

Effect of Patient-Centered Medical Home on Preventive Services for Adolescents and Young Adults

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abstract

OBJECTIVE: To determine the association between enrollment in patient-centered medical homes (PCMHs) and the receipt of preventive services among adolescents and young adults.

METHODS: Retrospective cohort study including patients of Hennepin County aged 10 to 24 who had face-to-face or telephone encounters with health care providers between 2010 and 2014 at clinics with PCMHs at the Hennepin County Medical Center, Minnesota. Exposure was enrollment in PCMHs. Outcomes were receipt of (1) preventive visits; (2) prescriptions for influenza, meningococcal, and human papillomavirus vaccinations; (3) screening for sexually transmitted infections; (4) prescription of any contraceptive and long-acting reversible contraceptives; and (5) cervical cancer screening. Generalized mixed effect models in a propensity-score-matched sample were used for data analysis.

RESULTS: Overall, 21 704 patients were included. Most patients were female, US-born, Hispanic/Latino, with an average age of 20.8 years. Patients enrolled in PCMH ($n = 729$) were more likely to be Latino, students, and have health insurance ($P < .001$). Adjusted odds ratios (99% confidence intervals) comparing the receipt of preventive services of patients enrolled in PCMHs to youth who did not receive these services were as follows: (1) preventive visits 1.10 (0.93–1.29); (2) influenza 0.89 (0.74–1.07), meningococcal 1.53 (1.30–1.80), and human papillomavirus vaccinations 1.53 (1.28–1.84); (3) screening for sexually transmitted infections 1.69 (1.28–2.24); (4) prescription of any type of contraception 2.18 (1.56–3.03) and long-acting reversible contraceptives 2.66 (1.89–3.74); and (5) cervical cancer screening 1.14 (0.87–1.48).

CONCLUSIONS: Overall, patients enrolled in PCMHs had higher odds of receiving multiple preventive services.



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Dr Garcia-Huidobro conceptualized and designed the study, contributed to the acquisition of the data, analyzed and interpreted the findings, and drafted the initial manuscript; Dr Shippee supervised the data analyses, drafted parts of the manuscript, and critically reviewed and revised the manuscript; Dr Joseph-DiCaprio and Mrs O'Brien contributed to the interpretation of the findings and critically reviewed the manuscript; Dr Svetaz conceptualized and designed the study, contributed to the acquisition of the data and interpretation of the findings, and critically reviewed the manuscript; and all authors approved the final manuscript as submitted.

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WHAT'S KNOWN ON THIS SUBJECT: Not all adolescents and young adults receive recommended preventive services. Patient-centered medical homes aim to improve outcomes and experience and reduce costs. Adolescents and young adults receiving these services have achieved higher rates of preventive visits and immunizations.

WHAT THIS STUDY ADDS: Adolescent and young adults enrolled in patient-centered medical homes are more likely to receive multiple preventive services including immunizations, screening for sexually transmitted infections, and contraception. Young adult, foreign-born, nonstudent, and insured patients benefited most consistently from these services.

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One in 5 people in the United States is an adolescent or young adult.¹ Behavioral patterns established in these years contribute to youths' current and future health status.² Because most adolescent morbidity is preventable, delivering preventive services is critical.

As summarized by Ozer and collaborators,³ high-quality preventive care for adolescents and young adults should encompass multiple areas, including physical growth and development, emotional and relational well-being, social and academic competence, sexuality and reproductive health, substance use and risk reduction, age-appropriate immunizations, and strategies to minimize preventable injuries. However, only 38% to 81% of adolescents, and even fewer young adults, received a preventive checkup in the previous 12 months.^{4,5} In addition, male, ethnic minority, low-income, and uninsured youth have lower rates of preventive services.⁴⁻¹⁴

The patient-centered medical home (PCMH), one of the most widespread approaches to health care delivery transformation, emphasizes improved access and continuity of care via primary care provider (PCP)-led teams. This system of care was developed as a strategy to achieve the Triple Aim: improve outcomes and experience and reduce costs.¹⁵ So far, PCMHs have been shown to reduce acute care use and improve health care outcomes in children.¹⁶⁻¹⁸ However, there is little evidence of their effects on preventive care services for adolescents and young adults.¹⁹ The aim of this study is to evaluate the effect of PCMH enrollment on receipt of multiple preventive services among youth aged 10 to 24. In addition, we explored whether the effects of PCMH enrollment differed by sociodemographic characteristics.

METHODS

Study Design

We conducted a retrospective cohort study with patients aged 10 to 24 who were enrolled in the ambulatory clinics of Hennepin County Medical Center (HCMC) that have PCMHs that deliver services for adolescents and young adults between 2010 and 2014 ($n = 28\,649$). Patients were excluded if they did not have any face-to-face or telephone encounters with health care providers ($n = 3291$, 11.5%), were not residents of Hennepin County ($n = 5097$, 17.8%), and if they did not release their clinical information for research ($n = 87$, 0.3%). The study's protocol was approved by the Human Subjects Research Office of the Minneapolis Medical Research Foundation.

Setting

HCMC is a safety net hospital and large ambulatory clinic system in Minnesota, providing care for low-income, uninsured, and vulnerable persons.²⁰ In 2015, >500 000 patients were served, of whom >70 000 (25%) did not have health insurance. In addition, whereas 86% of the entire state of Minnesota and 76% of Hennepin County residents are white,²¹ HCMC patients are 35% white, 32% African American/black, 19% Hispanic/Latino, and 12% other racial/ethnic status.

Exposure

The independent variable was PCMH enrollment. In the HCMC network, there are 14 primary care clinics with certified Health Care Homes (HCHs).²² In Minnesota, HCHs are PCMHs that are certified by the state based on clinic eligibility and 5 standards: (1) access/communication, (2) patient tracking and registry functions, (3) care coordination, (4) care plans, and (5) performance reporting and quality improvement.²³ These HCH certification standards are at a level 3 of the National Committee for

Quality Assurance recognition status (Minnesota Department of Health, unpublished data, 2016), which is the highest PCMH certification status.

Of the 14 HCMC HCHs, 9 provide care for adolescents and/or young adults. Other HCHs do not have young patients in their panel. Although each of those HCHs serves a different patient population based on its target population or location (eg, 1 HCH is focused on Latinos, and others are located in areas with high concentrations of patients from specific ethnicities), all focus their services in providing comprehensive care management to patients with high risk of future medical use. Eligibility for HCH services is determined according to health service utilization, number and type of chronic conditions, and sociodemographic characteristics. Most HCHs serving youth have care coordinators who use standard intake, monitoring, and follow-up protocols. Not all HCHs have the same resources (eg, some have a community health worker, social worker, nurse coordinator, school navigator, or parent educator) or practice the same intensity of care (eg, 1 HCH works with a single PCP, and other HCHs work with multiple PCPs; some HCHs have biweekly or monthly panel management meetings, but others do not have this practice). One HCH is focused on positive youth development and delivers adolescent-friendly services,²⁴ and another HCH has implemented certain components of adolescent-friendly care. Patients were considered exposed to the PCMH services if they were enrolled in any of the HCHs serving adolescents and/or young adults between 2010 and 2014.

Outcomes

Outcomes of this study are receiving (1) preventive health care visits; (2) influenza, meningococcal, and human papillomavirus (HPV)

vaccinations; (3) screening for sexually transmitted infections (STIs); (4) prescription for any artificial contraceptive method and long-acting reversible contraceptives (LARCs); and (5) screening for cervical cancer if the patient was 21 years or older. Because STI screening is recommended for sexually active women under 25 and high-risk males,³ this outcome included both men and women because Hennepin County has the highest rate of *Chlamydia trachomatis* infections in Minnesota.²⁵

Age (at January 1, 2015) was a continuous variable except when conducting stratified analyses, when it was categorized as 10 to 18 and 19 to 24. Race was patient-reported, and coded as Hispanic/Latino, non-Hispanic black (African American or African), and other (all patients from racial groups with <10% in any group). Other covariates included being US-born (versus foreign-born), primary language (English or other), marital status (single or other), employment (student or other including full- or part-time workers, self-employed, unemployed, and others), and health insurance status. Because few PCMH patients had private insurance, this variable was categorized into insured and uninsured.

Data Extraction

All data were extracted from patients' electronic medical records. For each calendar year between January 1, 2010, and December 31, 2014, all eligible patients were classified as either receiving or not receiving each preventive service. Information on preventive visits was extracted by using the *International Classification of Disease, Ninth Edition* codes V.20.2 and V.70.0. Vaccinations included influenza (each year's annual flu vaccine); meningococcal (meningococcal polysaccharide vaccine [MPSV4] or any quadrivalent meningococcal conjugate [MCV4,

MenACWY-D, and –CRM]); and HPV (at least 1 dose of bi-, tetra-, or nano-valent HPV vaccines). Patients were counted as receiving STI screening if providers ordered a urine sample to detect *C trachomatis*. Youth were classified as receiving contraceptive medications if they were prescribed any type of hormonal contraceptive (pills, patches, rings, or implants) or intrauterine device. LARCs included implants and intrauterine devices. Patients aged 21 or older were classified as receiving cervical cancer screening if providers ordered a Papanicolaou test or HPV DNA amplification test.

Statistical Analysis

Proportions and means (\pm SD) were calculated to describe patients and the clinical services they received. Demographic characteristics of patients enrolled in PCMHs were compared with patients not enrolled in these programs by using χ^2 and *t* tests for categorical and continuous outcomes, respectively.

The effects of PCMH enrollment status on the receipt of each preventive service were estimated by using mixed-effect logistic regressions. Two levels were considered in all analyses, where times of follow-up (2010–2014) were nested within patients. Unadjusted and adjusted odds ratios and 99% confidence intervals were calculated for each outcome. Unadjusted models did not include covariates, and adjusted models used propensity score matching to adjust for potential selection bias due to different probabilities of enrollment in PCMHs. The propensity score was estimated after regressing PCMH enrollment status on all covariates.²⁶ Propensity scores ranged between 0.002 and 0.794, and patients enrolled in PCMHs were matched to patients not receiving these services based on the propensity score within a 0.1 caliper. Analyses evaluating contraceptive prescriptions and cervical cancer

screening were limited to female patients, with cervical cancer screening analysis further restricted to patients 21 years or older.

To explore whether the effect of PCMHs on preventive services differed by demographic characteristics, we also tested interaction terms between PCMH enrollment status and demographic characteristics 1 at a time, by using propensity score matched mixed-effect logistic regression models. For interactions with *P* values <.01, we conducted stratified (subgroup) analyses for the different categories of each variable (eg, full models run separately for male and female patients), estimating adjusted odds ratios and 99% confidence intervals for the effect of PCMH in each group.

To determine the robustness of findings, we also conducted 2 sets of sensitivity analyses: first by using regression adjustment and the second by using 1:1 matching on all demographic characteristics. All analyses were conducted using Stata 14 (StataCorp, College Station, TX), and resulting *P* values <.01 were considered statistically significant.

RESULTS

Patients

A total of 21 704 HCMC patients aged 10 to 24 were included in this study. Of them, 729 were enrolled in the 9 PCMHs serving adolescents and young adults at HCMC network (3.4%). Table 1 summarizes demographic characteristics of patients according to PCMH enrollment status. Most patients were female (55.7%), US born (68.8%), Latino (42.9%) or African American (32.4%), with an average age of 20.8 years and with public (47.6%) or no health insurance (41.8%). We observed demographic heterogeneity in patients enrolled in the different PCMHs according to age, gender, race/ethnicity,

employment, and health insurance status. On average, PCMH patients were younger, more likely to be Latino or African American, and more likely to have public health insurance, compared with non-PCMH patients. Propensity score matching allowed successful balance between groups (Supplemental Table 4).

Effect of PCMH Status on Receipt of Preventive Services

Overall, youth patients enrolled in PCMHs were more likely to receive most preventive services compared with patients not enrolled in these programs (Fig 1). As we observed heterogeneity in PCMH patient composition, we also noticed variability in the outcomes achieved according to the PCMH in which patients were enrolled. After controlling for demographic differences between groups, the effect of PCMHs on most outcomes remained significant (Fig 2).

Results by Patient Demographics

Table 2 presents adjusted odd ratios of the effect of PCMHs on outcomes in demographic subgroup analyses, shown for all combinations that had significant interaction terms in overall models. Gender only

TABLE 1 Sociodemographic Characteristics of Patients Enrolled and Not Enrolled in PCMHs

	Enrolled in PCMHs (n = 729)	Not Enrolled in PCMHs (n = 20975)	P
Gender, female	434 (59.5)	11658 (55.6)	.035
Age, y, mean (SD)	19.0 (5.0)	20.8 (5.2)	<.001
Race			<.001
Hispanic/Latino	467 (64.1)	8862 (42.3)	
Non-Hispanic black	189 (25.9)	6841 (32.6)	
Non-Hispanic white	29 (4.0)	3185 (15.2)	
Other	44 (6.0)	2087 (10.0)	
Country of birth, US	471 (64.6)	14463 (68.8)	.108
Primary language, English	377 (51.7)	14381 (68.6)	<.001
Marital status, single	695 (95.3)	19265 (91.9)	.001
Employment status, student	405 (55.6)	9741 (46.4)	<.001
Health insurance status, insured			<.001
Public insurance	422 (57.9)	9904 (47.2)	
Private insurance	25 (3.4)	2274 (10.8)	
No insurance	282 (38.7)	8797 (41.9)	

Values are n (%), unless otherwise noted.

had a significant interaction for meningococcal vaccinations. Among females, PCMH enrollees were more likely to receive meningococcal vaccinations than non-PCMH enrollees, but PCMH had no effects among males. Among adolescents, PCMH enrollees had lower odds of preventive visits and flu shots but higher odds STI screening and contraception prescriptions. For young adults, PCMH enrollment (versus nonenrollment) meant higher odds of almost all preventive services. Hispanic/Latino PCMH

enrollees had higher odds of preventive visits, but lower odds of flu shots, versus non-PCMH patients; however, PCMH showed no significant effects for other racial/ethnic groups. Among those who were foreign born, PCMH enrollees had higher odds than non-PCMH patients for receiving most services, but PCMH had no significant effects for US-born patients. Among students, PCMH enrollees had lower odds of preventive visits and immunizations, but among nonstudents, PCMH enrollees were

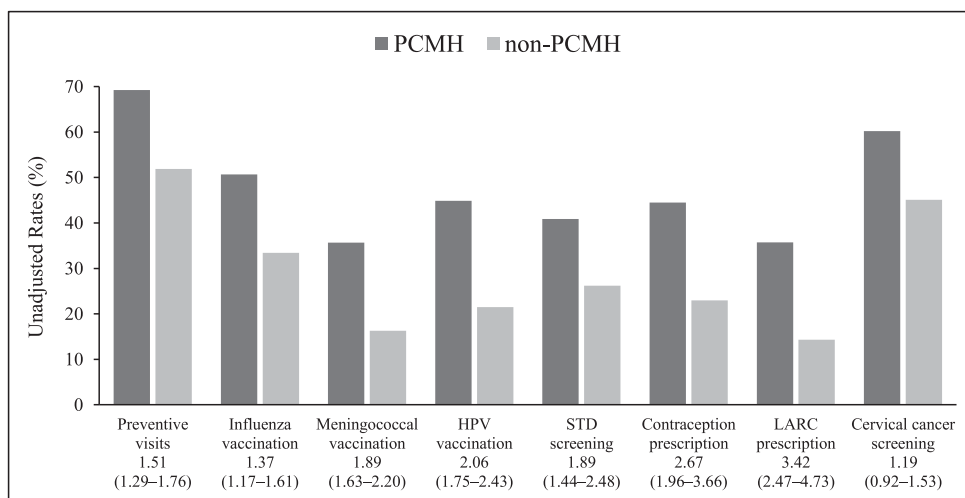


FIGURE 1

Unadjusted rates, odds ratios, and 99% confidence intervals comparing the receipt of preventive services between 2010 and 2014 among patients enrolled and not enrolled in PCMHs. Analyses evaluating contraceptive prescriptions and cervical cancer screening were conducted only among female patients. The analysis of cervical cancer screening was also restricted to patients 21 years or older.

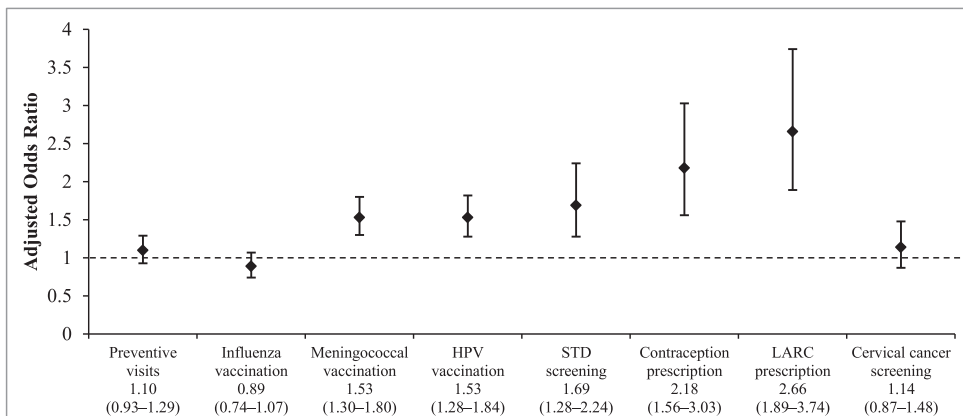


FIGURE 2

Adjusted odds ratios and 99% confidence intervals comparing the receipt of preventive services among patients enrolled and not enrolled in PCMHs. Analyses evaluating contraceptive prescriptions and cervical cancer screening were conducted only among female patients. The analysis of cervical cancer screening was also restricted to patients aged 21 years or older. Mixed effects logistic regression models used propensity score matching.

more likely to receive preventive visits and flu, meningococcal, and HPV vaccinations. Finally, insured patients in PCMHs had higher odds of most preventive services, whereas PCMH benefits for uninsured patients were limited to meningococcal vaccination and contraception and LARC prescriptions. There were no significant interactions between PCMH enrollment and sociodemographics on cervical cancer screening.

Sensitivity Analyses

Results using propensity score matching, regression adjustment, and 1:1 matching were similar (Table 3). Propensity score matching tended to estimate more conservative effect estimates than the regression adjustment and 1:1 matching.

DISCUSSION

In this study, we identified that patients enrolled in PCMHs had greater overall likelihood of receiving preventive care compared with adolescents and young adults not receiving these services. In addition, we found dissimilar effects according to the patient's sociodemographics.

Our findings support the usefulness of PCMHs as a health care strategy

to increase the receipt of multiple preventive services in a health system that provides care to adolescents and young adults at risk for preventive care disparities.⁴⁻¹⁴

Overall, patients enrolled in PCMHs were more likely to be Hispanic/Latino and speak a language other than English, compared with patients not receiving these services. This means HCMC is giving access to comprehensive health care management services to patients who have been less likely to enroll in PCMHs.¹⁹ An example of these efforts is the *Aqui Para Ti* (Here For You) HCH,²⁴ which is focused on the healthy youth development of Latino patients and contributed a large proportion of PCMH patients to this study. Second, although the rates of preventive services in this population were lower than in previous studies,⁴⁻¹³ we observed that patients enrolled in PCMHs were more likely to receive preventive care after matching them on their likelihood of PCMH enrollment. Because vulnerable youth have greater mental, sexual, behavioral, and physical health risks,^{27,28} they have a greater need for preventive health services but also have lower chances of receiving them.⁴⁻¹⁴ PCMHs may offer particular benefit to underserved youth, even though

getting access to this model of care remains a problem in this age group; only ~3% of the adolescents and young adults receiving care at HCMC received PCMH services.

Our results from interactions and subgroup analyses indicate that some patients receive most benefit from PCMHs. Such findings suggest multiple explanations: first, young adults, foreign-born, nonstudents, and insured patients are most in need of services and derive the most direct benefit; second, youth in these groups respond most favorably with the delivery of health care provided in these settings; and third, PCMHs focused on specific populations are more effective than others (eg, HCH targeting healthy youth versus HCHs including patients with chronic conditions). In the first case, PCMHs are simply a response to particular needs. In the latter, certain patient groups either respond to or receive better experience or delivery of care in PCMHs. If PCMHs are serving some youth better than others, it is an area for further attention. Alternatively, if some groups respond better to a PCMH model of care or if differences in PCMH implementation relate to outcomes, then work is needed to identify the characteristics of effective health care teams and strategies that improve care delivery

TABLE 2 Stratified Adjusted Odds Ratios (99% CI) of PCMH Effects on Outcomes That Had Statistically Significant Interactions

	Preventive Visits	Influenza Vaccination	Meningococcal Vaccination	HPV Vaccination	STI Screening	Contraception Prescription	LARC Prescription
Gender							
Male	—	—	1.00 (0.75–1.33)	—	—	—	—
Female	—	—	1.98 (1.62–2.42) ^a	—	—	—	—
Age category, y							
10–18	0.63 (0.51–0.79) ^a	0.60 (0.47–0.78) ^a	1.00 (0.83–1.22)	1.08 (0.90–1.32)	3.78 (2.05–6.96) ^a	5.16 (2.65–10.06) ^a	5.96 (2.71–13.07) ^a
19–24	1.88 (1.53–2.31) ^a	1.37 (1.08–1.73) ^a	8.63 (6.35–11.74) ^a	3.82 (2.79–5.25) ^a	1.25 (0.95–1.64)	1.53 (1.07–2.17) ^a	1.95 (1.35–2.81) ^a
Race							
Hispanic/Latino	1.24 (1.03–1.49) ^a	0.72 (0.60–0.87) ^a	—	—	—	—	—
Non-Hispanic black	0.72 (0.50–1.02)	1.51 (0.99–2.29)	—	—	—	—	—
Other	0.71 (0.42–1.20)	1.41 (0.75–2.64)	—	—	—	—	—
Country of birth							
United States	0.84 (0.67–1.04)	—	1.16 (0.93–1.45)	1.12 (0.89–1.42)	1.44 (0.98–2.14)	1.24 (0.75–2.07)	1.69 (0.92–3.09)
Other	1.80 (1.43–2.27) ^a	—	2.77 (2.18–3.53) ^a	3.09 (2.27–4.19) ^a	1.72 (1.20–2.47) ^a	2.89 (1.90–4.40) ^a	3.06 (2.08–4.49) ^a
Employment status							
Student	0.65 (0.52–0.82) ^a	0.59 (0.45–0.76) ^a	1.02 (0.84–1.24)	1.06 (0.87–1.30)	—	—	—
Other	1.89 (1.54–2.38) ^a	1.43 (1.13–1.83) ^a	7.52 (5.60–10.11) ^a	3.80 (2.76–5.24) ^a	—	—	—
Health insurance status							
Insured	1.86 (1.49–2.33) ^a	—	2.33 (1.77–3.07) ^a	2.71 (1.94–3.78) ^a	2.40 (1.77–3.27) ^a	2.81 (1.74–4.54) ^a	3.17 (1.93–5.20) ^a
Uninsured	0.86 (0.70–1.07)	—	1.29 (1.05–1.57) ^a	1.23 (0.99–1.54)	1.26 (0.95–1.66)	1.67 (1.07–2.59) ^a	2.09 (1.32–3.33) ^a

Analyses evaluating contraceptive prescriptions were conducted only among female patients. Mixed-effects logistic regression models used propensity score matching. Results are not reported for interactions that were not statistically significant.
^a Statistically significant comparing patients enrolled in PCMHs with patients not enrolled in these services within each strata.

across sites, as the level of PCMH implementation has been associated with the receipt of preventive services in nonpediatric patients.²⁹

Important limitations of the current study include differential levels of exposure, residual confounding, receiving services outside the HCMC network, including multiple comparisons, and not assessing the degree of adolescent-friendliness of HCMC clinics. First, although we identified the PCMH enrollment status of the included participants, we could not measure the length of time patients were exposed to the services of the different programs. These different lengths of exposure might underestimate the magnitude of the identified associations because patients with brief exposures were classified as being fully exposed, which might not have been accurate according to the length of membership in the PCMH.³⁰ Second, although we estimated average treatment effects by using propensity score matching, which produce valid and more reliable effect estimates than other methods,²⁶ we were not able to incorporate into the analysis measures of patient complexity,^{31,32} or other confounders such as level of education, income, or having special health care needs (eg, chronic conditions). In addition, during adolescence and young adulthood, marital, employment, and health insurance status change over time, and because we only had access to patients' status on these variables at the time of data extraction, we could not consider them as time-varying covariates. We believe that the residual confounding might have made us overestimate the PCMH effects. Additional overestimation of PCMH effects could arise from differential measurement of the outcomes because patients might have received some of the preventive services outside the HCMC network (eg, influenza vaccinations), especially those patients who did

not receive the PCMH services. Moreover, although patients could also have been nested within PCPs and specific primary care clinics,³³ these 3- or 4-level models were not conducted because many of patients did not identify a PCP ($n = 8355, 38.4\%$) or received care at multiple facilities of the HCMC ($n = 8480, 39.1\%$). We think that effect overestimation might be counterbalanced with the potential underestimation of effects due to the lack of consideration of length of exposure and the use of 99% confidence intervals. Fourth, in this study we focused on 8 outcomes and reported ~20 analyses for each of them (including main effects, interactions, and stratified analyses). This means that by chance, ~8 of the statistically significant associations could have been wrong with an α of 0.05.³⁴ To minimize this issue, we decided to use $P < .01$ as the marginal level for statistical significance and conducted sensitivity analyses that reported a pattern of consistent findings across multiple preventive services. Finally, we did not assess the degree that PCMHs or clinics offered adolescent-friendly care,³⁵ which could have affected the study's results. Future studies need to confirm our findings, especially the subgroup analyses.

This study presents a comprehensive evaluation of the benefits of PCMHs related to increasing the receipt of preventive services. These findings support the need to expand this model of care to benefit more low-income adolescents and young adults as a strategy to reduce health inequities. The Affordable Care Act has provided funding to increase access to PCMHs,³⁶ which has increased receipt of preventive services.³⁷ Although the \$35.7 million investment to support implementation of this model of care is important, these funds will not reach everyone. Local, state,

TABLE 3 Adjusted Odds Ratios (99% Confidence Intervals) Comparing the Receipt of Preventive Services Among Patients Enrolled in PCMHs and Not Enrolled in These Programs Using Propensity Score Matching, Regression Adjustment, and 1:1 Matching on Patient Demographics

Outcome	Propensity Score Matching	Regression Adjustment ^a	1:1 Matching
Preventive visits	1.10 (0.93–1.29)	1.28 (1.10–1.49)	1.40 (0.80–2.44)
Influenza vaccination ^b	0.89 (0.74–1.07)	1.11 (0.94–1.31)	1.04 (0.54–2.00)
Meningococcal vaccination ^b	1.53 (1.30–1.80)	1.74 (1.46–2.08)	1.88 (1.08–3.28)
HPV vaccination ^b	1.53 (1.28–1.84)	1.77 (1.49–2.10)	2.54 (1.36–4.73)
STI screening ^b	1.69 (1.28–2.24)	2.07 (1.66–2.56)	2.30 (0.91–5.84)
Contraception prescription ^b	2.18 (1.56–3.03)	3.39 (2.50–4.61)	5.00 (1.54–16.20)
LARC prescription ^b	2.66 (1.89–3.74)	3.96 (2.86–5.49)	7.83 (2.15–28.51)
Cervical cancer screening ^b	1.14 (0.87–1.48)	1.20 (0.93–1.56)	0.69 (0.22–2.17)

Analyses evaluating contraceptive prescriptions and cervical cancer screening were conducted only among female patients. The analysis of cervical cancer screening was also restricted to patients aged 21 y or older.

^a Mixed effect regression models were adjusted for patient's gender, age, race, country of birth, primary language spoken at home, marital, employment, and health insurance status.

^b These items had consistent findings across analytical methods.

and federal policies need to fund the implementation of coordinated team-based services, especially at locations that serve low-income, minority, and uninsured patients, who are least likely to receive preventive and therapeutic care.^{4–14} In addition, these policies need to address the needs of those youth who are not covered by the Affordable Care Act, including undocumented immigrants with no access to care. Shifting part of the Emergency Medical Assistance Program to support preventive care among youth could support this goal. Although cost reductions are possible, they might be limited to more complex patients,³⁸ and it remains to be seen whether reductions or cost offsets can be attained among adolescents and young adults.

CONCLUSIONS

Overall, youth enrolled in PCMHs had greater likelihood of receiving multiple preventive services compared with adolescents and young adults who were not enrolled in these programs. This finding highlights the value of this model of care at addressing not only the specific needs of patients

but also improving their preventive care.

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ABBREVIATIONS

HCH: Health Care Home
 HCMC: Hennepin County Medical Center
 HPV: human papillomavirus
 LARC: long-acting reversible contraceptive
 PCMH: patient-centered medical home
 PCP: primary care provider
 STI: sexually transmitted infection

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