

Patient Assignment and Quality Performance: A Misaligned System

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Patient assignment and patient attribution systems are designed by payers to identify the physician-patient relationship to designate physician accountability for the cost and quality of care as a mechanism to implement alternative payment models (APMs).^{1,2} The health care payment system is moving rapidly toward APM approaches, with 50% of Medicaid and commercial payers and 100% of Medicare payers expected to transition to APMs by 2030.³ A clear understanding by the physician regarding who is considered their patient is fundamental to effective patient management efforts and the success of APMs.⁴

Patient assignment and *patient attribution* are often used interchangeably,⁵ which obscures understanding of their implications for patient care management and accountability. However, the distinction between patient assignment and patient attribution is subtle but critical.

Payers prospectively assign patients to physicians during the performance period to assist physicians in identifying their patient population and facilitate proactive population health management efforts using 2 general approaches: (1) the patient selects a preferred physician, or (2) the payer automatically assigns the patient to the physician using a proprietary algorithm⁶ often based on geographic distance, clinic availability, and other elements at the time of enrollment.^{7,8} Payers separately attribute patients, almost always retrospectively, based on claims⁹ to establish accountability for a physician, which can involve unassigning patients well after the performance period has ended.¹⁰ The prospective patient assignment system is designed to help create a physician-patient relationship to maximize care management. The retrospective patient attribution system assesses the extent to which these physician-patient relationships occurred and reassigns patients to establish accountability for care. Complicating understanding of the physician-patient relationship, assignment and attribution are often used jointly, yet little is understood about the interplay between these 2 methods.

Patient assignment is an essential element for the successful implementation of value-based performance,¹¹ but it remains a relatively unstudied aspect of performance measurement,⁹ especially

ABSTRACT

OBJECTIVES: To assess the congruence between patient assignment and established patients as well as their association with Healthcare Effectiveness Data and Information Set (HEDIS) quality performance.

STUDY DESIGN: A retrospective cross-sectional analysis from January 2020 to February 2022.

METHODS: The study setting is a fully integrated health care delivery system in Phoenix, Arizona. The study population includes Medicaid patients who received primary care services or were assigned to a primary care physician (PCP) at the study setting by 5 Medicaid managed care organizations (MCOs). We identified 4 possible relationships between the established patients (2 primary care visits) and the assigned patients (assigned by the MCO to the study setting): true-positive, false-positive, true-negative, and false-negative classifications. Precision and recall measures were used to assess congruence (or incongruence). Outcome measures were HEDIS quality metrics.

RESULTS: A total of 100,030 Medicaid enrollees (adults and children) were established and/or assigned to the study setting from 5 separate payers. Only 15% were congruently established and assigned to the physician (true-positive). The overall precision was 21%, and the overall recall was 37%. The HEDIS quality performance was significantly higher ($P < .05$) for established patients for 5 of 6 metrics compared with patients who were not established.

CONCLUSIONS: The vast majority of assigned patients were not treated by the assigned PCP, yet better patient outcomes were seen with an established patient. As the health system rapidly adopts value-based payments, more rigorous methodologies are essential to identify physician-patient relationships.

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in complex multipayer and multiprovider systems. Existing literature is limited regarding the extent of patient assignment accuracy and its relationship with outcome measures.¹² In this study, we investigated the congruence between health plan patient assignment and established patients as well as the association between patient assignment and quality performance. We then discuss the implications of patient assignment incongruence on patient care management efforts, quality performance, and its relationship to patient attribution.

METHODS

Study Design

This was a retrospective cross-sectional study that analyzed data from January 2020 to February 2022 and was deemed exempt by the institutional review board of Arizona State University.

Setting and Study Population

This study was part of a broader program based on a Section 1115 Medicaid waiver and led by the Arizona Health Care Cost Containment System (AHCCCS)—Arizona's Medicaid program—to improve care quality. The study location was Valleywise Health (VH), a fully integrated health care delivery system located in Phoenix, Arizona, consisting of 3 behavioral health hospitals and 1 acute care hospital, which is a level 1 trauma center and teaching hospital with the second-largest burn center in the US. The VH primary care patient base consists of 11 health centers throughout the metropolitan area.

The study population included all Medicaid-enrolled patients who received primary care services from VH and/or were prospectively assigned to a VH primary care physician (PCP) or advanced practice provider (APP) by 5 Medicaid managed care organizations (MCOs) contracting with AHCCCS. Arizona is a mandatory Medicaid managed care state, which requires enrollees to select a managed care plan and PCP within 30 days; otherwise, an MCO and a PCP are automatically assigned.¹³ The Arizona Medicaid program supports the patient's freedom of choice, as AHCCCS-enrolled patients can see any PCP who is contracted with the MCO regardless of PCP assignment. The PCPs included physicians in family medicine, internal medicine, and pediatrics; residents in these 3 specialties; and family medicine-trained APPs, including nurse practitioners and physician assistants. Patient visits for specialty services were excluded. Patients new to AHCCCS did not have a claims history, so these newly enrolled patients were autoassigned to physicians based on geographic proximity and clinic availability.

Variables

The Section 1115 Medicaid waiver program included 6 National Committee for Quality Assurance Healthcare Effectiveness and Data Information Set (HEDIS) quality measures chosen by CMS for

TAKEAWAY POINTS

Patient assignment is a methodology to identify a designated physician for a given patient enrolled in a value-based payment program, which is a requirement of select Medicare programs, Medicaid managed care programs, and some commercial alternative payment models (APMs).

- ▶ The findings indicate a significant lack of congruence between patient assignment and performance on quality metrics.
- ▶ Physicians need to receive accurate and timely information regarding their patient panel to effectively manage patient care, a precursor to being held accountable for care delivered.
- ▶ This study highlights the challenges faced by physicians in determining their assigned patients for APMs and the implications for incentive payments.

a multiyear project by the Arizona Medicaid program to integrate primary care and behavioral health: (1) follow-up after hospitalization for mental illness within 7 days post discharge, (2) follow-up after hospitalization for mental illness within 30 days post discharge, (3) diabetes screening for people with schizophrenia or bipolar disorder who are using antipsychotic medications, (4) well-child visits in the first 15 months, (5) one or more well-child visits for children aged 3 to 6 years, and (6) adolescent well-care visits.¹⁴

Measurement

We defined an established patient as an AHCCCS-enrolled individual who had at least 2 primary care visits during the study period (January 1, 2020–February 6, 2022) as determined from the VH electronic health record; an assigned patient was defined as a patient prospectively assigned by a health plan to VH using the June 2022 PCP assignment files from the 5 MCOs. There is no common definition regarding how to define an established patient.^{15,16} However, annual health checks centered on preventing illness^{17–19} are associated with increased chronic disease treatment²⁰ and promote trusting therapeutic physician-patient relationships.²¹

We investigated the congruence between the MCO PCP assignment files and the patients established at VH. AHCCCS defines a provider as a group of PCPs that operates under 1 Taxpayer Identification Number (TIN). We identified 4 possible relationships between the established patients and the assigned patients. A congruent relationship is one in which the established and assigned categories are aligned. An incongruent relationship is one in which the established and assigned categories are not aligned. From these definitions, we could generate the true-positive (TP), false-positive (FP), true-negative (TN), and false-negative (FN) classifications, shown in **Table 1**. Precision ($TP / [TP + FP]$) and recall ($TP / [TP + FN]$) measures were used to assess congruence (or incongruence). In the context of this study, precision is the established and assigned patients as a percentage of all assigned patients and recall is the established and assigned patients as a percentage of all established patients.

Data Sources

We used 3 data sources. First, the patient assignment data were transmitted from each MCO in a PCP assignment file that included the name and demographic data of all patients assigned to a PCP

TABLE 1. Definitions for Established and Assigned Classifications

	Assigned patient	Not assigned patient
Established patient	True-positive (TP)	False-negative (FN)
Not established patient	False-positive (FP)	True-negative (TN)

FN, false-negative; FP, false-positive; TN, true-negative; TP, true-positive.

TABLE 2. Population Characteristics for Established and Assigned Patients

Characteristics	Established	Assigned	Total
Sex			
Male	18,867 (46%)	35,744 (48%)	54,611 (47%)
Female	22,565 (54%)	38,189 (52%)	60,754 (53%)
Total	41,432 (100%)	73,933 (100%)	115,365 (100%)
Race distribution			
White	21,162 (51%)	38,871 (53%)	60,033 (52%)
Black	7274 (18%)	13,629 (18%)	20,903 (18%)
Hispanic	5808 (14%)	8761 (12%)	14,569 (13%)
Native American	1001 (2%)	3032 (4%)	4033 (3%)
Other or unknown race	6187 (15%)	9640 (13%)	15,827 (14%)
Total	41,432 (100%)	73,933 (100%)	115,365 (100%)
Age			
Pediatric	17,285 (42%)	36,467 (49%)	53,752 (47%)
Adult	24,147 (58%)	37,466 (51%)	61,613 (53%)
Total	41,432 (100%)	73,933 (100%)	115,365 (100%)

TABLE 3. Patient Classification by Payer (January 2020-February 2022)

Payer	True-positive	False-negative	False-positive	Total	Recall	Precision
A	1873 (22%)	4098 (48%)	2618 (30%)	8589 (100%)	31.4%	41.7%
B	588 (13%)	2430 (56%)	1379 (31%)	4397 (100%)	19.5%	29.9%
C	4226 (10%)	10,350 (25%)	26,531 (65%)	41,107 (100%)	29.0%	13.7%
D	230 (6%)	2067 (54%)	1507 (40%)	3804 (100%)	10.0%	13.2%
E	8418 (20%)	7152 (17%)	26,563 (63%)	42,133 (100%)	54.1%	24.1%
Total	15,335 (15%)	26,097 (26%)	58,598 (59%)	100,030 ^a (100%)	37.0%	20.7%

^aThe total of 100,030 patients differs from the 115,365 patients in Table 2, which is related to the 15,335 true-positives where the number of assigned and established patients overlaps.

as of June 1, 2022, as well as the assigned PCP TIN. Second, data for established patients were obtained from the VH electronic health record from January 2020 to February 2022. Third, Medicaid claims data were used to analyze quality performance.

Statistical Analysis

We calculated the quantity of patients in each category in Table 1 from the payer assignment roster and the VH established patient report for each MCO. The statistical significance for the patient classification categories was determined using a z test. The quality measures for the 3 classification categories (TP, FN, and FP) were then estimated, and 95% CIs were calculated. TNs were not calculated because the patients not assigned and not established at VH represented the remaining universe of Medicaid patients.

RESULTS

A total of 115,365 AHCCCS enrollees (adults and children) were established and/or assigned to the study setting from 5 separate payers. Table 2 describes sex, race, and age distribution for established and assigned patients.

Table 3 summarizes the number of patients and their respective classification categories for each Medicaid payer. A total of 73,933 (15,335 TP + 58,598 FP) patients were assigned to VH. Of those, 21% (15,335) were established at VH and 79% (58,598) were not, demonstrating a significant and large difference (z test, $P < .05$). Conversely, 41,432 (15,335 TP + 26,097 FN) total patients were established at VH. Of those, 37% (15,335) were assigned to VH and 63% (26,086) were not, demonstrating a significant and large difference (z test, $P < .05$). The overall precision was 21% (range, 13%-42%), and the overall recall was 37% (range, 10%-54%).

The TP classification (assigned and established) was 15%, ranging from a low of 6% (plan D) to a high of 22% (plan A). The FN classification (established but not assigned) was 26%, ranging from a low of 17% (plan E) to a high of 55% (plan B). The FP classification (assigned but not established) was 59%, ranging from a low of 30% (plan A) to a high of 65% (plan C).

Table 4 further explores the 58,598 FP classifications for the 6 HEDIS metrics according to 3 categories: (1) *other PCP utilizer*, defined as a patient who did not have a visit at the study setting but had at least 1 visit with another PCP (n = 32,298; 55.1%); (2) *non-PCP utilizer*, defined as a patient who did not engage in PCP services with any PCP (n = 24,716; 42.2%); and (3) *VH utilizer*, defined as a patient with 1 visit only with a PCP at the study setting (n = 1584; 2.7%). The performance on the 6 HEDIS metrics is shown in Table 4 for each of these 3 categories. This analysis spanned January 2020 to January 2022; we do not expect substantial differences from the January 2022 to February 2022 time frame.

The Figure shows the relationship between patient assignment classification and our 6 HEDIS quality measures. It indicates that the performance for established patients (TP and FN) was significantly higher ($P < .05$) for 5 of 6 HEDIS measures compared with patients who were not established (overall FP). The Figure also shows an analysis of 2 FP categories: other PCP utilizer and non-PCP utilizer (VH utilizers were 1.2% of the FP population and not included). The quality performance for the FP other PCP utilizer category was significantly lower than that for the established patients (TP and

FN) for 5 of the 6 HEDIS metrics, and the quality performance for the FP non-PCP utilizer category was significantly lower for all HEDIS metrics.

DISCUSSION

These study findings have 3 important implications. First, the findings highlight the challenges for physicians in determining their patients for value-based payment arrangements. The lack of congruence between established and assigned patients among the 100,030 patients in this study is staggering; only 15% (n = 15,335) were congruently established and assigned to the physician (TP). Moreover, the precision and recall over all payers was only 21% and 37%, respectively. Looking closer at the 59% (n = 58,598) of FP classifications, 61% went to other PCPs, and 37% were not seen by any PCPs. These findings are consistent with previous research indicating that congruence of assignment and attribution is poor and unreliable.^{1,22-27} This misaligned system seriously hinders a physician's ability to conduct meaningful care management coordination.

Second, HEDIS outcomes were significantly better ($P < .05$) for established patients (TP and FN) for 5 of the 6 HEDIS metrics compared with assigned patients who were not established (FP). The results also indicate that patients with no PCP had the lowest performance on all 6 HEDIS metrics, at less than 2% for the 3 well-child metrics and significantly lower for the 3 behavioral health metrics (diabetes screening at 55.1%, follow-up after hospitalization for mental illness within 7 days at 15.3% and within 30 days at 26%).

Third, there is a large range within each patient assignment category among the 5 MCOs: specifically, a 3.6-fold difference from low to high in the TP category, a 4.0-fold difference in the FN category, and a 2.2-fold difference in the FP category. This suggests that MCO patient assignment accuracy can be improved, which is associated with better HEDIS care quality metrics.

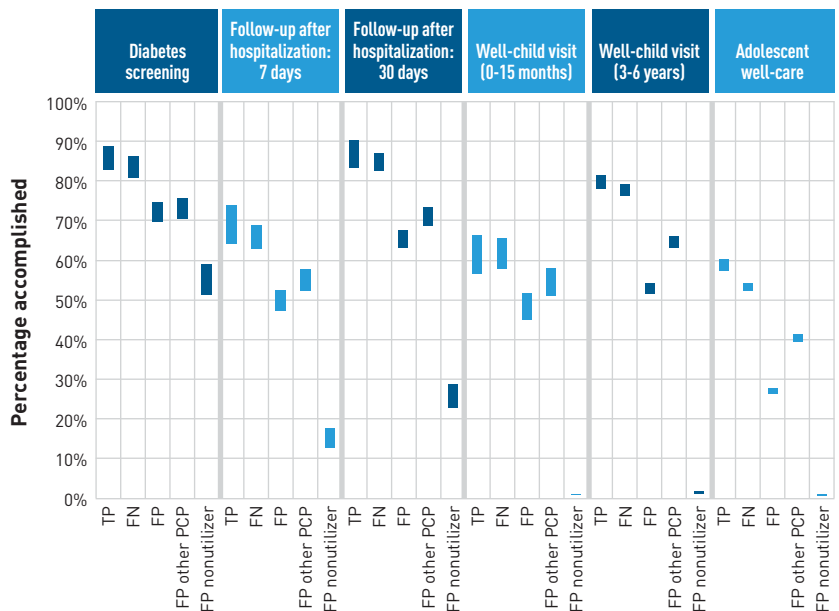
The TP classification (established and assigned) represents a congruent relationship in which a physician can proactively manage care of the patient and be held accountable for quality and cost under value-based arrangements. Only 15% (n = 15,335) of patients experienced this congruent relationship. The poor precision and recall suggest that

TABLE 4. False-Positive Assignment Classification and HEDIS Quality Performance (January 2020-January 2022)

	Other PCP utilizer	Non-PCP utilizer	VH utilizer	Total
Overall denominator, n (%)	32,298 (55.1%)	24,716 (42.2%)	1584 (2.7%)	58,598 (100%)
Quality performance				
Diabetes screening for people with schizophrenia or bipolar disorder using antipsychotic medications	505/693 (72.9%)	27/49 (55.1%)	11/11 (100%)	543/753 (72.1%)
Follow-up after hospitalization for mental illness within 7 days	470/855 (55.0%)	20/131 (15.3%)	9/12 (75.0%)	499/998 (50.0%)
Follow-up after hospitalization for mental illness within 30 days	607/855 (71.0%)	34/131 (26.0%)	12/12 (100%)	653/998 (65.4%)
Well-child visit (0-15 months)	298/546 (54.6%)	0/69 (0%)	2/7 (28.6%)	300/622 (48.2%)
Well-child visit (3-6 years)	1935/2992 (64.7%)	10/701 (1.4%)	69/123 (56.1%)	2014/3816 (52.8%)
Adolescent well-care visit	2892/7163 (40.4%)	38/3998 (1.0%)	204/515 (39.6%)	3134/11,676 (26.8%)

HEDIS, Healthcare Effectiveness and Data and Information Set; PCP, primary care physician; VH, Valleywise Health.

FIGURE. HEDIS Quality Performance Based on Assignment Classification



FN, false-negative; FP, false-positive; HEDIS, Healthcare Effectiveness and Data and Information Set; PCP, primary care physician; TP, true-positive.

prospective patient assignment methodologies have little bearing on proactive care management or provider accountability. This raises important concerns regarding patient assignment methods to effectively identify patients for outreach, engagement, and

population health management efforts and to provide ongoing evaluation of performance.

The FN classification (established but not assigned) ascribes patient care management to another physician rather than the established physician. Although 26% (n = 26,097) of patients were established at the study setting, they were assigned to a physician in another system. The assignment methods may not be sufficiently sensitive to identify the physician who is treating the patient. Although retrospective attribution of patients might eventually match the patient to the physician who provided care, the physician providing care (and potentially the patient) receives mixed signals during the performance period.

The FP classification (assigned but not established) constitutes the most problematic category. Patient assignment methods are designed to assist the physician in conducting proactive population health management efforts. The goal of the patient assignment system is to create a physician-patient relationship. However, the study findings indicate that the majority (61%) of the FP patients were already established with another physician, causing confusion, duplication of efforts, and waste to both parties when contacted by the assigned clinic. Conversely, 37% of FP patients were not engaged in any primary care services. This pool of unengaged patients is masked by the current patient assignment system. A more accurate patient assignment system would better facilitate targeted efforts to outreach to patients who do not engage with a plan-assigned provider to form an established relationship.

There are numerous barriers to improving care at the clinic level, such as social determinants of health, a fragmented delivery system, and physician shortages. Improving the accuracy of the patient assignment system is one of many efforts needed to improve quality.

Patient assignment and attribution methods constitute important design components in value-based payment models. A more congruent patient classification will improve alignment between the assignment and attribution processes and strengthen the validity of patient panels. Finally, the interplay between patient assignment and patient attribution is poorly understood.

Limitations

This study is based on an integrated multispecialty delivery system that provides care to a large Medicaid-enrolled population in Arizona. Although this limits the generalizability, it does not change the main implications that misalignment in patient assignment is substantial. This analysis focuses on patient assignment using a single assignment file (June 2022) from 5 health plans. We used the June 2022 MCO assignment file delivered to the care system 5 months following the study period. Future studies should investigate the impact of assignment files from different time periods throughout the performance period and the impact of enrollment changes to the patient assignment list.

For this study, we created the definitions of an established patient based on the literature, and the classification assignment framework (TP, FP, and FN) was adopted from the confusion matrix

used to evaluate classification models.²⁸ We did not control for differences in the PCP assignment methodologies among the 5 health plans, which are proprietary. Additionally, it is possible for a patient classified as TP to also receive 2 or more visits from another provider(s). However, this study did not explore whether patients who were considered established and assigned (TP) also had PCP visits at other entities. Future research should further study each classification category of patient assignment. We used a 2-year measurement period (January 1, 2020–February 6, 2022), so results may differ based on the study length. Finally, the confounding effects of the COVID-19 pandemic were not controlled for, and resulting factors such as maintenance of eligibility, changes in prevalence and complexity of medical needs, and availability of the care management workforce could not be considered. Future studies should examine the impact of COVID-19 upon assignment, attribution, and performance outcomes.

CONCLUSIONS

This study focused on patient assignment, a methodology used by health plans to identify a designated physician for a given patient enrolled in a value-based payment program²⁹ and a requirement of the Medicare Shared Savings Program^{30,31} and mandatory Medicaid managed care programs.³² The findings indicate that the vast majority of assigned patients are not treated by the assigned physician and that the best predictor of HEDIS patient outcomes is being an established patient. However, only 15% of the patients in our population were congruently aligned as an established and assigned patient. This misalignment creates confusion for physicians and patients, compromises care management activities, and is not effective to activate unengaged patients.

Value-based payment models are designed by MCOs to create physician accountability for care management with incentives or penalties based on performance. These findings indicate that patient assignment lacks congruence, recall, and precision. Unless the initial prospective assignment is accurate, physicians are unable to effectively manage care for their patients. As the health system rapidly adopts APMs, the alignment between patient assignment and established patients will become indispensable, requiring more rigorous methodologies to successfully achieve the goal of improved quality and lowered total cost of care.

The current patient assignment system does not sufficiently advance the goal of APMs. A system that imposes accountability on physicians for care outcomes but is misaligned erodes confidence in value-based payment models. We recommend establishing a comprehensive health plan and physician steering committee to fully explore mechanisms that optimize TP classifications, which are related to significantly better HEDIS performance, while minimizing FP and FN classifications. Physicians need to receive accurate and timely information regarding their patient panel to effectively manage patient care, a precursor to being held accountable for care delivered. ■

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