



Medicaid-serving Health Maintenance Organization- Federally Qualified Health Center (HMO-FQHC)- School of Public Health Collaboration to Provide After-Hours Pediatric Urgent Care: A One Year Demonstration Project

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Authors' contributions

This work was carried out in collaboration between all authors. Authors LSF and CEB designed the study, wrote the protocol and wrote the first draft of the manuscript. Author CEB submitted the protocol to the institutional review board for ethical review. Authors LSF and SA performed the statistical analysis and LSF and CEB managed the analyses of the study. Author AMD managed the literature searches and AMD and APG finalized the manuscript. The authors read and approved the final manuscript.

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ABSTRACT

Aim: To demonstrate the collaboration of Medicaid-serving Health Maintenance Organizations (HMOs) and Federally Qualified Health Centers (FQHCs) supported by the design and evaluation skills of a School of Public Health in providing pediatric after-hours urgent care in a large urban

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metropolitan area, and to study the implications of implementation of this collaborative effort in reducing the Emergency Department (ED) patient load.

Study Design: Prospective evaluation using pre-post comparison study design.

Methodology: Three FQHCs located in the Houston area were selected to participate in this demonstration project in collaboration with the city's three largest Medicaid-serving HMOs. The HMOs conducted a marketing campaign directed at members living in 24 zip codes in the intervention area for the availability of after-hours pediatric care at the three FQHCs. The University of Texas School of Public Health (UTSPH) supported the project team with design and evaluation expertise, obtained and analyzed enrollment, service use, and cost data from the HMOs for the project's pre-intervention period, August 1, 2009 through July 31, 2010 and from the project's post-intervention period, August 1, 2010 through July 31, 2011. The primary objective of the study was to determine if there were any differences in pre-post service use and cost patterns in the Medicaid and Children's Health Insurance Program (CHIP) HMO enrollees in the Houston neighbourhoods targeted by the intervention compared to enrollees in non-targeted areas.

Results: The evaluation study found that the proportion of enrollees in the intervention group having an ED visit decreased from 17% to 12% whereas the proportion of enrollees in the comparison group stayed the same for ED visits (18%). The proportion of enrollees in the intervention group having a physician office visit decreased from 73% to 72% whereas the proportion of enrollees in the comparison group having a physician office visit decreased from 64% to 57%.

Conclusion: The evidence suggests that patterns of ED and physician office visits and costs of Medicaid/CHIP enrollees changed after the first year of implementation of an after-hours project. These results are encouraging for a strategy of working with community-based providers such as FQHCs in making clinic services available in evenings and on weekends, along with promoting the availability of those services, as a way of lowering rates of ED use and costs in the Medicaid/CHIP population in the Houston/Harris County area.

Keywords: Pediatric emergency department; emergency department utilization; primary care capacity and extended-hours.

1. INTRODUCTION

Reports from the University of Texas School of Public Health (UTSPH), at the time that the demonstration project was designed and implemented showed high numbers of hospital emergency department (ED) visits for children receiving Medicaid and /CHIP children in Houston/Harris County [1]. In 2009/2010 timeframe, the UTSPH reported an estimated rate of ED visits for Medicaid/CHIP pediatric enrollees of 44.5 visits per 100 children in 2009. This compares to rates of 12.5 ED visits per 100 children with private insurance and 22.4 per 100 for children who were uninsured for the similar period. The UTSPH report also presented data showing that ED visits of children in the Houston/Harris County area peaked between 7-8 p.m. in the evening on weekdays, and approximately 40% of all ED visits were for conditions that could be treated in the primary care setting [1]. The Medicaid-serving HMOs in the Houston/Harris County service area recognized the need to work together on community-wide initiatives to reduce excessive pediatric ED utilization in order to redirect the presumed cost savings to other important

pediatric health care needs. Among the prominent initiatives discussed as best practice in the ED literature was that of providing extended hours and additional convenient/urgent care during the times that patients' primary care office providers were not available as a means to offer alternatives to seeking care in the costly, intensive ED setting and thus reducing the number of visits to EDs for non-urgent, primary care treatable conditions that could be shifted to lower intensity settings.

A national survey of emergency department patients at the time of the evaluation found that 56 percent of ED visits were avoidable [2]. Further literature suggests possible reasons for excessive use of EDs included lack of access or awareness of primary care resources, limited knowledge in determining urgency, and convenience and/or personal preference for the ED [3,4]. One of the HMOs serving Medicaid/CHIP children in the Houston/Harris County service area surveyed primary care providers in their network and found that two-thirds did not offer after-hours care (J Treadway, personal communication, March 2012). This finding combined with the UTSPH's

ED use data provided an argument for the development of a project to increase the availability of after-hours convenient/urgent care in the community. A paucity of literature addressed the pediatric ED setting and efforts to reduce excessive use, and among the relatively older literature were strategies directed at reducing excessive ED utilization that involved expansion of primary care availability [5, 6], patient/parental education [7], and the availability of an after-hours on-call nurse triage [8]. Additionally, a community consultant's assessment of the emerging Community Health Centers' movement in the Houston/Harris County area suggested that FQHCs were well positioned to address the community's need for after-hours care given the location of their clinics and their experience serving Medicaid/CHIP enrollees [1]. Finally, a feasibility study conducted by one of the Medicaid-serving HMOs in collaboration with a regional FQHC found that extended hours for primary care treatable conditions had potential as a strategy for reducing ED visits in the population of children who receive Medicaid and CHIP [9].

Based on these observations, and building upon the aforementioned feasibility study, an expanded demonstration project was planned to target a larger population of children receiving Medicaid and CHIP served by several of the Medicaid-serving HMOs in the Houston/Harris county service area and which included several additional FQHCs as well. The results of this demonstration are presented now, even after several years have passed since initial demonstration, owing to continued relevance of efforts directed at reducing excessive pediatric ED utilization and costs and the need that pediatric clinical and administrative leaders continue to have to ground their own initiatives in data and experiences presented in the published literature to justify the investment of time and effort that such change initiatives warrant. Specifically, a review of review articles exploring reduction of ED utilization published between 2010 and October 2015 identified 23 publications that evaluated six types of intervention including the one examined in this demonstration project, namely increasing access to primary care related services [10]. Of note, and providing support for bringing forward additional evaluations of ED reduction efforts, the authors of this review concluded in their 2016 publication: "Despite numerous publications, evidence about the effectiveness of interventions that aim to reduce ED use remains insufficient" [10].

2. MATERIALS AND METHODS

Initially, all five HMOs offering Medicaid/CHIP coverage in Houston/Harris County agreed to participate in the project, but ultimately only three were able to alter their processes such that they could provide the required data to be included in the demonstration project. A quasi-governmental agency, the Harris County Healthcare Alliance (HCHA) served as a neutral third party that navigated between and among the competitive HMOs and FQHCs. The HCHA planned and secured philanthropic support to fund the evaluation of the project, identified clinic locations and FQHC participants, coordinated the development and implementation of a shared marketing campaign, and collected and de-identified the enrollment and claims data for the evaluation study team. Because of its focus on primary care treatable conditions and providing additional hours of service, the project was named, the "After-Hours Pediatric Primary Care project."

2.1 After-Hours Pediatric Primary Care Project

Supported by the evidence of the need for after-hours primary care for Medicaid/CHIP enrollees, HCHA and the Medicaid-serving HMOs developed a multi-site after-hours primary care intervention at three FQHC clinics in Houston/Harris County. The intervention involved each clinic providing after-hours primary care services for children covered in the Medicaid and CHIP programs for children living in targeted zip codes in the area combined with a marketing campaign by the HMOs promoting the use of these after-hours clinics among residents and health care providers. The project aimed to encourage families to establish and/or continue their connections with a medical home; demonstrate the feasibility of FQHCs providing after-hours care at a reasonable cost; demonstrate that the availability and promotion of after-hours clinic services can change patterns of service use; and demonstrate that Medicaid-serving HMOs could save costs by investing in FQHC after-hours care.

Through a competitive bid process, three FQHCs located in Houston/Harris County were selected for participation by HCHA based on service organization capacity and readiness, hereby named as FQHC1, FQHC2, and FQHC3. FQHC1 provided comprehensive primary care at five sites. FQHC2 was established in 1998 and

Table 1. Clinic after-hours of operation, services, and accessibility

	Scheduled after-hours operation		Services offered during after-hours operations	Can appointments be scheduled?
	Mon –Fri	Weekends		
FQHC1	4 pm – 9 pm	8:30 am - 2:30 pm	Primary health care, well-child, urgent care	Yes
FQHC2	4 pm – 9 pm	8 am- 12 pm	Primary health care, well-child, vaccinations, and treatments minor conditions and injuries	Yes
FQHC 3	5 pm – 10 pm	12 pm – 7 pm	Urgent care only	No. Walk-ins only.

provided comprehensive primary care at one location in the Houston/Harris County area. FQHC3 provided comprehensive healthcare at three locations and provided only urgent care services at an additional site for a total of four locations.

Table 1 shows a summary of the after-hours of operation, services, and appointment scheduling at each clinic since the program began in August 2010.

The project targeted enrollees residing in 24 zip codes located within six miles of each of the three clinics (see Map 1). The marketing campaign targeting these ZIP codes began in the late summer of 2010 and continued throughout the fall. It included media coverage, promotional material, grand opening events, provider education, and member education. Promotional material such as door hangers, postcard mailers, and fliers were distributed to achieve general awareness. They were posted throughout the community, at schools and local businesses, and mailed to members. Grand opening events were held at two clinics in August 2010 and the third in October. Additional information to educate providers and enrollees on the benefits of the after-hours clinic services and appropriate use of the ED was made available on websites, nurse help lines, and through telephone hold messages.

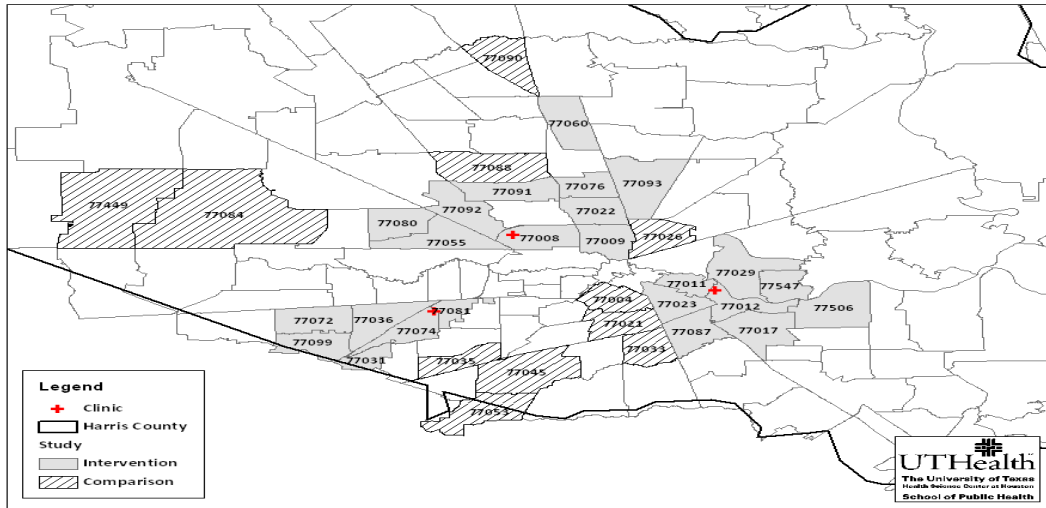
2.2 Evaluation Study

As indicated above, one of the expectations of the After-Hours Pediatric Primary Care project was that the availability and promotion of primary care services in evenings and weekends (i.e., extended hours) would change health service use patterns of enrollees, possibly diverting care from the ED, increasing the use of primary care, and reducing costs. The HCHA engaged the UTSPH to conduct an evaluation study to

determine if such changes had occurred after one year of implementation of the project. The study was conducted in two parts. Part 1 focused on obtaining and analyzing baseline enrollment and service use data from the HMOs for the pre-intervention period August 1, 2009 through July 31, 2010 for Medicaid/CHIP enrollees residing in the targeted zip codes and in a selected number of comparison zip codes. The primary objective for Part 1 was to use the data to describe the characteristics and service use patterns of enrollees in the targeted and comparison zip codes and determine if there were any differences that needed to be considered in the evaluation.

Part 2 of the evaluation study focused on obtaining and analyzing enrollment and service use data from the HMOs for the post-intervention period, spanning August 1, 2010 through July 31, 2011, covering the first year of the intervention’s operation. The primary objective of this part of the study was to determine if there were any differences in pre-post service use and cost patterns for pediatric enrollees in the Medicaid-serving HMOs, comparing enrollees in the targeted areas to enrollees in the comparison areas.

The study team, with the help of HCHA, developed an initial data request in collaboration with the participating HMOs to obtain the data to address the questions for Part 1 of the study. The HMOs selected 11 comparison zip codes that were similar to the targeted zip codes socio-economically and were thought to have similar patterns of service use. Enrollment and claims data were requested on all enrollees residing in the target and comparison ZIP codes during the 1-year pre-period. Data sharing agreements were executed, and after several meetings and much effort on the part of the data management staff at the HMOs, the required data elements were obtained by three of the five original HMOs



Map 1. Study area for after- hours primary care project

Table 2. Variable list and definitions

Variable	Definition
Member ID	Medicaid identification number
ZIP code	Resident zip code
Study arm	Intervention or comparison group
Race	Race/ethnicity
Age	Categorized as:<1 yr; 1-4 yrs; 5-9 yrs; and 10-17 yrs.
Enrollment Duration	Categorized as: 0-3 mths, 4-6mths; 7-9 mths; and 10-12 mths.
PO visit	Yes/no (includes office visits for specialty care as well as primary care)
PO visit total	Number of PO visits
PO visit cost	HMO payment for PO visits
ED visit	Yes/no
ED visit total	Number of ED visits
ED visit cost	HMO payment for ED visits
AH visit	Yes/no
AH visit total	Number of AH visits
AH visit cost	HMO payment for AH visits
Plan ID	HMO identifier

PO= physician office visits; ED=emergency department visits, and AH=after-hours clinic visits

accounting for over 80% of the covered pediatric population (i.e., HMO-1, HMO-2, and HMO-3). For Part 2 of the study, a second data request was made to the HMOs for the post-intervention period. These data again were obtained by the staff at HMO-1, HMO-2 and HMO-3 and made available to the UTSPH evaluation team.

The data were scrubbed and analyzed for completeness and accuracy. Standardized variable names and value labels were defined for the data from each plan and then merged to create one analysis file. To obtain unique observations of individuals, the data were

combined by member ID and then de-identified and given a unique matched identifier. To be included in the pre-post study, enrollees had to be born before August 1, 2010 (the start of the post-period), reside in one zip code throughout the study period, and be enrolled in the same HMO at least one month in both the pre- and post-periods (so that change in service use could be determined for each individual).

To obtain service use and cost over each of the periods, encounters and payments for physician office (PO) visits, hospital ED visits, and after-hours clinic (AH) visits were combined for each enrollee for each year. Variables were created

for the total number of pre- and post-period PO visits (CPT codes 99201-99215), hospital ED visits (CPT codes 99281-99285), and post-period AH visits (CPT code 99051). Total payments for each type of visit for each individual were summed for each period.

Enrollment and claims file variables used to describe enrollee characteristics, service use, and cost are summarized in Table 2.

To describe service use and costs at the group level, the following measures were calculated for the pre- and post-periods for each group for each service type:

- percentage of enrollees with a visit;
- average number of visits among enrollees with at least one;
- average number of visits per enrollee;
- average number of visits per member month;
- average cost of visits among enrollees with at least one;
- average cost of visits per enrollee;
- average cost of visits per member month; and, average cost per visit.

Comparisons were made between the intervention, comparison, and AH groups related to enrollee characteristics, service use, and costs. Evidence of the effects of the intervention was based on differences between the intervention and comparison groups in the percentage of enrollees with a PO or ED visit and the total number and costs of PO and ED visits per enrollee and per member month. The first measure reflects the likelihood of an individual having at least one visit in each period. The second measure sums the number of visits for all individuals in the group then divides by the number in the group or the number of member months. Pre-post changes in these measures show how the patterns of service use and cost are changing over time in each of the groups. Differences in the pre-post patterns may reflect how the intervention is affecting the intervention group.

To control for group differences, multivariate regression models were estimated to determine if ED use in the post-period (the primary outcome measure) was different between the intervention and comparison group while controlling for other factors. The first regression model estimated the odds of having an ED visit during the post-period while controlling for having an ED visit in the pre-

period, months of enrollment, the number of physician visits in the post-period, having an after-hours clinic visit, age, gender and whether the enrollee was in the intervention or comparison group. This model tested the hypothesis that enrollees in the intervention group had lower odds of an ED visit in the post-period than those in the comparison group controlling for other factors. The second regression model estimated the number of ED visits during the post-period among enrollees with at least one, controlling for the same variables as in regression model #1. The second model was used to test the hypothesis that enrollees in the intervention group with an ED visit had fewer ED visits than those in the comparison group controlling for other factors. All statistics were computed using STATA 10 (College Station, TX).

3. RESULTS

3.1 Demographic and Enrollment Characteristics

There were 114,041 enrollees in the intervention group and 42,732 in the comparison group. Among the enrollees, 3,444 visited an AH clinic one or more times. All but about 200 of these visits were enrollees that were included in the intervention group. Fig. 1 shows the race/ethnicity characteristics of enrollees in each group. Overall, 77% of the intervention group, 51% of the comparison group, and 84% of the after-hours user group were Hispanic. The percent African-American ranged from 6% in the AH group, 12% in the intervention group to 34% in the comparison group. The groups were similar with respect to the percent non-Hispanic white, Asian/other and unknown.

The intervention group tended to be slightly younger than the comparison group (Fig. 2). The mean age was about eight years for the intervention and comparison groups. The AH group tended to be younger than the intervention and comparison groups with a mean age of seven.

The number of months of enrollment was similar across the groups and increased somewhat from the pre- to post-period (Fig. 3). During the pre-period, the proportion of enrollees with 10-12 months of enrollment ranged from 59-64%. The proportion of enrollees who fell into this category in the post-period was 70-88%.

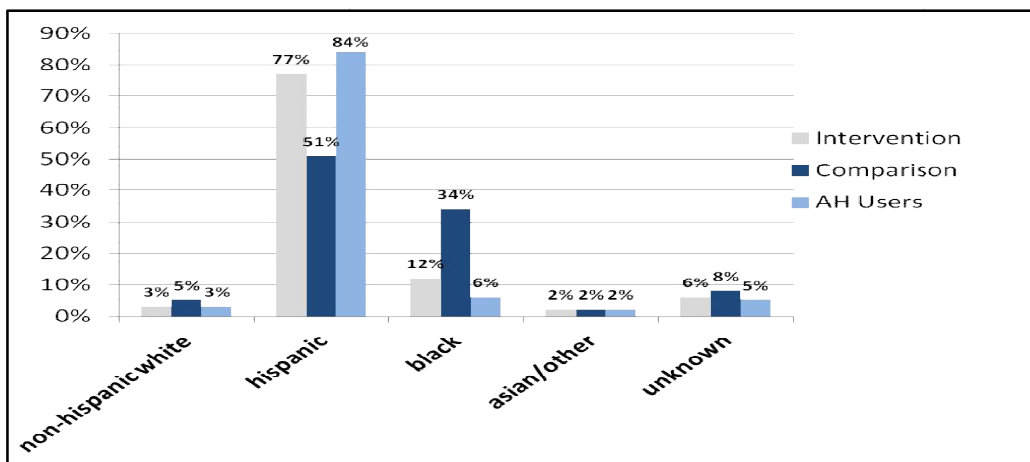


Fig. 1. Enrollee race /ethnicity by study group

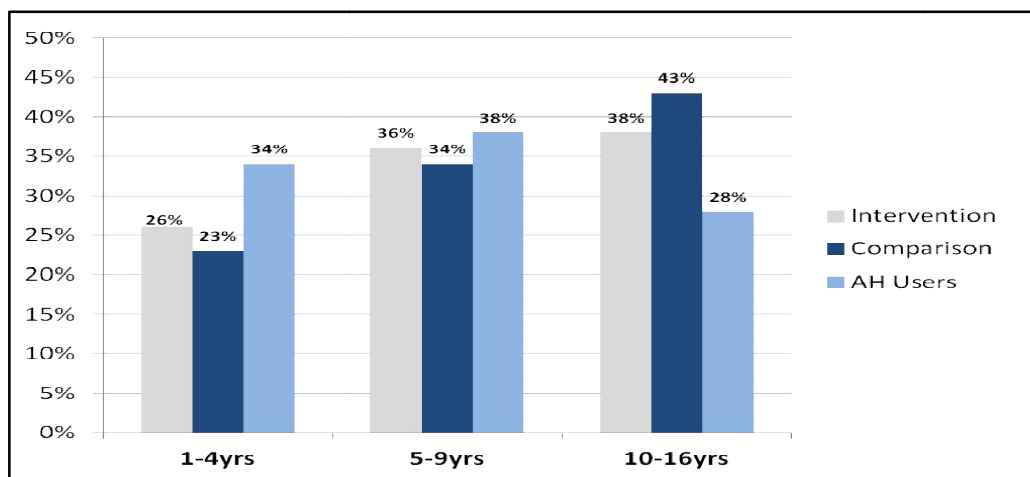


Fig. 2. Enrollee age by study group

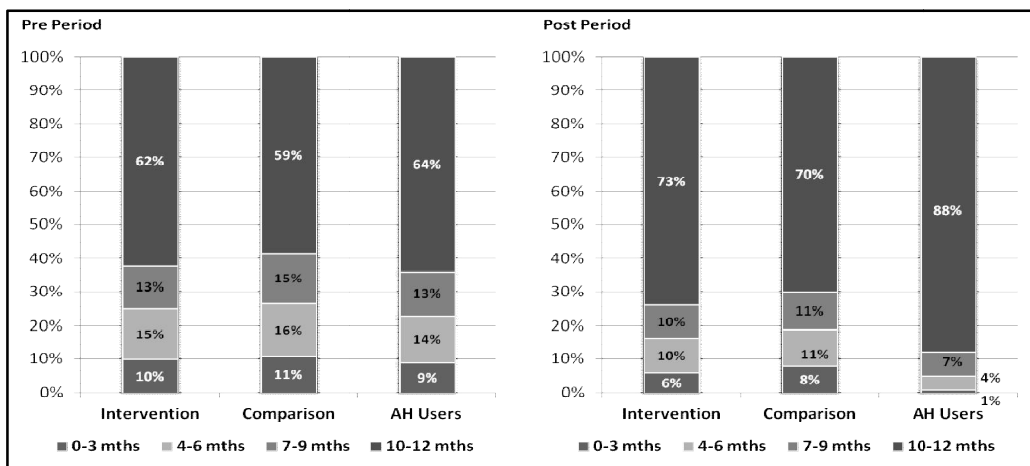


Fig. 3. Enrollee months of enrollment during pre- and post-period by study group

3.2 Pre-post Patterns of Service Use

The likelihood of having PO visits increased and the likelihood of having ED visits decreased for the intervention group versus the comparison group. Fifty-eight percent of enrollees in the intervention group had at least one PO visit only during the pre-period increasing to 62% during the post-period (Fig. 4). In the comparison group, the percentage with at least one PO visit decreased from 50% during the pre-period to 43% in the post-period. Seventy-five percent of clinic users had at least one PO visit during the post-period, up from 66% in the pre-period. The proportion of enrollees with ED visits only remained consistent across both time periods for both the intervention and comparison groups (2% vs. 4%, respectively), while declining from 2% to 0% for AH users. However, the proportion of enrollees with PO and ED visits in the intervention group decreased five percentage

points in the post-period, from 15% to 10%, while remaining stable at 14% in the comparison group. The percentage of AH clinic users with PO and ED visits rose from 18% to 23% (Fig. 4).

There were no major differences among the groups in the pattern of PO and ED visits among those with use. During the pre-period, the intervention group with at least one ED visit had an average of 2.6 ED visits versus 2.8 in the comparison group and 2.7 in the AH user group (Fig. 5). The post-period average number of visits among those with a visit changed very little for all three groups. Those in the intervention group with at least one PO visit had an average of 4.1 visits in the pre-period versus 3.6 in the comparison group and 5.8 in the user group (Fig. 6). Those figures declined to 4.0 for the intervention group, stayed the same for the comparison group, and rose to 6.4 for the AH user group.

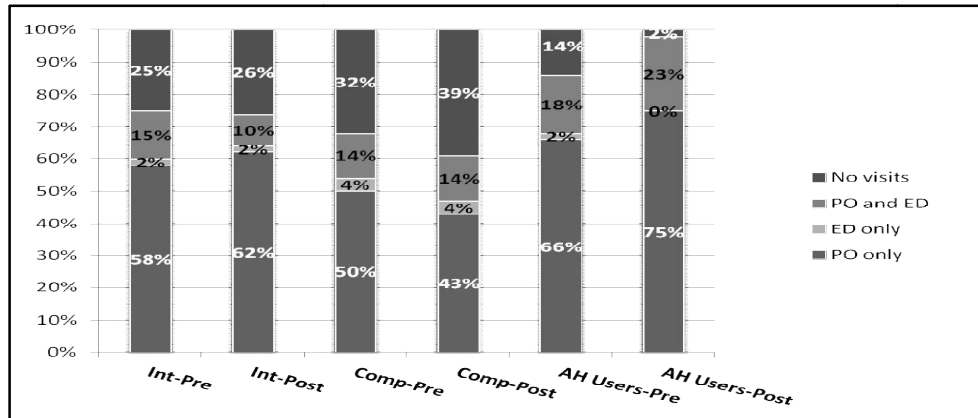


Fig. 4. Percentage of enrollees with and without healthcare visits in the pre- and post-period by study group

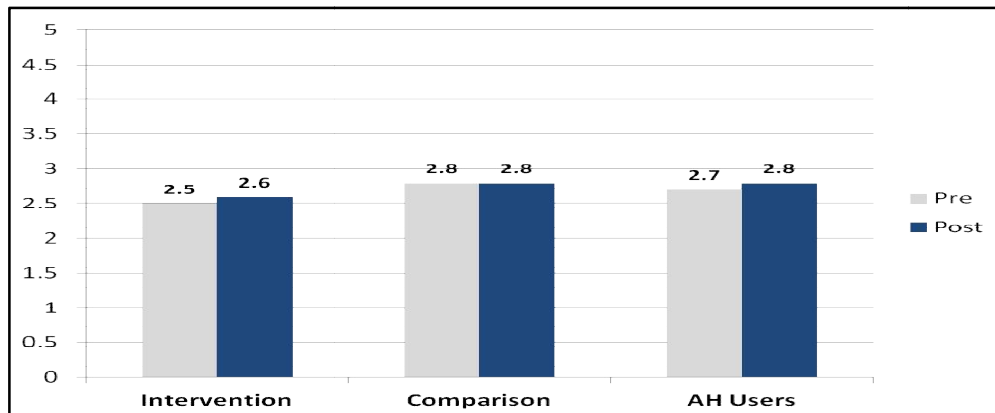


Fig. 5. Average number of ED visits per enrollee with a visit in the pre- and post-period by study group

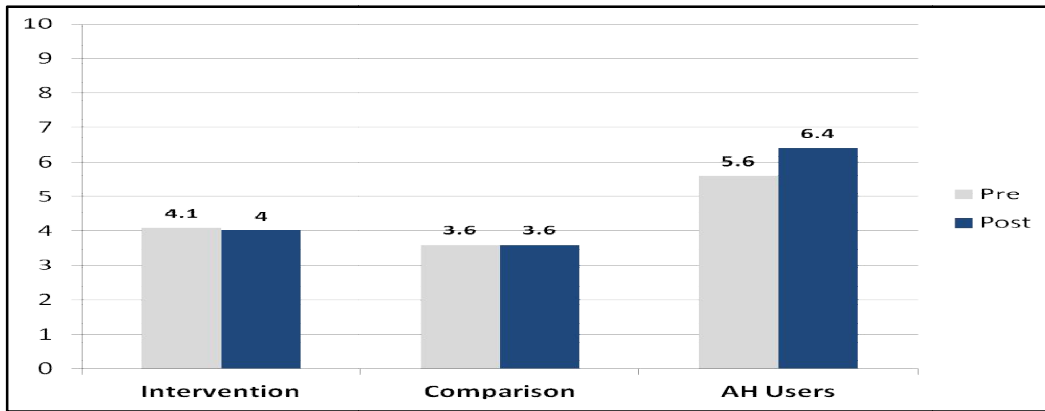


Fig. 6. Average number of PO visits per enrollee with a visit in the pre- and post-period by study group

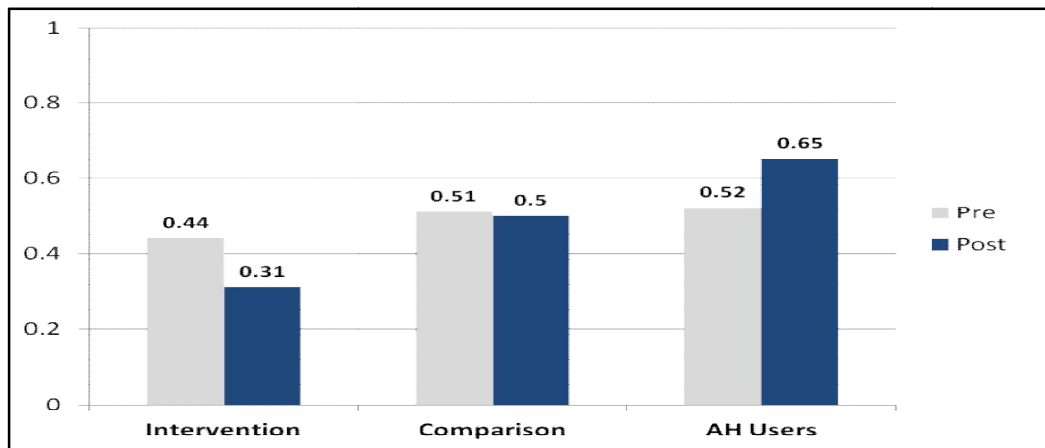


Fig. 7. Average number of ED visits per enrollee in the pre- and post-period by study group

The pre-post patterns in visits per enrollee and per member month were about the same between the groups in PO visits, but ED visits declined more for the intervention group versus the comparison group. The average number of ED visits per enrollee decreased from .44 (a rate of 44 per 100) to .31 (a rate of 31 per 100) in the intervention group, while decreasing only slightly from .51 to .50 visits in the comparison group, and rising from .52 to .65 for the AH user group (Fig. 7). The average number PO visits per enrollee declined slightly in the intervention and comparison groups from 3 to 2.9 and from 2.3 to 2.0, respectively, while rising among AH clinic users from 4.8 to 6.2 (Fig. 8). On a per member month basis the intervention group had a larger pre-post decrease in ED visits (.05 to .03) compared to the comparison (.06 to .05) and AH user groups (.06 to .05) (Fig. 9). The intervention group also experienced a larger increase in PO

visits per member month compared to the other two groups (Fig. 10).

3.3 Pre-post Changes in Service Costs

The differences in service costs between the groups reflect the differences in service use. Average ED visit costs per enrollee went up slightly less among enrollees in the intervention group compared to the other two groups (Fig. 11). Changes in PO visit costs per enrollee were about the same for the intervention and comparison groups, while rising for the AH user group (Fig. 12). PO visit costs per member month declined more in the intervention group than in the other two groups (Fig. 13). As shown in Fig. 14 ED visit costs per member month declined for the intervention group while staying the same or rising for the other groups.

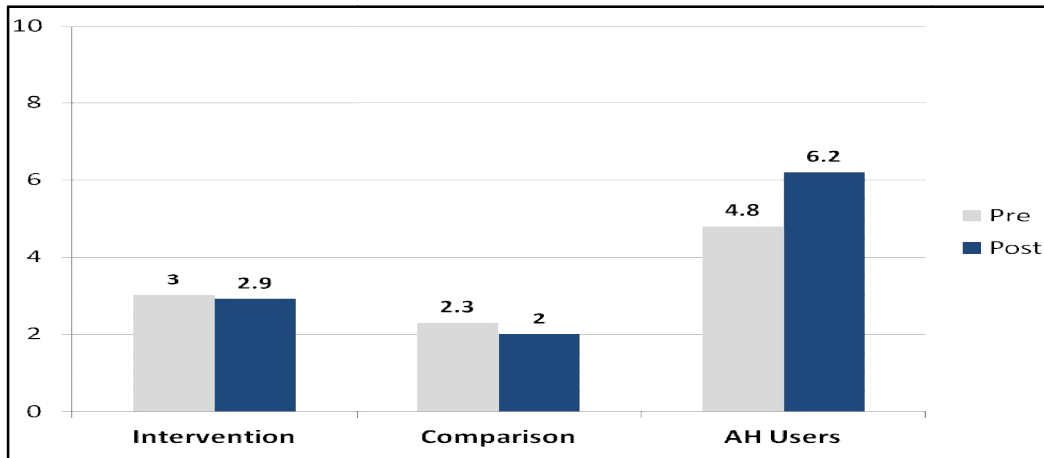


Fig. 8. Average number of PO visits per enrollee in the pre- and post-period by study group

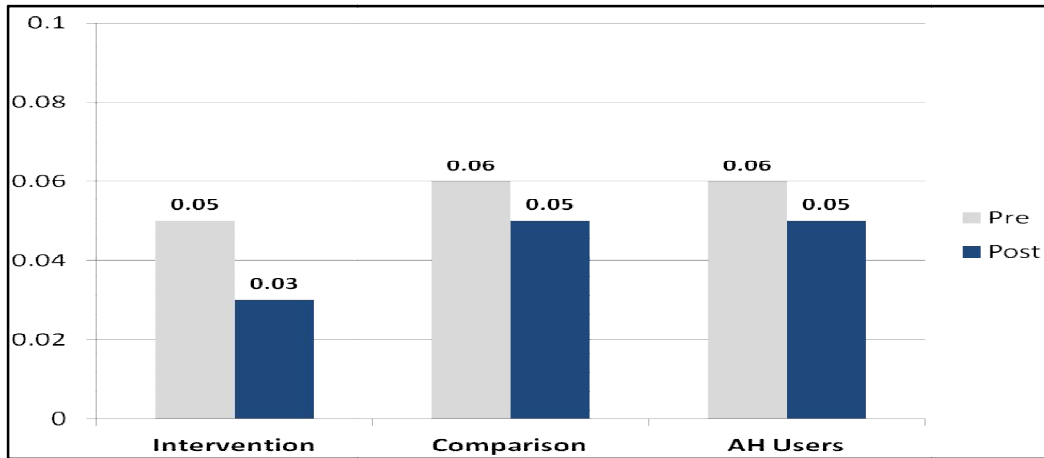


Fig. 9. Average number of ED visits per member month in the pre- and post-period by study group

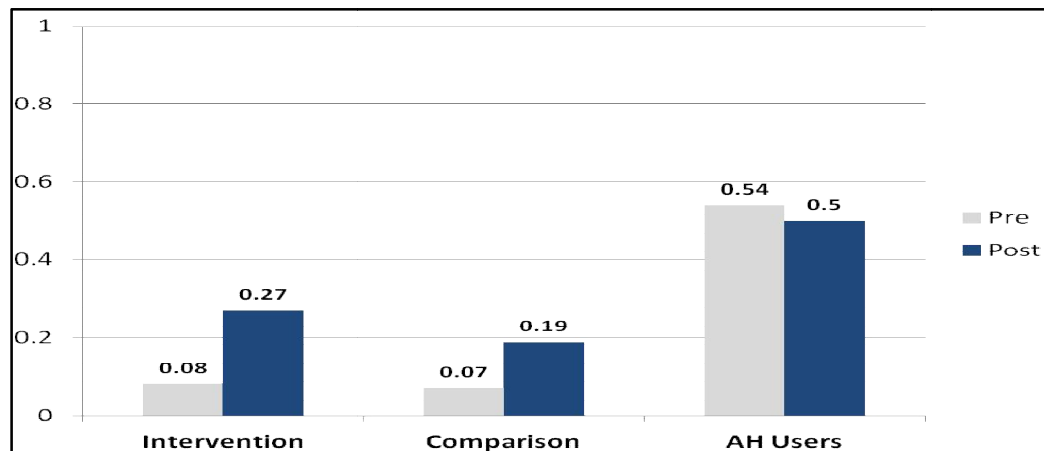


Fig. 10. Average number of PO visits per member month in the pre- and post-period by study group

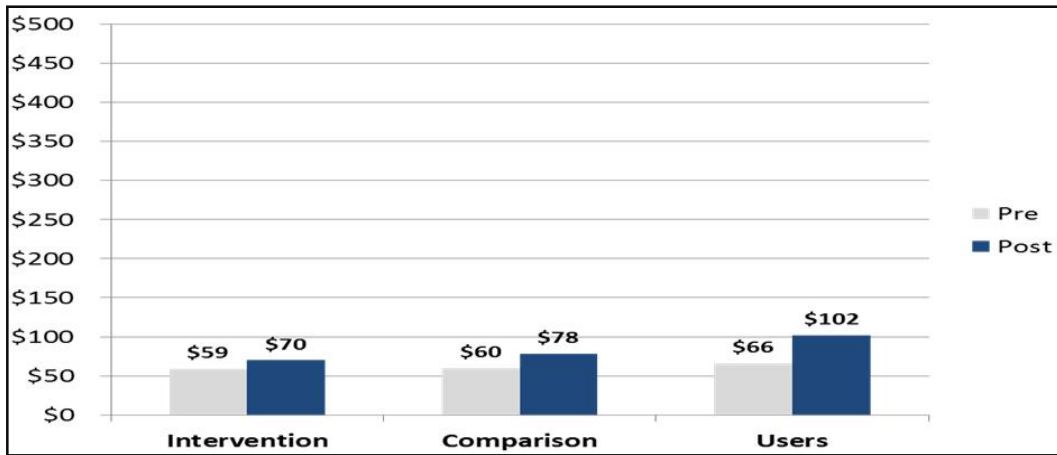


Fig. 11. Average cost of ED visits per enrollee in the pre- and post-period by study group

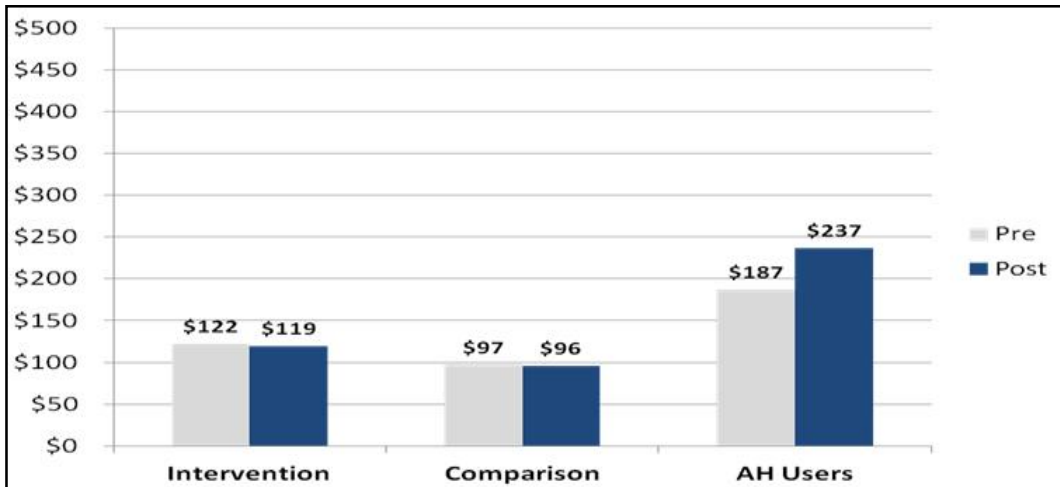


Fig. 12. Average cost of PO visits per enrollee in the pre- and post-period by study group

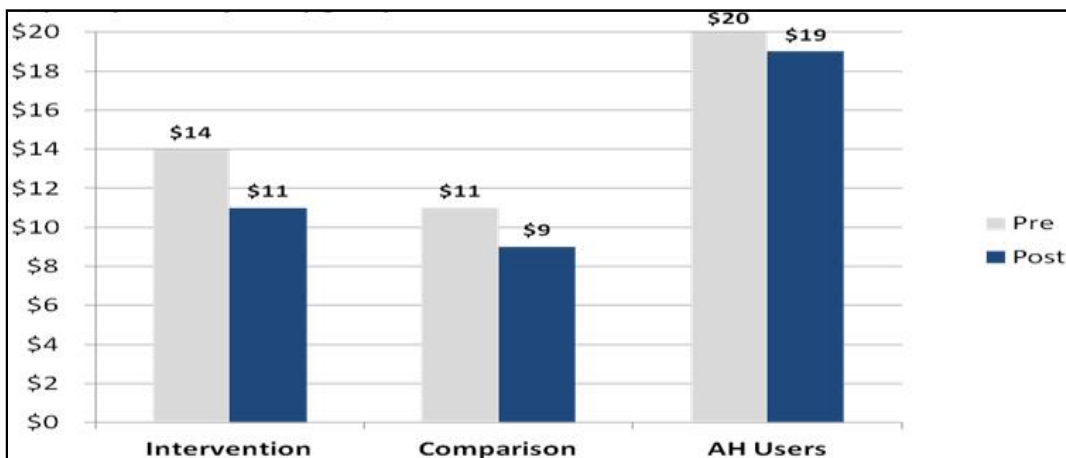


Fig. 13. Average cost of PO visits per member month in the pre- and post-period by study group

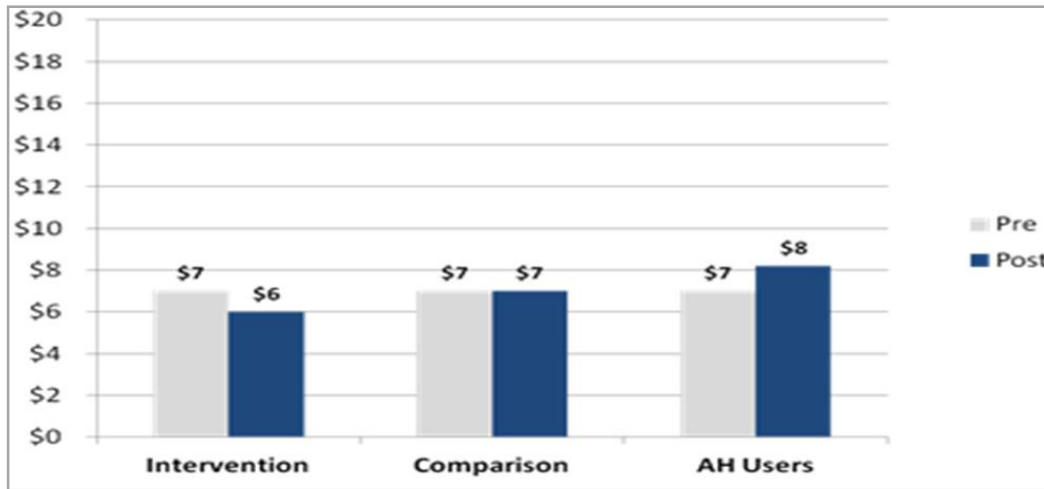


Fig. 14. Average cost of ED visits per member month in the pre- and post-period by study group

3.4 Regression Results

Table 3 shows the adjusted odds ratios of having an ED visit during the post-period was 47% (1 - 0.53) less for the intervention group relative to the comparison group while controlling for pre-period ED visits, duration of enrollment, number of PO visits in the post-period, any AH visits, age, and gender. Other factors significantly contributing to the likelihood of a post-period ED visit were having a pre-period visit, duration of enrollment, the number of post-period PO visit, and having an AH visit. Age was inversely related to having an ED visit and females were less likely than males to have an ED visit.

The number of ED visits among those with one visit during the post-period decreased by 0.13 for enrollees in the intervention group relative to enrollees in the comparison group controlling for

other factors (Table 4). Having an ED visit in the pre-period had a significant positive association with the number of ED visits in the post-period as did the number of post-period PO visits. None of the other variables in Model 2 had a significant relationship with the number of ED visits.

4. DISCUSSION

This study presents evidence that the After-Hours Pediatric Primary Care project, through its provision of extended hours of primary care related series likely had a favourable impact the on reducing the use of ED services among pediatric Medicaid enrollees. This finding is supported by a relatively larger decline in the percentage of enrollees with an ED visit, the rate of ED visits per enrollee, and the rate per member month in the intervention group versus

Table 3. Regression Model 1 of likelihood of an ED visit during post-period

		Regression results			
Variables\Description		OR	P value	95% CI	
Any pre-period ED visit		2.27	0.00	2.20	2.35
Total enrollment months					
7-12 mths		1.73	0.00	1.51	1.99
13-18 mths		2.62	0.00	2.29	2.99
19+mths		2.55	0.00	2.23	2.91
Number of post-period PO Visit		1.11	0.00	1.11	1.12
Any AH Visit		1.24	0.00	1.13	1.36
Age		0.97	0.00	0.97	0.97
Gender		0.88	0.00	0.86	0.91
Study Group		0.53	0.00	0.51	0.54
Constant		0.07	0.00	0.06	0.09

Table 4. Regression model 2 of number of ED visits for those with a visit during post-period

Variables	Description	Coef.	P value	95% C I	
Any pre-period ED visit		0.07	0.00	0.06	0.07
Total enrollment months		-0.00	0.73	-0.00	0.00
Number of post-period PO Visit		0.01	0.00	0.01	0.01
Any AH Visit		-0.07	0.06	-0.15	0.00
Age		0.00	0.07	0.00	0.00
Gender		-0.02	0.31	-0.04	0.01
Study Group		-0.13	0.00	-0.16	-0.09
Constant		2.12	0.00	2.04	2.19

the comparison group. Similar findings were seen in another study done over a period of 12 years by Wang and colleagues published in 2004 [11]. In addition, the regression results indicate being in the intervention group lowered the odds of having an ED visit by almost half, controlling for other factors, and was also associated with a 0.13 lower number of ED visits among those with a visit. Finally, ED visit costs per enrollee rose by about 19% in the intervention group (despite the reduction in the percentage with a visit and the number of visits) while in the comparison group per enrollee costs rose by 30%. ED costs on a per member month basis declined by about 14% in the intervention group while the comparison group member month costs stayed the same.

The findings for PO use patterns and costs are more mixed. The percentage of enrollees with a PO visit rose somewhat for enrollees in the intervention group while declining for the comparison group. However, the changes in PO visits per enrollee and per member month were similar between the two groups. The number of PO visits declined slightly on a per enrollee basis and rose slightly on per member month basis for both groups. Thus, there is inconsistent support for the expectation that the intervention is increasing the use of primary care. Similarly, the findings for PO visit costs are also somewhat mixed. The average costs for PO visits changed very little for both groups. The average cost for PO visits per member month declined by about 20% in both groups.

It is interesting to note that by most measures AH users had higher rates of service use and higher costs than the other two groups, and according to the first regression model, individuals with AH use had a greater likelihood of having an ED visit than those without an AH visit. This may seem counterintuitive given the expectation that the AH clinics would serve as a substitute for the hospital ED. The higher use reflects the fact that

this group was defined by being service users. Thus, they are more likely to be sick compared to the general population of enrollees, most of whom used no services throughout the year. The use of the AH clinic may actually be a substitute for the ED for many children in this group, but given their greater overall service needs, the service use and costs of AH users is the same or higher on all measures.

These findings are consistent with the results found in other studies. Morgan and colleagues [12] reported on a systematic review of 39 non-ED interventions to reduce ED utilization, noting that 10 of the 39 studies reported upon interventions similar to the After-Hours Pediatric Primary Care project described above which sought to add non-ED capacity as a means of shifting primary care treatable conditions to lower cost/lower intensity settings. Of note, Morgan and colleagues found mixed results with several studies showing decreases ranging from 9 to 54% while one study actually found an increase in ED use of 21%.

While this project was done several years ago, its impact has been far-reaching and one of the sponsoring organizations has continued this and other initiatives to reduce unnecessary ED use while at the same time shifting needed primary care treatable conditions to lower cost/lower intensity settings as noted in a recent 2017 publication highlighting this continued focus: "Over the last few years, we invested in community care...We specifically looked for sites where our data showed families had few, if any options for a medical home. Providers working in these settings are meeting a primary care need that should offset the default to seeking emergency care" [13].

5. LIMITATIONS

Implementation and evaluation of this FQHC-HMO intervention had several limitations. The

intervention involved a single strategy of providing additional after-hours care and was short-term being only one-year in duration. However, the intervention group did see a relatively larger decline in the percentage of enrollees with an ED visit, the rate of ED visits per enrollee, and the rate per member month in the intervention group versus the comparison group. Additionally, regression results indicate being in the intervention group lowered the odds of having an ED visit by almost half, controlling for other factors, and was also associated with a 0.13 lower number of ED visits among those with a visit. Of course, the effect on the PO was more mixed and not as robust. Voluntary after-hours clinics are one strategy to expand access, but these might not be as effective as providing additional care coordination as evaluated by Soril and colleagues [14] or other more onerous ED diversion projects increasingly proposed by political leaders interested in cost-cutting which include charging patients for routine care delivered in the ED or requiring prior authorization for referral to EDs for conditions other than the most obvious life-threatening situations because patients needing care when the FQHC was closed would still have the option to go to the ED.

Clearly, future projects would benefit from a longer intervention and evaluation time horizon and increased attention on standardized data collection at the community level at the outset. In addition, a more robust study design is warranted that ought to include other equally important aspects of a pediatric ED utilization reduction project such as the business impact on clinics and measuring of patients' and families' experience in order to allow investigators to arrive at a more definitive conclusion.

6. CONCLUSION

In summary, the evidence presented here suggests that patterns of ED care and ED cost of Medicaid enrollees after the first year of implementation of the After Hours Primary Care project were impacted. These results are encouraging for the After-Hours Primary Care strategy as a way to lower rates of ED use and costs in the Medicaid/CHIP population in the Houston/Harris County area.

CONSENT

It is not applicable.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Institutional Review Board (IRB) at the University of Texas has been collected and preserved by the authors.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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