

Efficacy of a care coordination program for children with complex chronic conditions discharged from a rural tertiary-care academic medical center



Clayten L. Parker, FNP-C;¹ Bennett Wall, MBA;¹ Dmitry Tumin, PhD;² Rhonda Stanley, SW;¹ Lana Warren, BSRT-NPS;¹ Kathy Deal, RN;¹ Tara Stroud, NNP-BC;¹ Kim Crickmore, PhD, RN;¹ Matthew Ledoux, MD²
¹ Vidant Medical Center, Greenville NC; ² Department of Pediatrics, Brody School of Medicine at East Carolina University, Greenville NC

INTRODUCTION

Complex chronic conditions (CCCs), are associated with increased hospital costs and increased risk of readmissions and visits to the emergency department (ED).

At Vidant Medical Center (VMC), the Center for Children with Complex and Chronic Conditions (C5) program was established in 2008 to initiate care coordination for children with CCCs in an inpatient Transitional Care Unit (TCU), and continue this coordination in a multidisciplinary outpatient C5 clinic at ECU Pediatrics, with home visits by a designated care coordination team.

To evaluate the efficacy of this program, a retrospective comparison of hospital revisits over a 12 months period between children enrolled in C5 and children who had a hospital discharge meeting CCC criteria, but were not enrolled in the program, was conducted.

METHODS

Control Group: Children <18y/o discharged from PICU or 2 West meeting CCC criteria as established by International Classification of Disease Code.

C5 Group: Children discharged from PICU or 2 West that were technology dependent (g-tube and/or trach, ventilator dependent) and followed by C5 Clinic and Care Coordination Team

Using 2017 data, patients with a CCC hospital discharge from the general pediatric ward or the pediatric intensive care unit (ICU) were identified as a comparison group for C5 program enrollees.

Outcome data were extracted from the electronic medical record (EMR) covering hospitalizations and ED visits at VMC during 2018.

Total cost of care in 2018 was also compared between groups. Multivariable Poisson regression models were used to model the number of revisits according to C5 program participation.

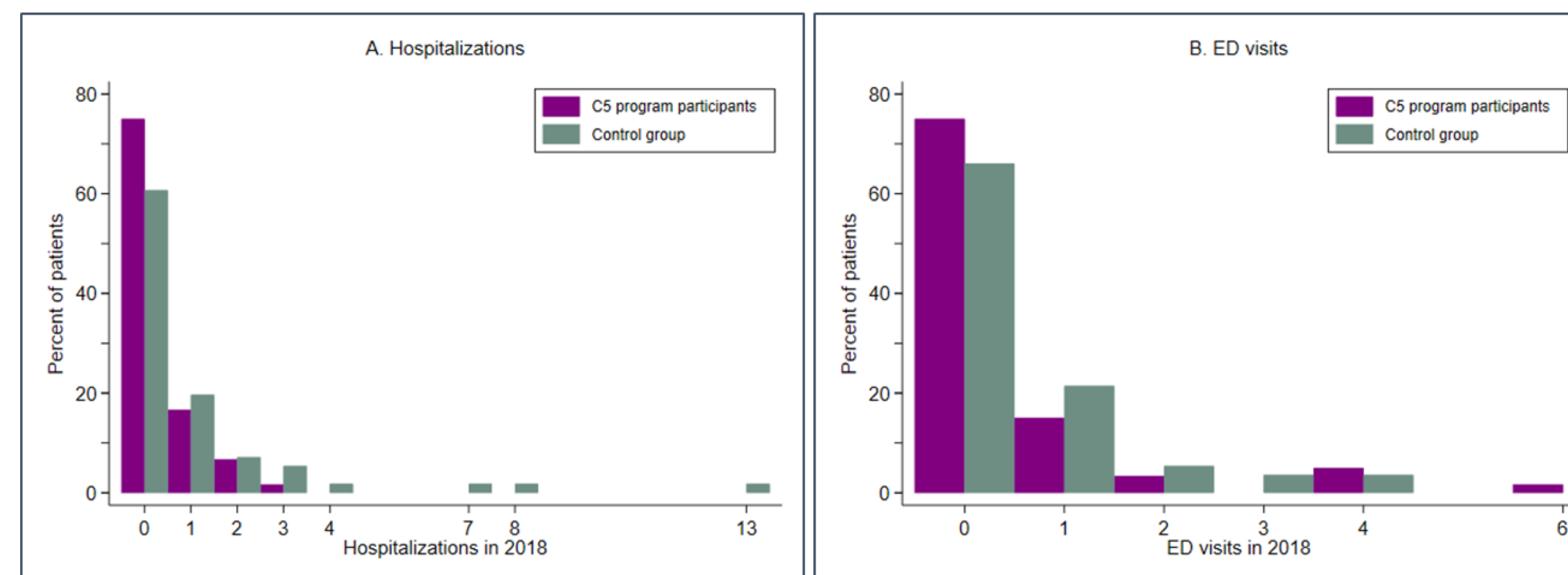
RESULTS

During 2017, we identified 60 C5 patients eligible for this analysis, who were matched to 56 CCC controls. In the following year (2018), patients enrolled in the C5 program were less likely than patients in the control group to return to the hospital and less likely to visit the ED (Figure 1).

Median total costs of care in 2018 were almost 3 times as large in the control group (\$3,200 vs. \$1,100), with the 95% confidence interval (CI) for the difference in medians suggesting that C5 participation was associated with no increase in the cost of care, and potential savings of up to \$4,500 per year.

On multivariable analysis of hospitalizations in 2018, C5 program participation was associated with 49% fewer hospitalizations in that year ($p=0.040$).

Figure 1. Histogram plots comparing hospitalizations and emergency department visits in 2018 according to C5 care coordination program participation.



DISCUSSION

At Vidant Medical Center, clinical experience suggested that the C5 program improved quality of life for children and their families, while reducing unnecessary hospitalizations, but quantifying these improvements had not been attempted.

As healthcare financing transitions away from fee-for-service models towards Population Health, it has become increasingly relevant to evaluate financial data at the patient level, to identify cost-effective practices and opportunities for cost savings.

Historically, patients followed by the program have been advised to go to the community ED by a provider outside of the C5 team, resulting in a transfer to the nearest children's hospital. Improved communication and comfort with managing these patients would help in reduction of ED visits and potential readmissions.

Furthermore, this analysis did not account for improvements in quality of life or attendance at outpatient specialty clinic visits (reduced no-show rate) associated with C5 program participation. For the corresponding time period of this study, the no-show rate at the C5 clinic was 15%. Future evaluation of the program may prospectively track both health care utilization as well as quality and longevity of life, to identify whether care coordination services are correlated with C5 Transition Care Coordination.

CONCLUSIONS

This project developed and demonstrated a method of using ICD-based CCC definitions to conduct quantitative evaluation of the effectiveness and value of the C5 care coordination program at VMC and ECU Pediatrics.

While children with hospital discharges meeting CCC criteria were deemed to be conceptually similar to C5 enrollees, the analysis was limited by using only 1 year of data to determine study eligibility, and the next year of data to query study outcomes.

Given the rarity of hospital readmissions in pediatrics, this may have limited the statistical power of the analysis, and specifically the ability to definitively demonstrate cost savings.

Moving forward, the program goals include evaluating broader outcomes of the C5 program in relation to a comparison group on a continuous basis, to provide measures of programmatic success.

Future growth of the C5 program is planned to include and prioritize newly diagnosed chronic disease patients deemed high risk for poor outcomes (e.g. ED visits, hospital readmissions) due to social determinants of health (SDOH).

With the program currently providing services to the most clinically "at-risk" children, the next goal of the program is to stratify a new "at-risk" patient population with both clinical and SDOH factors, expanding the scope of care coordination services at Vidant Medical Center and ECU Pediatrics.

ACKNOWLEDGEMENTS

The authors thank Dr. Charles Willson for being the pioneer of the C5 program assisting the most critically ill children in our community.

The authors also thank Hollie Wooten and Shakira Henderson for assistance with study design, and Virginia Vasquez-Rios for assistance with study conceptualization.

Clay Parker, FNP-C
Bennett Wall, MBA
Maynard Children's Hospital
Greenville, North Carolina 27858
252.847.0790
clparker@vidanthealth.com
bennett.wall@vidanthealth.com