Evaluating the Impact of Proactive Care Management with IDStrat

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Executive Summary

This purpose of this study is to quantify potential cost savings and member care improvements as a result of engagement through BlueCross BlueShield of Tennessee's (BCBST) Identification and Stratification (IDStrat) process. Commercial members engaged in clinical management that were identified through IDStrat were compared to commercial members identified through other means across several metrics including per-member, per-month (PMPM) cost and physician visits. Members identified by IDStrat experienced a statistically significant 7% greater reduction in costs after being engaged when compared with those identified by other methods. Members identified by IDStrat also experienced a significant reduction in emergency room visits after engagement. Future work aims to study the impact of wait time on cost savings.

Introduction

Proper identification and management of members with chronic health conditions can improve their quality of life and result in significant long-term cost reductions, as chronic conditions account for a significant portion of dollars spent on health care. For the calendar year 2018, BlueCross BlueShield of Tennessee's (BCBST) members with at least one avoidable chronic condition[1] accounted for 67% of total claims paid. These results are similar to what the Health Care Transformation Task Force found in 2015, that 65.2% of the health care spend was attributed to 10% of the population [1].

While the overall value of care management (CM) programs has been previously researched [1], less work has been done to compare the differences between purely reactive identification processes and processes that incorporate proactive and preventive care components. In purely reactive processes, members are identified for CM only after having a significant health care event, or having a condition reach a specific level of severity. Conversely, proactive identification processes attempt to address member health concerns earlier, before conditions become severe. Early detection and management may prevent the development of complications altogether or reduce the severity of chronic conditions over time, leading to lower long-term health care costs and better population health. BCBST built and utilizes an identification process that incorporates proactive and reactive components, known as the Identification and Stratification process, or IDStrat.

The IDStrat system identifies the best health intervention and management program designed to support better health outcomes for members while affording employers potential savings through timely and proactive engagement strategies. Created in 2014, IDStrat is a proprietary member-centric process which identifies and prioritizes members for CM resources by calculating a composite risk score encompassing all members' available health information and placing members into appropriate outreach queues. Through this process, BCBST continuously monitors population health and takes a personalized approach, with the goal of improved health outcomes and maximized member engagement. The IDStrat process enables a flexible delivery model to meet the unique needs of each individual. BCBST is industry-recognized and has won several awards for outstanding use of data and technology including:

- 2015 *Health Data Management*'s Analytics All-Stars
- 2015 Information Builders' Customer of Distinction Award
- 2015 Teradata Epic Award
- 2016 *ComputerWorld* Top 100 Technology Leader Award
- 2016 Digital Edge25 Award
- 2016 CIO 100 Honoree – Innovative use of IT to Deliver Measureable Business Value
- 2017 *ComputerWorld* Digital Edge50 Award

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[1] Defined as having a diagnosis from claims for type II diabetes, hypertension, chronic kidney failure, ischemic heart disease, hyperlipidemia, COPD, congestive heart failure, or alcoholic liver disease.

The innovative approach of the IDStrat process is evident. Since IDStrat also scores members who are identified through reactive means, one can conduct research establishing the effectiveness of a proactive engagement program relative to a purely reactive engagement program by comparing the outcomes of members engaged through the different, mutually exclusive methods. The objective of this white paper is to quantify outcomes for members' health, as well as monetary returns of such outcomes, as a direct result of identification by the IDStrat process.

The IDStrat Process

The IDStrat process is driven by internal, proprietary customized metrics and complex algorithms that run weekly to ensure members with the highest needs that are stratified to the appropriate clinical program receive a personalized, targeted engagement. The process for identification of members includes compiling current and historical data such as eligibility data, medical claims, behavioral health claims, pharmacy claims, biometrics and lab results, and health risk assessments (HRA). Analyzing all available data sources allows compilation of a holistic view of members' health status, and condition(s) driving cost and risk, for BCBST clinicians to use when managing a member's care.
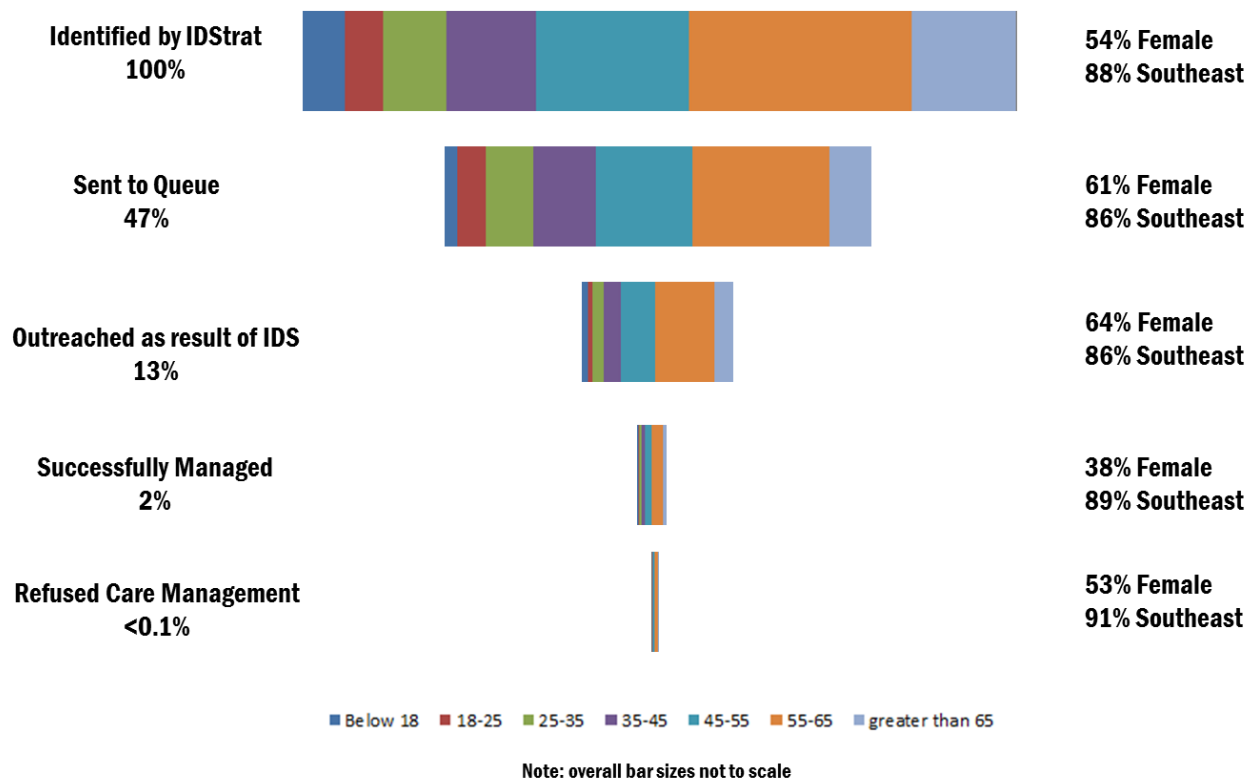
Each member is assigned a stratification score using a proprietary algorithm that utilizes weighted custom metrics. This results in a composite score that encompasses both the member's health and the business' priorities, allowing those members with the greatest needs to be addressed first. IDStrat has additional rules that ensure stratified members are eligible for participation in the specific clinical programs, and selects the communication method that maximizes the impact of a given member intervention.

Members identified with the highest scores are candidates for the most intensive programs. BCBST care managers provide these members with frequent communication and holistic support that includes the member, their support system, and their provider. Members with lower risk, are identified for engagement with a health coach (if eligible for Lifestyle Health Coaching), or sent a personalized message via print, online, email, or phone.

IDStrat Continuum

Members can be identified for multiple recommended programs, however, the recommendations are ranked by priority and the member is only queued for one program at a time. Once identified for a program, the member's identification information can be loaded to queue for the appropriate intervention, provided the member is not excluded from CM for reasons such as opting-out. Once in the respective queue, an outreach attempt is made to engage members in preventative programs by opening cases for the member. The number of eligible members processed at each stage in the IDStrat Continuum for the study period is shown in Figure 1, below.

Figure 1: Number of Members Processed at Each Stage in Study Period

Stage		Demographics
Identified by IDStrat	100%	54% Female / 88% Southeast
Sent to Queue	47%	61% Female / 86% Southeast
Outreached as result of IDS	13%	64% Female / 86% Southeast
Successfully Managed	2%	38% Female / 89% Southeast
Refused Care Management	<0.1%	53% Female / 91% Southeast

Legend: Below 18 | 18-25 | 25-35 | 35-45 | 45-55 | 55-65 | greater than 65

Note: overall bar sizes not to scale

Cohort Definitions

This study begins with members who were eligible for coverage for any time interval within the 22 month period between July 2016 and April 2018. The study is additionally limited to adult (age > 18) members participating in health care plans provided to BCBST's commercial clients (employer groups offering health care benefits to their employees through BCBST).

Because the value of IDStrat is the focus of this particular research, and not that of CM in general, the existence of CM is taken as a given, and the comparison lies between groups engaged as a result of identification through IDStrat and those engaged through other means. At BCBST, members may also be referred to CM through more reactive means, such as post-discharge programs designed to ensure discharge instructions are followed with the goal of reducing readmissions. These other CM avenues provide a means for comparison of the IDStrat process, with the idea that IDStrat allows for a more proactive approach to outreach, over purely reactive programs. In evaluating the impact of IDStrat, the data is separated into two cohorts: those successfully engaged in a program with a referral outside IDStrat versus those members engaged as a result of being identified through the IDStrat process.

Of total members in the study period, a total of 9,240 met the study criteria: engaged from either an IDStrat referral (Cohort 1) or engaged as a result of reactive program referrals (RPR) (Cohort 2). For a graphical interpretation, the "Successfully Managed" tier of Figure 1 constitutes Cohort 1, less the members less than 18 years of age. The breakdown of gender, age and geographic region for each cohort are found in Figure 2.

Figure 2: Percentage of Total Number of Members in Cohort 1 (Top) and Cohort 2 (Bottom) by Gender, Age, and Region (Left to Right).
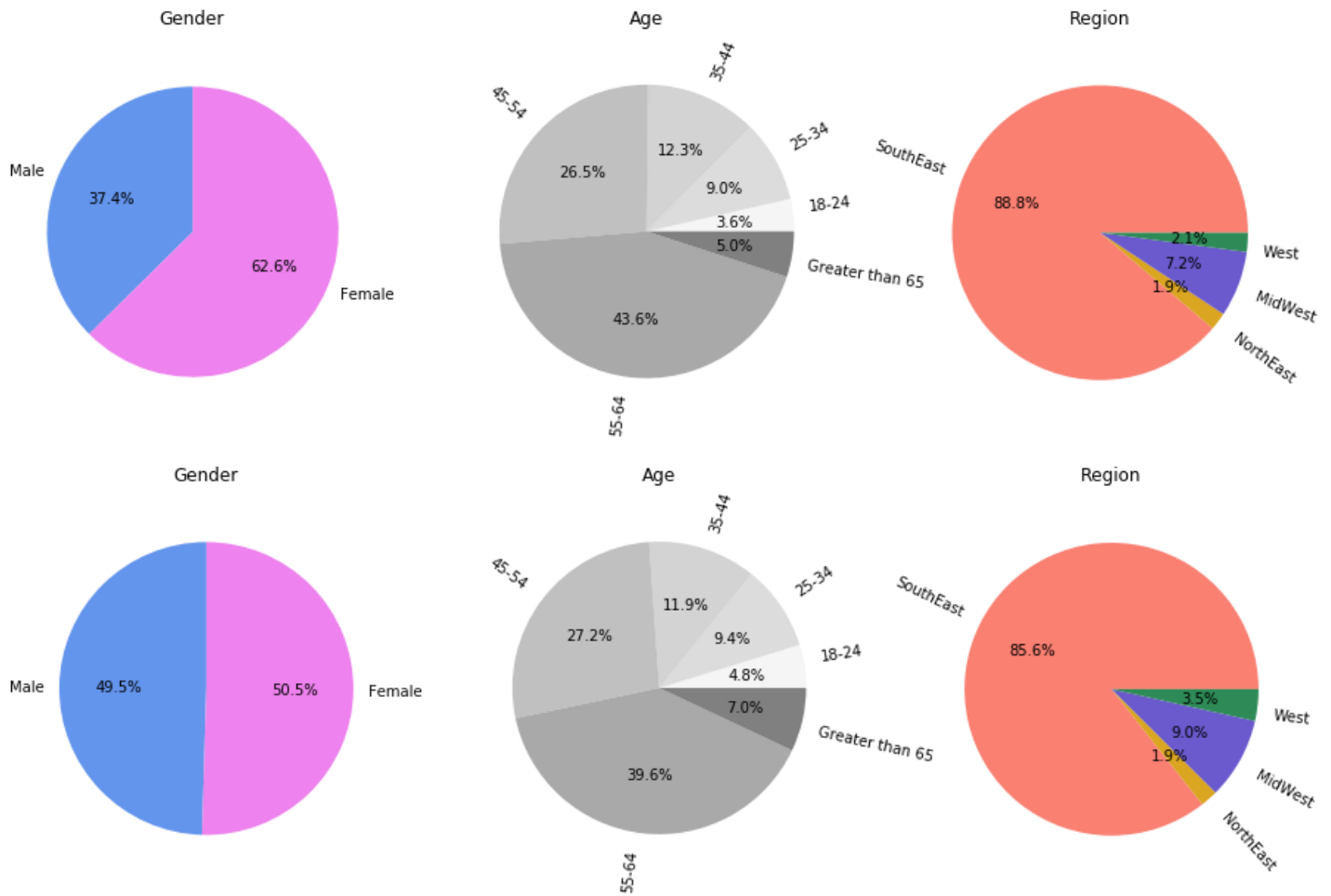
Methods and Data

The primary focus of this research is to quantify the benefits of the IDStrat process. As such, costs are one way in which impacts can be seen. While there are many ways in which one can subdivide cost data, this research seeks to take the member as a whole unit, and therefore includes total spend as a metric. This and other data taken from BCBST claims data with dates of service occurring between July 01, 2016, and April 30, 2018, and includes both medical (doctor, institution, and durable medical equipment) and pharmacy data. In addition to cost data, utilization is a metric which is of interest to business customers: CM, even if there is not a cost difference, may influence how members take advantage of their benefits. To examine differences in utilization, total counts of members' visits to a primary-care physician (PCP), an emergency department (ER), or specialist provider are analyzed as well.

To ensure that estimated effects more closely reflect reality and are as generalizable as possible, several controlling factors are included in the estimations. Demographic data such as the member's age (binned as seen in Figure 2), gender, and geographic region are included. The member's overall health at the point of engagement can have an impact. That is, members with overall poorer health are likely to have higher initial overall costs than those without. While one cannot include prior cost as a controlling variable, the IDStrat risk score is a composite of the member's health, and can act as a

proxy for the same. Therefore, the member's IDStrat risk score at the time of engagement is included as a controlling variable.

However, there are challenges inherent to health care data, requiring significant normalizations and transformations to make results comparable. Members' health insurance is often tied to their place of employment, and changing jobs may result in a change or loss of coverage. This is significant in that utilization rates are different based on how long a member has been eligible: a person with $3000 in claims with a full year's worth of eligibility is quite different from one who accrues the same amount while they are only eligible for a month. One method of addressing this issue is to ensure constant eligibility for any member included in a study. However, given that this study focuses on CM, it is theorized that members with employment instability may benefit more from early condition identification and CM as a result of the IDStrat process. Therefore, it is not prudent to filter the study population based on consistent eligibility. To address this issue, cost and utilization metrics are analyzed and reported on a per-member-per-month (PMPM) basis: costs and utilization are normalized based on the member's number of eligible days during the study period and scaled to a per-month basis.

Health care research must also allow for proper scope of effects. Members are likely to see greater cost changes as time after CM increases. To make a more level playing field for cohort comparisons, post-engagement cost estimates are limited to those costs accrued within six months of the member's first date of engagement, before and after. The difference between the two is taken at a member level to show the impact of CM on the member's costs from each engagement method.

Because the two cohorts are generally managed at different points, the RPR cohort being identified only after the presentation of serious conditions or the occurrence of inpatient stays, while IDStrat attempts to identify members before such events occur, there are marked differences in each cohort's gross costs. This makes a simple difference-in-dollars comparison between the two cohorts uninformative. To allow for a better analysis, the differences in costs are normalized by the cohort's average pre- and post-engagement costs, with results reported in percent difference terms.

Health care data tends to be skewed heavily in favor of low costs, with most members having relatively few claims. However, there are significant outliers which may bias data. To address this concern and reach a more conservative, more broadly applicable set of results, the data is winsorized. That is, cost and utilization metrics are statistically analyzed, and those values which fall outside of two standard deviations of the mean are capped at that level.

With the previous considerations taken collectively, this research analyzes the difference in six-month pre- and post-engagement PMPM costs/utilizations as a percent of the cohort's average costs/utilizations, comparing those identified through the IDStrat process to those identified through RPR across the metrics of total claims amounts paid, ER visits, specialist visits, and PCP visits. Data was manipulated using SQLite 3, with results estimated using ordinary least squares in Python 3.6.[2]

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[2] Packages included Numpy, Pandas, MatPlotLib, and StatsModels

Results

Table 1: Results of OLS Regressions

Variables	Engaged by IDSTRAT Coefficient (Δ % PMPM)	P-Value	IDSTRAT Pre-Eng Population Mean (PMPM)	IDSTRAT Post-Eng Population Mean (PMPM)	RPR Pre-Eng Population Mean (PMPM)	RPR Post-Eng Population Mean (PMPM)
Total Cost (winsorized)	-6.64	<0.001	$4530.85	$3098.07	$5594.19	$4852.98
PCP Visits	0. 06	0.987	0.39	0.31	0.35	0.31
ER Visits	-10.60	<0.001	0.15	0.07	0.09	0.07
Specialist Visits	-1.20	0.408	0.89	0.73	1.1	0.97

The use of the IDStrat process is significant and noticeable, showing impacts in two key areas: greater reductions in overall member costs and ER usage. As shown in Table 1, members experienced a 6.6% greater reduction in cost than those engaged by other means. This equates to $100.30 savings on a PMPM basis. Expanding these results to a broader population could result in hundreds of thousands of dollars saved. Given that the data has been winsorized to correct for outliers, there will be high cost claimant situations where these savings may be higher than the percentage reported. This is likely caused by the proactive nature of IDStrat, with CM nurses covering much of the same material that a doctor would cover regarding medication adherence, lifestyle habit changes, and follow-up care. The entire IDStrat process, and CM in general, is founded on the principle that preventive care improves health and saves costs. The results show that the use of a proactive process like IDStrat more effectively decreases costs relative to other means of engagement.

The results show a member managed through an IDStrat referral is associated with a 10% decline in ER visits. The drop in ER visits is highly desirable, given the high costs associated with and burden placed on the system by non-emergent or avoidable ER visits. Helping members seek care sooner, from a PCP or other setting, can also benefit their health outcomes. There is less desire to see a decrease in PCP and specialist visits: using those less expensive avenues more frequently may lower long-term costs while keeping a better eye on member health. The members managed as a result of IDStrat referral do not have a statistically significant impact on the use of PCPs or specialists, relative to other means of engagement. This suggests that calls made by CM nurses may be acting as a partial substitute for future emergency room visits, providing proactive treatment solutions before the conditions become serious enough such that an emergency room visit is necessary. While there is no definitive proof, one may also surmise that member communication with CM nurses as a result of referral through the IDStrat process may provide proper scope to members, informing them about alternative treatment methods for use in non-emergent situations.

Conclusion

This study compared members engaged in care management programs as a result of the IDStrat process to those engaged through other means. The chief difference between the two is that IDStrat incorporates both preventive and proactive components versus a purely reactive program. The parameters chosen for comparison were percent change in cost pre-engagement versus post-engagement PMPM, as well as number of PMPM PCP visits, ER visits, and specialist visits before/after engagement. Ordinary least squares regression was performed, and a 6.6% greater reduction in cost was found by members engaged by IDStrat, which equates to approximately $100 PMPM savings. Changes in the number of PCP visits and specialized physician visits were not found to be significantly impacted by the use of the IDStrat process. However, members referred through IDStrat were found to have a 10% greater reduction in ER visits. The results show a clear value in the use of proactive over purely reactive care management referral processes.

Sources

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