

**Impact of the *Partners for Children* Pilot Program  
on Medicaid Utilization and Expenditures:  
Follow-Up Report**

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**Sarah Clark, Lead Investigator  
Lisa Cohn, Lead Analyst  
Sara Schultz, Graphics Lead**



**SUSAN B. MEISTER  
CHILD HEALTH EVALUATION  
AND RESEARCH CENTER**  
MICHIGAN MEDICINE

Contact:  
Sarah Clark  
Susan B. Meister Child Health Evaluation and Research (CHEAR) Center  
University of Michigan  
300 North Ingalls, Rm 6A14  
Ann Arbor, MI 48109-5456  
Phone 734-647-3649

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## **EXECUTIVE SUMMARY**

### ***Background***

The Michigan Partners for Children (PFC) program was launched in 2017 at C.S. Mott Children's Hospital to serve medically complex children. The PFC team provides home-based care, symptom management, advance care planning, and 24/7 phone availability for families, as well as professional consultations to facilitate care in the outpatient, inpatient, and emergency department settings.

### ***Methods***

*Population:* 77 children enrolled in PFC between August 2018 and July 2019

*Design:* Compilation of Medicaid administrative (claims) data for months children were enrolled in Medicaid, for two time periods

Baseline: 12 months prior to initial PFC enrollment

PFC: from month after PFC enrollment through March 2020

*Main outcomes:* Average (standardized as per child per month) utilization of inpatient care and emergency department visits; average (standardized as per child per month) expenditures overall and by service category.

### ***Key Findings:***

- For the 77 children, the average Medicaid enrollment was 11.7 months for the baseline period and 13.7 months for the PFC period.
- Inpatient admissions per child per month decreased by 25% from the baseline to the PFC period, and number of inpatient days per child per month decreased by 61%.
- Emergency department visits decreased by 8% from the baseline to the PFC period.
- The average Medicaid paid amount per child per month was \$6,331 in the baseline period and \$4,271 in the PFC period, a drop of \$2,060.
- From baseline to the PFC period, critical care expenditures dropped by 75%, and general inpatient care expenditures dropped by 45%. Prescription drug expenditures increased by 39%. Expenditures for other services were similar across the two periods.

### ***Conclusion***

Over time, the Partners for Children program has reduced inpatient utilization and costs for medically complex children covered by Medicaid. Cost savings were largely due to decreases in inpatient care, particularly critical care. Increased expenditures for prescription medication and consistency in expenditures for other outpatient services demonstrate that savings were not due to constrained care.

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**BACKGROUND**

Children with serious, medically complex conditions present a challenge for the health care system. They see multiple specialists, take numerous medications, and often rely on medical devices to support their daily living. As such, they benefit from strong care coordination. Many care coordination programs are located within the primary care setting, but primary care pediatricians acknowledge a lack of comfort, expertise and resources to coordinate care for medically complex patients. Disease management programs facilitated through payers – if they include children – tend to focus on common chronic conditions with predictable care needs, rather than rare or medically complex conditions. Pediatric subspecialists have expertise in the needs of medically complex children, but typically have a narrow focus on a particular organ or system, with minimal effort to coordinate across different specialties. Thus, medically complex children are at risk for unmet needs, uncoordinated and/or duplicative care, increased resource utilization, and poor clinical outcomes.<sup>1</sup>

Some medically complex children, including many with cancer, congenital heart disease, or organ transplants, receive care coordination through comprehensive care clinics based at the health system where they receive most specialty care. In Michigan, the Children’s Special Health Care Services (CSHCS) program has long supported multispecialty clinics for children with certain complex conditions. However, medically complex children with rarer conditions have limited opportunity to receive comprehensive and coordinated care. These include children with complex genetic and neurologic conditions who require care from an array of specialists, such as neurologists, orthopedic surgeons, otolaryngologists, rehabilitation specialists, gastroenterologists, lung specialists, pediatric surgeons, urologists, and mental health specialists. Attending the multitude of clinic visits is complicated by their limited mobility and reliance on technology (e.g., feeding tubes, respiratory devices, mobility aids). Parents shoulder the burden of providing a substantial amount of at-home care<sup>2</sup> often with limited options for telephone advice and lack of communication between their child’s specialists.

The Michigan Partners for Children (PFC) program was launched in 2017 at C.S. Mott Children’s Hospital to serve medically complex children not already enrolled in a comprehensive care program and who would not qualify for existing hospice or home-based palliative care services. The PFC team of pediatric nurse practitioners, social workers, and complementary therapists would work with supervising physicians and specialists at C.S. Mott Children’s Hospital to provide home-based care, symptom management, advance care planning, and 24/7 phone availability for these children and their families. In addition, the PFC team would facilitate care through consultation with other health care providers. PFC enrollment is based on established medical complexity criteria; enrollment is contingent on parent acceptance and approval by the child’s primary care provider.

***Parent Expectations for the Program.*** In telephone interviews conducted in the first month after their child's initial PFC enrollment, parents described the difficulties of getting appropriate care for their medically complex child. Parents emphasized three particularly challenging aspects of care.

*Difficulty with in-person care:* The logistics of in-person care for medically complex children go beyond the distance to the clinic. Traveling, even short trips, is uncomfortable for many of these children. Often, two adults are needed so that one can drive while the other ensures that medical equipment is working. Transportation costs (gas, parking) become expensive with frequent clinic visits. Scheduling multiple visits on the same day can reduce transportation costs, but tests the endurance of both children and parents. Due to these challenges, parents acknowledge that they sometimes miss appointments.

*Inadequate options for telephone advice:* Parents of medically complex children need to continually monitor their child's condition and take appropriate action in response to a change in behavior or symptoms. However, parents describe their options for telephone advice as inadequate. Primary care providers want to be helpful, but typically have limited expertise and comfort with medically complex children. The child's specialists have the knowledge and expertise to give advice, but parents find it difficult to reach a specific specialist in a timely fashion. Requests through the patient portal are not necessarily answered promptly, while phone calls are routed to the clinic's general phone service, where the on-call physician may not know the child's medical history and can only offer rudimentary advice. As a result, parents feel they are on their own to make serious medical decisions for their medically fragile children.

*Lack of cross-specialty collaboration around care decisions:* Parents have a universal desire for specialists to look at their child holistically, but their experience with most specialists is that they narrowly focus on one body system and don't engage in conversations about the interconnectedness of the child's condition or treatment needs. Even for straightforward issues like coordinating medication changes, parents describe a lack of communication between specialists that can delay approvals and create extra stress for parents. Lack of cross-specialty collaboration also affects care in the emergency department (ED) and inpatient settings, when staff physicians do not consult promptly with the child's specialists. Parents believe this lack of communication delays the development of an effective treatment plan and results in the child staying longer than necessary in the ED or inpatient setting.

The PFC program was designed to address these common parent concerns. Home-based services would mitigate the need for some in-person visits, while offering additional support to parents on how to handle day-to-day home management of the child's medical needs. Access to 24/7 telephone advice through the PFC program would provide a direct pipeline to a clinical provider who is familiar with the child's condition and can offer tailored advice. Finally, the location of PFC staff within the C.S. Mott Children's Hospital setting would allow them to arrange formal consults and informal communications with specialists in the outpatient, inpatient, and emergency department settings to facilitate cross-specialty discussion and clinical decision-making.

## **INITIAL IMPACT REPORT**

Our team from the Susan B Meister Child Health Evaluation and Research (CHEAR) Center designed an assessment of the impact of the PFC program on Medicaid utilization and expenditures. PFC enrollees, like most medically complex children, are primarily covered by Medicaid, often with concurrent enrollment in CSHCS. Documenting the impact of the PFC program on Medicaid utilization and expenditures will inform future considerations of Medicaid reimbursement for PFC services.

In September 2020 we released an initial report, *Impact of the Partners for Children Pilot Program on Medicaid Utilization and Expenditure*. The report presented a pre-post comparison of standardized utilization and expenditure outcomes, comparing months with Medicaid coverage in the year prior to and following each child's PFC enrollment month.

The initial *Impact Report* found decreased inpatient utilization and costs when children were enrolled in PFC, compared with the year prior to PFC enrollment. Although there were small increases in outpatient utilization and cost during PFC enrollment, overall costs were markedly lower during PFC enrollment.

## **RATIONALE FOR FOLLOW-UP IMPACT REPORT**

The major limitations of the initial *Impact Report* are associated with its timing. Medicaid administrative data requires a period of "lag time" for billing and processing of reimbursement. Based on prior projects, we determined that a minimum of 5 months of lag time would be needed to have at least 95% data completeness. The timing of the initial impact report allowed us to examine Medicaid administrative data for services through September 30, 2019.

The September 2019 cut-off had a substantial impact on the length of time available for analysis after each child's PFC enrollment month. For the population of 77 children who met study criteria for the initial *Impact Report*, 92% of children had 10-12 months of Medicaid coverage eligible for analysis in the baseline period prior to PFC enrollment; in contrast, for the period after PFC enrollment, only 34% of children had 10-12 months of Medicaid coverage eligible for analysis, while 32% had 6-9 months and 34% had 3-5 months. Overall, the average months available for analysis was 11.7 months in the baseline period, compared to 7.4 months in the PFC period.

Thus, the limitations of the initial *Impact Report* include both an imbalance in the baseline and PFC periods, as well as a limited number of months of Medicaid administrative data available for roughly two-thirds of the population. This raises the question of whether the utilization and cost patterns observed in the initial *Impact Report* would continue over time.

In this *Follow-Up Impact Report*, we examine administrative data for services through March 31, 2020; this provides an additional 6 months of utilization and cost data, yielding roughly equal time in the baseline and PFC periods.

## METHODS

Our pre-post comparison relied on secondary analysis of health care utilization and costs paid by Medicaid for children enrolled in the PFC program, an approach used in prior evaluations of programs to improve care management for medically complex children.<sup>1,3,4</sup> We used Medicaid administrative data (enrollment and paid claims), extracted from the state data warehouse, which captures all Medicaid-paid utilization regardless of where the services were provided.

**Defining the Study Population.** In November 2019, PFC program staff provided a list of 107 enrolled patients, including their initial PFC enrollment date; enrollment changes were tracked via PFC staff records over time. To create a pre-post comparison framework, we defined each child’s study timeframe. First, we identified each child’s month of PFC enrollment as “Month 0” which would not be included in the pre-post analysis. We then identified each child’s baseline timeframe as the 12 months *prior to* the initial PFC enrollment month and each child’s PFC timeframe as months *after* the initial enrollment month. To limit data skewing from known high-cost events, we excluded the child’s month of birth.

For the initial *Impact Report*, we established minimum inclusion criteria: (a) at least 3 months of full scope and coverage Medicaid during both the baseline and PFC periods, and (b) at least 3 full months of PFC participation after the month of PFC enrollment. For this *Follow-Up Report*, we maintained the study population of 77 children who met those initial inclusion criteria. We defined the end of the PFC period as follows. For children who remained enrolled in PFC and children who were discharged from PFC (regardless of whether discharge was requested by parents or program staff), the PFC period included all months through March 2020. For children who died or were transferred to hospice during PFC enrollment, we ended the PFC period in the month *prior to* death or transfer to hospice.

Figure 1 provides examples of how child-specific study timeframes were determined.

**Figure 1. Examples of Study Timeframe Determination**

BASELINE PERIOD months 1-12 <i>prior to</i> initial PFC enrollment month	Initial PFC Enrollment “Month 0”	PFC PERIOD <i>begins</i> month <i>after</i> initial PFC enrollment	PFC PERIOD <i>ends</i> March 2020 *except for death or transfer to hospice
Aug 2017 - July 2018	<i>If enrolled 8/13/18:</i> Month 0 = August 2018	Sept 2018	<i>If still enrolled in PFC:</i> March 2020
Nov 2017 - Oct 2018	<i>If enrolled 11/5/18:</i> Month 0 = November 2018	Dec 2018	<i>If discharged Oct 2019:</i> March 2020
<i>If born Mar 2018:</i> Apr 2018 - Dec 2018	<i>If enrolled 1/28/19:</i> Month 0 = January 2019	Feb 2019	<i>If hospice started Feb 2020:</i> Jan 2020
Jun 2018 - May 2019	<i>If enrolled 6/27/19:</i> Month 0 = June 2019	July 2019	<i>If died Dec 2019:</i> Nov 2019

**Data Analysis.** We compiled Medicaid administrative claims data for each child’s study timeframe, which included dates of services spanning August 2017 to September 2020. Drawing on existing protocols (e.g., HEDIS specifications), we assessed revenue codes, procedure codes, claim type, and place of service codes to categorize utilization into service categories. We processed each child’s administrative claims from months with full Medicaid scope and coverage to count services and their corresponding paid amounts. We assigned those counts and costs to the child’s baseline period, month of PFC enrollment (“Month 0”), or PFC period.

**Enrollment Analysis.** We documented Medicaid benefit plan type for each child in each month of their baseline and PFC periods. We defined eligible months as those with a full scope and coverage Medicaid benefit plan; we also documented whether the benefit in that month reflected managed care or fee-for-service coverage.

**Utilization Analysis.** We focused our utilization analysis on high-cost services: inpatient care, critical care, and emergency department (ED) care. We quantified utilization of these services as follows:

*Inpatient care* was identified based on revenue codes consistent with methods used for HEDIS quality measures, yielding both counts of inpatient stays and length of stay for each admission. Consistent with HEDIS, when ED care resulted in an inpatient admission, we categorized the entire stay as inpatient care. We counted transfers between hospitals as a separate inpatient stay for each hospital admission. We used admission date to classify month of service. We counted inpatient stays when the admission date occurred prior to the baseline period, but the inpatient stay extended into the baseline period; in these cases, only days during the baseline period counted toward the length of stay. Similarly, we counted inpatient stays where the admission date occurred in the PFC period but the stay extended beyond the end of the PFC period; in these cases, only days during the PFC period counted toward the length of stay.

*Critical care stays* were considered a subset of inpatient care. We defined critical care as any inpatient stay that included critical care services, identified based on revenue codes 0200-0204, 0207-0213, and 0219.<sup>5</sup> We defined critical care length of stay as the total number of days for admissions that included critical care.

*General inpatient stays* were considered a subset of inpatient care. We counted any admission that did not include critical care as a general inpatient stay.

*Emergency Department (ED) care* included visits paid as either ED visits or observation (OBS) visits. We identified ED/OBS visits based on methods used for HEDIS quality measures. We did not count ED or observation visits that resulted in an inpatient admission. We limited ED/OBS visit counts to one visit per calendar day.

**Cost Analysis.** We assessed costs of care for the following service types.

*Inpatient costs* included institutional and professional costs. When ED care resulted in an inpatient admission, we assigned costs for the entire stay (ED plus inpatient care) to inpatient care. Professional costs during inpatient stays were assigned based on the date billed. For inpatient stays that crossed periods (went beyond either baseline or PFC

months), we assigned institutional costs proportionally based on the number of days in the baseline or PFC period; for example, a 20-day inpatient stay that reflected 10 days in the PFC period and 10 days outside the PFC period would have 50% of the institutional costs included in the total inpatient care costs.

*Critical care costs* were considered a subset of inpatient costs. We defined critical care costs as the total institutional and professional costs for inpatient stays that included critical care services.

*General inpatient costs* were considered a subset of inpatient costs. We defined general inpatient costs as the total institutional and professional costs for inpatient stays that did not include critical care.

*ED/OBS costs* were considered the total of all institutional and professional claims associated with ED/OBS visits. Ambulance costs were identified separately but grouped with ED for summary purposes.

*Outpatient care costs* included prescription medication, medical equipment, home-based care, hospice, and other services. We assigned costs for prescription medication using pharmacy claims. We assigned costs for other outpatient services using a combination of claim type and place of service codes. Outpatient costs do not reflect school-based services, as paid amounts are \$0, and subsequent bulk payments cannot be attributed to individual beneficiaries.

We then generated aggregate utilization counts and costs for all eligible months in the baseline and PFC periods. To facilitate comparison of data across periods, we standardized utilization and cost data to reflect the average per child per month for that period. For this *Follow-Up Report*, we validated the previous results from the initial *Impact Report* and found a difference of  $\leq 0.03\%$  (roughly \$2,000 in expenditures). We then generated utilization and cost data for the extended PFC period.

***Presentation of Results.*** The main body of this report presents the validated baseline period results from the initial *Impact Report*, and new results for the PFC period through March 2020. Appendix A presents tables that include data points from the PFC period in the initial *Impact Report*, to highlight changes over the extended timeframe.



## RESULTS

### Description of the Study Population.

PFC enrollment dates for the 77 children spanned from 08/13/2018 to 06/27/2019. At the time of PFC enrollment, 3 children were less than one year of age, 18 were 1-2 years, 15 were 3-5 years, 22 were 6-9 years, 14 were 10-14 years, and 5 were 15-16 years.

Table 2 compares characteristics for the baseline vs PFC periods. Average eligible months were slightly higher for the PFC period due to the extended period for analysis. In the PFC period, the nine children with 3-9 months include 1 child who died, 1 transferred to hospice, and 7 with a limited number of months covered by Medicaid. In both periods, over half of children were covered under Medicaid managed care. Over forty percent of children had evidence of non-Medicaid coverage, which typically occurred in conjunction with Medicaid fee-for-service coverage.

**Table 2. Characteristics of the Study Population (N=77), Baseline vs PFC Period**

	Baseline Period	PFC Period
Total months eligible for study	880	1057
Average months eligible for study	11.7	13.7
Months eligible for study		
N with 3-9 months	3	9
N with 10-12 months	74	25
N with 13-19 months	--	43
Medicaid Managed Care Enrollment		
% of children with any managed care	62.3%	59.7%
% of months with managed care	54.2%	52.6%
Non-Medicaid Coverage (Third-Party Liability)		
% of children with any non-Medicaid coverage	44.2%	42.9%
% of months with non-Medicaid coverage	43.2%	45.9%
Benefit Plan (% of months)		
CSHCS-Managed Care	50.2%	50.5%
CSHCS/Medicaid FFS	39.6%	43.3%
CSHCS/Healthy Kids Expansion	2.0%	1.2%
Medicaid-Managed Care	4.0%	2.1%
Medicaid FFS	4.0%	2.8%

## Utilization Patterns

**Inpatient Care.** Children in the study population had 80 inpatient admissions in the baseline period, with a total of 1,354 days of inpatient care; 21 admissions (26.3%) included critical care. During the PFC period, these children had 72 inpatient admissions, with a total of 634 days of inpatient care; 16 admissions (22.2%) included critical care.

The average number of admissions per child per month of study eligibility decrease from the baseline period to the PFC period for overall admissions, critical care admissions, and general inpatient admissions (Table 3). Average length of stay, represented by the number of inpatient days per child per month of study eligibility, also decreased for each type of inpatient care.

**Table 3. Utilization of Inpatient Care – Average Per Child Per Month, Baseline vs PFC Period**

	Baseline Period	PFC Period
<b>Inpatient Admissions per Child per Month</b>	<b>0.091</b>	<b>0.068</b>
Critical Care Admissions per Child per Month	0.024	0.015
General Inpatient Admissions per Child per Month	0.067	0.053
<b>Inpatient Days per Child per Month</b>	<b>1.539</b>	<b>0.600</b>
Critical Care Days per Child per Month	0.895	0.260
General Inpatient Days per Child per Month	0.643	0.340

Figure 1 portrays the magnitude of decrease in average inpatient admissions, with critical care stays demonstrating the largest drop from the baseline to the PFC period.

**Figure 1. Average Number of Inpatient Admissions per Child per Month**

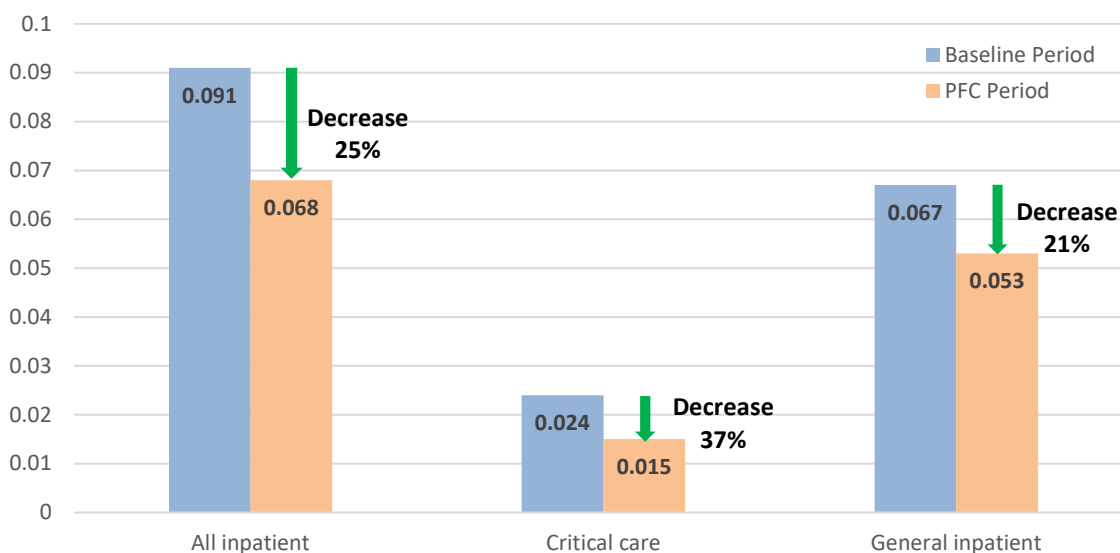
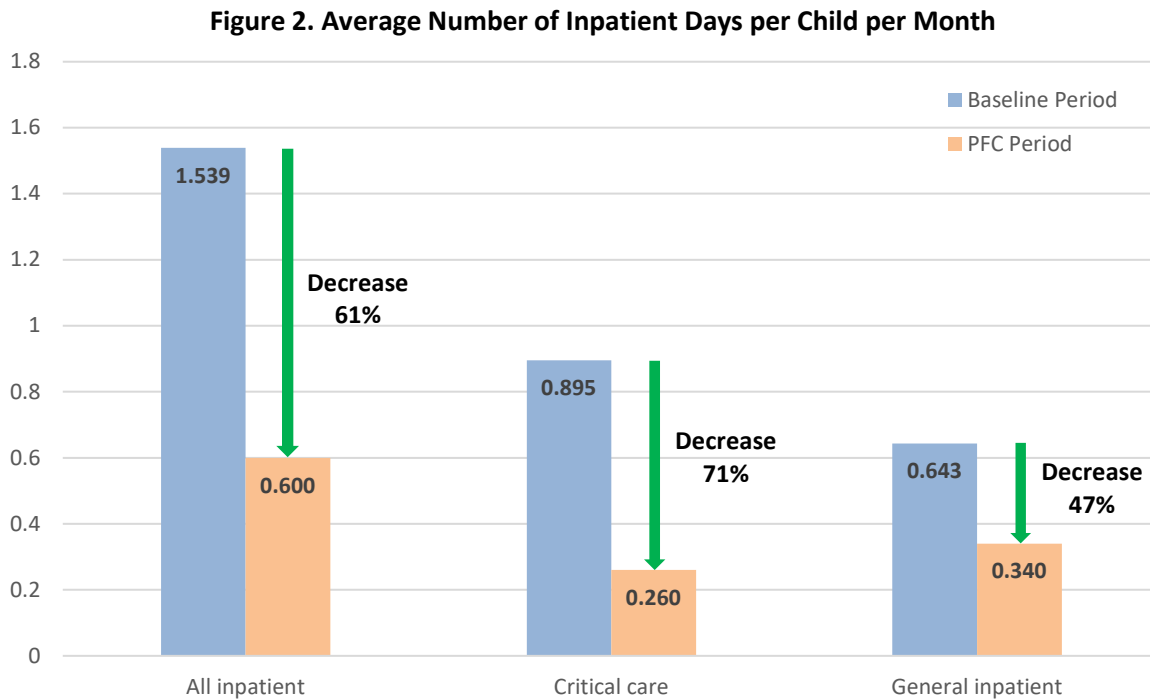


Figure 2 demonstrates the even greater decrease in average inpatient length of stay from the baseline to the PFC period for both critical care and general inpatient admissions.



**Emergency Care.** Children in the study population had 113 ED/OBS visits in the baseline period and 125 ED/OBS visits in the PFC period; this reflects an 8% decrease in average ED/OBS visits per child per month of study eligibility (see Table 4). The proportion of children with no ED/OBS visits was identical in the baseline and PFC periods.

**Table 4. Utilization of Emergency Care – Baseline vs PFC Period**

	Baseline Period	PFC Period
Average ED Visits per Child per Month	0.128	0.118
% of children with no ED visits	46.7%	46.7%

## Cost Patterns

**Total Medicaid Expenditures.** Total Medicaid expenditures reflected the amount paid by Medicaid for nearly all services across all settings and locations (with the exception of school-based services), for the 77 children in the study population, for all eligible months in the baseline and PFC periods.

As shown in Table 5, the costs of healthcare for the PFC population were substantial, with paid amounts of \$5.5 million in the baseline period and \$4.5 million in the PFC period. The average Medicaid expenditure per child per month decreased by 33% from \$6,331 in the baseline period, to \$4,271 per month in the PFC period. **On average, this reflects lower Medicaid expenditures of \$2,060 per child per month after PFC enrollment.**

**Table 5. Total Medicaid Expenditures Per Child Per Month**

	Baseline Period	PFC Period
Total Medicaid Paid Amount	\$5,571,427	\$4,514,364
Average Paid Amount Per Child Per Month	\$6,331	\$4,271

**Expenditures for Inpatient Care.** Medicaid expenditures for inpatient care decreased from the baseline to the PFC period (Table 6), which mirrored the declines in utilization of inpatient care. The average paid amount for inpatient care per child per month was \$3,323 in the baseline period and \$1,152 in the PFC period, which represents a 65% decrease.

Medicaid expenditures for both critical care and general inpatient care decreased substantially from the baseline to the PFC period. Critical care expenditures dropped by 75%, while expenditures for general inpatient care decreased by 45%. In addition, the proportion of inpatient expenditures related to critical care decreased by over one-quarter, from 68.8% in the baseline period to 50.5% in the PFC period.

**Table 6. Average Medicaid Expenditures Per Child Per Month for Inpatient Care**

	Baseline Period	PFC Period
Inpatient Care (total)	\$ 3,323	\$1,153
Critical Care	\$ 2,285	\$583
General Inpatient (non-critical)	\$ 1,038	\$570
% of Inpatient Care Expenditures for Critical Care	68.8%	50.5%

**Expenditures for Outpatient Services.** Expenditure patterns for outpatient services differed by service category (Table 7). Expenditures for emergency care increased by 15% from baseline to the PFC period despite a slight decrease in average ED utilization. Expenditures for prescription medication increased by 39%, reflecting an additional \$291 per child per month. Notably, there

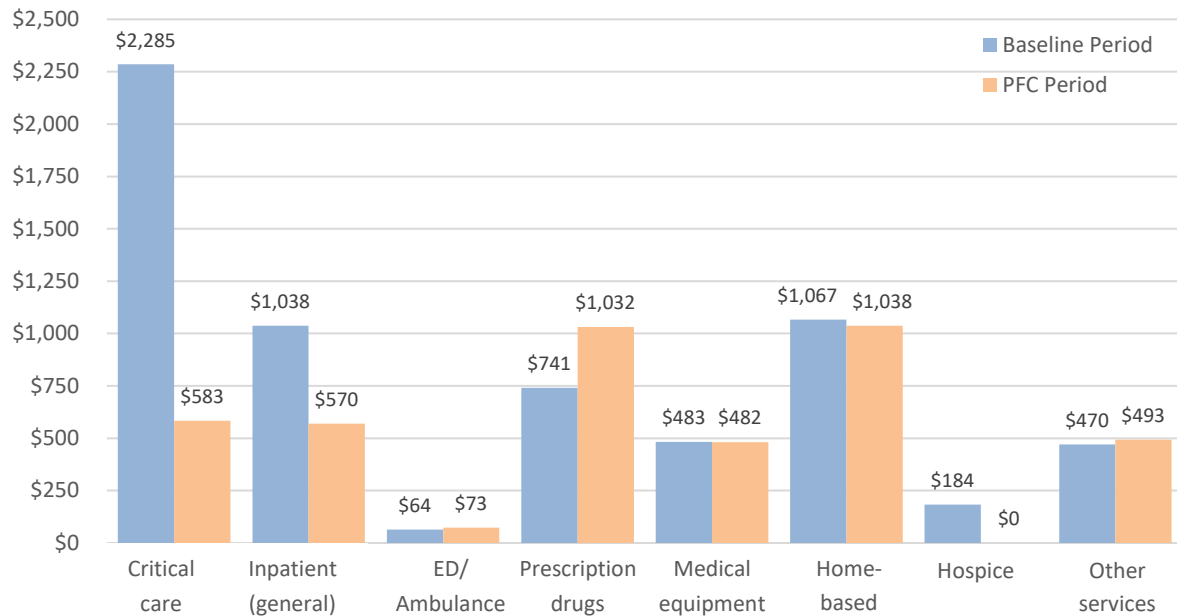
was a modest decrease in average expenditures for home-based care, despite PFC’s emphasis on that service. This was balanced by a similarly sized increase for other outpatient services. Finally, expenditures for hospice services decreased to \$0 in the PFC period, reflecting the exclusion of months after children were transferred out of PFC to hospice.

**Table 7. Average Medicaid Expenditures Per Child Per Month for Outpatient Services**

	Baseline Period	PFC Period
ED/OBS visits	\$ 50	\$57
Ambulance	\$ 14	\$15
Prescription Medication	\$ 741	\$1,032
Medical Equipment	\$ 483	\$482
Home-based Care	\$ 1,067	\$1,038
Hospice	\$ 184	\$0
Other	\$ 470	\$493

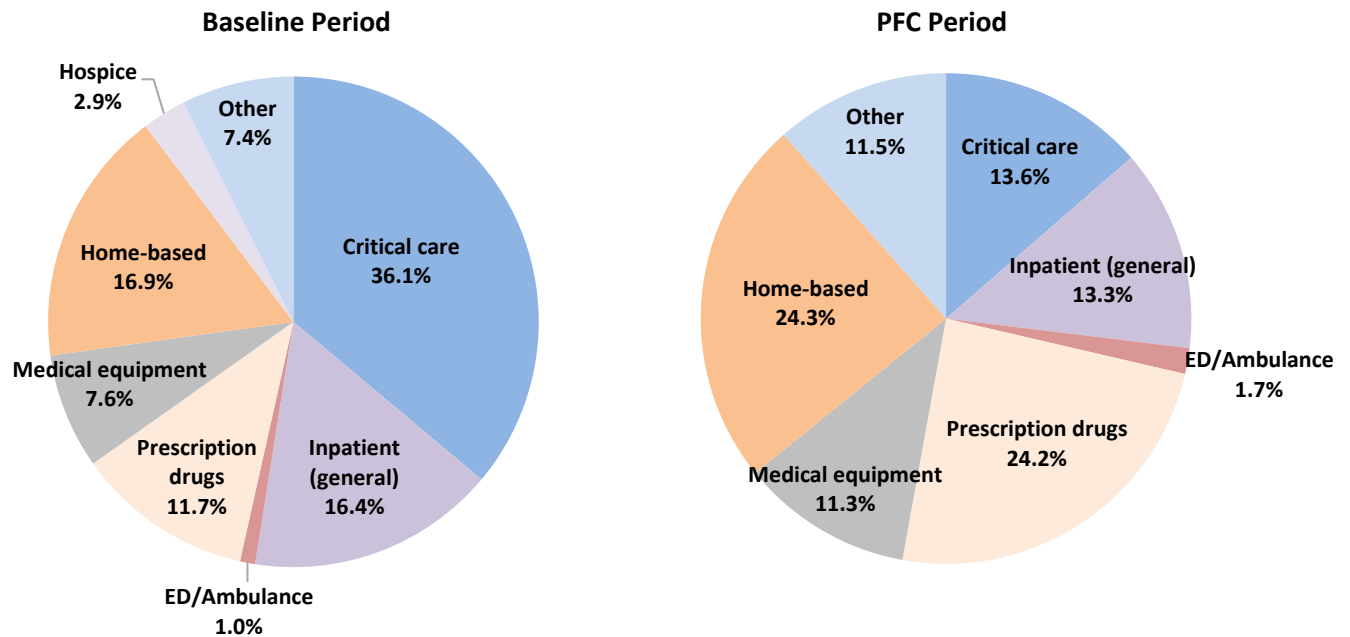
Figure 3 compares average expenditures per child per month, across all categories, for the baseline and PFC periods.

**Figure 3. Average Medicaid Expenditures Per Child Per Month: Baseline vs PFC Periods**



**Proportion of Expenditures by Service Categories.** As shown in Figure 4, inpatient care consumed more than half of the average monthly expenditures in the baseline period; this dropped to less than one quarter of expenditures in the PFC period. In contrast, a greater proportion of expenditures were devoted to prescription medications and home-based care in the PFC period, compared to baseline.

**Figure 4. Proportion of Average Monthly Per Child Expenditures by Service Category**



**Proportion of Expenditures by Payment Type.** The proportion of expenditures covered through Medicaid managed care vs fee-for-service was consistent across both the baseline and PFC periods, but differed by type of service. For prescription medications, only 12-13% was paid through managed care, while 87-88% was paid through fee-for-service. In contrast, for all other services, two-thirds was paid through managed care while one-third was paid through fee-for-service (Table 8).

**Table 8. Payment Source for Medicaid Expenditures**

	Baseline Period	PFC Period
Total Expenditures for Prescription Medication	\$ 651,734	\$1,091,288
% paid by Managed Care	13%	12%
% paid by Fee for Service	87%	88%
Total Expenditures for All Other Services	\$4,919,693	\$3,413,786
% paid by Managed Care	68%	67%
% paid by Fee for Service	32%	33%

Expenditures can also be considered in terms of “purchasing power” across periods. As shown below, maintaining the same expenditure level over time, with the reduced need for expenditures primarily for inpatient care, would translate to 32 cents of saving for every dollar in the PFC period.

*In the baseline period, \$1 of Medicaid expenditures went toward:*

- \$0.36 Critical care
- \$0.17 General inpatient/ED
- \$0.17 Home-based care
- \$0.12 Prescription medication
- \$0.08 Medical equipment
- \$0.10 Other services

*In the PFC period, an equivalent \$1 of Medicaid expenditures went toward:*

- \$0.09 Critical care
- \$0.11 General inpatient/ED
- \$0.16 Home-based care
- \$0.16 Prescription medication
- \$0.08 Medical equipment
- \$0.08 Other services
- \$0.32 Savings***

## DISCUSSION

This *Follow-Up Impact Report* reinforces the positive impact of the Partners for Children program on utilization and Medicaid expenditures for medically complex children. This analysis updates the initial *Impact Report* which had limited information about utilization and costs after PFC enrollment. With this extended follow-up period, we found that PFC had continued success over time in reducing both the number of inpatient stays and the average length of time per inpatient stay, with associated reductions in expenditures for inpatient care. The consistency of expenditures for outpatient care, medical equipment, and home-based care, along with increased expenditures for prescription drugs, confirm that the program is enhancing other aspects of care in order to reduce the need for inpatient services.

The economic impact for Michigan’s Medicaid program for this medically complex population are significant: an average overall savings of \$2,060 per child per month, which equates to \$24,720 per child per year. Another way to view the economic impact is that of every dollar expended in the baseline period for this group of children, \$0.32 was “saved” or not expended during the PFC period. Experts have called for new payment models to address the unique needs of medically complex children and their families, including those that offer home-based services,<sup>2</sup> and this report confirms that the cost savings from such programs may provide an opportunity for financial support of these new payment models.

The experiences of parents, shared in interviews at the start of their child’s enrollment in the PFC program, offer insight into the positive results. It is likely that offering home-based care, through a combination of in-person home visits and telephone check-ins, serves to build parents’ capacity for home management of their child’s condition. Supplementing that foundation with 24/7 access to urgent advice from a clinical provider who is familiar with the child’s condition and the family’s capabilities likely helps parents provide more appropriate and/or more timely home management, thereby reducing their child’s need for crisis care.

The decrease in inpatient costs may signal improved communication within the hospital setting. In interviews describing their pre-PFC experiences, parents cited a lack of communication between hospitalists and their child's specialty providers as contributing to delays in developing an appropriate management strategy during inpatient admissions. Results of this analysis may reflect the efforts of the PFC team to track which patients are admitted, and to arrange consultations with and clinical input from key specialists.

An important concurrent finding is that in addition to limiting inpatient costs, the PFC program appears to be successful in assisting families with accessing essential outpatient services, including prescription medications. This harkens back to parent comments about the difficulties in arranging prior authorizations and other approvals for services; PFC action may be effective in breaking through those barriers.

These findings are consistent with prior studies evaluating the impact of care management programs for medically fragile children,<sup>1,3,4</sup> the positive results for the PFC program are more pronounced. For example, the magnitude of the decrease in utilization and expenditures for inpatient care, including critical care, is nearly double that found in the evaluation of the original Partners for Children program in California.<sup>3</sup>

### **Additional Analyses**

***Post-Discharge Utilization and Expenditures.*** This analysis included 76 total months of Medicaid coverage after children had been discharged from PFC. The post-discharge months were generated by six children; 72 of 76 months were covered under the Medicaid CSHCS-MC benefit with 4 months covered by CSHCS and Medicaid FFS. The post-discharge months had slightly higher ED utilization and costs but overall lower expenditures, including lower utilization and expenditures for inpatient care. There were no critical care stays in the post-discharge months. Excluding post-discharge months had minimal impact on results.

***Additional CSHCS-Only Expenditures.*** A question from the initial report was whether the state CSHCS program was covering some expenditures for the PFC population. In the 20 months of CSHCS enrollment without concurrent Medicaid coverage, PFC children incurred only small costs paid through CSHCS, with no inpatient or ER expenditures.

***Consideration of Outliers.*** The initial *Impact Report* documented an increase in average expenditures for emergency department care in the early PFC period, largely due to a small number of high-cost visits; when ED expenditures were calculated excluding these high-cost visits, the expenditures were more similar to baseline. This *Follow-Up Report*, with its longer timeframe, demonstrates a much smaller change in ED costs from baseline to the PFC period, without the exclusion of outliers.

***Patterns during the Initial Months of the COVID Pandemic.*** Comparable analyses of utilization and expenditures were performed through September 2020, reflecting the initial months of the COVID Public Health Emergency period. Utilization and expenditures dropped across all service categories, consistent with changes in patient care protocols to delay in-person care. Although results for this time period may not be generalizable to "usual care" patterns, it is likely that



PFC-enrolled children and families benefitted from their already-established relationships with the PFC team prior to the pandemic, and were able to continue receiving PFC guidance on at-home management and avoid bringing their child into the high-risk hospital setting.

### **Limitations**

There are several limitations to this study. First, this study reflects children enrolled in the PFC program during its initial year of services. Due to the relatively small size of the study population, we were unable to assess subgroup patterns (e.g., by age group or by diagnosis).

Second, we excluded children who did not have at least 3 months of full scope and coverage Medicaid prior to and following their month of initial PFC enrollment. As such, results may not be generalizable to private payers.

Third, for the PFC period only, we excluded the month of and months following transfer to hospice. This information was not available for the baseline period; as such, hospice costs are reflected in the baseline but not the PFC period. However, all children who had hospice care in the baseline period had been removed from hospice before PFC enrollment.

Finally, Partners for Children was implemented at one institution. The extent to which similar changes in utilization and expenditures would occur with programs for medically complex children at different institutions is unknown. It is likely that generalizability to other institutions would be associated with the definition of eligible children, the strategies used to support home management, and the ability of program staff to intervene with hospital-based colleagues to minimize costly inpatient care.

### **Conclusion**

This analysis demonstrates that over time, the Partners for Children program has reduced inpatient utilization and costs for medically complex children covered by Medicaid, yielding an average savings of \$2,060 per child per month. Cost savings were largely due to decreases in inpatient care, particularly critical care. Increased expenditures for prescription medication and consistency in expenditures for other outpatient services demonstrate that savings were not due to constrained care.

## REFERENCES

1. Casey PH, Lyle RE, Bird TM, Robbins JM, Kuo DZ, Brown C, Lal A, Tanios A, Burns K. Effect of hospital-based comprehensive care clinic on health costs for Medicaid-insured medically complex children. *Arch Pediatr Adolesc Med* 2011; 165(5):392-398.
2. Foster C, Agrawal RK, Davis MM. Home health care for children with medical complexity: Workforce gaps, policy, and future directions. *Health Affairs* 2019; 38(6):987-993.
3. Gans D, Kominski GF, Roby DH, Diamant AL, Xiao Chen, Wenjao L, Hohe N. Better outcomes, lower costs: Palliative care program reduces stress, costs of care for children with life-threatening conditions. *UCLA Health Policy Brief* August 2012: 1-7.
4. Gordon JB, Colby HH, Bartelt T, Jablonski D, Krauthoefer ML, Krauthoefer ML, Havens P. A tertiary care-primary care partnership model for medically complex and fragile children and youth with special health care needs. *Arch Pediatr Adolesc Med* 2007;161(10): 937-944
5. Weissman GE, Hubbard RA, Cohn R, et al. Validation of an administrative definition of intensive care unit admission using revenue center codes. *Crit Care Med* 2017;45(8):e758-e762.

## Appendix A – Comparison of Initial vs Follow-Up Report Data for PFC Period

### Determination of Study Population

#### *Initial Report:*

We defined inclusion criteria as having: (1) at least 3 full months of PFC enrollment during the PFC timeframe; (2) at least 3 months of full scope and coverage Medicaid during the baseline timeframe; and (3) at least 3 months of full scope and coverage Medicaid during the post-enrollment PFC period. We applied these criteria to the 107 children who were enrolled in PFC as of November 2019; this process yielded the following exclusions:

- 10 children who were enrolled after July 1, 2019, and thus did not have at least 3 months of PFC enrollment in the study period;
- 1 child who was discharged from the PFC program prior to having 3 full months of PFC enrollment; and
- 19 children who did not have at least 3 months of full scope and coverage Medicaid in both the baseline and PFC timeframes.

The final sample consisted of 77 children whose initial PFC enrollment dates spanned 08/13/2018 to 06/27/2019.

#### *Follow-Up Report:*

We maintained the same population of 77 children and defined the end of the extended PFC period using the following criteria:

- If the child remained enrolled in PFC, the PFC period end date was March 2020.
- If the child was discharged from PFC (regardless of whether discharge was requested by parents or program staff), the PFC period end date was March 2020.
- If the child died during PFC enrollment, the PFC period end date was the month *prior* to death.
- If the child was transferred to hospice during PFC enrollment, the PFC period end date was the month *prior* to transfer.

The same criteria were used for the additional analysis through September 2020.

**Table 1A. Characteristics of the Study Population (N=77) Over Time**

	Baseline Period	<i>Initial Report</i> PFC Period*	<i>Follow-Up Report</i> PFC Period#
<b>Total months eligible for study</b>	<b>880</b>	<b>571</b>	<b>1057</b>
<b>Average months eligible for study</b>	<b>11.7</b>	<b>7.4</b>	<b>13.7</b>
Months eligible for study, by period,			
N with 3-9 months	6	51	9
N with 10-12 months	71	26	25
with 13-19 months	-		43
<b>Medicaid Managed Care Enrollment</b>			
% of children with any managed care	62.3%	55.8%	59.7%
% of months with managed care	54.2%	48.9%	49.3%
<b>Non-Medicaid Coverage (Third-Party Liability)</b>			
% of children with non-Medicaid coverage	44.2%	41.6%	42.9%
% of months with non-Medicaid coverage	43.2%	45.7%	45.9%

\* through September 2019

#through March 2020

**Table 2A. Utilization of Inpatient and ED Care – Average Per Child Per Month**

	Baseline Period	<i>Initial Report</i> PFC Period*	<i>Follow-Up Report</i> PFC Period#
<b>Inpatient Admissions per Child per Month</b>	<b>0.091</b>	<b>0.063</b>	<b>0.068</b>
Critical Care Admissions	0.024	0.011	0.015
General Inpatient Admissions	0.067	0.053	0.053
<b>Inpatient Days per Child per Month</b>	<b>1.539</b>	<b>0.616</b>	<b>0.600</b>
Critical Care Days	0.895	0.275	0.260
General Inpatient Days	0.643	0.342	0.340
<b>Average ED Visits per Child per Month</b>	<b>0.128</b>	<b>0.128</b>	<b>0.118</b>
<i>% children with no ED visits</i>	<i>46.7%</i>	<i>58.4%</i>	<i>46.7%</i>

\* through September 2019

#through March 2020

**Table 3A. Average Medicaid Expenditures Per Child Per Month**

	Baseline Period	<i>Initial Report</i> PFC Period*	<i>Follow-Up Report</i> PFC Period#
<b>Average Paid Amount Per Child Per Month</b>	<b>\$6,331</b>	<b>\$4,416</b>	<b>\$4,271</b>
<b>Inpatient Care (total)</b>	<b>\$ 3,323</b>	<b>\$ 1,048</b>	<b>\$1,153</b>
Critical Care	\$ 2,285	\$ 620	\$583
General Inpatient (non-critical)	\$ 1,038	\$ 428	\$570
<i>% of Inpatient Expenditures for Critical Care</i>	68.8%	59.2%	50.5%
<b>ED/OBS visits</b>	<b>\$ 50</b>	<b>\$ 74</b>	<b>\$57</b>
<b>Ambulance</b>	<b>\$ 14</b>	<b>\$ 18</b>	<b>\$15</b>
<b>Prescription Medication</b>	<b>\$ 741</b>	<b>\$ 1,006</b>	<b>\$1,032</b>
<b>Medical Equipment</b>	<b>\$ 483</b>	<b>\$ 441</b>	<b>\$482</b>
<b>Home-based Care</b>	<b>\$ 1,067</b>	<b>\$ 1,269</b>	<b>\$1,038</b>
<b>Hospice</b>	<b>\$ 184</b>	<b>\$ 0</b>	<b>\$0</b>
<b>Other</b>	<b>\$ 470</b>	<b>\$ 560</b>	<b>\$493</b>

\* through September 2019

#through March 2020