



Research Institute

Research Matters



Good Stewards

National diagnostic stewardship initiative reduces blood culture, antibiotics overuse

Diagnostic stewardship can reduce blood culture overuse in the Pediatric Intensive Care Unit (PICU) and thereby reduce the use of broad-spectrum antibiotics, according to research published in *JAMA Pediatrics*. The research was published by the Bright STAR Authorship Group, which included Le Bonheur Children's Medical Director of Infection Prevention Nick Hysmith, MD, MS, and shared the results of a clinical decision support tool developed by critical care intensivists in Le Bonheur's PICU led by Sachin Tadphale, MBBS, MPH. Results showed that implementation of a decision support tool for blood culture guidance reduced blood culture rates by 33% and the rate of broad-spectrum antibiotic use by 8%.

Bright STAR is a national quality improvement collaborative that aims to reduce overtesting and bacterial culture overuse, also known as diagnostic stewardship, thereby decreasing antibiotic use and potential for antibiotic resistance in critically-ill children.

"Blood cultures are the gold standard to identify sepsis but can be taken excessively, typically leading to antibiotic use for non-specific symptoms," said Hysmith. "By reducing unnecessary blood cultures, we hoped to reduce the use of broad-spectrum antibiotics and the possibility of critically-ill children developing antibiotic resistance."

Each site developed a clinical decision support tool to reduce blood cultures, targeting relatively stable patients with a fever but no additional sepsis signs. The purpose of the tool was to determine which patients could be monitored without blood culture after thoughtful evaluation. To measure the impact of this tool, analyses of specific outcomes were conducted from 24 months before to 18 months after the new tool was implemented. A project team was formed at each site to conduct a pre-implementation assessment and then develop a clinical decision support tool and implementation plan. The major goals were standardizing the decision to order blood culture and highlighting any patient safety concerns. Le Bonheur implemented the decision tool in the PICU as well as the Intermediate Care Unit (IMCU) and Neuro Intensive Care Unit (Neuro ICU).

Results from the 14-site study included:

- Reduction in total blood cultures from 37,527 to 20,340.
- Reduction in blood culture rates at 13 of 14 sites.
- 33% relative reduction rate in mean number of blood cultures per 1,000 patient days per month.
- 13% relative reduction of total days of broad-spectrum antibiotic use per 1,000 patient days.

Trauma-Informed Care

First year of results from Le Bonheur's Family Resilience Initiative shows high prevalence of adverse childhood events, social determinants of health

In its first year of operation, Le Bonheur's Family Resilience Initiative (FRI) showed that of the 246 families enrolled in the program, more than half of caregivers reported one or more adverse childhood events (ACEs) for their child and a social determinants of health (SDOH) need according to research published in *Clinical Pediatrics*. The FRI program is a multidisciplinary collaborative that screens for ACEs and SDOH in Le Bonheur's ULPS General Pediatrics Clinic and connects families with needed services to mitigate and prevent future ACEs.

Adverse childhood experiences are potentially traumatic events in childhood that can be emotionally painful or distressing and have effects that persist for years. Social determinants of health are defined by the World Health Organization as the non-medical factors that influence health outcomes. These include conditions in which people are born, work and live and economic, social and political forces and systems.

"Adverse childhood experiences have been described as the public health emergency of our time," said Jason Yaun, MD, division chief of Outpatient Pediatrics and medical director for FRI. "The primary care setting is an ideal place for screening for ACEs and SDOH and providing evidence-based interventions."

FRI is embedded in the primary care setting and funded through a grant from the Urban Child Institute. Outreach coordinators screen patients ages 9 months to 5 years as a part of their well-child visit using the Accountable Health Communities (AHC) Health-Related Social Needs (HRSN) screening tool for SDOH and a modified version of the Pediatric ACEs and Related Life Events Screener (PEARLS) tool for identifying ACEs. Families that have a SDOH need or an ACE are enrolled in the FRI program. If SDOH are identified, the outreach coordinator connects the family with resources to help meet their needs, and if any ACEs are identified free counseling is offered through a child psychologist embedded in the clinic. All families receive education and prevention strategies for ACEs. The outreach coordinators communicate findings to the medical team documenting ACEs and SDOH in the medical record. They follow up with families based on intensity of needs. The screening process is repeated on an annual basis.

During the first year of intake, FRI had 246 participants. Primary results showed 39.4% of families in the program reported both ACEs and SDOH with 56.9% reporting at least one ACE. At least one SDOH-related need was reported by 63% of families.



The Family Resilience Initiative is embedded in Le Bonheur's ULPS General Pediatric Clinic. Above, Jason Yaun, MD, (left) and Outreach Coordinator Christen Henderson (far right) meet with a patient and parent during clinic.

Additional results included:

- The most common ACE reported was separation or divorce of parents/guardians (40.7%) followed by child living or having lived with a household member who was depressed, mentally ill or attempted suicide (13.4%).
- The average number of ACEs per patient was .94.
- 40 families (33.1%) received a referral for psychology services.
- The most common SDOH issues were around food insecurity (36.1%) followed by utility needs (19.6%) and transportation (18.4%).
- Outreach coordinators conducted 2,240 follow-up activities.

"The successful design, implementation and experience of the FRI model in our first year shows that this model is a feasible approach to implement trauma-informed care," said Yaun.

Yaun says that provider awareness of the ACEs and SDOH needs of patients practically impacts patient care. Approaching care with a trauma-informed lens allows the clinic to view patients and families with greater empathy and probe into the root of the issue for anything from behavioral problems to appointment no-shows. Providers also can connect how trauma and ACEs play into health-related problems like feeding, development and sleep.

FRI research supports the evidence that ACEs are common from a young age which further emphasizes the need to mitigate effects of previous ACEs, while providing resiliency building and empowerment to prevent future ACEs. Next, the FRI program hopes to evaluate FRI interventions and impact on child development, health outcomes, health care utilization and more, potentially expanding enrollment to adolescents.

Le Bonheur researchers publish more than 100 articles in 2022

CFRI researchers continue to publish cutting-edge studies that help children with serious diseases who depend on Le Bonheur. Since Jan. 1 of this year, 118 articles have been published by Le Bonheur-affiliated authors and researchers and can be found on PubMed.gov. This volume of peer-reviewed research builds upon the astounding publishing output of 317 articles seen in 2021.

Please remember to include Le Bonheur in your authorship affiliation. CFRI's goal is to publish more than 200 manuscripts per year for a sixth year in a row, and an affiliation is one way we track our progress.

Current clinical trial totals at Le Bonheur

Sponsored trials:

162

Full board-reviewed studies:

75

PI-initiated studies:

53

