



The Power of Predictive Simulation:

Choosing the Best Strategy to Improve
Medication Use



Making Medication Adherence a Priority

As the healthcare system continues to shift towards a quality- and outcomes-based payment model, health plans have to be focused on those areas that have significant bearing on measurement criteria. Because of its impact on a variety of performance-based metrics - from management of chronic diseases to reduction in hospital readmissions - medication adherence needs to be a critical part of health plans' quality improvement strategies. But the statistics on medication adherence are daunting. Medications are not continued as prescribed in about 50% of cases, according to a 2013 Centers for Disease Control and Prevention (CDC) presentation, and 20-30% of prescriptions are never filled.¹

For health plans that are able to lift medication adherence rates for members, there are opportunities to boost revenue, improve enrollment, and influence marketplace reputation through quality measure programs such as CMS's Medicare Advantage Star Ratings Program and NCQA's HEDIS Program. The Star Ratings program, which was designed to help consumers compare Medicare Advantage health plans based on quality and performance, rewards top-performing plans with quality bonus payments and year-round member enrollment.

Data is showing that seniors are utilizing publicly-available information including Star Ratings in selecting their Medicare Advantage plan. According to CMS, by 2014 53% of Medicare Advantage enrollees were in plans with four or more stars compared to only 24% in these higher-rated plans in 2011.² As CMS continues to educate consumers on quality and make this information more transparent, plans with 4 or 5 stars have a distinct, highly-visible marketing advantage over their lower-rated competitors.

¹ <http://www.cdc.gov/primarycare/materials/medication/docs/medication-adherence-01ccd.pdf>

² <http://www.forbes.com/sites/brucejapsen/2014/05/10/seniors-flock-to-star-rated-medicare-plans-under-aca-rollout/>

The Role of Medication Adherence in Quality Performance Metrics

Quality-based measurement programs such as Medicare Star Ratings and HEDIS are highly focused on improving population-level adherence to chronic disease medications:

Medicare Stars: Three pharmacy-related measures for medication adherence – diabetic medications, hypertension medications and cholesterol lowering medications (statins) – are triple-weighted and make up approximately 12% of the overall Medicare Star Rating score in the 2015 calendar year measurement period (the 2017 Star Program).

HEDIS: Approximately 40% of Effectiveness of Care measures are related to medication adherence and proper pharmacological treatment for a wide range of conditions, including depression, schizophrenia, asthma and diabetes.

In addition to medication adherence measures, other Medicare Part C measures, such as reducing readmissions (another triple-weighted Stars measure) and reducing the risk of falling, are impacted by compliance with medication therapies. For instance, CMS estimates that 11% of hospital readmissions occur because of medication non-adherence, costing the U.S. healthcare system nearly \$100 billion annually.³ Seniors who are non-adherent to their medication regimen experience a 50% higher likelihood of suffering a fall than those who are adherent.⁴ And non-adherent patients are 17% more likely to be hospitalized than adherent patients, with a cost that exceeds that of an adherent patient by \$3,575.⁵ Health plans stand to benefit not only from reaping quality performance dollars but also from reducing unnecessary utilization and costs.

³ <http://www.mcknights.com/marketplace/medication-adherence-strategies-for-lowering-hospital-readmission-rates/article/268557/>

⁴ <http://www.news-medical.net/news/20100520/Non-adherence-to-medication-increases-risk-of-falling-in-older-adults.aspx>

⁵ <http://hin.com/blog/category/reducing-readmissions/>

Creating an Effective Medication Adherence Initiative

Given the importance of implementing a medication adherence program, the question becomes how does the health plan's executive team select the appropriate interventions and apply them at the right time to the right members to boost adherence rates? And, of course, this all needs to be considered within the context of existing constraints including budget, internal resources, vendor capacity, and more.

There are a wide variety of intervention options in the marketplace. Email and interactive voice response (IVR) are inexpensive but not as effective as more personal, high-touch interventions such as live calls from physicians or pharmacists. The chart below illustrates this correlation between "intervention cost" and "intervention effectiveness" for some frequently-used outreach types. Not only do the cost and effectiveness vary across intervention types, they

also vary *within* an intervention mode. Population-based characteristics or behaviors come into play; for instance, a Medicaid population may have a lower valid phone number rate than a commercial population that is readily reached by phone. And on the cost side, there may be variations in vendor pricing or fee structures. If internal teams are used for outreach, there are considerations of resource allocation, efficiency and cost effectiveness.



Unfortunately, it can be difficult for health plans to evaluate and compare vendors' claims regarding expected results of outreach programs. Not only do the methodologies for calculating outcomes vary by vendor, but results can differ significantly depending on the population, script, and time of year delivered. In particular, RxAnte has found great variation in expected outcomes depending on how likely the targeted patients are to adhere to their medication regimens *without intervention*. For instance, outreach to a population that is highly likely to be adherent would not see much lift in adherence rates (or ROI) because these members were already likely to fill their prescriptions and be compliant on their own. Similarly, outreach to patients who are highly *unlikely* to take their medications will not result in adherence rate improvement, even with powerful, high-touch interventions. In order to be effective, interventions must be deployed to those patients where they have the greatest potential to make an impact.

With a myriad of intervention options, disparities among member populations, and uncertainty about outcomes, executives face an imposing list of questions when designing adherence improvement programs.

Some plans may have previously established goals, for instance getting 85% of their patients in a 4 or 5 Star Plan by year end, and need to know if this objective is achievable under their current intervention plan. Others may want to see what incremental benefit they would realize if additional dollars were allocated for outreach, furnishing them data to support program expansion.

RxAnte can help executives extrapolate projected outcomes for their adherence intervention programs, enabling them to set realistic expectations with their leadership, vendors and internal outreach teams. In addition, RxAnte's predictive modeling and advanced analytics allow health plans to simulate thousands of possible outcomes scenarios that can happen in the real world, providing answers and direction for their program design/implementation process.

Choosing Interventions	<ul style="list-style-type: none"> › Do we have the right interventions in our toolkit? › Are there other interventions we should consider adding? › How can we adjust our strategy to change our expected outcome?
Managing Budget	<ul style="list-style-type: none"> › What will it cost to achieve our desired adherence lift? › How much adherence lift can I expect with my budget? › How much of each intervention do I need to deploy?
Setting Expectations	<ul style="list-style-type: none"> › What realistic expectations should I set with my leadership? › What capacity expectations should I set with my outreach teams and vendors?

RxAnte's Approach

Understanding this variability – in populations, costs, and even timing of outreach efforts – and the associated risk is key to developing an effective outreach program. RxAnte simulates possible “bundles” of interventions – along with estimates of their associated cost, effect and volume – all based on the health plan's unique situation. These inputs include: the health plan's desired outcomes and goals; the health plan's capacity and business rule constraints (i.e. patient exclusion reasons); unit cost of interventions to be deployed; and intervention performance benchmarks. This simulation method combines RxAnte's predictive analytics and the actual real-world constraints the health plan faces.

A Predictive Model for Medication Adherence

As a first step in the process, RxAnte establishes an RxAnte Adherence Score™ for each patient within the population based on existing claims data: patient demographics (age, gender, zip code), attributes of health status (interactions with the healthcare system, current diagnoses) and attributes of the patient's medication regimen (benefit level/copays, complexity of regimen, side-effects). The RxAnte score ranges from 0 (definitely *will not* be adherent) to 100 (definitely *will* be adherent). These scores change over time, and RxAnte regularly rescores the population to account for changes in behavior and other factors.

Within the health plan's underlying population, there will be individuals who will be adherent to their medication regimen without intervention, individuals who will not be adherent regardless of the level of intervention they receive, and individuals who are still “on the fence” – it is uncertain whether they will be adherent over the measurement period. If the health plan knows which members are already very likely to be adherent, it can use minimal or no intervention. Likewise, resources do not need to be put towards members who are very likely to be non-adherent – even costly, personalized interventions will not be successful in converting this group. On the other hand, if the health plan can identify those members whose future adherence is uncertain, targeted intervention programs can have a positive impact on medication adherence metrics.

Advanced Simulation Techniques Maximize ROI and Outcome Success

An individual's RxAnte Adherence Score™ estimates the likelihood of medication adherence at a particular point in time, but there are numerous factors that affect a population's adherence rate over the measurement period. Population attributes, geographic variations, outreach type, and deployment timing all influence outcomes. RxAnte's simulation technology iterates thousands of possible combinations of available interventions across the risk profiles of the individuals within the population.

RxAnte's experience in studying intervention programs has resulted in extensive data on adherence improvement (conversion rate) by intervention type for patients with

specific risk profiles. This puts RxAnte in the unique position of being able to estimate the *expected improvement for a specific patient* based on their *particular risk profile*, giving the health plan a more realistic, accurate assessment than simply applying a standard effectiveness rate over the entire population can provide.

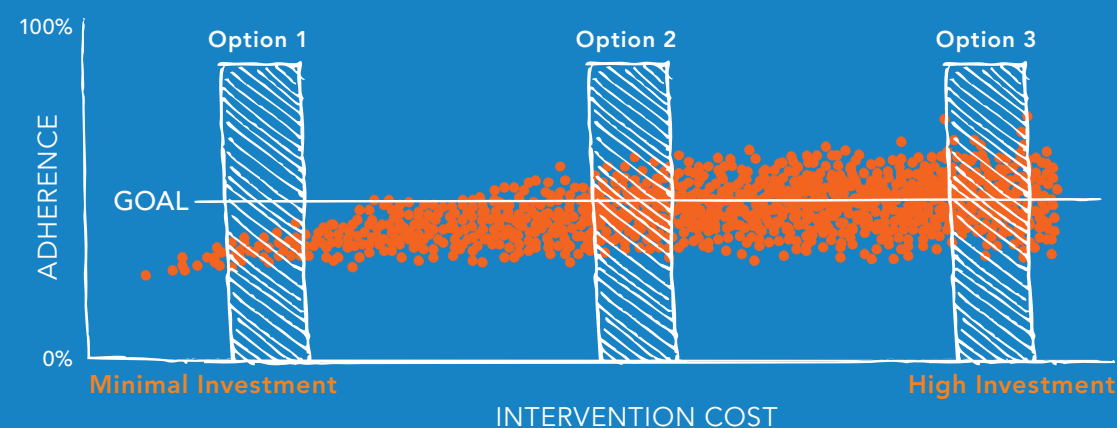
In the graph below, each orange dot represents a unique intervention strategy – or “bundle” of therapy outreach types, volume of intervention efforts, deployment modes and times, and vendors/contracted pricing. The intervention sets on the far left side of the scatter plot might target only the top prospects for intervention within the population; this is a lower overall investment for the health plan but won't reach the defined adherence goal.

Going deeper within the population, with more extensive interventions, increases costs but lifts adherence rates, represented by the “bundles” in the middle and right side of the chart.

At a certain point, the upward arc formed by thousands of permutations of intervention arrays begins to flatten out, and high-impact, high-cost interventions have no added benefit in improving adherence rates. By understanding where this point of diminishing returns occurs, executives are in a much better position to formulate an evidence-based intervention plan that balances adherence lift objectives with intervention program costs.

Based on the simulation results, RxAnte collaborates with the health plan to customize an intervention plan. Because the simulation findings are generated within the context of the health plan's specific member population – and take into account defined policies and/or limits of the organization – executives have a realistic picture of how many patients will need to be converted to reach objectives and how expected results compare to current quality measure thresholds. In addition, RxAnte calculates the point where the expected outcome and cost curves intersect and maximize ROI. Finally, the company highlights specific strategies for achieving the best results, which might include prioritizing certain therapy areas; focusing on particular regions, markets or populations; and adjusting capacity or business rule constraints.

ADVANCED SIMULATIONS HELP TO BALANCE THE PROBABILITY OF ACHIEVING DESIRED OUTCOMES AGAINST THE COST TO DEPLOY INTERVENTIONS



⏪ In this example, Option 1 might represent 15,000 pharmacist calls, 30,000 nurse calls and 20,000 refill reminders, while Option 2 might represent 25,000 pharmacist calls, 40,000 nurse calls and 80,000 refill reminders. Of course, within these options, there are hundreds of ways these interventions can be deployed – to identified population segments, at certain times of the year, at particular times of the day, for specific therapies, using a given vendor, etc. Balancing cost and efficiency with the likelihood of achieving the goal indicates selecting Option 2.

Considerations

There are numerous interventions available to improve medication adherence, and a wide variation in cost and effectiveness both *between* intervention types and *within* delivery modes. In order to make strategic decisions about development of intervention programs, health plans need to understand how to effectively measure and model all aspects of this variability. And it needs to be done in the context of the health plan's own realities, constraints and business rules.

Predictive analytics are the cornerstone of an effective medication adherence program. Only by measuring the likeliness of adherence at the *individual patient level* can the plan truly understand the underlying risk of the population. Applying a universal adherence rate across a broad population is not enough. To make this intelligence actionable, though, predictive analytics must be coupled with advanced simulation methodologies. By mimicking the wide range of implementation options and extrapolating the expected outcomes for each set of outreach efforts, RxAnte gives its health plan clients a realistic framework for decision making. Conducting this critical forecasting

phase prior to developing a medication adherence program puts the health plan in position to:

- 1 Understand the tactics and investment required to achieve desired adherence goals.
- 2 Develop realistic, viable budgets and financial plans.
- 3 Optimize the mix and volume of interventions and clinical programs within identified parameters.
- 4 Provide upper management, internal support teams, and vendors with an evidence-based assessment of baseline and projected adherence rates.
- 5 Meet quality improvement and performance objectives.

Simulation allows for more informed, educated decisions about how to spend budget dollars to maximize outcomes and set reasonable expectations about what goals are attainable. RxAnte's solution takes the guesswork out of the intervention planning process, eliminating surprises down the road.

About RxAnte

RxAnte is the leading platform for improving medication use and drug therapy outcomes through predictive analytics and targeted clinical programs. Its innovative analytics platform is transforming how organizations work with healthcare professionals, care management intervention providers, and patients to promote the safe and effective use of prescription medications. Created by experts in advanced analytics, medication adherence, health IT, and quality improvement, RxAnte offers patent-pending platforms that include predictive and decision analytics, advanced program evaluation methods, and an innovative platform for provider engagement.

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