

Evaluation of Rhode Island's Pediatric Practice Enhancement Project (PPEP)

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More than 12 million (13.9%) US children meet the Maternal and Child Health Bureau (MCHB) definition of children with special care needs (CSHCN).^{1,2} In Rhode Island 41,783 children (17.2%) have chronic physical, developmental, behavioral, and/or emotional conditions that require health and supportive services beyond the type or volume required by other children.³ ⁴ CSHCN have multiple medical needs and caretakers often struggle to navigate a complex system to obtain medical, mental health, educational, and social services.⁵ The attributes of care for CSHCN included in the American Academy of Pediatrics' medical home definition of delivering primary care call for care that is accessible, continuous, comprehensive, family-centered, coordinated, compassionate, and culturally effective.^{6,7} The **Pediatric Practice Enhancement Project (PPEP)** is Rhode Island's medical home initiative to enhance medical practices and coordination of care for CSHCN. Approximately 6% of Rhode Island's CSHCN population is enrolled in PPEP. This study compares health service utilization and health-related expenditures between PPEP and the standard care model for CSHCN in Rhode Island. This evaluation will inform a possible expansion of the PPEP model into practices with standard care.

METHODS

Neighborhood Health Plan of Rhode Island (NHPRI) claims and PPEP case management databases were linked to examine CSHCN encounters, claims per visit and expenditures per claim for the two models of care. Sample selection for both groups included being NHPRI insured from 01-01-2004 to 12-31-2007 and between 1 month and 18 years of age. Children younger than one month were excluded from this analysis because the PPEP model does not provide inpatient coordination at birth hospitals. The PPEP comparison group was CSHCN with SSI/Related group insurance. A total of 16,150 CSHCN visits met study criteria and were included in the sample (PPEP=4,180; standard care=11,970). Study

samples were stratified by outpatient (OV) and emergency visits (EV), inpatient admissions (IA), and calendar year, and analyzed using parametric (two sample t-test) and non-parametric methods. Because samples were not normally distributed, the Kruskal-Wallis statistic was used to determine differences in test scores in the overall and stratified analyses. Main study questions included 1) Is PPEP associated with lower emergency room and inpatient service use and higher utilization of primary care/preventive services? and 2) Are there differences in paid claims between the PPEP and standard of care models?

RESULTS

On average, PPEP encounters per child were 20.9% higher and claims per visit 3.9% lower compared to standard care. (Table 1) Cost analysis in this study was based on paid claims. Overall and annual expenditures per visit were lower for PPEP. Payments per claim were \$70.5 lower for PPEP ($p < .0001$) for the entire period. Annual average differences ranged from \$13 (2007) to \$22 (2006).

Average IA and OV per child were 61.9% lower and 20.9% higher for PPEP, respectively. (Table 2) Average paid claims for PPEP participants were \$449.9 lower (-15.1%) for IA ($p < .001$) and \$21.6 higher (7.6%) for OV ($p < .0001$). IA per child and claims per visit were lower for PPEP in each year. The only exception was a higher claim per visit ratio (10.5%) in 2006. PPEP paid claims for IA in this year were \$18.9 higher but this difference was not statistically significant ($p < .83$). OV for PPEP participants were lower than for standard care in each year. With the exception of 2007, claims per OV were lower in the PPEP model. Also, with the exception of 2004 (-\$1.3), paid claims were higher (range=\$2.2-\$10.5) for PPEP than for the standard care model (all years $p < .0001$).

Although the 2004-2007 average EV per child (41.2%) and claims per EV (9.9%) were higher for PPEP, paid claims for this model were \$10.8 lower than for standard care

TABLE 1
ALL CLAIMS

Year	Model	Children w/ Any Encounter (N)	Encounters (N)	Average Child Encounters	Claims from all Encounters (N)	Average Claims per Encounter	Average Payment per Claim (\$)	Average Difference (\$)	Kruskal-Wallis Test
2004	ppep	907	8,318	9.2	13,763	1.9	101.4	-19.9	$p < .0001$ (hs)
2004	non ppep	2,321	19,973	8.6	44,591	2.2	121.3		
2005	ppep	1,077	12,423	11.5	26,821	2.2	99.5	-15.8	$p < .0001$ (hs)
2005	non ppep	2,806	27,085	9.7	60,908	2.2	115.3		
2006	ppep	1,202	13,771	11.5	35,281	2.6	89.9	-21.9	$p < .0001$ (hs)
2006	non ppep	3,160	32,366	10.2	84,961	2.6	111.3		
2007	ppep	994	14,111	14.2	31,917	2.3	100.2	-12.9	$p < .0001$ (hs)
2007	non ppep	3,683	36,232	9.8	76,799	2.1	113.1		
	ppep	4,180	48,626	11.6	109,785	2.2	391	-17.6	$p < .0001$ (hs)
	non ppep	11,970	115,656	9.6	267,259	2.3	462		
	2004-7 difference			20.9%		-3.9%	-70.5	-17.6	$p < .0001$ (hs)

TABLE 2

INPATIENT CLAIMS

Year	Model	Hospitalized Children (N)	Hospital Stays (N)	Average Hospital Stays per Child	Claims from Hospital Stays (N)	Average Claims per Hospital Stay	Average Payment per Claim (\$)	Average Difference (\$)	Kruskal-Wallis Test
2004	ppep	56	368	6.6	865	2.4	640.2	-147.50	p<.0001 (hs)
2004	non ppep	141	1,261	8.9	5,206	2.5	787.7		
2005	ppep	71	390	5.5	757	1.9	687.3	-277.0	p<.0001 (hs)
2005	non ppep	158	1,297	8.2	3,066	2.4	964.3		
2006	ppep	74	373	5.0	1,304	3.5	686.1		
2006	non ppep	178	1,979	11.1	6,260	3.2	667.1	18.9	p=.8300 (ns)
2007	ppep	59	364	6.2	743	2.0	964.3	-44.4	p=.0084 (vs)
2007	non ppep	176	1,655	9.4	3,641	2.2	1,008.6		
	ppep	260	1,495	5.8	3,669	2.5	2,978	-117.2	
	non ppep	653	6,192	9.4	16,173	2.6	3,428	4.7	
	2004-7 difference			-61.9%		-4.5%	-449.9	-112.5	p=.001 (vs)

EMERGENCY CLAIMS

Year	Model	Children with ER Visits (N)	ER Visits (N)	Average ER Visits per Child	Claims from ER Visits (N)	Average Claims per ER Visit	Average Payment per Claim (\$)	Average Difference (\$)	Kruskal-Wallis Test
2004	ppep	260	977	3.8	1,205	1.2	93.1		
2004	non ppep	593	2,354	4.0	3,130	1.3	90.2	2.9	p .009 (vs)
2005	ppep	504	1,289	4.2	1,724	1.3	91.3	-9.4	p=.0001 (vs)
2005	non ppep	759	2,799	3.7	3,587	1.3	100.7		
2006	ppep	362	1,456	4.0	2,407	1.7	83.2	-1.8	p .5655 (ns)
2006	non ppep	880	3,536	4.0	5,825	1.6	84.9		
2007	ppep	170	1,592	9.4	2,390	1.5	100.5	-2.5	p=.9902 (ns)
2007	non ppep	1,205	4,184	3.5	3,983	1.0	103.0		
	ppep	1,096	5,314	5.3	7,726	1.4	368	-3.4	
	non ppep	3,437	12,873	3.8	16,525	1.3	379	0.7	
	2004-7 difference			41.2%		9.9%	-10.8	-2.7	p=.001 (vs)

OUTPATIENT CLAIMS

Year	Model	Children with OP Visits (N)	Outpatient Visits (N)	Average OP Visits per Child	Claims from OP Visits (N)	Average Claims per OP Visit	Average Payment per Claim (\$)	Average Difference (\$)	Kruskal-Wallis Test
2004	ppep	591	6,973	11.8	13,693	2.0	70.7	-1.3	p<.0001 (hs)
2004	non ppep	1,587	16,358	10.3	38,255	2.3	72.0		
2005	ppep	702	10,744	15.3	24,340	2.3	84.7		
2005	non ppep	1,889	22,989	12.2	54,255	2.4	74.2	10.5	p<.0001 (hs)
2006	ppep	766	11,945	15.6	31,573	2.6	72.6		
2006	non ppep	2,102	26,851	12.8	72,876	2.7	70.3	2.2	p=.0001 (hs)
2007	ppep	765	12,155	15.9	28,784	2.4	79.2		
2007	non ppep	2,302	30,393	13.2	69,175	2.3	69.1	10.1	p<.0001 (hs)
	ppep	2,824	41,817	14.6	98,390	2.3	307	-0.3	
	non ppep	7,880	96,591	12.1	234,561	2.4	286	5.7	
	2004-7 difference			20.9%		-4.9%	21.6	5.4	p<.0001 (hs)

(p<0.001). PPEP had higher EV per child and claims per EV starting in 2005. Also starting in 2005, PPEP paid claims were lower. Differences were statistically significant only for 2004 and 2005 (p<.001).

DISCUSSION

Understanding to what extent models of care influence health care utilization in specific service settings, as well as cost, is essential to determine their public health value to populations not receiving their benefits. Previous studies identified cost reductions associated with lower IA and reduced length of stay when CSHCN were enrolled in a comprehensive primary care program.^{8, 9}

In this study, average visits per child were higher and claims per visit were lower for PPEP. In addition, overall PPEP paid claims per visit for resource intensive services were lower (-\$450 IA and -\$11 EV) and higher for OV (+21%). These findings suggest that the PPEP model increases utilization of primary/

preventive care and that a higher use of these services may decrease utilization of more costly services. Utilization and costs were lower for IA while utilization was higher and costs lower for EV. Use of outpatient services was mixed, as PPEP showed higher visits per child and lower claims per OV.

Different utilization patterns observed in the three service settings influenced model expenditures. Paid claims were used to estimate savings for participants in the standard care model if they had received PPEP care coordination. Participation in PPEP would have yielded a savings of \$1,348,359 for each year of participation in this model.

This study has several limitations. The design did not control for disease severity and time of participation in each model of care. Some pediatric practices in Rhode Island may provide services with both PPEP care coordination and standard care. Some CSHCN receiving standard care and their families may have been exposed to the PPEP model. A mixed effects model was not considered in the research design. This factor along

with disease severity and follow-up time will be considered in a future study.

PPEP is Rhode Island's medical home initiative to enhance medical practices and coordination of care for CSHCN. In 2006, Rhode Island had the 2nd highest rate of CSHCN in the six New England states and the 6th highest rate among the 50 states and DC.⁴ Study findings support an expansion of the PPEP model to practices with standard care along with the need to gather additional research evidence to inform this growth.

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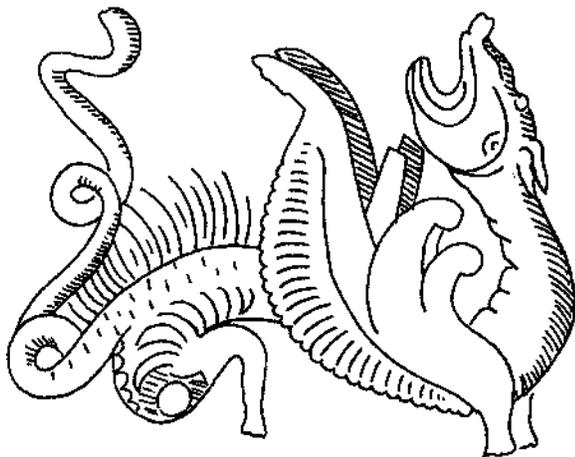
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