

Postdischarge Engagement Decreased Hospital Readmissions in Medicaid Populations

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Hospital readmissions signal gaps in the quality of care provided to patients. Of the 9 million Medicare patient hospitalizations per year,¹ almost 1 in 5 are readmitted within a month of discharge and many more return to the emergency department.² Many such readmissions are caused by inadequate discharge planning, poor care coordination between hospital and community clinicians, and the lack of effective longitudinal community-based care.

Best-practice recommendations to reduce readmissions have largely emerged from analyses conducted on commercial or Medicare fee-for-service populations, whereas relatively few analyses have been published on readmissions in the Medicaid managed care population.³ However, nonpregnant adult Medicaid patients experience readmission rates that are often higher than those experienced by Medicare beneficiaries. Readmission rates for adult (aged 45-64 years) Medicaid patients (22%)⁴ and those with heart failure (30%) are considerably higher than the corresponding rates in Medicare (16% and 25%, respectively).^{4,5} A retrospective analysis of Medicaid beneficiaries living in 19 states reported an average unadjusted 30-day readmission rate of 9.4% (range, 5.5%-11.9%).⁶ Hospital readmissions represent 12.5% of Medicaid payments for all hospitalizations, averaging \$77 million per US state annually.⁶ Although value-based incentives, financing, and technical assistance can provide powerful drivers to minimize hospital readmissions, most attention in the literature to solving the readmission challenge has focused on Medicare and commercial populations.

However, with increased attention given to Medicaid expansion under the Affordable Care Act, effective approaches to minimize Medicaid hospital readmissions are increasingly being sought. In the pediatric Medicaid population, diseases of the respiratory system were the top cause of readmission, accounting for 21.2% of all readmissions,⁶ so a preponderance of Medicaid readmissions studies target pediatric asthma. A systematic review of 29 studies identified African American race, public or no insurance, previous admission, and complex chronic comorbidity as risk factors associated with pediatric asthma readmissions.⁷ The populations analyzed

ABSTRACT

OBJECTIVES: To investigate the effect of managed care organization (MCO)-implemented postdischarge engagement, supported by other broadly focused interventions, on 30-day hospital readmissions in 6 at-risk Medicaid populations.

STUDY DESIGN: Prospective cohort study.

METHODS: One-year follow-up analysis of member claims data was performed following an intervention period from January 1, 2014, to December 31, 2014. Postdischarge engagement, supported by additional MCO-initiated interventions, was implemented to reduce 30-day hospital readmissions in Medicaid members having 1 or more dominant chronic conditions. Hospital readmission rates were calculated at baseline and at 1 year post intervention. Bivariable and multivariable generalized estimating equation analysis was used to quantify the likelihood of hospital readmissions.

RESULTS: Following implementation, postdischarge engagement rates increased significantly, whereas provider follow-up rates remained unchanged. Increased member engagement resulted in statistically significant reductions in weighted readmission rates enterprise-wide (-10.1%; $P < .01$) and in 3 of 6 MCOs (-3.9% to -15.8%; $P \leq .05$) in 2014. Compared with nonparticipants, members who were successfully reached for postdischarge engagement displayed a 33% decrease in 30-day readmissions enterprise-wide (adjusted odds ratio, 0.67; 95% CI, 0.62-0.73) and a comparable decrease (-23% to -39%) in 5 of the 6 MCOs. In this context, greater frequency of postdischarge engagement was associated with proportionally decreased likelihood of readmissions.

CONCLUSIONS: Postdischarge engagement, against the backdrop of multifaceted MCO-implemented interventions, was associated with significantly reduced hospital readmissions in at-risk Medicaid subjects. Reduced likelihood of readmissions was observed at both the enterprise-wide and plan levels in a manner proportional to the frequency of engagement, a novel reported outcome for this population.

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in 14 of the studies included (or were inferred to include) Medicaid beneficiaries.⁸⁻²⁰ Three of the studies reported that the readmission rate of children with asthma insured by Medicaid was higher than that of comparable children with private insurance.^{11,16,19}

Another systematic review retrieved 21 randomized clinical trials of transitional care interventions targeting chronically ill adults and further identified 9 interventions that demonstrated positive effects on hospital readmissions-related measures.²¹ Many of the successful interventions shared similar features, such as assigning a nurse as the clinical manager or leader of care and including in-person home visits to discharged patients. Five of the studies had interventions that could be described as discharge management plus follow-up,²²⁻²⁶ 2 as coaching,^{27,28} and 1 each as disease/case management²⁹ and telehealth.³⁰ All but 1 of the interventions²⁹ led to reductions in readmissions through at least 30 days after discharge. The majority of these interventions were performed on elderly populations, and only 1 study consisted of a sizable Medicaid cohort.²²

In 2014, AmeriHealth Caritas Family of Companies, a Medicaid managed care organization (MCO), implemented multifaceted enterprise-wide initiatives—including enhanced postdischarge engagement—to reduce 30-day all-cause readmission rates for plan members having 1 or more dominant chronic conditions, or a single condition of moderate chronic asthma, during the 2013 baseline period. We evaluate the impact of these initiatives in reducing hospital readmissions over a 1-year period enterprise-wide and across 6 MCO affiliates in 4 states (Pennsylvania, Louisiana, South Carolina, and Nebraska) and the District of Columbia (DC).

METHODS

Study Design and Inclusion Criteria

This was a 1-year follow-up prospective study. The study cohort included Medicaid members aged 5 to 64 years who had 1 or more dominant chronic conditions, or a single condition of moderate chronic asthma (selected for high prevalence and impactability in the Medicaid population), from January 1, 2013, to December 31, 2013. Medicaid-Medicare dual-eligible members (≥65 years) were not served during this time period. Subjects were members of 6 Medicaid MCOs serving 4 states (southeastern Pennsylvania [PA01], Lehigh/Capital-New West Pennsylvania [PA02], Louisiana [LA], South Carolina [SC], and Nebraska [NE]) and DC. Baseline index inpatient admissions were included from January 1, 2013, through December 31, 2013, with claims paid through March 31, 2014, or inpatient admission incurred before January 1, 2013, or discharged after December 1, 2012, with claims paid through March 31, 2014. Baseline 30-day all-cause inpatient readmissions were included if they were incurred between January 1, 2013,

TAKEAWAY POINTS

Postdischarge engagement, supported by broadly focused stakeholder education and encounters, is effective in reducing hospital readmissions in a frequency-sensitive manner.

- ▶ At-risk Medicaid beneficiaries who were successfully reached for postdischarge engagement displayed a 33% decrease in 30-day hospital readmissions.
- ▶ Greater frequency of postdischarge engagement was associated with proportionally decreased likelihood of readmissions, both enterprise-wide and at the individual plan level, a novel reported finding for a Medicaid population.
- ▶ Health plans can dramatically impact hospital readmission rates through greater postdischarge engagement and a variety of multifaceted interventions aimed at members, providers, and health plan staff.

and December 31, 2013, with claims paid through March 31, 2014, and the admission date was less than 30 days from prior index inpatient discharge. For measurement year 2014, the same logic was followed, with the admit date or discharge date advanced 12 months forward.

Hospital Readmission Identification Logic

Hospital readmissions were extracted from claims data housed in AmeriHealth Caritas' data management platform. Index admission was defined as an acute admission or maternity delivery. The outcome variable of 30-day all-cause readmission was based on acute admissions (but excluding maternity deliveries) incurred within 30 days after discharge of prior index admissions.

Categories of Interventions

A variety of initiatives targeting members, providers, and MCO associates were implemented to reduce 30-day all-cause hospital readmissions and expenditures in at-risk Medicaid members (Table 1), ranging from nonclinical interventions (eg, telephonic care management) to stakeholder communications (eg, member mailings, continuing medical education webinars for providers). Most interventions were general in nature, but several were member-specific and tiered to the member's risk level (eg, telephonic vs in-person contact during postdischarge planning). Pharmacy-based initiatives were implemented to improve medication adherence in partnership with the pharmacy benefit manager PerformRx.

Postdischarge Engagement

Members, especially those with the highest risk of readmission, were contacted following discharge, as were hospitals with the highest readmission rates to discuss ways to reduce member readmissions. Care management and care coordination decisions were made based on each member's diagnosis, readmission risk factors, and available home supports. Individual health management barriers were identified by speaking with the patient and his or her family and provider. Interventions focused on ensuring that the member understood discharge instructions (including medication schedules) and on facilitating postdischarge provider visits.

TABLE 1. MCO-Led Interventions to Reduce Hospital Readmission Rates

Category	Initiatives
Member	Educational communications including a discharge letter, welcome-home card, transition brochure, and urgent need contact magnet; home visits from community health navigator staff with leave-behind gift packets and educational material; targeted health education material for high-volume readmission diagnoses (eg, sickle cell disease, tips for staying healthy and out of the hospital); postdischarge engagement: telephonic and/or in-person care management and follow-up appointment coordination.
Provider	Discharge Communications Preferences Survey; provider notification of admission; educational mouse pad outlining information available through the plan's provider portal; readmissions lunch-and-learn presentations; dedicated readmission prevention webpage; CME webinars on reducing readmissions; reducing avoidable admissions flyer and leave-behind brochure; meetings with facility staff to share data and collaborate on transition pathways; provider incentive payments (for transition management codes).
Internal	Associate education through online newsletter; LCD panel messaging in company lobby; readmissions lunch-and-learn presentations; system flag for high-risk members; sentinel rule to alert care managers of an assigned member's admission; implementation of a focused transition workflow and documentation checklist; reporting to track transition management process; home health agency contracts for additional in-home follow-up.
Pharmacy	Pharmacist CME series; pharmacy-related member newsletter articles; academic detailing to pharmacies (face-to-face education of prescribers); pharmacy promotional items.

CME indicates continuing medical education; MCO, managed care organization.

Outcome Measures

Thirty-day all-cause readmission rates are expressed as utilization per 1000 members per year (PKPY) in each MCO.

$$\text{Plan-based 30-day readmission rate (in PKPY)} = \frac{\text{Readmissions per MCO} \times 1000}{\text{Member years per MCO}}$$

The percentage change of readmission rate per MCO is the quotient value of the difference in readmission rates between 2014 and 2013 divided by the readmission rate in 2013. The overall readmission rate (in PKPY) is the quotient value of the above formula summed for all 6 MCOs. The final rate is a weighted average of readmission rates across all 6 MCOs at baseline and the study period; plans having more participants contributed a proportionally greater rate to the overall average versus plans with fewer participants, better reflecting overall performance.

Also reported was the number of successful member calls within 30 days of the discharge date for the index admission (from January 1, 2014, to November 30, 2014) or within the days between the index discharge date and readmit date, whichever was shorter. A successful member call was only logged when an associate spoke directly with the member or his/her parent or guardian during the outreach, but not if the associate left a message or spoke to someone else at the residence.

Statistical Analysis

A χ^2 test was performed to compare differences in pre- versus postintervention engagement rates and postdischarge follow-up rates with providers within 7, 14, and 30 days of inpatient discharge

in 2013 and 2014. The Poisson distribution with GENMOD procedure (PROC GENMOD) was used to test readmission rate differences pre- and post intervention (details in [eAppendix](#) [available at [ajmc.com](#)]).

The number of successful member calls was grouped as a categorical variable with 4 groups (0, 1, 2, ≥ 3 calls) and as a dichotomous variable (0 vs ≥ 1 calls). Chi-square tests and Cochran-Armitage trend tests were used to compare the association between the engagement (≥ 1 call vs no calls) and readmissions and between the number of successful calls (0, 1, 2, ≥ 3 calls) and readmissions.

To quantify the likelihood of readmission among members with a different number of successful calls in 2014, the index discharge became the study unit. Because some members encountered multiple discharges in the study period, the generalized estimating equations (GEE) model was employed to account for repeated measures for 1 subject. The model used a binomial likelihood function, a logit

link function, and an independent correlation matrix. Empirical standard error estimates were used to estimate the standard errors. Odds ratios (ORs) and 95% CIs were then calculated as the exponentials of the parameters ($OR = e^{\beta}$). Two types of models with different independent variables were developed: 1 dichotomous (≥ 1 calls vs no call) and the other categorical (1, 2, ≥ 3 calls vs no call). For both models, bivariable GEE analysis was first performed to explore the unadjusted effect of successful calls on preventing readmission. Multivariable GEE analysis was then used to quantify the independent effect after controlling for sociodemographic variables like age, gender, race, aid category, and risk scores.

All analyses were performed using SAS EG 7.1 (SAS Institute; Cary, North Carolina). A significance level of $P < .05$ was deemed statistically significant for all comparisons.

RESULTS

Demographics

Medicaid subjects (N = 149,748) in 6 MCOs had 1 or more dominant chronic conditions (range, 54.41%-75.39%) or a single condition of moderate chronic asthma (range, 24.61%-45.59%) in 2013 ([Table 2](#)). Clinical Classifications Software (CCS Group; Rockville, Maryland) clustered the top 10 diagnosis categories of the study group at baseline, accounting for more than 45% of all hospital readmissions enterprise-wide, which were (in descending order) sickle cell disease, diabetes with complication, congestive heart failure, complicated procedures, asthma, chronic obstructive pulmonary disease, septicemia, pneumonia, chest pain, and skin infection. The majority of subjects in all MCOs were female (range,

51.97%-58.42%), and a plurality were younger than 18 years (range, 27.93%-58.06%; primarily because of asthma). In other respects, the MCOs comprised a diverse population.

Postdischarge Engagement and Provider Follow-Up

The rates of MCO-initiated postdischarge engagement (eAppendix Table 1A) and provider follow-up (eAppendix Table 1B) were compared in 2013 and 2014. Postdischarge engagement rates within 7, 14, and 30 days after discharge increased significantly enterprise-wide from 2013 to 2014 (15.07 percentage points [from 10.18% to 25.25%], 18.90 percentage points [from 14.18% to 33.08%], and 21.37 percentage points [from 17.74% to 39.11%], respectively; $P < .001$ for all) and for all MCOs except 1 ($P \leq .001$ for all; except 30-day NE, $P = .018$). Conversely, provider follow-up rates remained statistically unchanged.

Hospital Readmissions

The hospital readmission rates following discharge were also compared in 2013 and 2014 (Figure 1; eAppendix Table 2). The enterprise-wide weighted 30-day hospital readmission rate significantly decreased from 41.30 PKPY to 37.11 PKPY (-10.1%; $P < .01$) between 2013 and 2014. Postdischarge hospital readmission rates decreased in every MCO (range, -3.9% to -32.2%), but the reduction was only statistically significant in 3 of the 6 MCOs (PA01, $P = .03$; LA and SC, both $P < .01$). The enterprise-wide weighted hospital readmission rate for members with asthma alone significantly decreased as well (-20.7%; $P < .03$).

Postdischarge Engagement Prevents Hospital Readmissions

To investigate the impact of successful postdischarge engagement on readmissions, hospital readmission rates of members who were successfully engaged post discharge at least once (≥ 1 successful call) were compared with unengaged members (no successful calls; Figure 2; eAppendix Table 3). Members who were successfully engaged post discharge had significantly lower readmission rates enterprise-wide than unengaged members (14.5% vs 19.1%; $P < .001$). Even following adjustment with confounding variables of age, gender, race, aid category, and risk scores, postdischarge engagement was correlated with a 33% decrease in hospital readmissions (adjusted OR, 0.67; 95% CI, 0.62-0.73). A comparable decrease was observed in every MCO (range, -23% to -39%; adjusted OR, 0.61-0.77), except for NE, the plan with the smallest sample size.

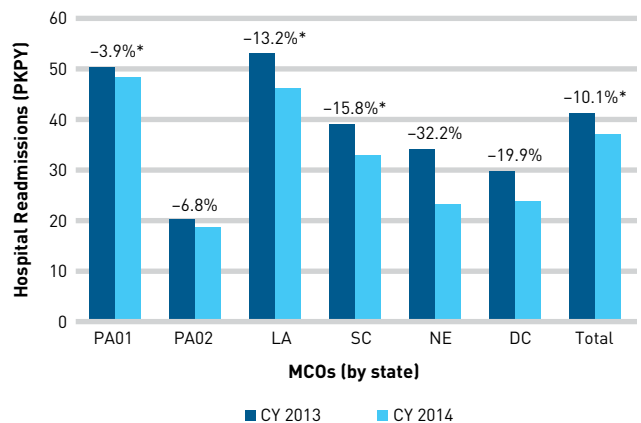
We next examined whether an increasing number of successful postdischarge calls was associated with a proportionately decreasing likelihood of hospital readmission (Figure 3; eAppendix Table 4). Enterprise-wide, members successfully engaged post discharge with 1, 2, and 3 or more contacts all had significantly lower readmission rates than unengaged members (16.3%, 15.4%, and 11.3% vs 19.1%, respectively; $P < .001$ for all). Even following adjustment with confounding variables of age, gender, race, aid category, and risk scores, increasing the number of postdischarge engagements

TABLE 2. Study Demographics

Variable	Managed Care Organization (% by state)					
	PA01	PA02	LA	SC	NE	DC
Gender						
Female	52.32	52.61	57.44	52.34	51.97	58.42
Male	47.68	47.39	42.56	47.66	48.03	41.58
Age, years						
<18	39.55	35.38	37.86	58.06	49.54	27.93
18-39	20.55	23.34	18.92	15.53	20.3	20.25
40-64	37.47	39.12	41.91	26.05	27.64	48.45
≥ 65	2.43	2.15	1.32	0.36	2.52	3.37
Aid category						
Non-SSI	25.64	20.46	46.3	68.05	60.71	88.99
SSI	74.36	79.54	53.7	31.95	39.29	11.01
Race						
Black	50.18	9.71	56.22	45.61	2.00	60.95
White	34.32	64.81	36.33	36.28	66.98	0.86
Other/Hispanic	15.5	25.48	7.45	18.11	31.02	38.19
Population condition						
Dominant chronic disease	67.26	75.39	69.84	54.41	74.32	63.81
Moderate chronic asthma	32.74	24.61	30.16	45.59	25.68	36.19

DC indicates District of Columbia; LA, Louisiana; NE, Nebraska; PA01, southeastern Pennsylvania; PA02, Lehigh/Capital–New West, Pennsylvania; SC, South Carolina; SSI, Supplemental Security Income.

FIGURE 1. Comparison of Hospital Readmission Rates Between 2013 and 2014*

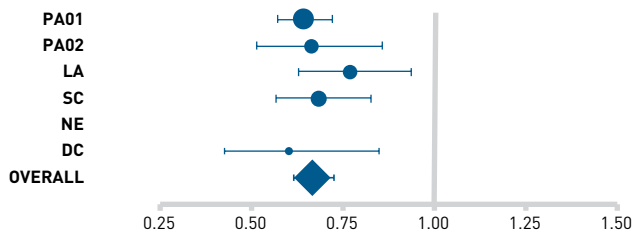


CY indicates calendar year; DC, District of Columbia; LA, Louisiana; MCO, managed care organization; NE, Nebraska; PA01, southeastern Pennsylvania; PA02, Lehigh/Capital–New West, Pennsylvania; PKPY, per 1000 members per year; SC, South Carolina.

* $P < .05$.

*Pre-post comparison of hospital readmissions of managed care cohorts and enterprise-wide total in 2014 versus 2013.

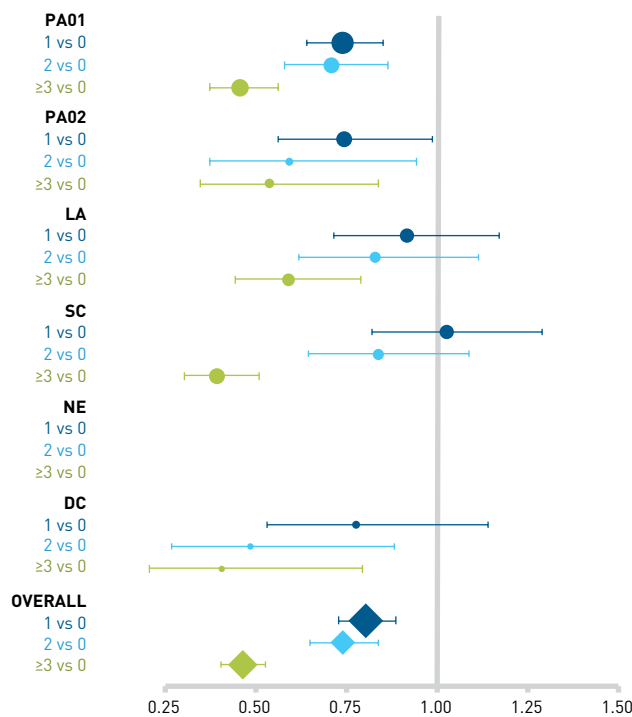
FIGURE 2. Forest Plot Predicting 30-Day Hospital Readmission Based on Number of Successful Postdischarge Calls to Member (2-group comparison)^a



DC indicates District of Columbia; LA, Louisiana; NE, Nebraska; OR, odds ratio; PA01, southeastern Pennsylvania; PA02, Lehigh/Capital–New West, Pennsylvania; SC, South Carolina.

^aThe 2-group comparison analyzes 1 or more postdischarge calls versus no calls. ORs (dots) bracketed by 95% CIs (brackets) were calculated using the generalized estimating equations model to quantify variable effects. Lower ORs (left side of the ordinate) indicated decreased likelihood of hospital readmissions. The dimensions of the dots are proportional to the population size under consideration (eAppendix Table 3).

FIGURE 3. Forest Plot Predicting 30-Day Hospital Readmission Based on the Number of Successful Postdischarge Calls to Member (4-group comparison)^a



DC indicates District of Columbia; LA, Louisiana; NE, Nebraska; OR, odds ratio; PA01, southeastern Pennsylvania; PA02, Lehigh/Capital–New West, Pennsylvania; SC, South Carolina.

^aThe 4-group comparison analyzes 1, 2, and 3 or more postdischarge calls versus no calls. ORs (dots) bracketed by 95% CIs (brackets) were calculated using the generalized estimating equations model to quantify variable effects. Lower ORs (left side of the ordinate) indicated decreased likelihood of hospital readmissions. One call, 2 calls, and 3 or more calls were compared with no calls. The dimensions of the dots are proportional to the population size under consideration (eAppendix Table 4).

from 1 to 2 to 3 or more successful contacts displayed decreasing likelihood of hospital readmissions (adjusted ORs, 0.80, 0.74, and 0.54, respectively). This observation was consistently detected in every MCO except for NE; however, the CI for 1 versus 0 and 2 versus 0 successful calls overlapped with the ordinate at 1.0 (indicating no change in OR) for 3 and 2 MCOs, respectively. In other words, 1 postdischarge engagement was insufficient to drive a decreased likelihood of readmission rates in 3 of the 6 MCOs (LA, SC, and DC), and even 2 postdischarge engagements were insufficient in 2 MCOs (LA and SC). By contrast, 3 postdischarge engagements were sufficient to decrease the likelihood of readmission rates in all 5 MCOs for which the OR could be calculated.

DISCUSSION

Ineffective transitions of care following hospital discharge are a major challenge in population health, where limited windows of opportunity exist to engage patients in follow-up care.³¹ Postdischarge engagement, supported by other broadly focused MCO-led nonclinical interventions, was examined for its impact on 30-day hospital readmissions in at-risk Medicaid subjects. Following implementation, postdischarge engagement rates increased significantly enterprise-wide (while provider follow-up rates remained unchanged), resulting in a statistically significant reduction in weighted readmission rates enterprise-wide, accompanied by a 4.8% reduction in associated expenditures. Members successfully engaged post discharge displayed decreased likelihood of readmission compared with those unengaged in 2014. Moreover, greater frequency of postdischarge engagement was associated with proportionally decreased likelihood of readmissions, a novel reported outcome for this population.

Although all 6 MCOs reported declines in readmission rates, 3 MCOs reported nonsignificant declines ($P > .05$). Two of these 3 MCOs had the lowest baseline readmission rates, while eliciting further reductions in postdischarge readmission rates with the highest magnitude declines among all MCOs (NE, -32.2%; DC, -19.9%). Therefore, the nonsignificance was largely due to their small population sizes relative to other MCOs (NE and DC had 1% and 5%, respectively, of the total study population). Moreover, the third “nonsignificant” MCO (PA02) showed a borderline P value of .09. Finally, inter-MCO differences in member sociodemographic profiles (racial composition, rurality, chronic disease-to-asthma ratio, and non-SSI status) and degree of implementation of the assorted postdischarge engagement processes (especially those dependent on the local health ecosystem) likely contributed to inter-MCO variations.

Reasons for this study’s successful outcomes are varied. First, postdischarge engagement by care managers established a link between member and MCO, providing a touchpoint for addressing postdischarge barriers. Postdischarge outreach addresses issues relating to medication possession and equipment/home care services, comprehension of discharge instructions, and reporting of signs and symptoms. The proportionally lower likelihood of hospital

readmission with increasing telephonic engagements in some cohorts was striking. Care managers representing MCOs—associated by members with the quality of medical care they receive—frequently hear health-related complaints. At minimum, telephonic engagement fosters member awareness of their health-related needs. Care managers are trained to spontaneously identify potentially serious issues and assist in addressing them before they require emergency care, an impact greatly amplified when: (1) contacting members with chronic and comorbid conditions (more likely to be enrolled in care management) and (2) completing validated health-related assessments on members to uncover additional assessment-focused concerns (Glenn Hamilton, MD, personal communication, December 8, 2017). Finally, members develop a stronger relationship with care managers who contact them more regularly.

Lastly, nonclinical initiatives helped establish a framework for implementing and communicating postdischarge solutions among members, providers, and MCO associates. Many successful initiatives were later adopted into the MCO's system of care. Overall provider engagement remained steady during most follow-up periods in most plans. Providers often lack dedicated staff for effective postdischarge engagement and may be unaware that a patient had a hospital admission. Conversely, MCOs primarily become aware of their members' hospital admissions upon processing their medical claims to reimburse hospitals for services rendered, so improved MCO-provider communication regarding patient status alerts both parties of unanticipated acute hospitalizations, follow-up appointment status, and existing care gaps. MCOs can supply de facto "back-office support" in patient engagement to provider offices with limited resources. Successful MCO-led member engagement is an ongoing challenge across all health plan programs and requires creative solutions, like initial outreach via SMS texting. Thus, additional investigations regarding the effectiveness of postdischarge engagement and other nonclinical interventions are warranted.

Limitations

Several limitations are apparent in this study. First, with the exception of postdischarge engagement, the individual efficacy of the remaining initiatives could not be determined. Second, despite a favorable overall rate, substantial variation in readmission rates exists among individual MCOs, consistent with reports in the Medicare population.^{32,33} To mitigate these effects, multivariable analyses were performed after controlling for sociodemographic confounding covariates at each MCO and enterprise-wide, with MCO population size also included as a covariate. Finally, a 1-year observational window cannot project whether postdischarge engagement maintains lower hospital admissions over the longer term. Not all nonclinical intervention components in this study were carried over in future years, so a uniform 2-year analysis was not possible under these circumstances. Additionally, member churn common to Medicaid MCOs dramatically reduced the number of members eligible for the study analysis, making any broad conclusions from a 2-year analysis suspect. Specifically, an

attrition rate of 14% after the first year post analysis increased to 25% in the second year and 33% in the third year. In spite of these limitations, these preliminary results drawn from the first-year study were (and continue to be) important in advancing our care management processes and developing additional high-touch community-based interventions.

CONCLUSIONS

This study, reporting on the success of postdischarge engagement in managing hospital readmission among demographically diverse Medicaid managed care populations, provides an important addition to existing hospital readmission literature. To our knowledge, it is also the first reported instance of a proportional, frequency-sensitive association between increased postdischarge member engagement and decreased likelihood of readmissions in Medicaid, a trend observed both enterprise-wide and in individual plans. Therefore, health plans, like providers, can dramatically impact hospital readmission rates through effective postdischarge engagement and other multifaceted interventions aimed at members, providers, and associates. ■

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eAppendix

Initiative Development

Focus group interviews with providers, members, and care managers, and predictive modeling techniques were employed to conduct needs assessments and identify risk factors for readmissions, including gender, age, race, aid and risk score categories pulled from the claim and member databases (see Table 2).

The findings were used to guide initiative development enterprise-wide: conditions that were more prevalent in readmission cases and facilities with high readmission rates were identified for targeting; the importance of care manager-initiated follow-up with members peri- and post-discharge was reinforced; and social determinants of health were identified among the leading causes of readmissions.

Poisson Distribution With GENMOD Procedure

The GENMOD procedure (PROC GENMOD) was used to test differences in readmission rates between 2013 and 2014 as follows: (1) readmission count was entered as the dependent variable, and time (2013 and 2014) as the independent variable; (2) time and member ID were used as class variables; (3) duration of member enrollment (member month) in each year was used as the offset variable; (4) Poisson distribution was selected with the link set as “log”; and (5) member ID was used as the subject in the repeated term.

DxCG Risk Scores

The DxCG risk adjustment model (Verisk Health, Waltham, Massachusetts) was used to apply risk scores to plan populations. DxCG prospective relative risk scores (RRSs) are good “generic” measures of disease burden. Higher RRS scores are associated with use of more inpatient hospital services, emergency room services and home care, and higher mortality. These scores

are widely employed in health policy studies, budgeting, payment, pricing, negotiation, provider profiling, disease management reconciliation, and resource planning.

We used the prospective risk scores derived from DxCG model to classify members into four quartile groups: the first quartile group has the least risk of hospital readmissions and the last quartile group has the greatest risk of hospital readmissions. The risk group was included in the multivariable logistic regression model along with other sociodemographic factors presented in Table 2 as covariates.

References:

1. DxCG Intelligence. DxCG Science Guide v4.1.3. Verisk Health Inc. 2012.
2. Agency for Healthcare Research and Quality (AHRQ) Center for Financing, Access, and Cost Trends. MEPS HC-140: 2002-2009 Risk Adjustment Scores. April 2013.

eAppendix Table 1A. Postdischarge Engagement Rates in 2013 Versus 2014

MCO	7-Day (%)			14-Day (%)			30-Day (%)		
	CY2013	CY2014	<i>P</i>	CY2013	CY2014	<i>P</i>	CY2013	CY2014	<i>P</i>
PA01	7.46	18.05	<.001	11.16	26.18	<.001	14.50	32.67	<.001
PA02	5.58	24.24	<.001	10.65	33.85	<.001	15.56	39.49	<.001
LA	13.75	34.30	<.001	19.05	42.03	<.001	23.15	48.15	<.001
SC	18.65	38.27	<.001	21.43	43.40	<.001	23.71	48.05	<.001
NE	16.51	27.46	<.001	25.81	37.70	.001	34.65	43.85	.02
DC	4.27	24.00	<.001	7.22	32.89	<.001	10.54	40.52	<.001
Total	10.18	25.25	<.001	14.18	33.08	<.001	17.74	39.11	<.001

eAppendix Table 1B. Postdischarge Physician Follow-up in 2013 Versus 2014

MCO	7-Day (%)			14-Day (%)			30-Day (%)		
	CY2013	CY2014	<i>P</i>	CY2013	CY2014	<i>P</i>	CY2013	CY2014	<i>P</i>
PA01	34.75	35.39	.26	50.40	51.03	.29	65.55	66.53	.08
PA02	35.22	36.15	.34	51.60	52.89	.20	66.33	68.69	.01
LA	32.20	29.97	.03	47.67	48.29	.56	64.24	65.64	.17
SC	37.35	34.90	.01	53.26	52.20	.26	68.45	66.48	.03
NE	36.51	38.52	.60	52.09	52.05	.99	66.74	63.52	.40
DC	31.07	33.17	.21	43.35	46.82	.05	55.69	59.20	.05
Total	34.78	34.60	.64	50.42	50.95	.19	65.59	66.32	.06

Calendar year (CY); Managed care organization (MCO). A significance level of $P < .05$ was deemed statistically significant for all comparisons. Hospitalization claims were paid through March 31, 2015.

eAppendix Table 2. Hospital Readmission Rates in 2013 Versus 2014

30-Day Readmission Rates (PKPY)					
MCO	CY2013	CY2014	Δ 2014–13	% Change	<i>P</i>
PA01	50.29	48.31	-1.97	-3.9%	.03
PA02	20.15	18.78	-1.37	-6.8%	.09
LA	53.21	46.19	-7.02	-13.2%	<.01
SC	39.07	32.91	-6.16	-15.8%	<.01
NE	34.19	23.20	-11.00	-32.2%	.13
DC	29.75	23.84	-5.91	-19.9%	.22
Total	41.30	37.11	-4.18	-10.1%	<.01

Calendar year (CY); Managed care organization (MCO); Per member per thousand (PKPY). A significance level of $P < .05$ was deemed statistically significant for all comparisons.

eAppendix Table 3. Association Between Postdischarge Engagement and 30-Day Readmission (2-group comparison)

MCO	No. of successful calls	Total Admits		No Readmit		Readmit		Stat. <i>P</i> ^a	Crude OR (95% CI)	Adjusted ^b OR (95% CI)
		#	%	#	%	#	%			
PA01	0	8,365	67.3	6,613	79.1	1,752	20.9	<.001	ref	ref
	≥1	4,059	32.7	3,410	84.0	649	16.0		0.72 (0.64–0.81)	0.64 (0.57–0.72)
PA02	0	2,524	60.5	2,219	87.9	305	12.1	.002	ref	ref
	≥1	1,647	39.5	1,499	91.0	148	9.0		0.72 (0.57–0.91)	0.66 (0.51–0.86)
LA	0	1,853	51.8	1,464	79.0	389	21.0	.003	ref	ref
	≥1	1,721	48.2	1,426	82.9	295	17.1		0.78 (0.64–0.95)	0.77 (0.63–0.94)
SC	0	2,492	51.9	2,005	80.5	487	19.5	<.001	ref	ref
	≥1	2,305	48.1	1,963	85.2	342	14.8		0.72 (0.59–0.87)	0.69 (0.57–0.83)
NE	0	137	56.1	120	87.6	17	12.4	.875	ref	ref
	≥1	107	43.9	93	86.9	14	13.1		1.06 (0.55–2.07)	NA (NA)
DC	0	841	59.2	689	81.9	152	18.1	.001	ref	ref
	≥1	579	40.8	512	88.4	67	11.6		0.60 (0.43–0.85)	0.61 (0.43–0.85)
Total	0	16,221	60.9	13,119	80.9	3,102	19.1	<.001	ref	ref
	≥1	10,418	39.1	8,903	85.5	1,515	14.5		0.72 (0.66–0.78)	0.67 (0.62–0.73)

^a P values for trend analysis. A significance level of P <.05 was deemed statistically significant for all comparisons.

^b Adjusted OR and 95% CI by age, gender, race, aid category, and risk scores.

eAppendix Table 4. Association Between Postdischarge Engagement and 30-Day Readmission (4-group comparison)

MCO	No. of successful calls	Total Admits		No Readmit		Readmit		Stat. <i>P</i> ^a	Crude OR (95% CI)	Adjusted ^b OR (95% CI)
		#	%	#	%	#	%			
PA01	0	8,365	67.3	6,613	79.1	1,752	20.9	<.001	ref	ref
	1	1,987	16.0	1,640	82.5	347	17.5		0.80 (0.69–0.92)	0.74 (0.64–0.85)
	2	956	7.7	797	83.4	159	16.6		0.75 (0.62–0.91)	0.71 (0.58–0.86)
	≥3	1,116	9.0	973	87.2	143	12.8		0.55 (0.46–0.68)	0.45 (0.37–0.56)
PA02	0	2,524	60.5	2,219	87.9	305	12.1	.016	ref	ref
	1	1,025	24.6	929	90.6	96	9.4		0.75 (0.58–0.97)	0.74 (0.56–0.98)
	2	318	7.6	292	91.8	26	8.2		0.65 (0.42–0.99)	0.59 (0.37–0.94)
	≥3	304	7.3	278	91.4	26	8.6		0.68 (0.44–1.05)	0.54 (0.34–0.83)
LA	0	1,853	51.8	1,464	79.0	389	21.0	.003	ref	ref
	1	692	19.4	559	80.8	133	19.2		0.90 (0.70–1.14)	0.92 (0.72–1.17)
	2	409	11.4	335	81.9	74	18.1		0.83 (0.62–1.11)	0.83 (0.62–1.11)
	≥3	620	17.3	532	85.8	88	14.2		0.62 (0.46–0.84)	0.59 (0.44–0.79)
SC	0	2,492	51.9	2,005	80.5	487	19.5	<.001	ref	ref
	1	739	15.4	586	79.3	153	20.7		1.07 (0.86–1.35)	1.03 (0.82–1.29)
	2	558	11.6	463	83.0	95	17.0		0.84 (0.65–1.10)	0.84 (0.64–1.09)
	≥3	1,008	21.0	914	90.7	94	9.3		0.42 (0.33–0.55)	0.39 (0.30–0.51)
NE	0	137	56.1	120	87.6	17	12.4	.813	ref	ref
	1	47	19.3	40	85.1	7	14.9		1.24 (0.45–3.38)	NA (NA)
	2	36	14.8	31	86.1	5	13.9		1.14 (0.40–3.23)	NA (NA)
	≥3	24	9.8	22	91.7	2	8.3		0.64 (0.15–2.82)	NA (NA)
DC	0	850	59.5	698	82.1	152	17.9	<.001	ref	ref
	1	292	20.4	250	85.6	42	14.4		0.77 (0.53–1.13)	0.78 (0.53–1.14)
	2	140	9.8	127	90.7	13	9.3		0.47 (0.26–0.86)	0.48 (0.27–0.88)
	≥3	147	10.3	135	91.8	12	8.2		0.41 (0.20–0.83)	0.40 (0.21–0.79)
Total	0	16,221	60.9	13,119	80.9	3,102	19.1	<.001	ref	ref
	1	4,782	18.0	4,004	83.7	778	16.3		0.82 (0.75–0.90)	0.80 (0.73–0.88)
	2	2,417	9.1	2,045	84.6	372	15.4		0.77 (0.68–0.87)	0.74 (0.65–0.84)
	≥3	3,219	12.1	2,854	88.7	365	11.3		0.54 (0.47–0.62)	0.46 (0.40–0.53)

^a *P* values for trend analysis. A significance level of *P* <.05 was deemed statistically significant for all comparisons.

^b Adjusted OR and 95% CI by age, gender, race, aid category, and risk scores.