

## **Program transformation from paper documentation to proactive data transfer: Use of an app in outpatient pediatric cardiology home monitoring program**

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### **Abstract**

**Background:** Single ventricle cardiac infants are a rare and high risk population with 10-15% inter-stage mortality and frequent morbidities including frequent readmissions in the first 6 months of life. Traditional home monitoring uses inter-professional clinical teams to evaluate data documented on paper by parents for symptom management. To predict change in hemodynamic status, nurse coordinators and advanced practice nurses use weekly phone or email communications to review these data (weights, oxygen saturations, and feeding logs). Since 2014, we have monitored interstage infants with single ventricle (SV) at home with CHAMP, a tablet PC with cloud-based instant analytic algorithms. Thus nurses can review and intervene on home monitoring data instantly instead of weekly. Nursing coordinators are a front line for care during the week and APRN's are on call 24 hours a day for this high risk population.

**Methods:** From May 2014 to June 2015, SV infants were enrolled in a crossover study comparing CHAMP to traditional paper documentation kept in a binder. All were discharged with the binder; they were randomized to receive CHAMP instead of the binder 1 or 2 months after discharge. One month after randomization, caregivers chose either the binder or CHAMP for the remainder of the interstage. Charts were reviewed for neonatal characteristics, readmission data including events prior to readmission, length of stay (LOS), ICU LOS and charges. High resource utilization (HRU) was defined as the 25% of readmissions that were associated with the greatest ICU LOS. HRU patients were compared to all others, who were defined as Low resource utilization (LRU) patients. **Results:** 31 infants were monitored for 4911 interstage days. There was 80% adherence with data transfer while using CHAMP. There were no interstage deaths and 73 inter-stage readmissions. HRU patients did not differ from LRU patients in neonatal characteristics. HRU babies were significantly more likely to be unplanned and born to younger mothers. The time from clinical change to communication with the clinical team was nearly 4 hours longer in HRU admissions ( $p=0.009$ ). HRU babies had higher charges (\$105,925 v. \$34,669 median,  $p=0.003$ ), LOS (12.5 v. 1.2 days  $p<0.001$ ), and more cardiac ( $p=0.011$ ) and general surgeries ( $p=0.037$ ). The association of CHAMP with LRU was trending but did not reach statistical significance, likely due to sample size ( $p=0.071$ ). **Conclusion:** Interstage SV infants are at high risk for readmissions. Delays in care are associated with HRU. Using CHAMP to transfer data to nursing coordinators may help decrease delays. Further study may provide the basis for predictive analytic algorithms,