

Impact of a pediatric-focused medical home learning collaborative on preventable emergency department visits by publicly-insured children in Massachusetts

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AcademyHealth Annual Research Meeting
New Orleans, LA
June 24-27, 2017



Funding Acknowledgment

- *Funded by the Centers for Medicare & Medicaid Services (CMS) through grant funds issued pursuant to CHIPRA section 401(d). Anna Christensen's time was supported by a contract with the U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality (HHSA290200900019I / HHSA29032004T). The statements and opinions expressed in this research are those of the authors and not those of HHS, including CMS and AHRQ.*

Technical Assistance Acknowledgment

- The authors wish to acknowledge and thank Hanzhi Zhou, Ph.D., of Mathematica Policy Research, for her assistance with statistical modeling.

Pediatric Patient-Centered Medical Home (PCMH)

- American Academy of Pediatrics defines a pediatric medical home as “a family-centered partnership within a community-based system that provides uninterrupted care with appropriate payment to support and sustain optimal health outcomes” that will “address preventative, acute, and chronic care from birth through transition to adulthood.”
- Goal is to deliver care that is:
 - Patient-centered
 - Comprehensive
 - Coordinated
 - Accessible
 - Committed to quality and safety

Pediatric PCMH Learning Collaborative

- MassHealth contracted with National Institute for Children's Health Quality (NICHQ) to implement learning collaborative to support medical home transformation at 13 child-serving practices with Medicaid/CHIP enrolled children (practices solicited through RFA)
- Funds obtained through the Children's Health Insurance Program Reauthorization Act (CHIPRA) Quality Demonstration Grant
- Learning collaborative – 29 months long (8/2011-12/2013)
- LC used in-person care team meetings, tele-meetings, on-site technical assistance
- Additional 12 child-serving Medicaid/CHIP practices were recruited (through written outreach) as comparison practices

Research Goal

- This study assesses whether an association exists between pediatric primary care practice participation in a learning collaborative (LC) designed to develop PCMH capacities and a reduction in preventable (i.e., primary care sensitive) ED utilization by children enrolled in those practices, particularly children with chronic health conditions.
- We are not testing for an association between measures of “medical homeness” and preventable ED utilization.

Research Questions

1. Did participation in the learning collaborative reduce preventable ED use by children in the intervention group identified as having chronic health conditions relative to children with chronic conditions in the comparison group?
2. Did participation in the learning collaborative reduce preventable ED use by children with chronic conditions *and* who remained enrolled in an intervention group practice for the duration of the learning collaborative, relative to the equivalent subset of the comparison group?

Data

- MassHealth (Medicaid) claims, encounter, and enrollment data, extracted from MMIS data warehouse
- Two six-month outcome measurement periods:
 - Baseline: January-June 2011 (pre-LC)
 - Follow-up: July-December 2013 (overlaps end of LC)
- Exclusions:
 - Children enrolled but with no claims (can't apply PMCA to determine chronic condition status; also suspect data issues)
 - Non-managed care (FFS) excluded (can't attribute to specific primary care practice)

Sample

- Children enrolled with intervention (LC) and comparison practices
- Practice attribution (both groups): MMIS for PCC Plan (PCCM) members, MCOs supplied their enrollment data
- Age range 3-21 as of end of measurement period
- Modified HEDIS-type continuous enrollment (CE) requirements applied:
 - Research Question 1: 6-month CE with one allowable gap (≤ 45 days) with intervention or comparison practice assessed separately for baseline and follow-up periods (1H 2011 and 2H 2013)
 - Research Question 2: 6-month CE in 6 consecutive 6-month periods (1/2011-12/2013)

Outcome Measure – Preventable ED Visits

- ED visits resulting in IP admissions excluded
- Remaining visits analyzed using NYU ED algorithm¹ with modifications to better capture preventable visits among pediatric populations²
- Visits classified as preventable if total probability of Emergent + Emergent/Primary Care Treatable + Emergent/ED Care Needed/Preventable/Avoidable ≥ 0.7 (70%)

1. New York University. NYU ED Background. <http://wagner.nyu.edu/faculty/billings/nyued-background> (Accessed December 12, 2015.)

2. National profile of nonemergent pediatric emergency department visits. Ben-Isaac E, Schragger SM, Keefer M, Chen AY. Pediatrics. 2010 Mar;125(3):454-9.

Modifier Variable – Chronic Condition Status

- Pediatric Medical Complexity Algorithm (PMCA)
- Developed by researchers at Seattle Children’s Hospital
- Adaptation of Chronic Disability Payment System (CDPS), modified to better specify complexity of chronic disease in pediatric population
- Uses three-year claims lookback to assign one of three categories:
 1. Complex Chronic Disease
 2. Non-Complex Chronic Disease
 3. Without Chronic Disease
- Our analysis of preventable ED use compared categories 1 and 2 (any chronic disease) to 3 (no chronic disease)

Analytic Methods

- *Outcome*: Binary variable, had/did not have preventable ED visit in baseline/follow-up period
- *Question 1*: Repeat cross section analysis (fixed-effects logistic regression model)
 - Sample - Children with CE in baseline and/or follow-up
- *Question 2*: Longitudinal regression model (general linear model with binomial distribution and logit link)
 - Subsample - Children with CE in same practice type for full study period (same individuals in baseline and follow-up)

Results (Practice Characteristics)

	INTERVENTION		COMPARISON	
	#	%		%
Total	13		12	
Practice Size				
Enrollment: 0-500	3	23.10%	6	50.00%
Enrollment: 501-1000	4	30.80%	2	16.70%
Enrollment: 1001+	6	46.20%#	4	33.30%
Region				
Boston	5	38.50%	3	25.00%
Central	1	7.70%	2	16.70%
MetroWest	3	23.10%	4	33.30%
Northeast	2	15.40%	1	8.30%
Western	2	15.40%	2	16.70%
Practice Type				
Pediatrics Only	6	46.20%	10	83.30%
Multi-specialty	7	53.80%	2	16.70%

Sample Characteristics (w/ PMCA)

Characteristic	Children in Intervention Practices	Children in Comparison Practices
Repeat cross-section (Baseline)	n= 15,336	n= 7,113
Mean age (sd)	10.6 (5.1)	10.7 (5.1)
Percent with a chronic condition	41.3	46.7
Complex chronic	15.6	16.2
Non-complex chronic	25.6	30.6
Repeat cross-section (Follow-up)	n= 18,595	n= 8,866
Mean age (sd)	10.5 (5.0)	10.5 (4.9)
Percent with a chronic condition	42.4	45.9
Complex chronic	16.2	16.7
Non-complex chronic	26.2	29.2
Longitudinal analysis	n= 6,906	n= 3,163
Mean age (sd)	9.4 (4.1)	9.5 (4.1)
Percent with a chronic condition	44.8	50.2
Complex chronic	17.7	17.7
Non-complex chronic	27.1	32.5

Results (Question 1)

- Repeat cross section, unadjusted percentages

Baseline (1H 2011)	Intervention	Comparison
Has ED, appropriate	5.2%	5.0%
Has preventable ED	13.5%	9.9%
No ED visit	81.2%	85.2%
Cohort size	15,336	7,113
Follow-up (2H 2013)		
Has ED, appropriate	5.7%	5.0%
Has preventable ED	11.9%	8.5%
No ED visit	82.3%	86.5%
Cohort size	18,595	8,866

Cross-Sectional Analysis Results (Question 1)

- No difference between intervention and comparison groups in preventable ED use decrease for intervention vs. comparison practices
($\beta_{\text{time*intervention}} = 0.13, p = 0.20$)
- Effect did not differ significantly (using $p < 0.05$ standard) for children with versus without chronic conditions, but came close
($\beta_{\text{time*intervention*health}} = -0.24, p = 0.07$)

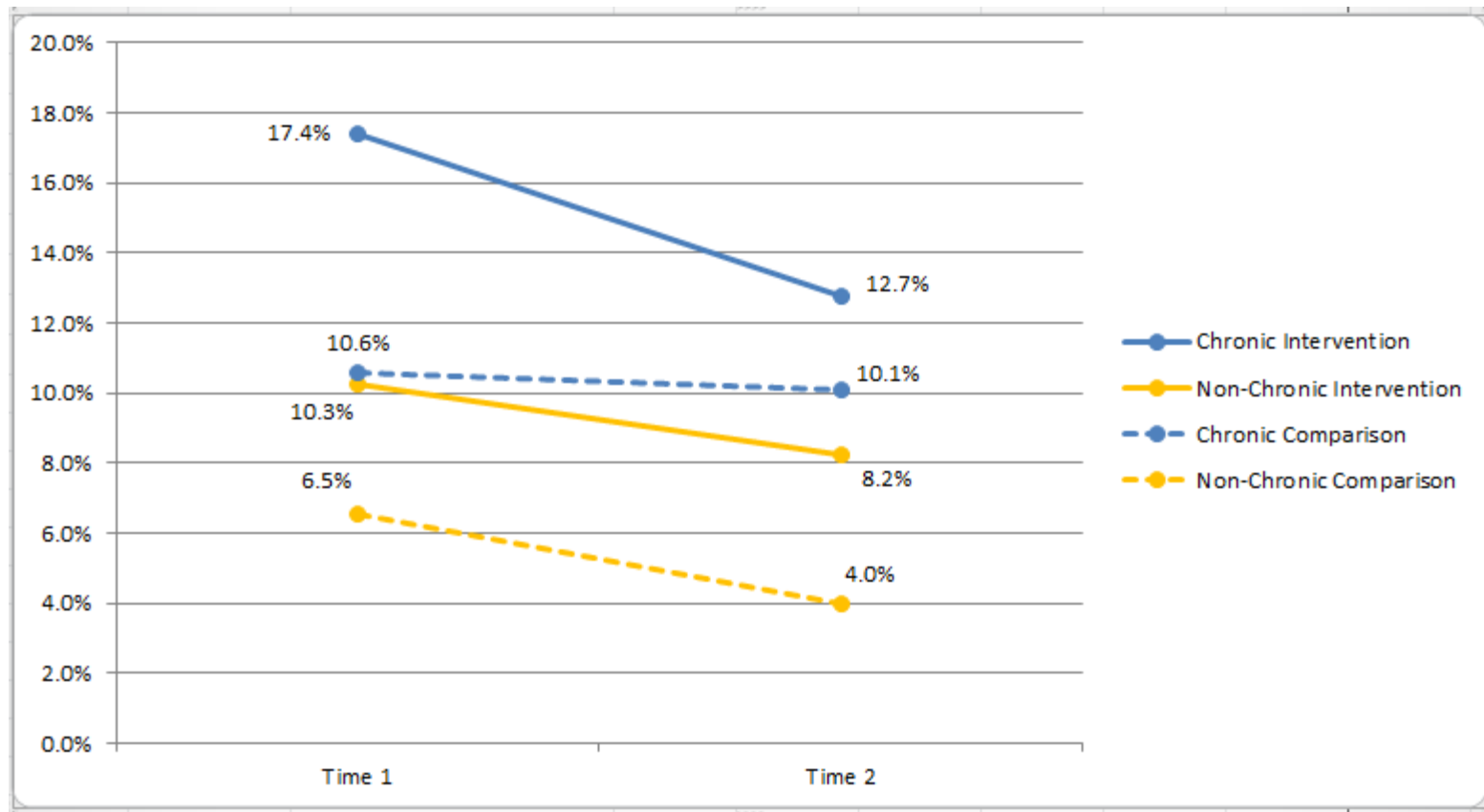
Results (Question 2)

- Longitudinal analysis, unadjusted percentages

Baseline (1H 2011)	Intervention	Comparison
Has ED, appropriate	4.6%	4.4%
Has preventable ED	13.5%	8.6%
No ED visit	81.9%	87.0%
Cohort size	6,906	3,163
Follow-up (2H 2013)		
Has ED, appropriate	5.3%	5.2%
Has preventable ED	10.4%	7.2%
No ED visit	84.3%	87.6%
Cohort size	6,906	3,163

Results (Question 2) – By PMCA Category (Chronic Disease vs. No Chronic Disease)

- Longitudinal analysis, unadjusted percentages



Longitudinal Analysis Results (Question 2)

- No difference between intervention and comparison groups in preventable ED decrease for children without chronic conditions: ($\beta_{\text{time*intervention}} = 0.22, p = 0.23$)
- However, effect significantly differed for children with versus without chronic conditions:
($\beta_{\text{time*intervention*health}} = -0.52, p = 0.02$)
- Test of linear combination of coefficients showed that for children with CC, ED visits decreased more in intervention than comparison practices
($\beta_{\text{time*intervention}} = -0.30, p = 0.03$)

Key Conclusions

- During the LC, preventable ED use declined in both intervention and comparison groups, and among children with and without chronic conditions.
- In the repeat cross-section analysis, we see a marginal association between LC participation and greater relative reduction in preventable ED use for children with chronic conditions.
- The longitudinal analysis shows stronger effects, specifically for children with chronic conditions who maintained continuous PCP enrollment with LC participant practices.
- While all children can benefit from pediatric medical home, those with chronic conditions/special needs could receive the greatest benefit.

Caveats and Limitations

- Differences between intervention and comparison practice populations (especially baseline preventable ED use)
- Follow-up timeframe (endpoint) not ideal, because it overlaps rather than follows end of LC – but this was in the evaluation plan we committed to for CHIPRA Evaluation
- PCMH LC participation doesn't necessarily lead to development of PCMH characteristics
- LC participants were a self-selected group (RFA respondents – desire for change?)

Questions?

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Appendix – SAS code for logistic regression model

```
proc logistic data=ed.model_final descending;  
  class psize pgeo / param=ref ;  
  model edvisits = age psize pgeo ptype treat intake  
                chronic treat * intake treat * chronic intake *  
                chronic  
                treat * intake * chronic psite_dm1 - psite_dm24/  
  expb;  
run;
```

Appendix – SAS code for general linear model

```
proc genmod data=ed.model_ce6_final descending;  
class id_medicaid psize pgeo / param=ref ;  
model edvisits = age psize pgeo ptype treat intake  
          chronic treat * intake treat * chronic intake * chronic  
          treat * intake * chronic psite_dm1 -  
psite_dm24/error=bin link=logit covb type3;  
repeated subject = id_medicaid / type = exch maxiter = 10000 covb  
corrb;  
  
estimate 'B8+B11' treat * intake 1 treat * intake * chronic 1;  
  
run;
```