IMPACT PROFILE

Using genetic testing to improve pediatric sedation outcomes

Translational Science Benefits Model

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Utilizing a genetic test to minimize harmful side effects and improve care for pediatric patients receiving sedation.

The Challenge

Over 40,000 children annually require sedation for breathing tubes. The drug class benzodiazepines are the most used sedative for children. However, 76% of children do not tolerate these sedatives well, leaving them at risk for prolonged hospital stays, neurologic harm, and post-traumatic stress disorder. Without a personalized medication plan, pediatric patients are at an increased risk for poor health outcomes due to sedation.

The Approach

We will study how children in the pediatric ICU respond to benzodiazepines for breathing-tube sedation by:

- Using genetic testing to see how they process these and other medications.
- Comparing genetic results with key health and safety outcomes during and after the ICU stay.
- Interviewing parents and, when possible, patients to understand the full impact of sedation and the ICU experience.

The Impact

This project links children's genetics to clinical outcomes and patient- or parent-reported experiences. Developing personalized sedation practices could improve safety and reduce medication-related harm for pediatric patients.

RESEARCH HIGHLIGHTS

- **High Prevalence:** Most patients with breathing tubes receive benzodiazepines, and many children metabolize these medications in a way that increases their risk for side effects.
- **Mixed Methods Innovation:** First study to examine impact of genes on medication reaction and use patient and parent experience to develop a personalized medication plan.

Key Benefits

The Pharmacogenomics of Benzodiazepines study results in *Clinical* benefits.

Guidelines: Inform clinical recommendations for genetic testing to personalize sedative regimens in pediatric intensive care units. (*Potential*)

Therapeutic procedures: Advance patient- and parent-reported physical, emotional, and cognitive recovery after hospitalization. (*Potential*)

Therapeutic procedures: Minimize adverse events, complications, and psychological stress in critically ill children while optimizing their sedation. (*Potential*)

The team:

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