patient records, and encompassing trillions of facts—as well as our analytics software and professional services expertise to make data-informed decisions and realize measurable clinical, financial, and operational improvements. We envision a future in which all healthcare decisions are data informed.

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