

Case Studies

Using Predictive Analytics in Healthcare to Forecast 87% of Sudden Death Events

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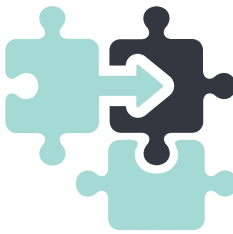


Abstract

Our health plan client had been outsourcing their Medicaid analytics and risk stratification for a particular state. There were concerns regarding the viability of produced results in facilitating effective care management practices.

The client needed a way to develop prescriptive paradigms for care management, which embodied predictive abilities that went beyond rule-based stratification of member-specific risks.

SDLC Partners not only empowered the client with the know-how to insource Medicaid analytics and risk stratification, but developed rapid prototypes of sophisticated machine learning models that offered unparalleled prescriptive augmentations to guide care management practices with demonstrated predictive power based on testing against retrospective data.



The Challenge

This payer was relying on outsourced analytics and risk stratification to fuel population health and care management outreach to a particular state’s Medicaid members.

Further, the deterministic nature of the outsourced risk stratification process – which was based primarily on claims-driven diagnosis codes – was found wanting in terms of an ability to predict adverse events like unanticipated death investigation alerts or effectively curb opioid / substance abuse.

The client needed a way to develop prescriptive paradigms for care management, which embodied predictive abilities that went beyond rule-based stratification of member-specific risks. The goal of such a prescriptive risk stratification paradigm is to target member outreach, as well as offer timely and effective care management to high-risk members. Some specific cohorts of interest, concerning prescriptive care management, included substance abuse, maternity, neonatal ICU care, and sudden death investigation alerts.

However, the resulting insights were not robust enough to accomplish optimal managed care or predict deaths amongst members that were at risk of substance abuse. This health plan wanted to prescribe care management practices in a manner that anticipated and therefore averted otherwise unanticipated deaths amongst members, especially owing to opioid abuse.

The Solution

SDLC Partners helped the health plan bring all Medicaid analytics for this state inhouse, as well as create advanced data analytics capabilities for predicting high-risk health events.

We built statistical models for stratifying member-specific risk in Medicaid markets, which were embodied as artificial intelligence (AI) modules, establishing member-specific risk scores. We helped structure the internal team and resources to facilitate robust and scalable data-science on Medicaid data like enrollment, claims, case, and task data.

Through collaboration between our respective data science team and their population health management team, the client was offered an opportunity to upgrade their risk stratification approach from a business-rules–based member identification paradigm to a data science–driven prescriptive model to manage care effectively.

Now, the client can leverage historical claims, enrollment, and other member data in a manner that surpasses basic ICD10–based grouping. We’ve enabled their use of robust predictive analytics that can direct care management effort and investment towards saving lives and improving the health of high-risk members.

The Results

The new, inhouse predictive analytics and risk stratification capabilities are incredibly successful. Our data modeling was able to predict 87 percent of previously unanticipated member deaths in 2019, whereas prior risk stratification approaches were not able to identify these events nor intervene in time. This amounts to 73 out of 84 deaths that could have been prevented over the scope of a year.

In addition to a more sophisticated prediction of unanticipated deaths, our work in opioid risk modeling revealed key drivers of opioid dependence and death.

Our data modeling was able to predict 87 percent of unanticipated member deaths, representing 73 members whose death could have been averted based on timely care management or intervention.

While principal diagnosis ICD10 code-based risk stratification was a strong determinant of opioid abuse, and correlated with member personas that died in an untimely fashion, a strong predictor of opioid abuse was found to be the prescribing primary care physician. By working with physicians who have tendencies to prescribe opioids more willingly, the payer can potentially make a positive impact on high-risk members that, in turn, may be at risk of an untimely death.

These new predictive analytic capabilities may enable interventions before a sudden death event occurs, but may also favorably impact the future population of members at risk for sudden death due to opioid addiction.

AI may have several applications to a payer, including modeling care costs, inpatient admission length of stay, etc. from the vast reserve of historical data, offering an opportunity to create operational efficiencies through strategic decision making.

If your organization wants to start predicting critical events that affect your customers and company, SDLC Partners can help. Contact us to discuss where we could take your data science capabilities.

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