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Background

- Infants with congenital heart disease (CHD) require continued and complex care and readmission is frequent, contributing to high burdens on the health care system, patient, and family.
- Children's High Acuity Monitoring Program (CHAMP®) is a remote patient monitoring application for home-based care of infants with heart disease during the interstage.[1]
- Parents enter hemodynamic data and connect to care teams. This has reduced mortality and unplanned readmissions[2], but interstage readmissions do still occur.
- Readmissions are expected for all interstage patients with a goal of short stays after planned surgical and catheterization procedures with no additional hospital days.
- Purpose: While CHAMP has reduced unplanned readmissions, there's an opportunity to examine further what may contribute to variations in readmission length and causes throughout the patient population and across the multi-site registry.

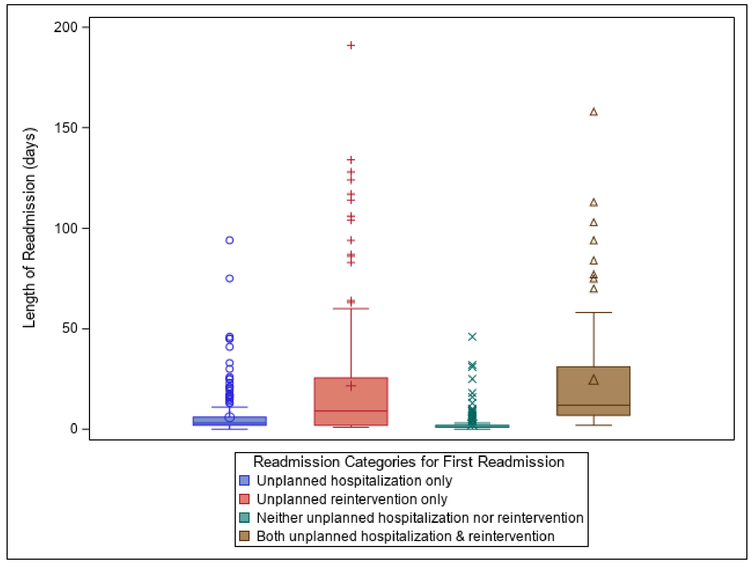
Methods

- Retrospective descriptive analysis of data from 11 US pediatric cardiac hospitals participating in the CHAMP Cardiac Multi-site Repository with 90.5% of parental participation consent rate (2014-2022)
- Categorized readmissions by planned hospitalization, unplanned hospitalization, unplanned cardiac surgery or catheterization reinterventions, or combinations
  - Planned: Hospitalization or procedure was intended; Unplanned: Unexpected discovery or event leading to need for additional care
- Demographics and data evaluated include CHAMP patient demographics, descriptive statistics, and readmission outcomes
- Sub-analysis evaluated patients first readmission via unplanned categories and length of stay (LOS) in days using Kruskal Wallis Test, Wilcoxon Rank-Sum, and pairwise two-sided multiple comparison (Dwass, Steel, Critchlow-Flinger Method)

Cohort

Demographics n = 1006	
Male sex assigned at birth, % (n)	59.6% (555/931)
White race, % (n)	73.0% (734)
Non-Hispanic/Non-Latino, % (n)	83.0% (759/915)
Mother, Father English Speaking, % (n)	92.3% (862/934), 90.6% (782/863)
Gestational age in weeks (Median [IQR])	39.00 [37.00, 39.00]
Birth weight kg (Median [IQR])	3.15 [2.80, 3.50]
Miles from site > 100, % (n)	36.4% (334/918)
Hypoplastic left heart syndrome, % (n)	30.8% (286/929)
No non-cardiac major syndrome, % (n)	72.2% (726)
No non-cardiac anomaly, % (n)	79.5% (800)

Readmission Length of Stay



Results

- Of 1006, 220 patients (22%) had no readmissions
- 1676 total readmissions:
  - 72.26% (1211) required an unplanned reintervention and/or hospitalization
  - 27.74% (465) had planned readmissions with no unplanned reinterventions with the shortest length of stay
- Across all hospitals - Median (IQR) of 2 (1, 2) readmissions per interstage infant and rates of unplanned hospitalizations and reinterventions held similarly
- Cyanosis/hypoxia accounted for 33% of unplanned hospitalizations with reinterventions; unplanned hospitalizations attributed highly to vomiting/diarrhea (11%) and bronchiolitis/pneumonia (9.7)%, unplanned reintervention for residual lesion (9.1%) and inadequate weight gain (6.3%)
- First readmission only:
  - 67.18% required an unplanned reintervention and/or hospitalization
  - LOS for unplanned hospitalization with reintervention - 12 [7, 31] days vs. planned hospitalization and intervention 1 [1,2] days (p<.0001)
- Limitations of retrospective data: missingness and inaccuracies in reported data

Conclusion

- CHAMP provides robust insight into relatively rare congenital heart disease through research repository.
- CHAMP sites exhibit similar readmission numbers on a per patient basis with longer length of stay with unplanned hospitalizations and reinterventions that is maintained across all 11 pediatric hospitals.
- This research is key for the next steps of an in-depth analysis of readmission patterns by 1) reason for admission and remote monitoring concerns leading to readmission, 2) adherence of CHAMP app prior to readmissions, and 3) patient predictors to enhance the predictive patient-centered care model CHAMP utilizes.

References: 1. Shirali et al., (2016). 2. Bingler et al., (2018).

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