

Practice Innovation, Health Care Utilization and Costs in a Network of Federally Qualified Health Centers and Hospitals for Medicaid Enrollees

Tricia J. Johnson, PhD,¹ Art Jones, MD,² Cheryl Lulias, MPA,² and Anthony Perry, MD³

Abstract

State Medicaid programs need cost-effective strategies to provide high-quality care that is accessible to individuals with low incomes and limited resources. Integrated delivery systems have been formed to provide care across the continuum, but creating a shared vision for improving community health can be challenging. Medical Home Network was created as a network of primary care providers and hospital systems providing care to Medicaid enrollees, guided by the principles of egalitarian governance, practice-level care coordination, real-time electronic alerts, and pay-for-performance incentives. This analysis of health care utilization and costs included 1,189,195 Medicaid enrollees. After implementation of Medical Home Network, a risk-adjusted increase of \$9.07 or 4.3% per member per month was found over the 2 years of implementation compared with an increase of \$17.25 or 9.3% per member per month, before accounting for the cost of care management fees and other financial incentives, for Medicaid enrollees within the same geographic area with a primary care provider outside of Medical Home Network. After accounting for care coordination fees paid to providers, the net risk-adjusted cost reduction was \$11.0 million.

Keywords: Medicaid, integrated delivery system, care coordination, virtual network, health care utilization, health care costs

Introduction

MEDICAID EXPANSION and the creation of the Health Insurance Marketplaces (also known as Exchanges) through the Patient Protection and Affordable Care Act have significantly improved access to health insurance coverage for individuals with low incomes and limited resources in states that have adopted the Medicaid expansion. Nationally, the number of Medicaid enrollees increased 29% between July-September 2013 and August 2016.¹ In Illinois, there were 637,056 newly eligible adults enrolled in Medicaid because of the Affordable Care Act in June 2016.² Although Medicaid expansion is theoretically thought to reduce emergency department (ED) visits and hospital admissions through increased access to primary care services, results from the Oregon health insurance experiment demonstrated that Medicaid coverage by itself does not necessarily translate into a reduction in the use of these services.^{3,4}

There is mixed evidence that care coordination programs for Medicaid enrollees can reduce costs.⁵ State Medicaid

programs have struggled to implement cost-effective strategies that provide high-quality and accessible care to enrollees, given low provider reimbursement rates.^{6,7} In 2011, only 69% of US physicians reported accepting new Medicaid patients, while 83% accepted new Medicare patients and 82% accepted new privately insured patients.⁸ In Illinois only 65% of office-based physicians reported accepting new Medicaid patients, ranking the 8th lowest of all states in terms of accepting new Medicaid patients. Furthermore, physicians' acceptance of new Medicaid patients is strongly correlated with Medicaid reimbursement rates.^{8,9} Many Medicaid beneficiaries face cultural, language, transportation, nutritional, housing, and other social and economic barriers to accessing primary care and complying with prescribed care plans that pose challenges to providers responsible for managing their care.¹⁰⁻¹² Although commercial insurers generally use a combination of financial incentives that target providers and enrollees to encourage use of primary care and discourage inappropriate use of more expensive ED and hospital services, state Medicaid programs are

¹Department of Health Systems Management, Rush University, Chicago, Illinois.

²Medical Home Network, Chicago, Illinois.

³Ambulatory Transformation Center, Rush University Medical Center, Chicago, Illinois.

prohibited from levying substantial out-of-pocket costs on enrollees, thus limiting potential strategies to incentivize use of primary care services.

To better assist patients with the most complex medical, behavioral, and psychosocial needs, providers and payers are becoming more sophisticated in stratifying individuals by level of risk of adverse health outcomes and developing better care coordination models. Insurers and providers have debated the optimal model for care coordination. Many health insurers use a centralized approach that allows for a more standard, less costly model. Some primary care providers (PCPs) and other care management agencies, however, assert they are better positioned to coordinate care for their complex patients, capitalizing on established face-to-face relationships, ready access to the primary care team and health record as well as familiarity with unique community needs and resources. PCPs operating as part of an integrated delivery system that shares data, care models, and financial incentives may be in the best position to deliver on these promises.

The purpose of this study was to evaluate the impact of one such integrated delivery system. At the time of this study, Medical Home Network (MHN) comprised 6 hospital systems and 12 PCP entities (6 of which are Federally Qualified Health Centers) serving a Medicaid population on Chicago's South and West Sides. The unique structure of MHN includes the following principles: (1) *egalitarian governance*, with hospitals and Federally Qualified Health Centers having equal decision-making authority in the aggregate, necessitating collaboration rather than domination by either type of provider; (2) *practice-level care coordination* performed by care coordinators employed by the primary care entities; (3) use of *real-time electronic alerts* including admission, discharge, and transfer alerts analyzed in conjunction with claims data to inform care coordinators and practitioners at the point of decision making; and (4) *pay-for-performance incentives* based on process measures targeted at improving transitions of care and reducing avoidable hospital utilization and costs. The pay-for-performance measures included a \$20 financial incentive for PCPs to follow up within 7 days following an ED visit or hospital discharge and a \$10 financial incentive for ED care teams to provide MHN members information about their PCP. A web-based electronic portal virtually integrated providers with different electronic systems and facilitated data sharing, communication among care teams, and proactive care management across the continuum of care. Primary care teams were alerted in real time when a patient was registered in an ED or inpatient unit of a partner hospital as well as when he or she was discharged or transferred from those settings. These real-time alerts facilitated PCP follow-up within 7 days of ED visits and hospital stays.

When MHN launched, Illinois Medicaid reimbursed the majority of providers on a fee-for-service basis, with no requirements for prior authorization of hospital or specialist care. The only restriction on care for Medicaid enrollees was Illinois Medicaid's requirement that patients utilize their assigned provider for primary care. MHN partnered with 107 primary care medical homes representing 12 organizations and 6 hospital systems in December 2012 to manage care for 170,000 Medicaid enrollees. This article compares health care utilization and cost in the 2 years after implementation of MHN with a risk-adjusted, matched control

group of Illinois Medicaid enrollees residing in the same or similar communities.

Methods

Study population

In this retrospective analysis of utilization and costs, the population included all Medicaid enrollees who were members of MHN (ie, had a PCP at one of the MHN primary care medical homes) at any time in Performance Year 1 (December 1, 2012, through November 30, 2013) and a non-MHN comparison group that included all Illinois Medicaid enrollees who were not attributed to MHN and resided in a zip code with more than 100 MHN enrollees. Membership in MHN comprised persons who were designated by the State of Illinois program (Illinois Health Connect) as having their PCP at one of the 107 MHN sites. For individuals who switched between the 2 groups (eg, initially had a PCP in the MHN network and then switched to a PCP outside of MHN), the experience was allocated to each group based on the number of days in each cohort as a percentage of the days in the month. For PCP changes that occurred during an inpatient stay, the inpatient days, claims, and costs occurring after the switch were attributed to the group to which the member was attributed at the time of admission. This study meets the criteria for exemption, because only aggregated, population-level data were used, and was not reviewed by the institutional review board.

Data sources

Medicaid enrollment and claims data were obtained from the Illinois Department of Healthcare and Family Services for dates of service from December 2011 to November 2014 and represented 3 time periods: Baseline Year prior to implementation of MHN (December 2011 – November 2012), Performance Year 1 (December 2012 – November 2013), and Performance Year 2 (December 2013 – November 2014). Claims data included both medical and pharmaceutical claims. To account for potential demographic and health status differences between the MHN and non-MHN populations, performance measurements were risk adjusted to the same demographic and morbidity level. All metrics were adjusted to the risk level consistent with the non-MHN population in the baseline year. The study team is not aware of any changes in benefit coverage or provider reimbursement levels that would have had a meaningful impact on the comparison of the MHN and non-MHN populations between the baseline and performance years, and therefore, the team made no adjustments to the claims for any such changes across the 3 years.

Outcomes

The main outcomes of interest included utilization and cost measures. The utilization measures were (1) hospital inpatient days per 1000 enrollees per year, (2) hospital inpatient admissions per 1000 enrollees per year, (3) hospital inpatient average length of stay (LOS) in days, (4) ED visits per 1000 enrollees per year, (5) inpatient admissions followed by a PCP visit within 7 days as a percentage of total inpatient admissions per 1000 enrollees per year, (6) ED visits followed by a PCP visit within 7 days as a percentage

of ED visits that did not result in an inpatient hospitalization, and (7) inpatient admissions with a readmission to any hospital within 30 days of discharge as a percentage of total inpatient admissions. Thirty-day readmissions included any rehospitalization, regardless of the diagnosis or the admitting hospital, and included transfers. Maternity admissions were excluded from the analysis. Each readmission was attributed to the group (MHN or non-MHN comparison) to which the patient was assigned at the time of the initial hospital admission based on data from the Illinois Health Connect program. The per member per month (PMPM) total cost of care per Medicaid enrollee excluded care coordination fees paid by the Illinois Department of Healthcare and Family Services to MHN.

Unadjusted analysis

The study team calculated unadjusted utilization per 1000 enrollees and costs for the MHN and non-MHN comparison groups for the Baseline Year and Performance Years 1 and 2 and percentage changes between the 3 years for each of the utilization measures and PMPM total cost. These analyses did not account for any differences in the risk profiles of the 2 groups, such as differences in age, sex, or presence of comorbid medical conditions.

Risk-adjusted analysis

The risk-adjusted analysis utilized a proprietary, validated risk-adjustment methodology to calculate risk scores that represented an individual's expected relative health care resource use for all services (medical and pharmacy) and by service category (medical, pharmacy, inpatient, emergency, outpatient, physician, and other). These risk scores accounted for differences in age and sex and the presence of comorbid medical conditions between the 3 years and between the MHN and non-MHN comparison groups. These risk scores were used to adjust utilization and cost measures for both cohorts and years to a risk profile consistent with the risk scores of the Baseline Year non-MHN comparison group. The entirety of the member's experience for each year was used to calculate

the risk score for the Baseline and Performance Years, prior to assigning the member's exposure to the MHN or non-MHN comparison group. Although the level and quality of diagnosis and other coding practices can impact the risk scores, there was no incentive for providers to increase coding for either group. Coding differences within the claims data were assumed to be minimal between the MHN and non-MHN comparison groups and from year to year.

The utilization and cost outcomes were adjusted to reflect the demographics and morbidity of the non-MHN group in the Baseline Year using a factor equal to the ratio of the average risk scores of the non-MHN Baseline Year over the average risk scores for the group and time period of interest (MHN Baseline, MHN Performance Years 1 and 2, non-MHN Performance Years 1 and 2). Each outcome was adjusted by the relevant risk score. Hospital inpatient days and inpatient admissions were adjusted using the inpatient risk score; ED visits were adjusted using the emergency risk score; PMPM cost of care was adjusted using the medical risk score for medical costs and pharmacy risk score for the prescription drug costs. Inpatient admissions with a PCP visit within 7 days, readmissions within 30 days, and percent of ED visits with a PCP visit within 7 days were not risk adjusted because both the numerator and denominator would have been adjusted by the same factor (ie, the risk-adjusted and non-risk-adjusted outcomes would be identical). The main results reported in this article are comparisons between Baseline and Performance Year 2. Supplementary Tables (Supplementary Data are available online at www.liebertpub.com/pop) report comparisons between Baseline and Performance Year 1.

Results

The number of MHN and non-MHN members and member months are reported in Table 1. The average duration of enrollment the MHN and non-MHN comparison groups per member was 8.6 versus 9.7 months at Baseline and 8.7 versus 9.5 months in Performance Year 2 for MHN and non-MHN members, respectively, demonstrating a slightly higher turnover in enrollment for MHN members. The average risk scores were consistently higher in the MHN group than in the

TABLE 1. RISK SCORES FOR MEDICAL HOME NETWORK AND NON-MEDICAL HOME NETWORK MEMBERS BY PERFORMANCE YEAR

	<i>Baseline</i>		<i>Performance year 1</i>		<i>Performance year 2</i>	
	<i>MHN</i>	<i>Non-MHN</i>	<i>MHN</i>	<i>Non-MHN</i>	<i>MHN</i>	<i>Non-MHN</i>
Members	190,385	998,810	178,816	943,248	158,706	898,741
Member months	1,642,968	9,731,809	1,594,539	9,267,188	1,381,645	8,504,093
Months per member, Mean	8.6	9.7	8.9	9.8	8.7	9.5
Risk Scores						
Total Medical and Pharmacy	1.23	1.02	1.21	0.99	1.04	0.89
Medical	1.10	0.91	1.09	0.89	0.94	0.80
Inpatient	0.38	0.28	0.37	0.28	0.31	0.24
Emergency	0.03	0.03	0.03	0.03	0.03	0.03
Outpatient	0.30	0.25	0.30	0.24	0.26	0.22
Physician	0.35	0.32	0.35	0.31	0.31	0.29
Other	0.04	0.03	0.04	0.03	0.03	0.02
Pharmacy	0.13	0.11	0.12	0.10	0.10	0.09

Note: Risk scores were weighted by exposure months per member. MHN, Medical Home Network.

TABLE 2. RISK-ADJUSTED PERFORMANCE MEASURES, PER 1000 MEMBERS, PERFORMANCE YEAR 2 VERSUS BASELINE

	<i>Baseline</i>		<i>Performance year 2</i>		<i>Percentage change</i>	
	<i>MHN</i>	<i>Non-MHN</i>	<i>MHN</i>	<i>Non-MHN</i>	<i>MHN</i>	<i>Non-MHN</i>
Total hospital inpatient days, n	645.5	585.6	599.9	686.7	-7.1	17.3
Total hospital inpatient admissions, n	125.8	122.4	118.1	120.5	-6.1	-1.5
Hospital length of stay, mean	5.1	4.8	5.1	5.7	-1.1	19.1
ED visits, n	750.4	673.2	761.4	682.2	1.5	1.3
Inpatient admissions with PCP visit within 7 days, % ¹	14.8	38.3	14.5	30.2	-2.3	-21.1
ED visits with PCP visit within 7 days, % ¹	16.1	24.4	18.2	22.3	13.0	-8.3
Inpatient admissions with readmission to any hospital in 30 days, % ¹	31.5	29.2	23.7	22.3	-24.8	-23.7
Total cost of care per member per month, dollars	212.69	185.67	221.76	202.92	4.3	9.3

¹The risk-adjusted and unadjusted values are identical, because both the numerator and denominator were adjusted by the same value. ED, emergency department; MHN, Medical Home Network; PCP, primary care physician.

non-MHN group, but decreased for both groups between Performance Years 1 and 2 (by 0.17 for the MHN group and by 0.10 for the non-MHN group).

The unadjusted performance measures are reported in Supplementary Table S1, and the adjusted performance measures for Performance Year 1 versus Baseline are reported in Supplementary Table S2. Table 2 reports the risk-adjusted performance measures for MHN and non-MHN members. Utilization and costs were adjusted to the non-MHN risk level. Total inpatient days decreased by 7.1% for MHN members and increased by 17.3% for non-MHN members. Inpatient admissions per 1000 members decreased for both MHN and non-MHN membership groups. Average inpatient LOS decreased for MHN members, while increasing by more than 19% for non-MHN members. The percent of inpatient admissions with a PCP visit within 7 days following discharge decreased for MHN and non-MHN members, while the percent of ED visits with a follow-up visit to a PCP within 7 days increased for MHN members, while decreasing more than 8% for non-MHN members (Table 2). The proportion of inpatient admissions with a readmission within 30 days decreased for both MHN and non-MHN members. On a risk-adjusted basis, the total PMPM cost of care increased by \$9.07 for MHN members and increased by \$17.25 for non-MHN members (Table 2).

Discussion

This study was based on the claims data of 1.1 million Medicaid enrollees in Illinois and compared utilization and costs prior to and after implementation of a care coordination pilot that brought together 107 primary care sites and 6 hospital systems. Although a number of recent studies have evaluated the impact of Medicaid enrollment on health care utilization,^{3,13,14} this study evaluated the effectiveness of an integrated delivery system for low-income individuals who were already enrolled in Medicaid. With the exception of ED visits, changes in utilization and PMPM costs favored MHN. This study found that the proportion of MHN enrollees who completed a primary care visit within 7 days after an ED visit substantively increased in Performance Year 2, while the proportion of non-MHN enrollees who completed a follow-up primary care visit in the same window of time decreased. Additionally, hospital admissions per 1000 members decreased for both MHN and non-MHN groups in Performance Year 2,

and notably, hospital LOS decreased by 1.1% for the MHN group while increasing by 19.1% for the non-MHN comparison group. The differences in hospital LOS between MHN and non-MHN groups do not directly account for slower growth in PMPM health care spending in the MHN group compared to the non-MHN group (4.3% versus 9.3%), given that most hospital stays were reimbursed on a diagnosis-related group basis rather than per diem basis. One possible explanation for the differences in LOS may be related to differences in the underlying reasons for hospitalization between the 2 groups, but future work should examine this finding.

Somewhat surprisingly, the number of ED visits per 1000 MHN members did not decrease in either Performance Year 1 or Year 2, despite an increase in follow-up primary care visits. Furthermore, the 13.0% increase in ED visits with a PCP visit within 7 days for enrollees was more pronounced in light of the 8.3% decrease in ED visits with a PCP visit within 7 days for the non-MHN group. One plausible explanation for this finding relates to the decrease in hospital admissions and readmissions within 30 days for MHN members, and a possible substitution from hospital admissions to ED visits. ED providers may have been more likely to discharge patients home in the MHN model, given the care coordination resources in place that included active follow-up generally within 1 or 2 days of ED discharge and awareness among MHN providers that primary care-based care coordination was a component of MHN participation. Similarly, PCPs may have sent patients to the ED rather than admitting them to the hospital because of the active care management in place. Additional work is needed to understand whether ED and PCP practices changed in response to the primary care-based care management services. The integration of care management and focus on population health in the primary care practices may have contributed to the decrease in inpatient admissions and readmissions within 30 days. In a study of office-based provider visits and ED utilization by Medicaid enrollees, Widmer et al found that office visits were positively associated with ED utilization, suggesting that ambulatory provider visits are not enough to reduce ED visits.¹⁵ Future work should evaluate the underlying reasons for ED visits by Medicaid enrollees who have a usual source of primary care.

The MHN members had higher turnover than the non-MHN members in both the Baseline and Performance Years,

and the differences in turnover may have dampened utilization differences between the MHN and non-MHN groups. One plausible explanation for the turnover is differential loss of Medicaid eligibility in the MHN and non-MHN groups. Additionally, because there was a substantially larger number of non-MHN providers in the geographic areas of the present study, there was a greater likelihood of switching to a provider outside of MHN. It is possible that individuals who were initially MHN members benefited from the MHN care coordination model and took that experience in using their PCP with them when switching to a non-MHN provider.

Although the study team cannot disentangle the relative importance of each of the 4 guiding principles of MHN (egalitarian governance, practice-level care coordination, real-time alerts, and pay for performance), the team speculates that each principle played a role in reducing costs. The egalitarian governance among primary care medical homes and hospitals created a sense of trust and common purpose to improving health. The physician champions and care management leaders within the network were crucial change catalysts at the practice level and hospitals. These individuals worked with the care teams to achieve on-the-ground delivery transformation. This shared commitment to population health and belief that care management at the practice level was more effective created a culture of shared accountability.

It has become increasingly common for health insurers to provide care management from a centralized office, often at a remote location where care coordinators reach out to patients telephonically. Although this model is potentially low cost, it is limited by the fact that care coordinators often are not familiar with either the community in which the patient lives or the unique resources available. The MHN model was built on patient-centered, practice-level care management, where care coordinators were integral members of the primary care team and were familiar with, and often living in, the same communities. The study team speculates that, through this model, enrollees developed relationships with their PCPs and other care team members that may have improved their engagement in their own health, although changes in engagement in the MHN and non-MHN comparison groups were not assessed.

The pay-for-performance incentives for improving care coordination were relatively small. PCPs were paid \$20 for completing a follow-up visit with enrollees within 7 days after hospital discharge or ED visit, and ED care teams were paid \$10 for providing information from the MHN portal about the patient's PCP prior to ED discharge. The value of these pay-for-performance care coordination fees averaged \$4.77 PMPM in Performance Year 1 and \$5.25 PMPM in Performance Year 2 (or \$57.24 and \$63.00 per member annually). Given that the financial incentives for providers were relatively small, and the fact that there was no financial incentive for the patient to use a PCP, it is doubtful that changes in utilization were driven solely by the financial incentives.

The study team believes that real-time alerts coupled with reporting historical medical and prescription claims data through electronic information exchange were essential. These real-time alerts were perceived as "game changers" by providing instantaneous actionable data that helped providers prioritize tasks to promote care coordination and collaboration, including scheduling follow-up visits with the PCP after an ED

visit or hospital stay. The real-time alerts made it possible for PCPs to follow up with patients shortly after patients were discharged from the ED, often in the same day, and in some cases, patient navigators in the primary care practices were able to meet with patients while they were still in the ED to facilitate the connection back to the PCP. Furthermore, this technology provided a more comprehensive picture of utilization across providers and settings than had been available historically.

Conclusion

Comprehensive population health management requires a skilled care coordination workforce, with individuals who are culturally literate, trained in patient engagement and behavior change techniques informed by actionable data from across the continuum of care. The results through the second year after implementation of MHN show a risk-adjusted savings for the MHN group compared with the non-MHN group. After accounting for the MHN care coordination fees paid to providers, net cost savings were \$6.94 PMPM in Performance Year 1 and \$10.69 PMPM in Performance Year 2, for a net risk-adjusted cost savings of \$11.0 million over the 2 performance years. Subsequent work within the network has focused on training care teams to effectively manage the health of their patient panels. The MHN pilot was predicated on egalitarian governance among primary care providers and hospitals, practice-level care coordination led by care managers adept at managing information to improve patient outcomes, real-time electronic alerts, and small financial incentives.

Author Disclosure Statement

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Address correspondence to:
Tricia Johnson, PhD
Department of Health Systems Management
Rush University
1700 West Van Buren Street
TOB Suite 126B
Chicago, IL 60612

E-mail: tricia_j_johnson@rush.edu

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