

Leveraging Predictive Analytics to Target Payer-Led Medication Adherence Interventions

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ABSTRACT

This article examines how predictive analytics can enhance payer initiatives to improve medication adherence. Despite its known impact on health outcomes and costs, medication nonadherence remains a widespread and persistent challenge in health care. Although payers are increasingly involved in addressing nonadherence, traditional approaches typically lead to suboptimal results due to their reactive nature and generic intervention.

With improved access to data and more sophisticated machine learning tools, there is a growing opportunity for payers to use predictive analytics to stratify and target members at high risk, predict potential primary and secondary nonadherence, and preemptively intervene with tailored solutions.

The potential benefit of this approach includes prevention, not only resolution, of nonadherence and leads to improved health outcomes, reduced health care costs, and increased member satisfaction. The article also discusses potential caveats to consider, such as data sharing, bias mitigation, and regulatory compliance, when implementing predictive analytics in this context.

MEDICATION NONADHERENCE HAS persistently remained an unmet challenge affecting health outcomes and patients' quality of life. A large body of evidence links poor medication adherence to increased risk of disease progression, hospitalization, and thereby health care costs.¹⁻³ In 2024, the total costs of unnecessary medical expenditures resulting from nonadherence are estimated at approximately \$300 billion, representing more than 30% of the total waste (excluding fraud and abuse) in the health care system.⁴

Historically, payers' role in ensuring adherence has been largely limited to making medicines more affordable to their members, but the increasing adoption of value-based care as well as incentivization through programs such as the Healthcare Effectiveness Data and Information Set (HEDIS) and Medicare Advantage (MA) Star Ratings have prompted a more proactive approach. With the rise of payer-led care management, especially among the larger players, payers have started building care teams of health care professionals, such as nurses, pharmacists, and therapists. These teams are typically notified of nonadherence events, among other gaps in care, through claims data and help members address the causes behind nonadherence.

LIMITATIONS OF THE CURRENT APPROACH

Payer-led care management interventions, although more impactful than no intervention, can face effectiveness challenges. First, they tend to be retrospective, in that they address nonadherence after it occurs. Moreover, there can be a considerable lag between the nonadherence event and the time when payers receive claims data and act upon the information. This delay can worsen the chronic condition and in some advanced conditions can lead to severe consequences such as hospitalization or emergency department visits.⁵

Second, current outreach is typically generic and does not proactively account for the specific causes behind nonadherence. For instance, intervention for nonadherence due to a member's difficulty in remembering a complex medication regimen would be different from that due to difficulty in getting a specialty drug fill. However, these specific reasons are often determined only after the initial member outreach, leading to further delays in addressing the issue.

PREDICTIVE ANALYTICS AS A POTENTIAL SOLUTION

Payers can enhance their outreach by leveraging machine learning and predictive analytics and preemptively targeting members at high risk with tailored interventions during their key moments of influence. This would require analyzing existing clinical and claims data to predict members prone to specific challenges leading to nonadherence and addressing such issues before the nonadherence occurs. For example, members with chronic diseases, such as hypertension, are more prone to nonadherence when they do not experience immediate symptoms.⁶ Payers can predict such nonadherence by considering the specific chronic conditions and time since prescription, among other data variables.

To predict nonadherence events effectively, payers need to carefully select relevant data variables. Prediction of primary and secondary medication nonadherence may require analysis of distinct data variables. For context, primary medication nonadherence occurs when a new prescription is not filled within an acceptable time frame. This includes prescriptions presented at the pharmacy or electronically prescribed by the provider, as well as the ones that are not received by the pharmacy.⁷ Reasons for primary nonadherence can be member based (eg, cost, logistics, lack of understanding) or accessibility based (eg, pharmacy availability). Member-based causes can be predicted by using members' demographic, socioeconomic, and well-being characteristics, gathered from sources such as claims, Medicaid eligibility, and geographic data. Post prediction, interventions such as providing low-cost drug alternatives or education on the importance of medication can address member-based causes. The accessibility-based causes can be predicted by analyzing data variables including ease of drug access (eg, specialty drugs can be more difficult to access), pharmacy availability or mail order services in the member's residential location, and history of drug shortages at the pharmacy. Interventions such as providing transportation or setting up mail delivery can help resolve these causes.⁸

Secondary nonadherence measures lack of prescription refills among members and implies members taking insufficient doses required to experience a therapeutic effect, missing doses, or discontinuing therapy early.⁹ Secondary nonadherence impacts a health plan's clinical quality and cost goals, and in case of MA plans also affects the MA Star Ratings performance. For context, the 3 medication adherence measures for diabetes, hypertension, and cholesterol not only are triple weighted in the MA Star Ratings, but they also impact several measures in Part C and Part D.¹⁰

Secondary nonadherence typically denotes a member's intrinsic difficulties in adhering to medication and can be predicted by analyzing data variables such as potential adverse effects of medication, complexity of the dosing regimen, presence of multiple morbidities, counteraction of existing drugs, behavioral health assessments, and past adherence behavior. As for primary adherence, demographic and socioeconomic variables can help inform potential secondary nonadherence. Interventions such as offering once-daily formulations, explaining the necessity of prescribed adherence, or downloading digital reminders can address the underlying causes.¹¹


LIMITATIONS AND CAVEATS

Access to comprehensive and timely member data is crucial for robust analytics and accurate predictions. This entails that, alongside claims data, payers require access to clinical (including pharmacy, ambulatory care, and hospital) and demographic data. Although data sharing and interoperability remains a challenge,¹² payers increasingly have more access to member data given the sustained push for better data gathering and sharing. Sources of payer data include their own initiatives, such as member surveys, as well as other health care stakeholders (eg, data shared for diagnosis-related group/post-payment audits or HEDIS/risk adjustment reviews).

The other caveat for payers when leveraging predictive analytics is to ensure bias mitigation and regulatory compliance. Uncareful data usage for algorithm-based decision-making can unintentionally perpetuate existing social inequalities (eg, stratifying low-income members as low risk because they do not incur high medication costs).¹³ CMS has issued rules and guidance that require MA plans to ensure that their algorithmic tools are not perpetuating or exacerbating existing or new biases.¹⁴ Although these rules primarily address machine learning-based member discrimination for utilization management and prior authorization issues, a related instance in care management might also have adverse consequences. Preventing such bias can include steps such as ensuring usage of a holistic data set that has adequate sampling from the underrepresented groups and using nuanced algorithmic logic (eg, not using cost or high utilization as proxies to predict need to intervene, as this may deny care to members who were already receiving insufficient care).¹⁵

CONCLUSIONS

Medication adherence is crucial for improving member health outcomes and reducing costs. Predictive

algorithms can help identify nonadherence factors and underlying conditions, enabling payers to prioritize and implement tailored interventions. By building comprehensive data sets and refining machine learning logic, payers can more effectively improve adherence among their member populations. 

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